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UK Renal Registry 19th Annual Report: Chapter 1 UK RRT Adult Incidence in 2015: National and Centre-specific Analyses

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Keywords

Acceptance rates · Clinical Commissioning Group · Comorbidity · Diabetes · Dialysis · End stage renal disease · End stage renal failure · Established renal failure · Glomerulonephritis · Haemodialysis · Incidence · Peritoneal dialysis · Registries · Renal replacement therapy · Transplantation · Treatment modality · Acute haemodialysis

Summary

- The incidence rate in the UK increased from 115 per million population (pmp) in 2014 to 120 pmp in 2015 reflecting renal replacement therapy (RRT) initiation for 7,814 new patients.
- There was an increase in incidence rate from 2014 to 2015 in each of the four countries of the UK.
- The median age of all incident patients was 64.4 years but this was highly dependent on ethnicity (66.3 for White incident patients; 59.8 for non-White patients).
- Diabetic renal disease remained the single most common cause of renal failure (27.5%).
- By 90 days, 67.3% of patients were on haemodialysis (HD), 18.4% on peritoneal dialysis (PD), 8.6% had a functioning transplant (Tx) and 5.7% had died or stopped treatment.
- The percentage of RRT patients at 90 days who had a functioning transplant varied between centres from 0% to 35% (between 7% and 35% for transplanting centres and between 0% and 13% for non-transplanting centres).
- The mean eGFR at the start of RRT was 8.5ml/min/1.73 m^2 similar to the previous five years.
- Late presentation (<90 days) fell from 23.9% in 2006 to 16.4% in 2015.

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Introduction

This chapter contains analyses of adult patients starting renal replacement therapy (RRT) in the UK in 2015. The methodology and results for these analyses are in four separate sections: geographical variations in incidence rates; the demographic and clinical characteristics of patients starting RRT; analyses of late presentation and delayed referral; and new for this report, acute haemodialysis sessions.

The data were analysed using SAS 9.3.

Definitions

The definition of incident patients is given in detail in appendix B: Definitions and Analysis Criteria (www.renalreg.org). In brief, it is all patients over 18 who commenced RRT in the UK in 2015 and who did not recover renal function within 90 days. Note that this does not include those with a failed renal transplant who returned to dialysis.

Differences may be seen in the 2010 to 2014 numbers now quoted when compared with previous publications because of retrospective updating of data in collaboration with renal centres. Also, for patients who were initially thought to have acute renal failure, subsequent chronic RRT codes may have been received in the following year's data, allowing the UK Renal Registrty (UKRR) to backdate the start date of RRT.

Where applicable and possible, pre-emptive transplant patients were allocated to their work up centre rather than their transplant centre. However, this was not possible for all such patients and consequently some patients probably remain incorrectly allocated to the transplanting centre. The term established renal failure (ERF) as used within this chapter is synonymous with the terms end stage renal failure/disease (ESRF or ESRD).

UK Renal Registry coverage

The UKRR received individual patient level data from 70 adult renal centres in the UK (five centres in Wales, five in Northern Ireland, nine in Scotland, 51 in England). Cambridge renal centre (Addenbrooke's) was unable to submit 2015 data at patient level prior to the UKRR closing the database and only provided summary numbers of patients starting RRT by treatment modality. This centre is therefore excluded from most analyses in this chapter. Data from centres in Scotland were obtained from the Scottish Renal Registry. Data on children and young adults can be found in chapter 4: Demography of the UK Paediatric Renal Replacement Therapy population in 2015.

Renal Association Guidelines

Table 1.1 lists the relevant items from the Renal Association Guidelines on the Planning, Initiating and Withdrawal of Renal Replacement Therapy [1]. Many of the audit measures are not currently reported by the UKRR; mainly due to a high proportion of incomplete data or because the relevant data item(s) is not currently within the specified UKRR dataset. Over time it is hoped to work with the renal community to improve reporting across the range of these measures.

1. Geographical variation in incidence rates

Introduction

Over the years there have been wide variations in incidence rates between renal centres. Equity of access to RRT is an important aim but hard to assess as the need for RRT depends on many variables including medical, social and demographic factors such as underlying conditions, age, gender, social deprivation and ethnicity. Thus, comparison of crude incidence rates by geographical area can be misleading. This year's report again uses age and gender standardisation of Clinical Commissioning Group/Health Board (CCG/HB) rates as well as showing crude rates. It also gives the ethnic minority percentage for each area as this influences incidence rates.

Methods

CCG/HB level

Crude incidence rates per million population (pmp) and age/gender standardised incidence ratios were calculated as detailed in appendix D: Methodology used for Analyses (www.renalreg.org).

For the calculation of rates and standardised ratios by CCG/HB, for which patient-level information is needed for age/gender standardisation, the Cambridge data from 2014 were used in place of the missing 2015 data. This is obviously a gross approximation but was felt to be a better approach than excluding a number of CCGs from the analyses. As the main analysis is based on six years of data the effect of this approximation will be not as great as it would be for a one year analysis. Those CCGs that were at least in part (>10%) covered by Cambridge were identified using 2010–14 data and flagged in table 1.3. For three CCGs with between 10% and 65% of the RRT starters being incident patients of Cambridge, rates/ratios for 2015 are shown but the values are flagged. For CCGs where most patients (>65%) are thought to be incident patients of Cambridge, the

Table 1.1. Summary of Renal Association (RA) audit measures relevant to RRT incidence

RA audit measure	Reported	Reason for non-inclusion/comment
Percentage of patients commencing RRT referred <3 months and <12 months before date of starting RRT	Yes	UKRR dataset allows reporting on time elapsed between date first seen and start of RRT
Percentage of incident RRT patients followed up for >3 months in dedicated pre-dialysis or low clearance clinic	No	Not in UKRR dataset
Proportion of incident patients on UK transplant waiting list at RRT initiation	No	Not in UKRR dataset
Proportion of incident RRT patients transplanted pre-emptively from living donors and cadaveric donors	Yes	
Mean eGFR at time of pre-emptive transplantation	No	Numbers with data were small, the UKRR will consider doing a combined years analysis in future reports
Proportion of incident patients commencing peritoneal or home haemodialysis	Partly	See appendix F for proportion starting on PD and table 1.12 for proportion on PD at 90 days. Not reported for home HD due to small numbers.
Proportion of patients who have undergone a formal education programme prior to initiation of RRT	No	Not in UKRR dataset
Proportion of haemodialysis patients who report that they have been offered a choice of RRT modality	No	Not in UKRR dataset
Proportion of patients who have initiated dialysis in an unplanned fashion who have undergone formal education by 3 months	No	Not in UKRR dataset
Evidence of formal continuing education programme for patients on dialysis	No	Not in UKRR dataset
Proportion of incident patients known to nephrology services for 3 months or more prior to initiation (planned initiation)	Yes	
Proportion of planned initiations with established access or pre-emptive transplantation	Yes	See appendix F for proportion of incident patients having pre–emptive transplantation, and see chapter 12 for dialysis access
Inpatient/outpatient status of planned initiations	No	Not in UKRR dataset
Mean eGFR at start of renal replacement therapy	Partly	Reported but not at centre level due to poor data completeness

2015 rates/ratios have been blanked as they are based in large part on 2014 data.

For Sheffield, 55 of their 151 incident patients for 2015 were not submitted. Here the data were used as received but the relevant CCGs are again flagged/blanked as above as their rates/ratios will be underestimates.

Centre level

As mentioned previously, Cambridge was unable to submit 2015 data at patient level but provided the UKRR with information allowing their incident number for 2015 to be estimated and this estimate has been used in tables 1.2 and 1.4 but not elsewhere in this chapter. A number of other centres have informed the UKRR of corrections to the data they submitted and these have been applied to tables 1.2 and 1.4 but not elsewhere in this chapter. These are detailed in the footnotes to table 1.4. The largest of these was Sheffield with approximately a third of the 2015 incident patients not submitted. Therefore the results for Sheffield are likely not representative. In particular, all those submitted were early presenters (see the third section of this chapter).

For the methodology used to estimate catchment populations see appendix E: Methodology for Estimating Catchment Populations (www.renalreg.org).

Results

Overall

In 2015, the number of adult patients starting RRT in the UK was 7,814 equating to an incidence rate of 120 pmp (table 1.2), compared with 115 pmp in 2014.

Table 1.2. Number of new adult patients starting RRT in the UK in 2015

	England	N Ireland	Scotland	Wales	UK
Number starting RRT	6,580	221	623[b]	390	**7,814**
Total estimated population mid-2015 (millions)[a]	54.8	1.9	5.4	3.1	**65.1**
Incidence rate (pmp)	120	119	116[b]	126	**120**
(95% CI)	(117–123)	(104–135)	(107–125)	(113–138)	**(117–123)**

[a]Data from the Office for National Statistics, National Records of Scotland and the Northern Ireland Statistics and Research Agency – based on the 2011 census

[b]The number starting RRT, and hence the RRT incidence rate, published in the Scottish Renal Registry report for the same period is slightly lower at 619 (115 pmp). This is explained by differences in the definition of incident RRT patients between the two registries

Wales remained the country with the highest incidence rate (126 pmp – figure 1.1). There continued to be very marked gender differences in incidence rates which were 152 pmp (95% CI 148–156) in males and 89 pmp (95% CI 86–92) in females.

The denominators used for these rates were the entire population i.e. they include under 18 year olds. When incident patients aged under 18 were included in the numerator the UK rate was 122 pmp.

CCG/HB level

Table 1.3 shows incidence rates and standardised incidence ratios for CCG/HBs. There were wide variations between areas. From the analysis using all six years, out of a total of 235 areas, 48 areas had notably high ratios and 71 notably low. The standardised incidence ratios ranged from 0.63 to 2.64 (IQR 0.82, 1.10). The crude rates ranged from 71 pmp to 205 pmp (IQR 93 pmp, 117 pmp). As previously reported, urban areas with high percentages of non-White residents tended to have high incidence rates. Figure 1.2 shows the strong positive correlation between the standardised incidence ratio and the percentage of the CCG/HB population that was non-White.

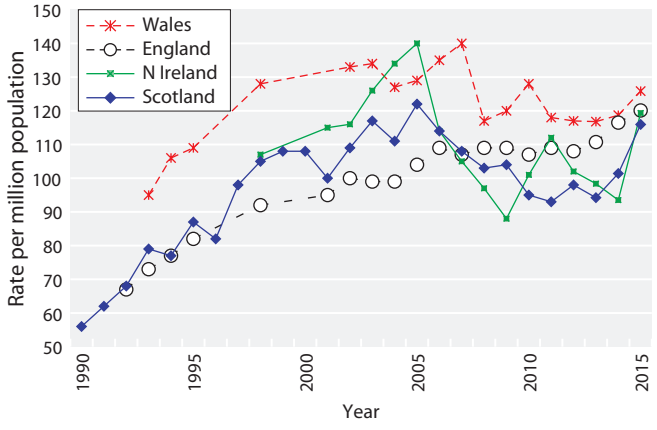

Fig. 1.1. RRT incidence rates in the countries of the UK 1990–2015

Centre level

The number of new patients starting RRT at each renal centre from 2010 to 2015 is shown in table 1.4. The table also shows centre level incidence rates (per million population) for 2015. For most centres there was a lot of variability in the numbers of incident patients from one year to the next making it hard to see any underlying trend. Some centres have had an increase in new patients over time and others have fallen. The variation may reflect chance fluctuation, the introduction of new centres, changes in catchment populations or in completeness of reporting. Variation over time may also be due to changing incidence of established renal failure (increases in underlying disease prevalence, survival from comorbid conditions and recognition of ERF), changes to treatment thresholds such as a greater emphasis on pre-emptive transplantation or the introduction of conservative care programmes. Analysis of CKD stage 5 patients not yet on RRT is required to explore some of these underlying mechanisms for centre level incidence rate changes.

There was an increase of 18.8% in new patients for England between 2010 and 2015. Across all four countries the change between 2010 and 2015 was an increase of 18.2%.

2. Demographics and clinical characteristics of patients starting RRT

Methods

Age, gender, primary renal disease, ethnic origin and treatment modality were examined for patients starting RRT. A mixture of old and new (2012) ERA-EDTA codes for primary diagnoses [2] were received from centres. The split was about 30:70 for 2015 incident patients. For those people without an old code, new

Table 1.3. Crude adult incidence rates (pmp) and age/gender standardised incidence ratios 2010–2015

CCG/HB – CCG in England, Health and Social Care Areas in Northern Ireland, Local Health Boards in Wales and Health Boards in Scotland
O/E – standardised incidence ratio
LCL – lower 95% confidence limit
UCL – upper 95% confidence limit
pmp – per million population
[a] – per year
Areas with notably low incidence ratios over six years are italicised in greyed areas, those with notably high incidence ratios over six years are bold in greyed areas – for the full methodology see appendix D
Confidence intervals are not given for the crude rates per million population but figures D1 and D2 in appendix D can be used to determine if a CCG/HB falls within the 95% confidence interval around the national average rate
Mid-2015 population data from the Office for National Statistics, National Records of Scotland and the Northern Ireland Statistics and Research Agency – based on the 2011 census
% non-White – percentage of the CCG/HB population that is non-White, from 2011 census
[b]CCGs where at least 10% of the incident RRT population were incident patients of Cambridge/Sheffield renal centres. In these CCGs the rates/ratios are approximated/underestimated. In the CCGs which were >65% covered by Cambridge/Sheffield, the rates for 2015 have been blanked (see methods for details)

									2015	2010–2015				
UK area	CCG/HB	Total population (2015)	2010 O/E	2011 O/E	2012 O/E	2013 O/E	2014 O/E	O/E	Crude rate pmp	O/E	LCL	UCL	Crude rate pmp[a]	% non-White
Cheshire, Warrington and Wirral	*NHS Eastern Cheshire*	*196,500*	*0.86*	*0.75*	*0.70*	*0.64*	*0.72*	*0.84*	*117*	*0.75*	*0.63*	*0.91*	*96*	*3.7*
	NHS South Cheshire	178,900	0.71	0.74	0.58	1.14	1.08	0.82	106	0.85	0.70	1.03	101	2.9
	NHS Vale Royal	*102,900*	*0.81*	*0.88*	*0.78*	*1.26*	*0.16*	*0.38*	*49*	*0.70*	*0.53*	*0.92*	*81*	*2.1*
	NHS Warrington	*207,700*	*0.61*	*0.45*	*0.85*	*0.70*	*0.99*	*0.76*	*91*	*0.73*	*0.60*	*0.89*	*81*	*4.1*
	NHS West Cheshire	231,000	1.16	1.05	0.85	0.98	0.82	0.79	104	0.94	0.80	1.10	113	2.8
	NHS Wirral	*320,900*	*0.91*	*0.91*	*0.63*	*0.98*	*0.68*	*1.09*	*140*	*0.87*	*0.75*	*1.00*	*102*	*3.0*
Durham, Darlington and Tees	NHS Darlington	105,400	0.98	0.86	1.28	0.83	0.55	1.14	142	0.94	0.74	1.19	108	3.8
	NHS Durham Dales, Easington and Sedgefield	274,000	1.05	1.11	0.85	1.01	0.93	1.01	131	0.99	0.86	1.14	119	1.2
	NHS Hartlepool and Stockton-on-Tees	287,300	0.82	0.93	1.05	0.89	0.97	0.70	84	0.89	0.76	1.03	97	4.4
	NHS North Durham	*245,700*	*0.50*	*0.55*	*1.25*	*0.64*	*0.51*	*0.72*	*90*	*0.69*	*0.58*	*0.83*	*79*	*2.5*
	NHS South Tees	274,800	1.09	0.95	0.98	1.22	0.81	1.63	197	1.12	0.98	1.29	124	6.7
Greater Manchester	NHS Bolton	281,600	1.42	0.95	0.91	0.92	0.68	1.09	124	0.99	0.85	1.15	104	18.1
	NHS Bury	187,900	0.69	0.72	1.37	0.79	1.17	0.99	117	0.96	0.80	1.15	104	10.8
	NHS Central Manchester	**188,900**	**2.08**	**1.11**	**1.69**	**2.27**	**2.24**	**2.24**	**164**	**1.95**	**1.66**	**2.29**	**132**	**48.0**
	NHS Heywood, Middleton & Rochdale	214,200	0.78	1.23	1.27	1.24	1.34	0.96	107	1.14	0.97	1.34	117	18.3
	NHS North Manchester	**178,700**	**0.92**	**1.48**	**1.48**	**1.44**	**1.44**	**1.99**	**168**	**1.47**	**1.23**	**1.76**	**115**	**30.8**
	NHS Oldham	230,800	0.84	1.04	0.72	0.96	1.28	1.12	121	1.00	0.84	1.18	100	22.5
	NHS Salford	245,600	1.36	0.74	0.87	1.10	0.89	0.78	81	0.95	0.80	1.13	92	9.9
	NHS South Manchester	162,700	1.02	1.20	1.20	1.25	0.91	1.41	129	1.17	0.96	1.42	98	19.6
	NHS Stockport	*288,700*	*0.94*	*0.88*	*0.65*	*0.54*	*0.89*	*0.77*	*97*	*0.78*	*0.66*	*0.91*	*89*	*7.9*
	NHS Tameside and Glossop	254,900	0.93	0.98	0.60	1.09	0.82	0.99	118	0.90	0.77	1.06	98	8.2
	NHS Trafford	233,300	1.30	0.50	1.16	1.13	0.84	0.85	99	0.96	0.81	1.13	102	14.5
	NHS Wigan Borough	*322,000*	*0.74*	*1.01*	*0.77*	*0.72*	*0.92*	*0.81*	*99*	*0.83*	*0.72*	*0.96*	*93*	*2.7*
Lancashire	NHS Blackburn with Darwen	146,800	0.92	1.41	1.24	0.93	0.81	1.63	170	1.16	0.95	1.42	111	30.8
	NHS Blackpool	139,600	0.66	0.89	1.51	1.17	1.16	0.90	115	1.05	0.87	1.27	123	3.3
	NHS Chorley and South Ribble	172,500	0.55	0.96	0.74	1.28	0.87	1.12	139	0.93	0.77	1.12	105	2.9
	NHS East Lancashire	*374,200*	*0.75*	*0.93*	*0.55*	*0.87*	*1.08*	*0.66*	*80*	*0.81*	*0.70*	*0.93*	*90*	*11.9*
	NHS Fylde & Wyre	*167,900*	*0.70*	*0.55*	*0.77*	*0.79*	*0.96*	*0.85*	*125*	*0.77*	*0.64*	*0.94*	*105*	*2.1*
	NHS Greater Preston	*202,800*	*0.55*	*0.53*	*1.01*	*0.85*	*0.93*	*1.03*	*118*	*0.83*	*0.68*	*1.00*	*87*	*14.7*
	NHS Lancashire North	*161,500*	*0.58*	*1.00*	*0.67*	*0.60*	*0.61*	*0.64*	*81*	*0.68*	*0.54*	*0.85*	*78*	*4.0*
	NHS West Lancashire	112,700	0.56	0.85	0.77	0.67	0.64	1.30	169	0.81	0.63	1.03	96	1.9

Table 1.3. Continued

UK area	CCG/HB	Total population (2015)	2010 O/E	2011 O/E	2012 O/E	2013 O/E	2014 O/E	2015 O/E	2015 Crude rate pmp	2010–2015 O/E	2010–2015 LCL	2010–2015 UCL	2010–2015 Crude rate pmp[a]	% non-White
Merseyside	NHS Halton	126,500	0.87	1.53	0.98	0.96	1.04	1.41	166	1.14	0.93	1.39	123	2.2
	NHS Knowsley	147,200	0.89	1.12	1.31	0.70	1.69	0.87	102	1.10	0.91	1.33	118	2.8
	NHS Liverpool	**478,600**	**0.87**	**1.11**	**1.21**	**1.01**	**1.20**	**1.30**	**138**	**1.12**	**1.01**	**1.25**	**110**	**11.1**
	NHS South Sefton	**158,600**	**1.33**	**1.40**	**1.05**	**1.29**	**1.28**	**1.04**	**132**	**1.23**	**1.04**	**1.45**	**144**	**2.2**
	NHS Southport and Formby	115,100	0.63	0.95	0.74	1.38	0.81	0.66	96	0.86	0.69	1.07	114	3.1
	NHS St Helens	177,600	0.93	0.75	0.89	0.63	0.96	0.97	124	0.86	0.71	1.04	100	2.0
Cumbria, Northumberland, Tyne and Wear	*NHS Cumbria*	*504,100*	*0.75*	*0.58*	*0.62*	*0.92*	*0.79*	*0.82*	*115*	*0.75*	*0.67*	*0.84*	*96*	*1.5*
	NHS Newcastle Gateshead	*493,900*	*0.79*	*0.82*	*0.84*	*0.62*	*0.85*	*1.06*	*117*	*0.83*	*0.74*	*0.94*	*85*	*10.1*
	NHS North Tyneside	*202,500*	*0.92*	*0.67*	*0.88*	*0.95*	*0.65*	*0.75*	*94*	*0.80*	*0.67*	*0.96*	*92*	*3.4*
	NHS Northumberland	*315,300*	*0.61*	*0.82*	*0.76*	*0.62*	*0.94*	*0.63*	*89*	*0.73*	*0.63*	*0.85*	*94*	*1.6*
	NHS South Tyneside	*148,700*	*0.75*	*1.09*	*0.54*	*0.76*	*0.61*	*0.96*	*121*	*0.78*	*0.63*	*0.97*	*91*	*4.1*
	NHS Sunderland	277,200	1.06	0.76	0.89	0.61	0.91	1.00	123	0.87	0.75	1.02	99	4.1
North Yorkshire and Humber	*NHS East Riding of Yorkshire*	*315,100*	*0.70*	*0.73*	*0.69*	*0.46*	*0.73*	*0.84*	*121*	*0.69*	*0.60*	*0.80*	*92*	*1.9*
	NHS Hambleton, Richmondshire and Whitby	151,800	0.77	0.69	1.21	0.87	0.82	0.61	86	0.82	0.68	1.01	106	2.7
	NHS Harrogate and Rural District	157,000	0.66	0.96	0.95	0.52	1.07	1.08	146	0.88	0.73	1.07	109	3.7
	NHS Hull	259,000	0.97	0.77	0.77	0.95	1.01	1.37	147	0.98	0.84	1.15	97	5.9
	NHS North East Lincolnshire	159,600	0.71	1.32	0.68	0.83	0.99	1.01	125	0.93	0.76	1.12	105	2.6
	NHS North Lincolnshire	169,800	0.70	1.51	1.13	1.00	0.47	1.01	130	0.97	0.81	1.16	114	4.0
	NHS Scarborough and Ryedale	*110,700*	*0.59*	*0.57*	*0.92*	*0.69*	*0.78*	*0.69*	*99*	*0.71*	*0.55*	*0.91*	*93*	*2.5*
	NHS Vale of York	*355,400*	*0.71*	*1.08*	*0.92*	*0.77*	*0.82*	*0.64*	*79*	*0.82*	*0.71*	*0.94*	*93*	*4.0*
South Yorkshire and Bassetlaw	NHS Barnsley[b]	239,300	1.18	0.80	1.02	1.03	1.29			0.99	0.85	1.16	113	2.1
	NHS Bassetlaw[b]	114,500	0.93	0.82	1.04	1.23	0.89	0.53	70	0.90	0.72	1.13	109	2.6
	NHS Doncaster	304,800	0.95	1.07	0.82	1.15	1.34	0.76	92	1.01	0.88	1.16	113	4.7
	NHS Rotherham[b]	*260,800*	*1.12*	*0.70*	*0.84*	*0.75*	*0.83*			*0.81*	*0.69*	*0.95*	*92*	*6.4*
	NHS Sheffield[b]	569,700	1.05	1.00	1.23	0.95	0.95			0.96	0.86	1.06	96	16.3
West Yorkshire	*NHS Airedale, Wharfedale and Craven*	*159,300*	*0.56*	*0.49*	*0.65*	*0.84*	*1.15*	*0.87*	*113*	*0.77*	*0.62*	*0.95*	*92*	*11.1*
	NHS Bradford City	**83,900**	**3.31**	**1.87**	**2.63**	**2.56**	**3.15**	**2.36**	**167**	**2.64**	**2.14**	**3.26**	**173**	**72.2**
	NHS Bradford Districts	**337,700**	**1.23**	**1.09**	**1.40**	**1.05**	**1.15**	**1.50**	**157**	**1.24**	**1.09**	**1.41**	**119**	**28.7**
	NHS Calderdale	*208,400*	*0.52*	*0.59*	*0.76*	*1.05*	*0.62*	*0.68*	*82*	*0.71*	*0.58*	*0.86*	*78*	*10.3*
	NHS Greater Huddersfield	243,800	0.82	0.91	1.10	0.92	1.01	0.77	90	0.92	0.78	1.08	99	17.4
	NHS Leeds North	*200,800*	*0.67*	*0.84*	*0.78*	*0.85*	*0.89*	*0.66*	*80*	*0.78*	*0.65*	*0.95*	*87*	*17.4*
	NHS Leeds South and East	249,700	0.73	0.93	0.75	0.95	0.98	0.67	68	0.83	0.70	1.00	78	18.3
	NHS Leeds West	*323,600*	*0.61*	*0.58*	*0.72*	*1.14*	*0.70*	*0.89*	*90*	*0.78*	*0.66*	*0.92*	*72*	*10.8*
	NHS North Kirklees	190,500	1.06	1.24	0.48	1.46	0.84	0.81	89	0.98	0.81	1.18	99	25.3
	NHS Wakefield	333,800	0.88	0.91	1.07	0.85	1.01	0.61	75	0.89	0.77	1.02	100	4.6
Arden, Herefordshire and Worcestershire	**NHS Coventry and Rugby**	**448,800**	**1.33**	**1.44**	**1.75**	**1.29**	**1.11**	**1.06**	**111**	**1.32**	**1.19**	**1.47**	**128**	**22.2**
	NHS Herefordshire	188,100	0.72	0.82	0.90	0.80	0.91	1.30	181	0.92	0.77	1.09	117	1.8
	NHS Redditch and Bromsgrove	180,500	0.98	0.80	1.23	0.72	0.82	0.75	94	0.88	0.73	1.06	102	6.0
	NHS South Warwickshire	*261,500*	*0.75*	*0.99*	*0.66*	*0.58*	*0.85*	*0.79*	*103*	*0.77*	*0.65*	*0.91*	*92*	*7.0*
	NHS South Worcestershire	*298,600*	*0.67*	*0.71*	*0.81*	*0.77*	*0.96*	*0.75*	*100*	*0.78*	*0.67*	*0.91*	*96*	*3.7*
	NHS Warwickshire North	189,100	1.62	1.10	0.80	0.74	1.57	1.09	137	1.15	0.98	1.35	133	6.5
	NHS Wyre Forest	99,500	0.93	1.06	0.81	0.63	1.35	0.43	60	0.87	0.68	1.10	111	2.8

Table 1.3. Continued

UK area	CCG/HB	Total population (2015)	2010 O/E	2011 O/E	2012 O/E	2013 O/E	2014 O/E	2015 O/E	2015 Crude rate pmp	2010–2015 O/E	2010–2015 LCL	2010–2015 UCL	2010–2015 Crude rate pmp[a]	% non-White
Birmingham and the Black Country	**NHS Birmingham CrossCity**	**740,800**	**1.38**	**1.62**	**1.49**	**1.46**	**1.52**	**1.63**	**162**	**1.52**	**1.40**	**1.65**	**139**	**35.2**
	NHS Birmingham South and Central	**202,300**	**1.51**	**1.86**	**1.52**	**1.65**	**1.78**	**1.41**	**133**	**1.62**	**1.39**	**1.88**	**142**	**40.4**
	NHS Dudley	316,500	0.82	0.85	1.22	1.21	0.94	0.83	104	0.98	0.85	1.12	113	10.0
	NHS Sandwell and West Birmingham	**487,700**	**1.84**	**1.69**	**1.47**	**1.55**	**1.71**	**1.84**	**180**	**1.69**	**1.54**	**1.85**	**152**	**45.3**
	NHS Solihull	210,400	1.00	0.68	1.01	0.90	0.89	1.08	138	0.93	0.78	1.10	109	10.9
	NHS Walsall	**276,100**	**1.96**	**1.23**	**1.37**	**1.61**	**1.00**	**1.31**	**152**	**1.40**	**1.24**	**1.59**	**150**	**21.1**
	NHS Wolverhampton	**254,400**	**1.50**	**1.18**	**1.53**	**1.07**	**1.52**	**1.26**	**142**	**1.34**	**1.17**	**1.53**	**139**	**32.0**
Derbyshire and Notting-hamshire	NHS Erewash	96,300	0.89	1.15	1.33	1.30	0.70	0.93	114	1.04	0.82	1.32	118	3.2
	NHS Hardwick[b]	*110,500*	*0.40*	*0.71*	*0.85*	*0.76*	*0.79*			*0.70*	*0.54*	*0.91*	*84*	*1.8*
	NHS Mansfield & Ashfield	196,400	0.91	0.75	0.83	0.81	1.02	0.78	97	0.85	0.71	1.02	97	2.5
	NHS Newark & Sherwood	118,700	0.96	1.30	0.93	0.49	0.72	0.63	84	0.83	0.66	1.04	101	2.4
	NHS North Derbyshire[b]	*272,900*	*0.69*	*0.94*	*0.78*	*0.76*	*0.61*			*0.69*	*0.59*	*0.81*	*87*	*2.5*
	NHS Nottingham City	**318,900**	**1.60**	**1.12**	**1.24**	**1.28**	**1.32**	**1.77**	**160**	**1.39**	**1.22**	**1.59**	**117**	**28.5**
	NHS Nottingham North & East	*149,500*	*0.87*	*0.78*	*0.72*	*0.70*	*0.55*	*0.85*	*107*	*0.74*	*0.59*	*0.93*	*86*	*6.2*
	NHS Nottingham West	112,300	0.98	0.55	1.10	1.22	0.87	0.91	116	0.94	0.75	1.18	110	7.3
	NHS Rushcliffe	*114,500*	*0.95*	*1.16*	*0.38*	*1.04*	*0.42*	*0.20*	*26*	*0.68*	*0.52*	*0.89*	*80*	*6.9*
	NHS Southern Derbyshire	523,800	0.97	1.03	1.13	0.87	0.96	0.81	97	0.96	0.86	1.07	105	11.0
East Anglia	*NHS Cambridgeshire and Peterborough*[b]	*876,400*	*0.77*	*0.90*	*0.66*	*1.05*	*0.78*			*0.83*	*0.76*	*0.91*	*89*	*9.5*
	NHS Great Yarmouth & Waveney	214,800	1.09	1.16	0.97	0.95	0.79	1.16	163	1.02	0.88	1.18	131	2.7
	NHS Ipswich and East Suffolk	*399,500*	*0.66*	*0.62*	*0.89*	*0.91*	*0.72*	*1.13*	*150*	*0.83*	*0.73*	*0.94*	*101*	*5.6*
	NHS North Norfolk	*170,600*	*0.79*	*0.51*	*0.76*	*0.82*	*0.85*	*1.05*	*164*	*0.80*	*0.67*	*0.96*	*115*	*1.5*
	NHS Norwich[b]	198,200	1.17	1.13	0.89	0.82	0.82	0.97	111	0.96	0.81	1.15	102	7.3
	NHS South Norfolk[b]	*243,400*	*0.67*	*0.95*	*0.81*	*0.99*	*0.65*	*0.99*	*136*	*0.84*	*0.72*	*0.99*	*106*	*2.6*
	NHS West Norfolk[b]	*174,100*	*0.83*	*0.63*	*0.67*	*0.61*	*0.86*			*0.76*	*0.63*	*0.93*	*101*	*2.6*
	NHS West Suffolk[b]	*226,300*	*0.84*	*0.70*	*0.89*	*0.83*	*0.60*			*0.74*	*0.61*	*0.88*	*87*	*4.6*
Essex	NHS Basildon and Brentwood	257,800	0.88	1.04	1.25	0.93	0.98	1.08	128	1.03	0.89	1.19	112	7.1
	NHS Castle Point, Rayleigh and Rochford	174,300	0.87	0.75	0.70	1.18	0.73	0.87	120	0.85	0.71	1.02	108	3.0
	NHS Mid Essex[b]	*385,700*	*0.84*	*0.98*	*0.81*	*0.72*	*0.87*	*0.76*	*96*	*0.83*	*0.73*	*0.95*	*96*	*4.4*
	NHS North East Essex	325,100	0.98	1.24	0.95	0.85	1.11	0.87	114	1.00	0.88	1.14	120	5.5
	NHS Southend	178,700	0.65	0.84	0.94	1.06	0.72	1.02	123	0.87	0.72	1.06	97	8.4
	NHS Thurrock	165,200	1.16	1.19	0.79	0.96	1.09	1.05	109	1.04	0.85	1.27	99	14.1
	NHS West Essex[b]	300,200	0.65	0.73	1.19	1.04	1.10	0.97	117	0.95	0.82	1.10	104	8.2
Hertfordshire and the South Midlands	NHS Bedfordshire	440,300	0.86	0.72	0.95	0.99	0.94	0.92	109	0.90	0.79	1.01	97	11.2
	NHS Corby	66,900	1.31	1.11	0.79	0.61	1.02	1.68	179	1.09	0.81	1.48	107	4.5
	NHS East and North Hertfordshire	559,100	0.87	1.04	0.70	1.09	1.03	1.11	127	0.98	0.88	1.09	103	10.4
	NHS Herts Valleys	*588,200*	*0.84*	*0.78*	*0.88*	*0.90*	*1.11*	*0.84*	*95*	*0.89*	*0.80*	*1.00*	*93*	*14.6*
	NHS Luton	**214,700**	**1.09**	**1.38**	**1.21**	**1.98**	**1.53**	**1.33**	**126**	**1.42**	**1.22**	**1.66**	**124**	**45.3**
	NHS Milton Keynes	267,800	1.03	0.91	1.10	0.88	1.18	1.28	131	1.07	0.92	1.25	100	19.6
	NHS Nene	*640,000*	*0.74*	*0.89*	*1.07*	*0.97*	*0.90*	*0.85*	*100*	*0.90*	*0.82*	*1.00*	*98*	*9.1*
Leicestershire and Lincolnshire	*NHS East Leicestershire and Rutland*	*325,900*	*0.71*	*0.72*	*0.97*	*0.90*	*0.78*	*0.92*	*120*	*0.83*	*0.73*	*0.96*	*100*	*9.8*
	NHS Leicester City	**342,600**	**1.72**	**1.80**	**1.62**	**1.69**	**1.21**	**1.51**	**140**	**1.59**	**1.41**	**1.78**	**135**	**49.5**
	NHS Lincolnshire East	*232,000*	*0.78*	*0.89*	*0.75*	*1.08*	*0.57*	*0.76*	*112*	*0.80*	*0.68*	*0.94*	*109*	*2.0*
	NHS Lincolnshire West	*234,300*	*0.64*	*0.74*	*0.42*	*0.79*	*0.60*	*0.65*	*81*	*0.64*	*0.53*	*0.78*	*73*	*3.0*
	NHS South Lincolnshire	146,000	1.17	0.97	0.90	0.66	0.68	0.95	130	0.88	0.72	1.08	111	2.3
	NHS South West Lincolnshire	*124,300*	*0.91*	*0.95*	*0.67*	*0.85*	*0.50*	*0.54*	*72*	*0.73*	*0.57*	*0.93*	*90*	*2.3*
	NHS West Leicestershire	*387,500*	*1.10*	*0.90*	*0.52*	*0.80*	*0.99*	*0.63*	*77*	*0.82*	*0.72*	*0.94*	*93*	*6.9*

Table 1.3. Continued

UK area	CCG/HB	Total population (2015)	2010 O/E	2011 O/E	2012 O/E	2013 O/E	2014 O/E	2015 O/E	2015 Crude rate pmp	2010–2015 O/E	2010–2015 LCL	2010–2015 UCL	2010–2015 Crude rate pmp[a]	% non-White
Shropshire and Staffordshire	NHS Cannock Chase	134,900	1.11	1.15	0.80	1.17	0.80	0.77	96	0.96	0.78	1.18	110	2.4
	NHS East Staffordshire	125,700	1.51	0.88	0.72	1.13	0.87	0.71	87	0.96	0.77	1.19	109	9.0
	NHS North Staffordshire	216,700	0.69	1.11	0.59	0.96	0.97	1.05	138	0.90	0.76	1.06	109	3.5
	NHS Shropshire	311,400	0.92	0.97	0.75	1.01	0.88	0.92	128	0.91	0.80	1.04	116	2.0
	NHS South East Staffs and Seisdon and Peninsular	*224,800*	*0.71*	*0.99*	*0.72*	*0.63*	*0.77*	*0.71*	*93*	*0.75*	*0.63*	*0.90*	*91*	*3.6*
	NHS Stafford and Surrounds	152,200	1.13	0.82	0.92	0.90	0.85	1.21	164	0.97	0.81	1.17	122	4.7
	NHS Stoke on Trent	259,900	1.40	1.06	0.86	1.10	1.45	1.04	119	1.15	1.00	1.33	122	11.0
	NHS Telford & Wrekin	**171,200**	**1.38**	**1.10**	**1.21**	**1.23**	**1.27**	**1.43**	**164**	**1.27**	**1.08**	**1.50**	**133**	**7.3**
London	**NHS Barking & Dagenham**	**202,000**	**1.38**	**1.66**	**2.05**	**1.61**	**2.03**	**1.95**	**163**	**1.79**	**1.54**	**2.08**	**138**	**41.7**
	NHS Barnet	**379,700**	**1.74**	**1.42**	**1.50**	**1.24**	**1.31**	**1.42**	**145**	**1.43**	**1.28**	**1.60**	**135**	**35.9**
	NHS Camden	**241,100**	**1.63**	**1.13**	**1.13**	**1.34**	**1.19**	**1.32**	**124**	**1.29**	**1.10**	**1.50**	**112**	**33.7**
	NHS City and Hackney	**277,800**	**1.57**	**1.71**	**2.05**	**1.86**	**2.16**	**1.17**	**94**	**1.75**	**1.53**	**2.00**	**129**	**44.6**
	NHS Enfield	**328,400**	**1.37**	**1.98**	**1.62**	**1.58**	**1.54**	**1.54**	**152**	**1.60**	**1.43**	**1.80**	**146**	**39.0**
	NHS Haringey	**272,900**	**1.44**	**1.72**	**2.30**	**2.24**	**1.67**	**1.57**	**139**	**1.82**	**1.61**	**2.07**	**149**	**39.5**
	NHS Havering	249,100	0.36	1.20	1.04	0.82	0.92	1.09	128	0.91	0.78	1.07	98	12.3
	NHS Islington	**227,700**	**1.50**	**1.55**	**2.07**	**1.51**	**1.13**	**1.60**	**136**	**1.56**	**1.34**	**1.81**	**122**	**31.8**
	NHS Newham	**332,800**	**2.26**	**2.17**	**1.95**	**2.19**	**2.31**	**2.42**	**186**	**2.22**	**1.99**	**2.48**	**158**	**71.0**
	NHS Redbridge	**296,800**	**1.55**	**1.38**	**2.15**	**1.99**	**1.46**	**1.47**	**142**	**1.66**	**1.47**	**1.88**	**147**	**57.5**
	NHS Tower Hamlets	**295,200**	**1.41**	**1.66**	**1.88**	**2.08**	**2.34**	**2.49**	**180**	**1.99**	**1.75**	**2.26**	**133**	**54.8**
	NHS Waltham Forest	**271,200**	**1.23**	**1.82**	**1.27**	**1.68**	**2.10**	**1.78**	**162**	**1.66**	**1.46**	**1.89**	**139**	**47.8**
	NHS Brent	**324,000**	**2.66**	**2.10**	**2.45**	**1.96**	**2.54**	**2.32**	**222**	**2.34**	**2.12**	**2.58**	**206**	**63.7**
	NHS Central London (Westminster)	**174,100**	**1.30**	**1.31**	**1.18**	**1.40**	**1.10**	**1.00**	**103**	**1.21**	**1.01**	**1.45**	**115**	**36.2**
	NHS Ealing	**343,100**	**2.01**	**1.91**	**2.26**	**1.69**	**1.79**	**2.32**	**227**	**2.00**	**1.81**	**2.22**	**180**	**51.0**
	NHS Hammersmith and Fulham	**179,400**	**1.56**	**1.43**	**1.49**	**0.99**	**1.45**	**1.22**	**111**	**1.35**	**1.13**	**1.61**	**114**	**31.9**
	NHS Harrow	**247,100**	**2.13**	**2.23**	**1.59**	**1.06**	**1.55**	**1.46**	**158**	**1.66**	**1.46**	**1.88**	**165**	**57.8**
	NHS Hillingdon	**297,700**	**1.48**	**1.47**	**1.50**	**1.43**	**1.01**	**1.11**	**111**	**1.33**	**1.16**	**1.51**	**122**	**39.4**
	NHS Hounslow	**268,800**	**1.81**	**1.84**	**1.74**	**2.03**	**1.29**	**1.32**	**127**	**1.66**	**1.46**	**1.89**	**146**	**48.6**
	NHS West London (Kensington and Chelsea, Queen's Park and Paddington)	225,900	1.25	1.21	0.91	0.98	1.52	0.69	71	1.09	0.92	1.29	103	33.4
	NHS Bexley	242,100	1.38	1.21	0.87	1.01	1.11	1.22	136	1.13	0.97	1.32	116	18.1
	NHS Bromley	324,900	1.15	0.69	0.71	0.84	0.99	1.51	175	0.99	0.87	1.14	106	15.7
	NHS Croydon	**379,000**	**1.43**	**1.26**	**2.00**	**1.95**	**1.80**	**1.89**	**193**	**1.73**	**1.56**	**1.92**	**162**	**44.9**
	NHS Greenwich	**274,800**	**2.06**	**1.04**	**1.17**	**2.41**	**1.25**	**1.73**	**156**	**1.61**	**1.41**	**1.83**	**134**	**37.5**
	NHS Kingston	173,500	0.87	0.96	1.09	1.12	1.13	0.80	81	0.99	0.81	1.21	92	25.5
	NHS Lambeth	**324,400**	**1.38**	**1.78**	**1.69**	**1.40**	**1.89**	**2.00**	**166**	**1.70**	**1.50**	**1.92**	**130**	**42.9**
	NHS Lewisham	**297,300**	**1.46**	**1.80**	**1.87**	**1.49**	**1.54**	**1.52**	**135**	**1.61**	**1.42**	**1.83**	**131**	**46.5**
	NHS Merton	**204,600**	**1.21**	**1.57**	**1.77**	**1.25**	**1.39**	**1.74**	**171**	**1.49**	**1.28**	**1.74**	**135**	**35.1**
	NHS Richmond	*194,700*	*0.88*	*0.69*	*0.79*	*0.98*	*0.78*	*0.61*	*67*	*0.79*	*0.64*	*0.97*	*79*	*14.0*
	NHS Southwark	**308,900**	**1.84**	**1.99**	**1.77**	**2.27**	**1.89**	**1.89**	**159**	**1.94**	**1.73**	**2.18**	**150**	**45.8**
	NHS Sutton	**200,100**	**1.45**	**1.30**	**1.54**	**0.80**	**1.67**	**1.47**	**160**	**1.37**	**1.18**	**1.60**	**137**	**21.4**
	NHS Wandsworth	**314,500**	**1.49**	**1.23**	**1.39**	**0.96**	**1.57**	**1.76**	**153**	**1.41**	**1.23**	**1.61**	**112**	**28.6**
Bath, Gloucestershire, Swindon and Wiltshire	*NHS Bath and North East Somerset*	*184,900*	*0.64*	*0.56*	*0.92*	*0.95*	*0.66*	*0.59*	*70*	*0.72*	*0.58*	*0.89*	*78*	*5.4*
	NHS Gloucestershire	*617,200*	*0.90*	*0.88*	*1.17*	*0.70*	*0.78*	*0.79*	*102*	*0.87*	*0.79*	*0.96*	*103*	*4.6*
	NHS Swindon	222,800	1.03	1.14	1.22	0.92	1.17	1.28	144	1.13	0.97	1.32	116	10.0
	NHS Wiltshire	*486,100*	*0.81*	*0.64*	*0.47*	*0.77*	*0.81*	*0.67*	*86*	*0.70*	*0.61*	*0.79*	*82*	*3.4*

Table 1.3. Continued

UK area	CCG/HB	Total population (2015)	2010 O/E	2011 O/E	2012 O/E	2013 O/E	2014 O/E	2015 O/E	2015 Crude rate pmp	2010–2015 O/E	2010–2015 LCL	2010–2015 UCL	2010–2015 Crude rate pmp[a]	% non-White
Bristol, North Somerset, Somerset and South Gloucestershire	**NHS Bristol**	**449,300**	**1.51**	**1.43**	**1.25**	**1.37**	**1.16**	**1.19**	**116**	**1.31**	**1.18**	**1.47**	**118**	**16.0**
	NHS North Somerset	209,900	0.98	0.87	1.02	1.04	1.05	0.81	110	0.96	0.82	1.13	120	2.7
	NHS Somerset	*545,400*	*1.07*	*0.85*	*0.67*	*0.55*	*0.88*	*0.67*	*92*	*0.78*	*0.70*	*0.87*	*98*	*2.0*
	NHS South Gloucestershire	*274,700*	*1.09*	*0.61*	*0.81*	*1.15*	*0.68*	*0.75*	*91*	*0.85*	*0.72*	*0.99*	*94*	*5.0*
Devon, Cornwall and Isles of Scilly	NHS Kernow	551,700	0.90	0.81	0.95	0.85	0.79	1.16	161	0.91	0.83	1.01	117	1.8
	NHS North, East, West Devon	*890,600*	*1.01*	*0.93*	*1.00*	*0.83*	*0.93*	*0.84*	*110*	*0.92*	*0.85*	*0.99*	*111*	*3.0*
	NHS South Devon and Torbay	278,600	1.27	0.89	1.08	1.00	0.87	0.84	122	0.99	0.86	1.12	132	2.1
Kent and Medway	NHS Ashford	124,300	0.93	0.83	1.27	1.09	0.96	0.87	105	0.99	0.80	1.23	110	6.3
	NHS Canterbury and Coastal	207,700	0.95	0.83	0.57	0.94	1.17	0.90	111	0.90	0.75	1.07	102	5.9
	NHS Dartford, Gravesham and Swanley	258,200	0.98	0.87	0.98	1.46	0.94	0.94	108	1.03	0.88	1.19	109	13.0
	NHS Medway	276,500	0.73	0.90	0.81	1.08	0.92	1.15	127	0.94	0.80	1.10	95	10.4
	NHS South Kent Coast	205,500	0.92	1.02	0.57	0.75	1.00	0.93	127	0.87	0.73	1.03	108	4.5
	NHS Swale	112,500	1.05	0.59	1.34	0.82	1.16	0.90	107	0.98	0.78	1.23	107	3.8
	NHS Thanet	139,800	1.46	0.86	1.04	1.55	1.01	0.65	86	1.09	0.90	1.31	131	4.5
	NHS West Kent	*476,800*	*0.72*	*0.82*	*0.62*	*0.70*	*0.93*	*0.81*	*99*	*0.77*	*0.68*	*0.87*	*86*	*4.9*
Surrey and Sussex	NHS Brighton & Hove	285,300	0.84	0.93	1.16	0.79	1.07	1.07	109	0.98	0.84	1.14	92	10.9
	NHS Coastal West Sussex	*495,000*	*0.49*	*0.64*	*0.80*	*0.78*	*1.02*	*0.89*	*127*	*0.78*	*0.70*	*0.87*	*102*	*3.8*
	NHS Crawley	110,900	1.98	0.50	0.80	1.07	1.29	0.71	72	1.05	0.82	1.34	98	20.1
	NHS East Surrey	182,000	1.30	0.74	1.25	0.91	0.82	1.39	165	1.07	0.90	1.27	116	8.3
	NHS Eastbourne, Hailsham and Seaford	188,100	0.60	0.84	1.04	1.18	0.73	1.08	154	0.92	0.77	1.08	121	4.4
	NHS Guildford and Waverley	*206,100*	*0.72*	*0.74*	*1.16*	*0.54*	*0.77*	*0.87*	*102*	*0.80*	*0.66*	*0.97*	*87*	*7.2*
	NHS Hastings & Rother	184,400	0.76	0.96	0.73	1.22	0.64	0.96	136	0.88	0.74	1.05	114	4.6
	NHS High Weald Lewes Havens	*171,600*	*0.65*	*0.68*	*0.91*	*0.61*	*0.97*	*0.86*	*117*	*0.78*	*0.65*	*0.95*	*98*	*3.1*
	NHS Horsham and Mid Sussex	*230,300*	*0.73*	*0.79*	*0.51*	*0.76*	*0.83*	*0.56*	*69*	*0.70*	*0.58*	*0.84*	*80*	*4.9*
	NHS North West Surrey	343,000	1.15	1.31	0.91	0.94	1.22	0.88	105	1.06	0.94	1.21	116	12.5
	NHS Surrey Downs	287,000	0.96	0.97	0.89	1.02	0.94	0.80	101	0.93	0.80	1.07	108	9.1
	NHS Surrey Heath	*95,900*	*0.79*	*0.77*	*0.76*	*0.46*	*0.44*	*0.93*	*115*	*0.69*	*0.51*	*0.92*	*78*	*9.3*
Thames Valley	*NHS Aylesbury Vale*	*207,000*	*0.96*	*1.03*	*0.74*	*0.67*	*0.81*	*0.74*	*87*	*0.82*	*0.68*	*0.99*	*89*	*9.7*
	NHS Bracknell and Ascot	137,000	1.02	0.76	0.37	1.24	0.97	0.73	80	0.85	0.67	1.07	85	9.5
	NHS Chiltern	*324,000*	*0.68*	*0.69*	*0.74*	*0.99*	*0.78*	*0.81*	*99*	*0.78*	*0.67*	*0.91*	*88*	*15.8*
	NHS Newbury and District	*106,400*	*0.65*	*0.63*	*0.62*	*1.03*	*0.90*	*0.71*	*85*	*0.76*	*0.58*	*0.99*	*83*	*4.4*
	NHS North & West Reading	100,300	0.29	0.94	0.93	0.64	0.95	0.91	110	0.79	0.60	1.03	86	10.4
	NHS Oxfordshire	*663,600*	*0.89*	*1.01*	*0.98*	*0.88*	*0.83*	*0.81*	*93*	*0.90*	*0.81*	*0.99*	*96*	*9.3*
	NHS Slough	**145,700**	**2.01**	**2.21**	**1.75**	**1.79**	**1.71**	**1.96**	**172**	**1.90**	**1.60**	**2.25**	**153**	**54.3**
	NHS South Reading	**111,000**	**1.33**	**1.16**	**1.17**	**2.39**	**1.52**	**0.73**	**63**	**1.38**	**1.09**	**1.73**	**110**	**30.5**
	NHS Windsor, Ascot and Maidenhead	141,400	0.92	1.24	0.61	1.33	1.20	0.61	71	0.98	0.80	1.21	105	14.7
	NHS Wokingham	*160,400*	*0.80*	*1.31*	*0.47*	*0.80*	*0.76*	*0.63*	*75*	*0.79*	*0.64*	*0.98*	*86*	*11.6*
Wessex	*NHS Dorset*	*765,700*	*0.62*	*0.73*	*0.71*	*0.72*	*0.71*	*0.60*	*82*	*0.68*	*0.62*	*0.75*	*86*	*4.0*
	NHS Fareham and Gosport	199,500	1.12	0.78	0.78	1.01	1.08	0.89	115	0.94	0.80	1.12	113	3.4
	NHS Isle of Wight	139,400	0.62	0.77	0.87	1.22	0.85	0.68	100	0.84	0.69	1.02	114	2.7
	NHS North East Hampshire and Farnham	209,200	0.87	0.84	1.16	1.17	0.85	0.95	110	0.97	0.82	1.15	104	9.7
	NHS North Hampshire	*220,800*	*0.71*	*0.69*	*0.47*	*0.71*	*1.03*	*0.76*	*91*	*0.73*	*0.61*	*0.89*	*80*	*6.4*
	NHS Portsmouth	211,800	0.54	1.31	1.10	1.12	0.97	1.03	104	1.01	0.85	1.21	94	11.6

Table 1.3. Continued

UK area	CCG/HB	Total population (2015)	2010 O/E	2011 O/E	2012 O/E	2013 O/E	2014 O/E	2015 O/E	2015 Crude rate pmp	2010–2015 O/E	2010–2015 LCL	2010–2015 UCL	2010–2015 Crude rate pmp[a]	% non-White
Wessex cont.	NHS South Eastern Hampshire	211,900	1.07	0.76	0.63	0.96	1.09	0.70	94	0.87	0.73	1.02	107	3.1
	NHS Southampton	249,500	1.25	1.15	0.88	0.63	0.98	0.95	92	0.97	0.82	1.15	87	14.1
	NHS West Hampshire	*554,900*	*0.47*	*0.67*	*0.62*	*0.66*	*0.76*	*0.59*	*79*	*0.63*	*0.56*	*0.71*	*78*	*3.9*
Wales	Betsi Cadwaladr University	694,500	0.99	0.83	1.01	0.90	1.07	1.08	144	0.98	0.90	1.07	120	2.5
	Powys Teaching	132,600	0.72	1.27	1.26	0.73	0.58	0.97	143	0.92	0.75	1.12	124	1.6
	Hywel Dda	383,200	1.13	1.24	0.92	1.08	1.18	1.02	141	1.09	0.98	1.22	138	2.2
	Abertawe Bro Morgannwg University	**525,500**	**1.52**	**1.18**	**1.44**	**1.04**	**0.95**	**1.12**	**139**	**1.20**	**1.09**	**1.32**	**137**	**3.9**
	Cwm Taf	296,700	1.01	1.45	0.91	1.13	1.13	0.95	115	1.09	0.96	1.25	121	2.6
	Aneurin Bevan	**581,800**	**1.29**	**1.21**	**1.18**	**1.04**	**1.16**	**0.98**	**122**	**1.14**	**1.04**	**1.25**	**130**	**3.9**
	Cardiff and Vale University	484,800	1.32	1.01	1.01	1.11	0.93	0.92	99	1.05	0.93	1.17	103	12.2
Scotland	Ayrshire and Arran	370,600	1.14	0.83	0.95	1.00	0.80	0.91	121	0.93	0.83	1.06	114	1.2
	Borders	*114,000*	*1.08*	*0.56*	*0.55*	*0.47*	*0.57*	*0.74*	*105*	*0.66*	*0.51*	*0.85*	*86*	*1.3*
	Dumfries and Galloway	*149,700*	*0.59*	*0.58*	*1.04*	*0.40*	*1.19*	*0.60*	*87*	*0.74*	*0.60*	*0.91*	*98*	*1.2*
	Fife	368,100	1.26	1.17	0.87	1.01	0.91	1.05	133	1.04	0.92	1.17	121	2.4
	Forth Valley	302,700	1.04	0.82	0.87	1.00	0.92	1.02	126	0.95	0.82	1.09	107	2.2
	Grampian	*587,800*	*0.86*	*0.83*	*0.85*	*0.91*	*0.76*	*0.89*	*105*	*0.85*	*0.76*	*0.95*	*92*	*4.0*
	Greater Glasgow and Clyde	1,149,900	0.91	1.11	1.13	0.93	0.90	1.16	133	1.02	0.95	1.10	108	7.3
	Highland	*321,000*	*0.67*	*0.52*	*0.61*	*0.67*	*0.50*	*0.93*	*128*	*0.65*	*0.56*	*0.76*	*82*	*1.3*
	Lanarkshire	654,500	0.95	0.83	1.08	0.93	0.89	0.95	115	0.94	0.85	1.03	104	2.0
	Lothian	*867,800*	*0.62*	*0.72*	*0.74*	*0.60*	*0.75*	*0.70*	*80*	*0.69*	*0.62*	*0.76*	*72*	*5.6*
	Orkney	21,700	0.39	0.00	1.86	0.72	0.00	1.65	231	0.78	0.45	1.34	100	0.7
	Shetland	23,200	0.40	0.78	0.00	0.75	1.06	1.03	129	0.68	0.38	1.23	79	1.5
	Tayside	415,000	1.03	1.19	0.68	0.86	0.95	0.94	120	0.94	0.84	1.06	111	3.2
	Western Isles	27,100	1.50	0.00	0.00	0.84	1.59	1.54	222	0.93	0.60	1.45	123	0.9
Northern Ireland	**Belfast**	**353,800**	**1.33**	**1.07**	**1.69**	**1.16**	**0.85**	**1.19**	**127**	**1.21**	**1.07**	**1.37**	**119**	**3.2**
	Northern	471,200	1.08	1.24	1.12	1.03	1.02	0.89	102	1.06	0.95	1.18	111	1.2
	Southern	373,000	1.02	1.28	0.86	0.84	0.77	0.90	94	0.94	0.82	1.08	90	1.2
	South Eastern	354,700	0.73	0.92	0.78	0.92	0.77	1.27	149	0.90	0.79	1.04	98	1.3
	Western	299,000	0.90	0.98	0.59	0.98	1.06	1.11	120	0.94	0.81	1.09	94	1.0

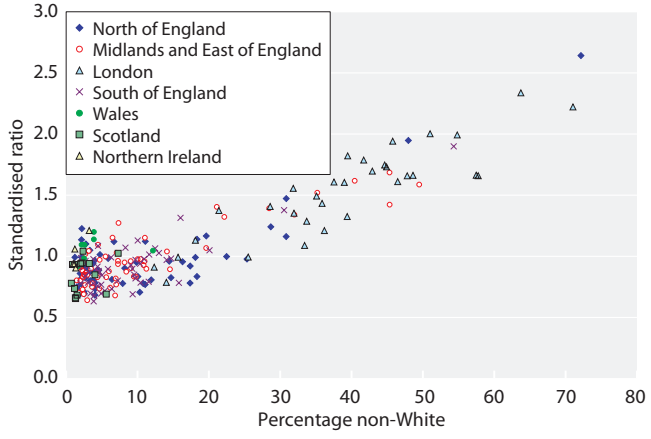

Fig. 1.2. Age/gender standardised incidence ratio (2010–2015) by percentage non-White

codes (where available) were mapped back to old codes using the mapping available on the ERA-EDTA website. As recommended in the notes for users in the ERA-EDTA's PRD code list document, this mapping is provided for guidance only and has not been validated; therefore care must be taken not to over interpret data from this mapping. These codes were grouped into the same eight categories as in previous reports, the details are given in appendix H: Ethnicity and ERA-EDTA Coding (www.renalreg.org).

Most 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. 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). Data on ethnic origin were grouped into White, South Asian, Black, Chinese or Other. The details of regrouping of the PAS codes into the above ethnic categories are provided in appendix H: Ethnicity and ERA-EDTA Coding (www.renalreg.org). Chi-squared, Fisher's exact, ANOVA and Kruskal Wallis tests were used as appropriate.

Table 1.4. Number of patients starting RRT by renal centre 2010–2015

Centre	Year						Estimated catchment population (millions)	2015 crude rate pmp[a]	(95% CI)
	2010	2011	2012	2013	2014	2015			
England									
B Heart	94	113	101	100	100	122	0.74	165	(136–195)
B QEH	196	213	210	200	250	247	1.70	145	(127–163)
Basldn	35	44	53	34	45	46	0.42	111	(79–143)
Bradfd	67	60	71	63	83	88	0.65	135	(107–163)
Brightn	105	119	132	139	148	142	1.30	109	(91–128)
Bristol	168	141	149	174	151	144	1.44	100	(84–116)
Camb	105	122	123	136	126	175[b]	1.16	151	(129–174)
Carlis	22	27	19	42	37	44	0.32	137	(97–178)
Carsh	216	207	244	229	265	248	1.91	130	(114–146)
Chelms	46	47	46	47	55	46	0.51	90	(64–116)
Colchr	32	44	29	29	38	28	0.30	94	(59–128)
Covnt	113	110	114	91	125	109	0.89	122	(99–145)
Derby	79	74	80	74	76	60[c]	0.70	85	(64–107)
Donc	45	43	40	60	54	36	0.41	88	(59–116)
Dorset	72	79	73	73	78	74	0.86	86	(66–105)
Dudley	43	43	56	51	42	49	0.44	111	(80–142)
Exeter	139	112	134	100	143	126[cd]	1.09	116	(95–136)
Glouc	61	58	76	53	62	64	0.59	109	(82–136)
Hull	87	108	94	90	98	121[c]	1.02	119	(97–140)
Ipswi	32	29	44	40	34	66	0.40	165	(126–205)
Kent	131	120	114	143	149	142	1.22	116	(97–135)
L Barts	201	250	266	284	302	314	1.83	172	(153–191)
L Guys	142	121	130	134	160	180	1.08	166	(142–191)
L Kings	144	138	123	166	148	179	1.17	153	(130–175)
L Rfree	203	220	235	225	230	237[c]	1.52	156	(136–176)
L St.G	85	72	95	84	91	117[cd]	0.80	147	(120–173)
L West	364	364	354	303	355	340	2.40	142	(127–157)
Leeds	124	153	151	183	170	146	1.67	87	(73–102)
Leic	243	266	235	288	252	273	2.44	112	(99–125)
Liv Ain	48	58	63	65	65	66	0.48	136	(103–169)
Liv Roy	97	111	104	95	136	146	1.00	146	(122–170)
M RI	159	154	161	198	164	199[c]	1.53	130	(112–148)
Middlbr	100	100	119	111	102	133[c]	1.00	132	(110–155)
Newc	91	98	102	92	109	124	1.12	111	(91–130)
Norwch	85	86	75	79	76	109	0.79	139	(113–165)
Nottm	116	114	100	113	111	129[c]	1.09	119	(98–139)
Oxford	164	176	170	164	188	200[c]	1.69	118	(102–135)
Plymth	56	60	54	64	55	53	0.47	113	(82–143)
Ports	147	187	159	194	230	197	2.02	97	(84–111)
Prestn	121	138	146	154	164	161[c]	1.49	108	(91–124)
Redng	89	103	72	117	104	86	0.91	94	(75–114)
Salford	145	131	134	116	161	176[c]	1.49	118	(101–136)
Sheff	141	135	156	136	151	151[c]	1.37	110	(93–128)
Shrew	57	61	58	59	65	65	0.50	130	(98–161)
Stevng	104	110	109	156	150	139	1.20	115	(96–135)
Sthend	27	29	26	42	30	35	0.32	110	(74–147)
Stoke	95	91	74	104	115	107	0.89	120	(97–143)
Sund	54	57	71	51	62	63	0.62	102	(77–127)
Truro	46	39	49	45	39	71[c]	0.41	172	(132–212)
Wirral	59	58	46	65	55	63	0.57	110	(83–137)
Wolve	106	77	87	91	79	83	0.67	124	(97–151)
York	39	53	55	37	64	61	0.49	124	(93–155)

Table 1.4. Continued

Centre	Year						Estimated catchment population (millions)	2015 crude rate pmp[a]	(95% CI)
	2010	2011	2012	2013	2014	2015			
N Ireland									
Antrim	38	29	25	29	35	35	0.29	119	(79–158)
Belfast	71	68	96	72	64	89	0.64	140	(111–169)
Newry	21	36	17	23	20	28	0.26	107	(67–147)
Ulster	20	36	28	30	23	32	0.27	120	(79–162)
West NI	28	35	22	30	35	37	0.35	105	(71–139)
Scotland									
Abrdn	51	50	53	58	53	66	0.60	110	(83–137)
Airdrie	56	48	60	51	50	64	0.55	116	(88–144)
D & Gall	10	10	18	8	22	12	0.15	81	(35–127)
Dundee	50	59	38	42	50	45	0.46	97	(69–126)
Edinb	69	76	82	72	90	97	0.96	101	(81–121)
Glasgw	153	177	184	174	174	222	1.62	137	(119–155)
Inverns	28	12	16	21	21	34	0.27	126	(84–168)
Klmarnk	43	33	40	40	34	39	0.36	108	(74–142)
Krkcldy	45	43	30	38	36	44	0.32	139	(98–180)
Wales									
Bangor	26	20	21	24	22	29	0.22	133	(85–181)
Cardff	181	186	170	171	168	158	1.42	111	(94–129)
Clwyd	21	17	22	17	32	29	0.19	153	(97–209)
Swanse	134	118	118	109	121	129[c]	0.89	146	(121–171)
Wrexm	25	26	34	37	41	45	0.24	187	(133–242)
							% change since 2010		
England	**5,540**	**5,723**	**5,781**	**5,983**	**6,342**	**6,580**	**18.8**		
N Ireland	**178**	**204**	**188**	**184**	**177**	**221**	**24.2**		
Scotland	**505**	**508**	**521**	**504**	**530**	**623**	**23.4**		
Wales	**387**	**367**	**365**	**358**	**384**	**390**	**0.8**		
UK	**6,610**	**6,802**	**6,855**	**7,029**	**7,433**	**7,814**	**18.2**		

[a]pmp – per million population
[b]Cambridge were unable to submit patient level data for 2015 but provided the UKRR with information allowing their incident number for 2015 to be estimated. This number has been used here and in table 1.1 but not elsewhere in this chapter
[c]Subsequent to closing the 2015 database the UKRR received corrections to the numbers of incident patients in 2015 for these centres. This table and table 1.2 (but not the remainder of this chapter) include these revisions. For most centres the change was small (<5 patients), but the changes made here were notable for a number of centres: MRI-21 (pre-emptive transplants now allocated to other centres), Salford +38, Sheffield +55, Truro −9
[d]Exeter believe that their number for 2015 should be 11 higher than reported here, these are all patients that have been allocated to other centres (mainly pre-emptive transplants) and these are reported here under those centres (as those were the numbers those centres were told would be published). L St.G believe that their number for 2015 should be 3 lower than reported here, these are all patients that they believe should have been allocated to other centres

Estimated glomerular filtration rate (eGFR) at the start of RRT was studied amongst patients with eGFR data within 14 days before the start of RRT. The eGFR was calculated using the abbreviated 4 variable MDRD study equation [3]. For the purpose of the eGFR calculation, patients who had missing ethnicity but a valid serum creatinine measurement were classed as White. The eGFR values were log transformed due to their skewed distribution.

Results

Incidence rates had plateaued in the nine years before the previous report but they increased in 2014 and again in 2015 (figure 1.3). Figure 1.4 shows RRT incidence rates for 2015 by age group and gender. For both men and women, the peak rate was in the 75–79 age group. Showing numbers starting RRT (rather than rates); figure 1.5 shows that the 65–74 age group contained the most incident patients for HD and the 55–64 age group included the most people for PD.

Age

In 2015, the median age of patients starting renal replacement therapy was 64.4 years (table 1.5) and this has changed little over recent years. Per modality, the median age at start was 66.9 years for patients starting on HD, 60.3 for patients starting on PD and 50.8 for

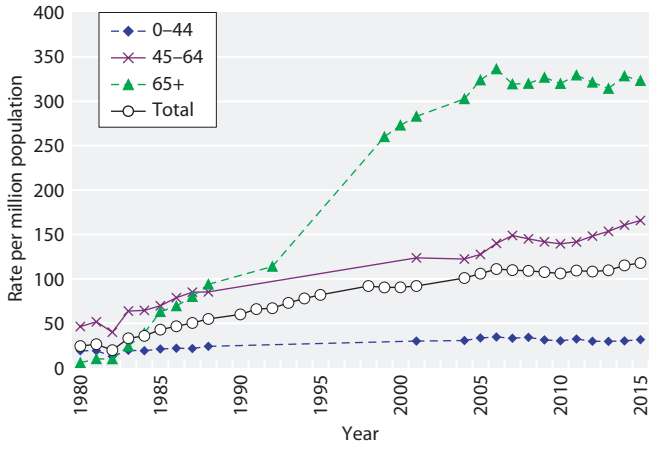

Fig. 1.3. RRT incidence rates between 1980 and 2015

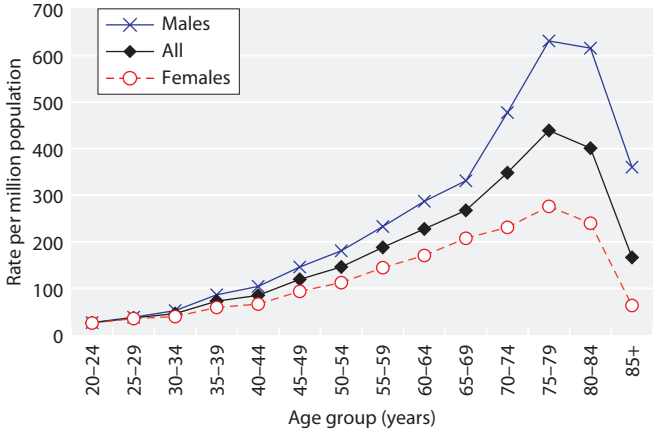

Fig. 1.4. RRT incidence rates in 2015 by age and gender

those having a pre-emptive transplant (table 1.6). The median age at start of non-White patients increased from 57.0 years for 2013 starters to 58.7 in 2014 and 59.8 in 2015 but was still considerably lower than that

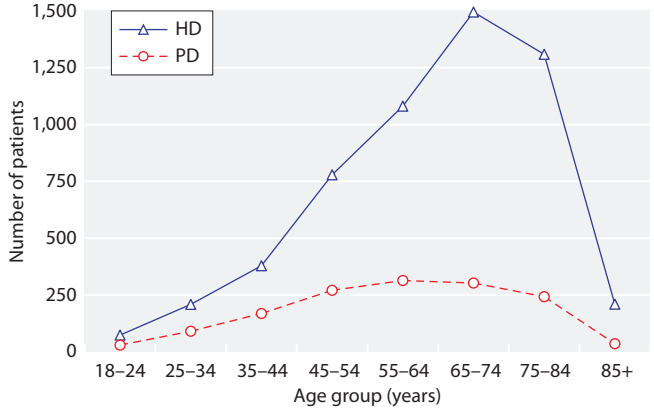

Fig. 1.5. Number of incident dialysis patients in 2015, by age group and initial dialysis modality

Table 1.5. Median, inter-quartile range and 90% range of the age of patients starting renal replacement therapy in 2015 by country

Country	Median	IQR	90% range
England	64.6	(51.6–74.8)	(32.0–83.9)
N Ireland	67.5	(52.9–76.5)	(29.4–83.6)
Scotland	61.5	(50.9–70.7)	(33.8–80.7)
Wales	65.1	(51.7–75.4)	(32.3–83.1)
UK	**64.4**	**(51.6–74.6)**	**(32.1–83.7)**

for White patients (66.3 years) reflecting CKD differences and the younger age distribution of ethnic minority populations in general compared with the White population (in the 2011 census data for England and Wales 5.3% of ethnic minorities were over 65 years old compared to 18.3% of Whites) [4]. The median age of new patients with diabetes was similar to the overall median and has not varied greatly over recent years.

There were large differences between centres in the median age of incident patients (figure 1.6) reflecting differences in the age and ethnic structure of the catchment populations and also, particularly in smaller centres, chance fluctuations. The median age of patients starting treatment at transplant centres was 62.2 years (IQR 50.0, 73.1) and at non-transplanting centres 66.2 years (IQR 53.2, 75.8).

There has been recent interest in the access of older patients to RRT and this is explored again this year. Averaged over 2010–2015, crude CCG/HB incidence rates in the over 75 years age group varied from 57 per million age related population (pmarp) in Borders to 1,059 pmarp in NHS Brent (IQR 252 pmarp, 399 pmarp). The wide range of treatment rates suggests that there was geographical variation in the prevalence of comorbid and predisposing renal conditions as well as uncertainty within the renal community about the suitability of older patients for dialysis. The variation between CCG/HBs seen in the over 75s was much greater than the variation seen in the overall analysis although some of this difference is likely to be due to the smaller numbers included in the over 75 analysis.

Table 1.6. Median, inter-quartile range and 90% range of the age of patients starting renal replacement therapy in 2015 by initial treatment modality

Treatment	Median	IQR	90% range
HD	66.9	(54.3–75.8)	(34.7–84.1)
PD	60.3	(47.8–72.4)	(30.1–83.0)
Transplant	50.8	(41.0–60.5)	(24.1–71.9)

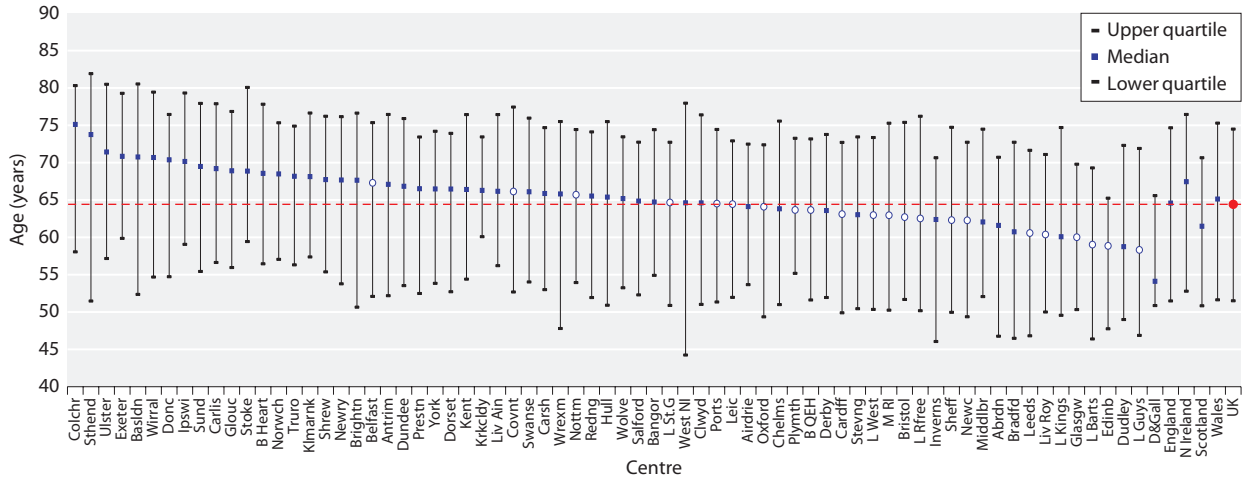

Fig. 1.6. Median age of incident RRT patients by centre in 2015
White points indicate transplant centres

Gender

More men than women started RRT in every age group except the youngest (figure 1.7). The overall breakdown was 62.2% male, 37.8% female equating to a M : F ratio of 1.65.

Ethnicity

As in previous reports, Scotland is not included in this section as completeness of ethnicity data was low. Across centres in England, Wales and Northern Ireland the average completeness was 95.8% for 2015 incident patients – similar to the 94.8% seen last year. A five year cohort was used for the centre level analysis presented here (table 1.7a). For completeness data by centre for 2015 incident patients see the Introduction chapter of this report. Table 1.7b shows the overall detailed ethnicity breakdown for England for 2015.

Primary renal diagnosis

The breakdown of primary renal diagnosis (PRD) by centre is shown for a 2011–2015 incident cohort in table 1.8a. The breakdown by country is shown for 2015 incident patients in table 1.8b. For completeness data for 2015 by centre see the Introduction chapter of this report. Fifty-seven centres provided data on over 90% of incident patients and 28 of these centres had 100% completeness. There was only a small amount of missing data for Wales and Scotland, whilst Northern Ireland had 9.5% missing and England had 11.3% missing. The overall percentage missing was 9.7% and this was slightly lower in the under compared to the over 65 year olds (8.8% and 10.8% respectively). Seven

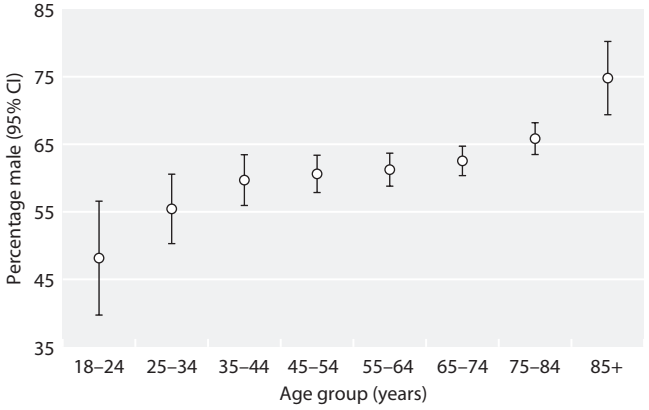

Fig. 1.7. Percentage of patients starting RRT in 2015 who were male, by age group

centres had missing PRD for more than 25% of incident patients.

The UKRR continues to be concerned about centres with apparently very high data completeness for PRD but also very high rates of 'uncertain' diagnoses (EDTA code 00: Chronic renal failure; aetiology uncertain). 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 of e.g. renal vascular disease and hypertensive renal disease remain relatively subjective. Many of the new ERA-EDTA PRD codes allow clinicians to indicate the basis for the diagnosis of the renal disease (e.g. based on histology or not). Adoption of these new codes should therefore reduce the coding of PRD as uncertain. This year there was again a lot of variability between centres

Table 1.7a. Percentage of incident patients (2011–2015) in minority ethnic groups (South Asian, Black, Chinese or Other) by centre

Centre	% data not available	*N* with data	Percentage in minority ethnic group
England			
B Heart	0.0	536	37
B QEH	0.2	1,118	35
Basldn	1.8	218	15
Bradfd	1.1	361	42
Brightn	3.5	656	8
Bristol	2.2	742	10
Camb	4.1	486	5
Carlis	0.0	169	2
Carsh	6.8	1,112	29
Chelms	17.4	199	9
Colchr	6.0	158	3
Covnt	0.0	549	19
Derby	2.5	358	16
Donc	0.0	233	5
Dorset	0.0	377	4
Dudley	0.4	240	13
Exeter	2.1	598	1
Glouc	0.0	313	5
Hull	0.8	510	3
Ipswi	10.8	190	13
Kent	0.7	663	5
L Barts	0.4	1,411	66
L Guys	3.4	700	42
L Kings	0.3	752	47
L Rfree	3.5	1,106	51
L St.G	6.1	433	52
L West	0.0	1,716	60
Leeds	0.2	801	19
Leic	5.5	1,242	23
Liv Ain	1.9	311	4
Liv Roy	4.6	565	8
M RI	2.9	871	27
Middlbr	0.4	564	5
Newc	0.0	525	8
Norwch	1.6	418	3
Nottm	0.0	563	15
Oxford	4.9	857	17
Plymth	0.4	285	4
Ports	8.8	882	6
Prestn	0.4	758	13
Redng	10.2	433	26
Salford	0.6	676	19
Sheff	1.2	666	12
Shrew	0.3	307	7
Stevng	4.7	633	24
Sthend	3.7	156	9
Stoke	0.8	487	7
Sund	0.7	302	4
Truro	0.4	251	*
Wirral	2.8	279	3
Wolve	0.2	416	30
York	3.0	262	3
N Ireland			
Antrim	0.0	153	*
Belfast	6.9	362	2
Newry	0.0	124	*
Ulster	0.0	149	5
West NI	0.0	159	*
Wales			
Bangor	0.0	116	*
Cardff	1.3	842	7
Clwyd	1.7	115	4
Swanse	0.3	592	2
Wrexm	1.1	181	3
England	**2.5**	**29,414**	**24**
N Ireland	**2.8**	**947**	**2**
Wales	**0.9**	**1,846**	**4**
E, W & NI	**2.4**	**32,207**	**22**

*Values suppressed due to small numbers in minority ethnic group

Table 1.7b. Percentage of incident RRT patients (2015) in different ethnic groups (England)

Country	% data not available	*N* with data	Percentage in each ethnic group				
			White	South Asian	Black	Chinese	Other
England	**4.0**	**6,091**	**74.6**	**13.5**	**8.2**	**0.7**	**3.1**

but no centre had a far higher percentage with 'uncertain' diagnosis than the others. Last year there were three centres with diagnosis 'uncertain' for over 45% of their incident patients – Cambridge (65%), Colchester (61%) and Ipswich (79%). The situation has improved this year for Colchester but Ipswich now has 65% missing data and Cambridge were unable to supply the data.

There was a lot of variability between centres in the percentages with the specific diagnoses (partly due to the reasons mentioned above). For example, for the 2011–2015 cohort, the percentage with diabetes as PRD varied from 15% to 40%.

The overall UK distribution of PRDs is shown in table 1.9. When using a simple under versus over 65

Table 1.8a. Distribution of primary renal diagnosis by country in the 2011–2015 incident RRT cohort

Centre	% data not available	*N* with data	Percentage							
			Uncertain aetiology	Diabetes	Glomerulo-nephritis	Hyper-tension	Other	Polycystic kidney	Pyelo-nephritis	Renal vascular disease
England										
B Heart	3	520	17	39	10	8	13	4	6	2
B QEH	0	1,119	16	22	13	6	22	7	5	9
Basldn	6	208	7	30	20	7	10	5	9	12
Bradfd	0	364	20	26	15	10	13	6	5	5
Brightn	8	628	22	20	15	4	20	8	7	5
Bristol	2	741	13	24	15	4	19	10	8	6
Camb										
Carlis	1	168	2	20	14	18	14	12	8	13
Carsh	47	631								
Chelms	5	230	18	26	15	7	20	4	7	4
Colchr	11	51	29	33	*	*	*	*	*	*
Covnt	2	540	15	20	14	13	14	6	7	11
Derby	2	361	13	32	16	2	17	5	9	5
Donc	0	232	22	19	12	10	20	7	4	5
Dorset	0	376	10	25	12	10	17	10	9	7
Dudley	0	240	23	21	10	8	26	5	3	4
Exeter	1	607	10	23	15	10	16	6	7	13
Glouc	0	313	30	21	15	3	13	7	5	6
Hull	0	513	20	20	15	6	17	11	8	4
Ipswi	45	52								
Kent	0	666	23	23	15	5	17	5	8	3
L Barts	6	1,335	14	33	11	11	15	5	9	2
L Guys	24	554	32	22	12	7	13	6	5	3
L Kings	0	754	11	38	10	17	11	4	6	3
L Rfree	3	1,113	10	31	12	9	25	4	3	6
L St.G	23	354	20	27	15	9	17	7	3	2
L West	0	1,715	11	39	13	4	18	6	5	5
Leeds	0	801	13	21	15	11	18	9	9	5
Leic	17	1,087	21	21	14	6	15	9	9	5
Liv Ain	2	311	24	20	13	9	14	4	7	10
Liv Roy	22	374	7	21	17	17	20	8	8	2
M RI	9	819	10	28	13	14	19	7	6	3
Middlbr	1	561	19	26	12	5	18	8	6	6
Newc	1	521	14	21	15	4	23	9	7	8
Norwch	4	409	26	20	15	3	15	8	6	6
Nottm	1	560	20	23	12	5	20	8	8	6
Oxford	0	897	15	28	16	6	15	9	6	5
Plymth	10	258	10	19	21	7	12	8	8	15
Ports	11	865	10	25	14	9	19	9	8	7
Prestn	0	759	14	24	14	11	15	7	9	6
Redng	1	477	17	29	13	3	18	5	7	7
Salford	42	394								
Sheff	1	667	18	25	18	5	10	8	8	8
Shrew	4	297	23	24	8	5	25	5	4	6
Stevng	8	609	17	24	11	2	32	7	3	4
Sthend	0	162	19	19	15	4	20	10	7	7
Stoke	11	438	10	27	11	8	22	8	5	8
Sund	2	299	4	24	13	19	18	8	7	8
Truro	2	248	11	24	20	8	17	5	8	8
Wirral	22	223	8	28	8	15	26	7	3	5
Wolve	1	411	25	20	13	2	26	4	5	4
York	1	268	7	19	18	9	22	10	9	7

Table 1.8a. Continued

Centre	% data not available	*N* with data	Percentage							
			Uncertain aetiology	Diabetes	Glomerulo-nephritis	Hyper-tension	Other	Polycystic kidney	Pyelo-nephritis	Renal vascular disease
N Ireland										
Antrim	0	153	30	28	10	*	14	4	9	*
Belfast	5	368	15	19	14	4	20	11	13	4
Newry	0	124	14	28	10	2	17	10	5	13
Ulster	1	148	11	26	11	13	19	4	5	11
West NI	0	159	8	23	14	11	18	5	13	8
Scotland										
Abrdn	0	280	9	31	14	8	17	9	7	5
Airdrie	0	273	18	26	17	5	12	8	8	6
D & Gall	0	70	7	40	14	14	13	*	*	*
Dundee	0	234	15	22	15	7	21	9	5	5
Edinb	0	417	12	26	17	4	18	12	6	5
Glasgw	0	931	13	28	16	2	15	9	6	10
Inverns	1	103	21	15	16	*	24	10	7	*
Klmarnk	0	186	4	27	12	8	17	6	10	16
Krkcldy	0	191	16	25	18	*	16	5	6	*
Wales										
Bangor	1	115	19	27	12	9	11	6	3	13
Cardff	0	851	23	26	17	2	12	8	4	6
Clwyd	7	93	17	26	13	12	18	4	5	4
Swanse	1	588	7	30	18	3	15	3	7	17
Wrexm	0	183	14	26	15	3	16	8	10	8
England	**8**	**27,100**	**16**	**26**	**13**	**8**	**18**	**7**	**7**	**6**
N Ireland	**2**	**952**	**16**	**23**	**13**	**6**	**18**	**8**	**10**	**7**
Scotland	**0**	**2,685**	**13**	**27**	**16**	**4**	**17**	**9**	**7**	**8**
Wales	**1**	**1,830**	**16**	**27**	**17**	**3**	**14**	**6**	**6**	**10**
UK	**7**	**32,567**	**16**	**26**	**14**	**7**	**18**	**7**	**7**	**6**

*Values suppressed due to small numbers (primary or secondary suppression)
The percentage in each category has been calculated after excluding those patients with data not available
For those centres with >25% missing primary diagnoses, the percentages in the other diagnostic categories have not been calculated
For those centres judged to have high % uncertain aetiology for a year, their data has not been used for that year

Table 1.8b. Distribution of primary renal diagnosis by country in the 2015 incident RRT cohort

Country	% data not available	*N* with data	Percentage							
			Uncertain aetiology	Diabetes	Glomerulo-nephritis	Hyper-tension	Other	Polycystic kidney	Pyelo-nephritis	Renal vascular disease
England	**11.3**	**5,628**	**14.9**	**27.5**	**13.5**	**7.4**	**17.4**	**7.3**	**6.6**	**5.5**
N Ireland	**9.5**	**200**	**15.5**	**26.0**	**16.5**	**5.5**	**16.0**	**7.5**	**9.0**	**4.0**
Scotland	**0.0**	**623**	**11.6**	**28.6**	**14.9**	**4.2**	**18.1**	**9.3**	**4.7**	**8.7**
Wales	**0.5**	**387**	**11.9**	**26.9**	**19.9**	**2.8**	**16.3**	**6.5**	**7.0**	**8.8**
UK	**9.7**	**6,838**	**14.4**	**27.5**	**14.1**	**6.8**	**17.3**	**7.4**	**6.5**	**5.9**

The percentage in each category has been calculated after excluding those patients with data not available

Table 1.9. Percentage distribution of primary renal diagnosis by age in the 2015 incident RRT cohort

	Percentage with diagnosis							
	Age group							
Diagnosis	18–<35	35–<45	45–<55	55–<65	65–<75	75–<85	85+	All
Diabetes	14.3	26.5	30.3	33.9	29.8	23.3	9.9	27.5
Glomerulonephritis	29.6	20.6	16.6	13.5	11.6	8.9	8.4	14.1
Pyelonephritis	9.1	5.2	5.8	4.8	6.8	7.8	8.9	6.5
Hypertension	4.0	6.7	5.8	5.5	6.4	8.9	14.8	6.8
Polycystic kidney	5.8	11.6	14.3	9.0	4.9	3.0	2.0	7.4
Renal vascular disease	0.7	1.2	1.5	3.5	7.7	11.8	17.2	5.9
Other	22.5	17.6	15.6	18.4	18.2	15.5	12.8	17.3
Uncertain aetiology	14.0	10.7	10.0	11.2	14.6	20.8	26.1	14.4

Percentages calculated after excluding those patients with data not available

split (data not shown) diabetic nephropathy was the most common renal diagnosis in both the under and over 65 year age groups, accounting for 28% of all (non-missing) incident diagnoses. Glomerulonephritis and autosomal dominant polycystic kidney disease (ADPKD) made up much higher proportions of the younger than the older incident cohorts (18% vs 10% and 11% vs 4% respectively), whilst patients with renal vascular disease comprised a much higher percentage of the older rather than the younger patients (10% vs 2%). Uncertainty about the underlying diagnosis was also much more likely in the older rather than the younger cohort (18% vs 11%).

For all primary renal diagnoses except ADPKD, the male to female ratio was 1.4 or greater. This gender difference may relate to factors such as smoking, hypertension, atheroma and renal vascular disease, which are more common in males and may influence the rate of progression of renal failure.

Table 1.10 shows the incidence rates for each PRD per million population for the 2015 cohort. As there were some missing data, the rates for at least some of the diagnoses will be underestimates.

First established treatment modality

In 2015, the first treatment recorded, irrespective of any later change, was haemodialysis in 73.1% of patients, peritoneal dialysis in 19.2% and pre-emptive transplant in 7.7% (table 1.11). The percentage having a pre-emptive transplant fell in 2015, however, about half of this drop is due to Cambridge (a transplant centre) not being included in the data for 2015. Table F.1.3 in appendix F: Additional Data Tables for 2015 New and Existing Patients gives the treatment breakdown at start of RRT by centre.

Many patients undergo a brief period of HD before switches to other modalities are, or can be, considered. Therefore, the established modality at 90 days is more representative of the elective first modality and this

Table 1.10. Primary renal diagnosis RRT incidence rates (2015) per million population (unadjusted)

Diagnosis	England	N Ireland	Scotland	Wales	UK
Diabetes	28.8	28.1	33.1	33.6	29.4
Glomerulonephritis	14.2	17.8	17.3	24.8	15.1
Pyelonephritis	6.9	9.7	5.4	8.7	7.0
Hypertension	7.7	5.9	4.8	3.5	7.2
Polycystic kidney	7.6	8.1	10.8	8.1	7.9
Renal vascular disease	5.8	4.3	10.1	11.0	6.3
Other	18.2	17.3	21.0	20.3	18.5
Uncertain aetiology	15.6	16.7	13.4	14.8	15.4
Data not available	13.3	11.3	0.0	0.6	11.5
All	**118**	**119**	**116**	**126**	**118**

The overall rates per country may be slightly different to those in table 1.2 as Cambridge have been excluded from both the numerator and the denominator here

Table 1.11. Treatment at start and at 90 days by year of start

Start	HD (%)	PD (%)	Transplant (%)
Day 0 treatment			
2010	74.5	18.6	6.9
2011	72.7	20.4	6.9
2012	72.8	19.5	7.7
2013	71.9	19.4	8.8
2014	71.9	19.8	8.3
2015	73.1	19.2	7.7
Day 90 treatment			
Oct 2009 to end Sept 2010	72.5	19.4	8.1
Oct 2010 to end Sept 2011	70.7	20.6	8.7
Oct 2011 to end Sept 2012	70.8	20.2	9.1
Oct 2012 to end Sept 2013	69.8	20.0	10.2
Oct 2013 to end Sept 2014	69.6	20.1	10.3
Oct 2014 to end Sept 2015	71.3	19.6	9.1

modality was used for the remainder of this section. For these analyses, the incident cohort from 1st October 2014 to 30th September 2015 was used so that follow up to 90 days was possible for all patients. By 90 days, 5.2% of incident patients had died and a further 0.5% had stopped treatment, leaving 94.3% of the original cohort still on RRT. Table 1.12a shows the percentages on each treatment modality at 90 days both as percentages of all of those starting RRT and then of those still on treatment at 90 days. Expressed as percentages of the whole incident cohort, 67.3% were on HD at 90 days, 18.4% were on PD and 8.6% had received a transplant. Expressed as percentages of those still receiving RRT at 90 days, 71.3% were on HD, 19.6% on PD and 9.1% had received a transplant.

Figure 1.8 shows the modality breakdown with the HD patients further subdivided. Of those still on RRT at 90 days, 41% were treated with hospital HD, 30% with satellite HD, and only 0.4% were receiving home HD at this early stage. This 0.4% on home HD was 27 patients (across 11 centres). This was a decrease from the 0.6% (43 patients across 16 centres) seen for 2014. Chapter 2: UK Renal Replacement Therapy Prevalence in 2015 shows that 4.2% of all dialysis patients were receiving home HD.

Table 1.12b shows the treatment breakdown at 90 days by centre. Here a five year cohort was used (1st October 2010 to 30th September 2015). The percentage of incident patients who had died by 90 days varied considerably between centres. The ongoing observation that in some centres few patients die by 90 days is difficult to explain clinically. Differences in the definition of whether patients have acute or chronic renal failure and when they then report patients to the UKRR (with a period of time between start of RRT and reporting to the UKRR in which they have by definition survived – immortal time bias) may be a factor in this apparent variation along with possible differences in clinical practice.

Using just 2015 incident patients, the percentage of patients still on RRT at 90 days who had a functioning transplant at 90 days varied between centres from 0% to 35% (between 7% and 35% for transplanting centres and between 0% and 13% for non-transplanting centres). The mean percentage of the incident cohort with a functioning transplant at 90 days was greater in transplanting compared to non-transplanting centres (11.9% vs 5.8%). One possible reason could be that some patients transplanted pre-emptively were attributed to the incident cohort of the transplanting centre rather than that of the referring centre.

Table 1.13 gives the HD/PD breakdown by age group for those incident patients on dialysis at 90 days (incident cohort 1/10/2012 to 30/09/2015). The percentage on PD at 90 days was about 50% higher in patients aged under 65 years than in older patients (27% vs 17%). In both

Table 1.12a. RRT modality at 90 days by country (incident cohort 1/10/2014 to 30/09/2015)

		Status at 90 days of all patients who started RRT (%)					Status at 90 days of only those patients still on RRT (%)		
Centre	*N*	HD	PD	Tx	Recovered/ discontinued	Died	HD	PD	Tx
England	**6,431**	**66.7**	**18.9**	**8.6**	**0.4**	**5.4**	**70.9**	**20.0**	**9.1**
N Ireland	**214**	**62.6**	**15.9**	**16.4**	**2.8**	**2.3**	**66.0**	**16.8**	**17.2**
Scotland	**553**	**73.4**	**14.7**	**8.0**	**0.5**	**3.4**	**76.5**	**15.3**	**8.3**
Wales	**389**	**70.2**	**18.3**	**5.7**	*	*	**74.6**	**19.4**	**6.0**
UK	**7,587**	**67.3**	**18.4**	**8.6**	**0.5**	**5.2**	**71.3**	**19.6**	**9.1**

*Values suppressed due to small numbers (primary or secondary suppression)

Table 1.12b. RRT modality at 90 days by centre (incident cohort 1/10/2010 to 30/09/2015)

Centre	*N*	Percentage who had died by 90 days	Percentage of patients still on RRT at 90 days		
			HD	PD	Tx
England					
B Heart	528	5	79	17	3
B QEH	1,092	2	72	19	9
Basldn	218	4	74	25	1
Bradfd	363	5	78	12	10
Brightn	671	7	69	25	6
Bristol	760	5	71	17	12
Camb	542	4	63	10	26
Carlis	171	2	54	39	7
Carsh	1,189	7	74	19	7
Chelms	244	4	*	21	*
Colchr	172	8	*	*	*
Covnt	560	8	61	29	10
Derby	370	6	54	44	2
Donc	227	6	*	21	*
Dorset	375	3	68	27	5
Dudley	244	4	*	34	*
Exeter	621	4	75	21	4
Glouc	314	4	72	24	4
Hull	500	5	60	33	6
Ipswi	200	2	67	27	6
Kent	660	5	73	17	9
L Barts	1,374	4	64	29	7
L Guys	721	2	73	9	18
L Kings	752	2	71	25	4
L Rfree	1,139	4	64	25	11
L St.G	453	4	74	15	11
L West	1,734	3	82	6	12
Leeds	809	6	66	17	17
Leic	1,310	6	68	19	13
Liv Ain	309	13	72	25	3
Liv Roy	577	9	55	25	19
M RI	883	6	60	21	18
Middlbr	556	7	79	7	13
Newc	510	8	69	19	12
Norwch	419	7	79	19	2
Nottm	558	7	55	32	14
Oxford	884	5	60	23	17
Plymth	281	6	65	21	15
Ports	956	4	72	18	11
Prestn	757	5	73	16	11
Redng	484	7	59	35	7
Salford	704	5	66	27	7
Sheff	689	5	76	15	9
Shrew	313	8	71	27	2
Stevng	662	5	78	13	9
Sthend	162	6	69	25	6
Stoke	476	7	72	26	2
Sund	302	3	80	13	7
Truro	247	11	72	19	9
Wirral	296	14	73	23	4
Wolve	436	7	62	36	2
York	261	4	60	25	15

Table 1.12b. Continued

Centre	*N*	Percentage who had died by 90 days	Percentage of patients still on RRT at 90 days		
			HD	PD	Tx
N Ireland					
Antrim	149	4	79	15	6
Belfast	387	4	63	13	24
Newry	125	5	*	31	*
Ulster	144	10	*	11	*
West NI	155	4	74	19	6
Scotland					
Abrdn	276	4	79	19	2
Airdrie	262	1	*	12	*
D & Gall	69	4	56	44	0
Dundee	233	4	83	16	2
Edinb	399	5	72	11	17
Glasgw	900	3	77	12	12
Inverns	98	*	69	27	4
Klmarnk	180	8	*	22	*
Krkcldy	182	8	83	17	0
Wales					
Bangor	114	6	*	21	*
Cardff	867	5	71	17	12
Clwyd	109	6	74	22	4
Swanse	604	6	74	22	4
Wrexm	183	7	66	27	7
England	**30,035**	**5**	**70**	**21**	**10**
N Ireland	**960**	**5**	**72**	**16**	**12**
Scotland	**2,599**	**4**	**77**	**15**	**7**
Wales	**1,877**	**6**	**72**	**20**	**8**
UK	**35,471**	**5**	**70**	**20**	**10**

*Values suppressed due to small numbers (primary or secondary suppression)

age groups there was a lot of variability between centres in the percentage on PD.

In 2015, the median age at start for those on HD at 90 days was 66.7 years compared with 59.9 years for PD. There were eleven centres where the percentage of patients treated with PD was the same as or higher in the over 65s than the under 65s (seven centres for the three year cohort shown in table 1.13). This reflects the use of assisted PD programmes – a feature of note and one that is valued by the patients and their families.

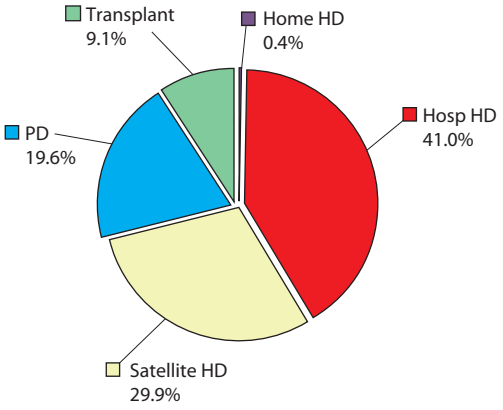

Fig. 1.8. RRT modality at 90 days (incident cohort 1/10/2014 to 30/09/2015)

Modality change over time

Table 1.14 gives the breakdown of status/treatment modality at four subsequent time points by initial treatment type for patients starting RRT in 2010. Fifty-four percent of patients who started on HD had died within five years of starting. This compared to 34% and 4% for those starting on PD or transplant respectively. Of the patients starting on PD, 90% were on PD at 90 days but this percentage dropped sharply at the later time points. In contrast, 92% of patients starting with a transplant were also transplant patients at the five year time point.

Table 1.13. Modality split of patients on dialysis at 90 days (incident cohort 1/10/2012 to 30/09/2015)

	Age <65 (%)		Age ⩾65 (%)	
Centre	HD	PD	HD	PD
England				
B Heart	74	26	88	12
B QEH	73	27	89	11
Basldn	70	30	79	21
Bradfd	82	18	95	5
Brightn	70	30	78	22
Bristol	74	26	84	16
Camb	87	13	88	13
Carlis	57	43	58	42
Carsh	72	28	84	16
Chelms	76	24	83	17
Colchr	100	0	100	0
Covnt	63	37	73	27
Derby	44	56	70	30
Donc	70	30	85	15
Dorset	71	29	72	28
Dudley	56	44	74	26
Exeter	71	29	81	19
Glouc	58	42	81	19
Hull	59	41	75	26
Ipswi	73	27	72	28
Kent	74	27	87	13
L Barts	67	34	70	30
L Guys	88	12	92	8
L Kings	71	29	78	22
L Rfree	62	38	74	26
L St.G	83	17	81	19
L West	93	7	92	8
Leeds	77	24	88	12
Leic	76	24	85	15
Liv Ain	59	41	83	17
Liv Roy	68	33	72	28
M RI	72	28	80	20
Middlbr	86	14	95	6
Newc	79	21	79	21
Norwch	79	21	92	8
Nottm	53	47	78	22
Oxford	65	35	77	23
Plymth	69	31	81	19
Ports	78	22	84	16
Prestn	80	20	83	17
Redng	53	47	74	27
Salford	69	31	76	24
Sheff	79	21	88	12
Shrew	61	39	82	18
Stevng	84	16	90	10
Sthend	66	34	78	22
Stoke	60	40	81	20
Sund	76	24	97	3
Truro	71	29	88	12
Wirral	66	34	88	12
Wolve	57	43	73	27
York	68	32	78	22
N Ireland				
Antrim	83	17	89	11
Belfast	78	22	84	16
Newry	74	27	55	45
Ulster	76	24	93	7
West NI	67	33	81	19
Scotland				
Abrdn	71	30	89	11
Airdrie	87	13	88	12
D & Gall	61	39	59	41
Dundee	83	18	84	16
Edinb	89	11	86	14
Glasgw	86	14	88	12
Inverns	61	40	83	17
Klmarnk	78	22	79	21
Krkcldy	71	29	90	10
Wales				
Bangor	83	17	81	19
Cardff	74	27	87	13
Clwyd	67	33	87	14
Swanse	65	35	88	12
Wrexm	51	49	86	15
England	**72**	**28**	**82**	**18**
N Ireland	**76**	**24**	**83**	**17**
Scotland	**81**	**19**	**86**	**14**
Wales	**69**	**31**	**87**	**13**
UK	**73**	**27**	**83**	**17**

Renal function at the time of starting RRT

The mean eGFR at initiation of RRT in 2015 was 8.5ml/min/1.73 m^2. This is shown by age group in figure 1.9.

Figure 1.10 shows serial data from centres reporting to the UKRR every year since 2006. For the six years before 2011 there was higher average eGFR at start of RRT for PD than HD patients but on average, the values were more similar between treatments for 2011 to 2015.

Some caution should be applied to the analyses of eGFR at the start of RRT as data were only available for less than half of the incident patients (approximately 3,100 for 2015) and almost half of these came from only 10 centres. Three-quarters of the values came from 21 centres. Further caution should be applied as a review of pre-RRT biochemistry in nine renal centres revealed that up to 18% of patients may have had an incorrect date of starting RRT allocated and thus, the eGFR used

Table 1.14. Initial and subsequent modalities for patients starting RRT in 2010*

First treatment	*N*	Later modality	Percentage			
			90 days	1 year	3 years	5 years
HD	4,856	HD	90	73	47	28
		PD	2	3	2	1
		Transplant	1	4	11	16
		Recovered/discontinued	0	1	1	1
		Died	7	18	39	54
PD	1,219	HD	6	16	21	16
		PD	90	64	27	11
		Transplant	2	11	30	38
		Recovered/discontinued	0	1	1	1
		Died	2	9	21	34
Transplant	430	HD	0	1	2	3
		PD	0	0	1	1
		Transplant	99	98	95	92
		Died	1	1	2	4

*Cambridge excluded as five year follow up not available

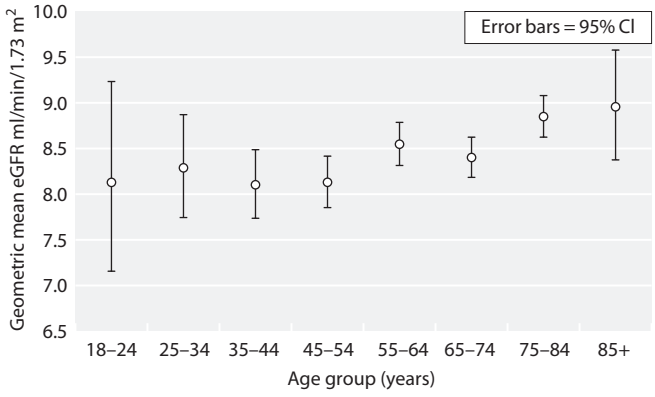

Fig. 1.9. Geometric mean eGFR at start of RRT (2015) by age group

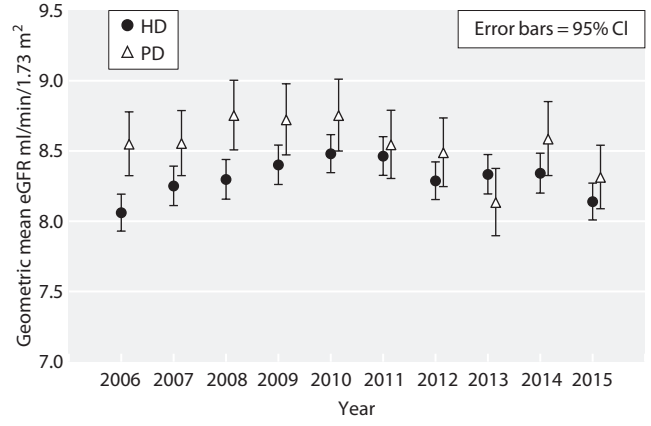

Fig. 1.10. eGFR on starting RRT 2006 to 2015, PD and HD (restricted to centres reporting since 2006)

for analysis may have been taken whilst they were already receiving RRT. For details see the 12th Annual Report chapter 13: The UK Renal Registry Advanced CKD Study 2009 [5]. The UKRR hopes to address this and other related timeline anomalies by prospectively capturing data on patients attending renal units from eGFR 30 ml/min/1.73 m^2 and by more frequent data downloads.

3. Late presentation and delayed referral of incident patients

Introduction

Late presentation to a nephrologist is regarded as a negative aspect in renal care. It can be defined in a number of ways as it has a range of possible causes. There are many patients with chronic kidney disease who are regularly monitored in primary or secondary care and whose referral to nephrology services is delayed (delayed or late referral). In contrast, other patients present late to medical services due to no particular deficiency in the service; those with either such slowly progressive disease as to have remained asymptomatic for many years or the opposite – those with rapidly progressive CKD. The main analyses presented here do not differentiate between these groups and include any patient first seen by renal services within 90 days of starting RRT as 'late presentation'. One analysis attempts to capture 'late referrals': it shows the percentage presenting

within 90 days of starting RRT after excluding an acute renal disease group.

Methods

Date first seen by a nephrologist has not been collected from the Scottish Renal Registry and so Scottish centres were excluded from these analyses. Data were included for incident patients in English, Welsh or Northern Irish centres in the years 2014 to 2015. This two year cohort was used for most of the analyses in order to make the late presentation percentages more reliably estimated and to allow these to be shown for subgroups of patients. The date first seen in a renal centre and the date of starting RRT were used to define the late presenting cohort. A small amount of data was excluded because of actual or potential inconsistencies. Only data from those centres with 75% or more completeness for the relevant year were used. Data were excluded if 10% or more of the patients were reported to have started RRT on the same date as the first presentation. This was because investigation has shown that this is likely due to misunderstanding on the part of the renal centres resulting in incorrect recording of data. Sheffield was excluded from the late presentation analyses because 55 of their incident patients for 2015 were not submitted to the UKRR and those 96 that were submitted were all early presenters. After these exclusions, data on 10,038 patients were available for analysis. Presentation times of 90 days or more before start were defined

Table 1.15. Percentage completeness of time of presentation data (2014 and 2015 incident RRT patients) by centre

	N		Percentage completeness	
Centre	2014	2015	2014	2015
England				
B Heart	100	122	95.0	95.9
B QEH	250	247	98.0	98.8
Basldn	45	46	95.6	97.8
Bradfd	83	88	98.8	100.0
Brightn	148	142	96.6	97.9
Bristol	151	144	98.7	77.8
Camb	126	[a]	68.3	[a]
Carlis	37	44	94.6	97.7
Carsh	265	248	42.6	42.3
Chelms	55	46	100.0	95.7
Colchr	38	28	44.7	67.9
Covnt	125	109	92.0	88.1
Derby	76	63	100.0	98.4
Donc	54	36	98.2	94.4
Dorset	78	74	98.7	94.6
Dudley	42	49	95.2	95.9
Exeter	143	122	97.2	99.2
Glouc	62	64	72.6	92.2
Hull	98	124	[b]	97.6
Ipswi	34	66	85.3	16.7
Kent	149	142	100.0	100.0
L Barts	302	314	28.8	[b]
L Guys	160	180	80.0	93.3
L Kings	148	179	100.0	99.4
L Rfree	230	236	96.5	96.2
L St.G	91	119	24.2	67.2
L West	355	340	98.3	97.7
Leeds	170	146	98.8	98.0
Leic	252	273	98.0	98.2
Liv Ain	65	66	98.5	95.5
Liv Roy	136	146	97.1	91.1
M RI	164	220	50.0	92.3
Middlbr	102	134	98.0	98.5
Newc	109	124	98.2	99.2
Norwch	76	109	[b]	[b]
Nottm	111	125	97.3	94.4
Oxford	188	203	97.9	98.5
Plymth	55	53	49.1	94.3
Ports	230	197	60.4	67.0
Prestn	164	159	91.5	96.9
Redng	104	86	97.1	100.0
Salford	161	138	4.4	5.8
Sheff[c]	151	96[c]	98.0	92.7[c]
Shrew	65	65	98.5	[b]
Stevng	150	139	96.7	87.8
Sthend	30	35	100.0	88.6
Stoke	115	107	92.2	92.5
Sund	62	63	100.0	96.8
Truro	39	80	97.4	96.3
Wirral	55	63	96.4	[b]
Wolve	79	83	96.2	97.6
York	64	61	[b]	98.4
N Ireland				
Antrim	35	35	97.1	94.3
Belfast	64	89	95.3	89.9
Newry	20	28	95.0	100.0
Ulster	23	32	95.7	96.9
West NI	35	37	97.1	[b]
Wales				
Bangor	22	29	90.9	100.0
Cardff	168	158	95.8	98.1
Clwyd	32	29	[b]	72.4
Swanse	121	128	100.0	100.0
Wrexm	41	45	97.6	93.3
England	**6,342**	**6,343**	**80.1**	**81.0**
N Ireland	**177**	**221**	**96.0**	**77.8**
Wales	**384**	**389**	**89.1**	**91.0**
E, W & NI	**6,903**	**6,953**	**81.0**	**81.4**

[a]Cambridge was unable to submit 2015 data

[b]Data not shown as >10% of patients reported as starting RRT on the same date as first presentation

[c]Only 96 of Sheffield's 151 incident patients were submitted to the UKRR and, although completeness was good for these 96, they included no late presenters. Therefore Sheffield have been excluded from the late presentation analyses

as early presentation and times of less than 90 days were defined as late presentation.

Estimated glomerular filtration rate (eGFR) at the start of RRT was studied amongst patients with eGFR data within 14 days before the start of RRT. The eGFR was calculated using the abbreviated 4 variable MDRD study equation [3]. For the purpose of the eGFR calculation, patients who had missing ethnicity but a valid serum creatinine measurement were classed as White. The eGFR values were log transformed due to their skewed distribution.

A mixture of old and new (2012) EDTA codes for primary diagnoses were received from centres. New codes were received for about 64% of 2014 incident patients and for about 70% of 2015 incident patients. For those people without an old code, new codes (where available) were mapped back to old codes. These codes were grouped into the same eight categories as in previous reports, the details are given in appendix H: Ethnicity and ERA-EDTA Coding (www.renalreg.org).

The 'acute' group was made up of those people with conditions likely to present with rapidly deteriorating renal function: crescentic (extracapillary) glomerulonephritis (type I, II, III), nephropathy (interstitial) due to cis-platinum, renal vascular disease due to malignant hypertension, renal vascular disease due to polyarteritis, Wegener's granulomatosis, cryoglobulinemic glomerulonephritis, myelomatosis/light chain deposit disease, Goodpasture's syndrome, systemic sclerosis (scleroderma), haemolytic ureaemic syndrome, multi-system disease – other, tubular necrosis (irreversible) or cortical necrosis, Balkan nephropathy, kidney tumour(s), and traumatic or surgical loss of kidney(s).

Results

Data completeness

Table 1.15 shows the percentage completeness of data for 2014 and 2015.

Late presentation by centre

Figure 1.11 shows that late presentation varied between centres from 5% to 35% in patients starting RRT in 2014 to 2015. The overall rate of late presentation was 17.0% and was 12.2% once those people with diseases likely to present acutely were excluded. Table 1.16 shows the overall percentage presenting late for the combined 2014/2015 incident cohort, the percentages presenting late amongst those patients defined as not having an 'acute diagnosis' and the percentages amongst non-diabetics (as PRD).

Considerable differences exist between centres in late presentation rates. One centre (Birmingham Heartlands) attained a late presentation rate of just over 5%. Four centres (Ipswich, Southend, Stoke and Wirral) reported that over 40% of their incident patients were only seen within a year of commencement of RRT. These differences have implications for their regions and referral pathways.

Late presentation in 2015 and the trend over time

There has been a steady decline nationally in the proportion of patients presenting late to renal services, with some centres achieving <10% late presentation rates. This may be a consequence of the National CKD guidelines published by the Medical and GP Royal Colleges [6], the Quality and Outcomes Framework (QOF) initiative (www.dh.gov.uk) raising awareness of CKD amongst non-nephrologists and the introduction of estimated GFR reporting. The Health Foundation is currently funding a quality improvement initiative rolling out a computer program that flags people with declining kidney function to laboratory staff who in turn flag these people to the GP to ensure they are aware of the decline and have considered referral to a nephrologist. About twenty renal centres are participating in this initiative (ASSIST-CKD [7]) which is being managed through Kidney Research

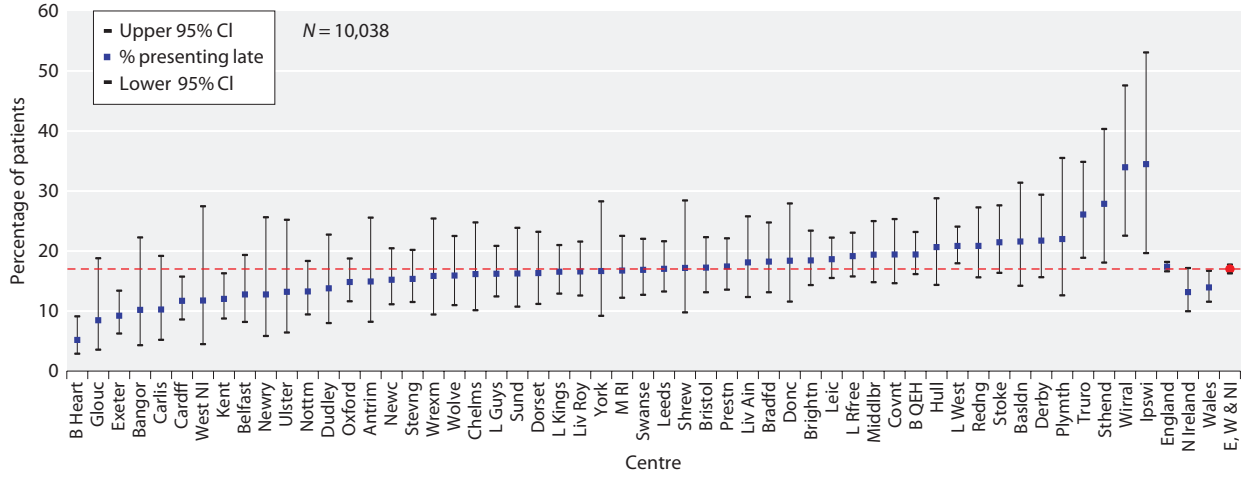

Fig. 1.11. Percentage presenting late (2014/2015)

Table 1.16. Percentage of patients presenting to a nephrologist less than 90 days before RRT initiation and percentage presenting less than a year before initiation (2014/2015 incident patients) by centre

		Percentage presenting <90 days before start				Percentage presenting <1 year before start[b]	
Centre	*N* with data	Overall	(95% CI)	Non-acute[a]	Non-diab PRD		(95% CI)
England							
B Heart	212	5.2	(2.9–9.1)	3.3	7.1	10.4	(6.9–15.3)
B QEH	489	19.4	(16.2–23.2)	16.0	21.1	31.9	(27.9–36.2)
Basldn	88	21.6	(14.2–31.4)	20.9	28.6	30.7	(22.0–41.1)
Bradfd	170	18.2	(13.1–24.8)	10.6	24.6	28.8	(22.5–36.1)
Brightn	282	18.4	(14.3–23.4)	13.2	21.0	33.7	(28.4–39.4)
Bristol	261	17.2	(13.1–22.3)	9.9	20.5	24.9	(20.0–30.5)
Carlis	78	10.3	(5.2–19.2)	10.0	8.5	15.4	(9.0–25.2)
Chelms	99	16.2	(10.1–24.8)	14.0	21.1	30.3	(22.1–40.0)
Covnt	211	19.4	(14.6–25.3)	14.8	22.4	34.6	(28.5–41.3)
Derby	138	21.7	(15.6–29.4)	14.1	29.0	32.6	(25.3–40.9)
Donc	87	18.4	(11.6–27.9)	11.0	22.7	28.7	(20.2–39.1)
Dorset	147	16.3	(11.2–23.2)	10.8	19.1	26.5	(20.0–34.2)
Dudley	87	13.8	(8.0–22.7)	8.6	16.7	24.1	(16.3–34.2)
Exeter	260	9.2	(6.3–13.4)	6.1	11.2	25.8	(20.8–31.4)
Glouc	59	8.5	(3.6–18.8)	5.5	12.2	17.0	(9.4–28.7)
Hull	121	20.7	(14.4–28.8)	18.4	23.5	38.0	(29.8–47.0)
Ipswi	29	34.5	(19.7–53.1)			58.6	(40.4–74.8)
Kent	291	12.0	(8.8–16.3)	8.7	13.8	23.0	(18.5–28.2)
L Guys	296	16.2	(12.4–20.9)	12.4	15.5	29.7	(24.8–35.2)
L Kings	326	16.6	(12.9–21.0)	14.5	21.8	29.8	(25.0–34.9)
L Rfree	449	19.2	(15.8–23.1)	15.7	22.6	34.1	(29.8–38.6)
L West	681	20.9	(18.0–24.1)	16.8	25.3	34.8	(31.3–38.5)
Leeds	311	17.0	(13.3–21.6)	13.0	18.5	28.6	(23.9–33.9)
Leic	515	18.6	(15.5–22.2)	11.2	21.7	33.0	(29.1–37.2)
Liv Ain	127	18.1	(12.3–25.8)	9.4	23.5	28.4	(21.2–36.8)
Liv Roy	265	16.6	(12.6–21.6)	10.3	14.0	27.6	(22.5–33.2)
M RI	203	16.8	(12.2–22.5)	9.0	22.8	36.5	(30.1–43.3)
Middlbr	232	19.4	(14.8–25.0)	15.2	22.4	31.5	(25.8–37.7)
Newc	230	15.2	(11.1–20.5)	9.7	18.5	24.8	(19.6–30.8)
Nottm	226	13.3	(9.4–18.4)	11.3	17.7	23.5	(18.4–29.4)
Oxford	384	14.8	(11.6–18.8)	8.7	19.7	27.9	(23.6–32.6)
Plymth	50	22.0	(12.6–35.5)	20.5	26.3	32.0	(20.6–46.0)
Prestn	304	17.4	(13.6–22.1)	11.9	22.8	29.3	(24.4–34.6)
Redng	187	20.9	(15.6–27.3)	14.0	27.3	27.8	(21.9–34.7)
Shrew	64	17.2	(9.8–28.4)	15.8	17.7	37.5	(26.6–49.9)
Stevng	267	15.4	(11.5–20.2)	11.4	15.2	20.6	(16.2–25.9)
Sthend	61	27.9	(18.1–40.3)	21.8	34.8	42.6	(30.9–55.2)
Stoke	205	21.5	(16.4–27.6)	13.9	25.2	45.4	(38.7–52.2)
Sund	123	16.3	(10.7–23.9)	9.5	19.2	29.3	(21.9–37.9)
Truro	115	26.1	(18.9–34.9)	19.8	34.2	39.1	(30.7–48.3)
Wirral	53	34.0	(22.6–47.6)	13.2	37.2	56.6	(43.1–69.2)
Wolve	157	15.9	(11.0–22.5)	11.6	18.4	28.7	(22.1–36.2)
York	60	16.7	(9.2–28.3)	13.8	20.0	36.7	(25.5–49.5)
N Ireland							
Antrim	67	14.9	(8.2–25.6)	8.5	21.3	20.9	(12.8–32.3)
Belfast	141	12.8	(8.2–19.4)	6.3	14.7	21.3	(15.3–28.8)
Newry	47	12.8	(5.9–25.6)	9.5	17.1	17.0	(8.8–30.5)
Ulster	53	13.2	(6.4 – 25.2)	10.9	18.0	28.3	(17.8 – 41.8)
West NI	34	11.8	(4.5–27.5)	[c]	15.4	26.5	(14.4–43.5)

Table 1.16. Continued

Centre	*N* with data	Percentage presenting <90 days before start				Percentage presenting <1 year before start[b]	
		Overall	(95% CI)	Non-acute[a]	Non-diab PRD		(95% CI)
Wales							
Bangor	49	10.2	(4.3–22.3)	10.4	10.8	18.4	(9.8–31.7)
Cardff	316	11.7	(8.6–15.7)	7.1	13.2	22.2	(17.9–27.1)
Swanse	249	16.9	(12.7–22.0)	12.4	20.7	28.9	(23.6–34.9)
Wrexm	82	15.9	(9.4–25.4)	11.0	16.7	24.4	(16.3–34.8)
England	**9,000**	**17.4**	**(16.6–18.2)**	**12.6**	**20.7**	**30.1**	**(29.1–31.0)**
N Ireland	**342**	**13.2**	**(10.0–17.2)**	**7.7**	**16.7**	**22.2**	**(18.1–26.9)**
Wales	**696**	**13.9**	**(11.6–16.7)**	**9.7**	**16.0**	**24.6**	**(21.5–27.9)**
E, W & NI	**10,038**	**17.0**	**(16.3–17.8)**	**12.2**	**20.2**	**29.4**	**(28.5–30.3)**
Min		**5.2**		**3.3**	**7.1**	**10.4**	
Quartile 1		**14.6**		**9.6**	**16.7**	**24.7**	
Quartile 3		**19.4**		**14.0**	**22.8**	**33.2**	
Max		**34.5**		**21.8**	**37.2**	**58.6**	

Blank cells – data for PRD not used due to high % with missing data or high % with uncertain aetiology
[a]Non-acute group excludes those diagnoses defined as acute (see methods)
[b]The remaining patients starting RRT therefore presented over 1 year beforehand
[c]Value suppressed due to small numbers

UK, the UKRR is leading the stepped-wedge evaluation to establish effectiveness.

In 2015, 71.3% of incident patients presented to nephrology services over a year before they started RRT, an increase from the 69.4% reported last year. The remaining patients presented within a year of start, with 8.1% of patients presenting within the 6–12 month window before RRT, 4.2% within 3–6 months and 16.4% within three months of RRT start. Figure 1.12 shows this breakdown by year for those 33 centres supplying data over 75% complete for each of the last six years. The figure shows an increase over time in the percentage of patients presenting a year or more before starting RRT. As shown in previous reports this increase was even more marked in the years before those shown in the figure. In 2005, only 52.6% of incident patients presented over a year before they started RRT.

Characteristics of patients presenting late versus those presenting early

In the combined 2014/2015 incident cohort, the median age was a little lower in those presenting late than those presenting early (table 1.17). The male : female ratio was higher in the group presenting late than those presenting early. There were large differences in the

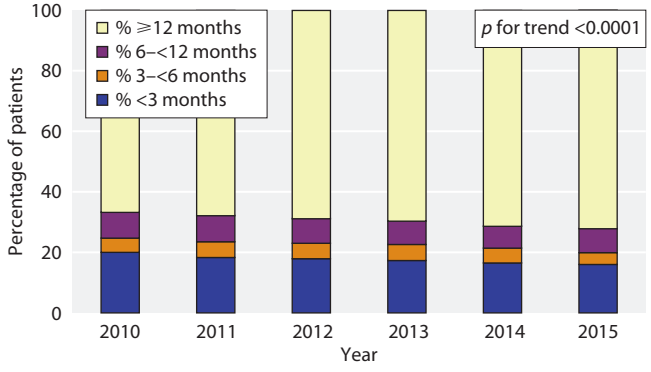

Fig. 1.12. Late presentation rate by year (2010–2015)
Restricted to centres reporting continuous data for 2010–2015

Table 1.17. Patient characteristics amongst patients presenting late (<90 days) compared with those presenting early (⩾90 days) (2014/2015 incident patients)

	<90 days	⩾90 days	*p*-value
Median age	64.5	65.1	0.02
Male : female ratio (% male)	1.94 (66%)	1.66 (62%)	0.004
Percentage starting on PD	10.2	22.2	<0.0001
Percentage on PD at 90 days	12.7	21.7	<0.0001
Mean haemoglobin at RRT start (g/L)	90	99	<0.0001
Geometric mean eGFR at RRT start (ml/min/1.73 m^2)	7.7	8.6	<0.0001

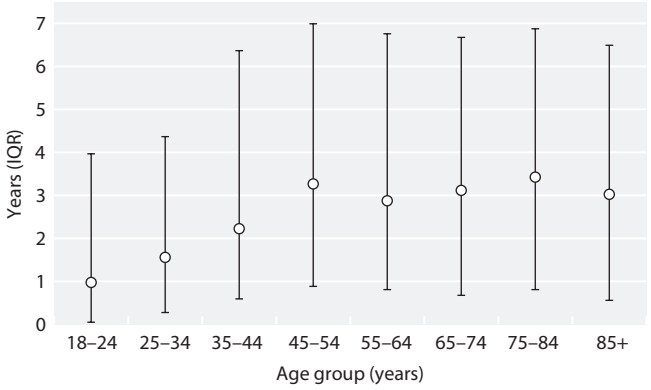

Fig. 1.13. Median duration of pre-RRT care by age group (incident patients 2014/2015)

percentages starting on PD and in haemoglobin and eGRF at start with all three of these being lower in late presenters than in early presenters. The difference for haemoglobin may reflect inadequate pre-dialysis care with limited anaemia management, but alternatively those presenting late may be more likely to have anaemia because of multisystem disease or inter-current illness. More detailed analyses of haemoglobin at start of RRT and late presentation can be found in chapter 7: Haemoglobin, Ferritin and Erythropoietin amongst UK Adult Dialysis Patients in 2015. The finding of lower average eGFR in those presenting late is in contrast to some of the studies in the literature but many of those studies pre-date the era of routine use of eGFR [8, 9]. A recent Cochrane review [10] has shown that eGFR was indeed lower in RRT patients referred late (mean difference of 0.42 ml/min/1.73 m^2) compared to those presenting early (definition: more than six months before starting RRT) consistent with UKRR data.

In the 2014/2015 cohort, the percentage of South Asian and Black patients presenting late (<90 days) was lower than in Whites (14.0% vs 17.3%: $p < 0.001$). Above age 45, the median duration of pre-RRT care did not vary greatly with age group (figure 1.13).

Primary renal disease and late presentation

In the 2014/2015 cohort, there were large differences in late presentation rates between primary renal diagnoses (Chi-squared test $p < 0.0001$) (table 1.18). Patients in the acute group or with data not available had high rates of late presentation as anticipated. Those with diabetes and adult polycystic kidney disease or pyelonephritis had low rates in keeping with their longer natural histories of CKD progression. There was a notable decline in the proportion of diabetics presenting late up until 2007. Since then the proportion has been stable. The decline seen earlier likely reflects national initiatives to screen patients with diabetes for proteinuria and falling GFR.

Table 1.18. Late presentation by primary renal diagnosis (2014/2015 incident patients)

		Late presentation	
Diagnosis	*N*	*N*	%
Uncertain aetiology	1,245	266	21.4
Diabetes	2,570	198	7.7
Glomerulonephritis	1,274	181	14.2
Other identified category	921	166	18.0
Polycystic kidney or pyelonephritis	1,224	75	6.1
Renal vascular disease	1,153	131	11.4
Acute group	932	516	55.4
Data not available	262	81	30.9

Unlike elsewhere in the report: (i) the RVD group includes hypertension, and (ii) polycystic kidney and pyelonephritis are grouped together
For definition of acute group see methods

Comorbidity and late presentation

In the 2014/2015 cohort, the percentage of patients who were recorded as having no comorbidity was similar in those who presented late as in those presenting earlier (49.1% vs 51.1%: $p = 0.2$). That said however, there were differences in those with comorbidities: cardiovascular disease was less common and liver disease and malignancy more common in those presenting late compared to those presenting early (table 1.19) perhaps reflecting underlying causes of CKD and its progression. This is in keeping with findings from other studies [8–9, 11].

Table 1.19. Percentage prevalence of specific comorbidities amongst patients presenting late (<90 days) compared with those presenting early (⩾90 days) (2014/2015 incident patients)

Comorbidity	<90 days	⩾90 days	*p*-value
Ischaemic heart disease	13.1	20.1	<0.0001
Cerebrovascular disease	7.9	10.8	0.01
Peripheral vascular disease	7.5	11.8	<0.0001
Diabetes (not a cause of ERF)	12.0	10.7	0.2
Liver disease	5.2	3.1	0.001
Malignancy	20.8	12.0	<0.0001
COPD	8.4	7.7	0.5
Smoking	11.4	11.6	0.8

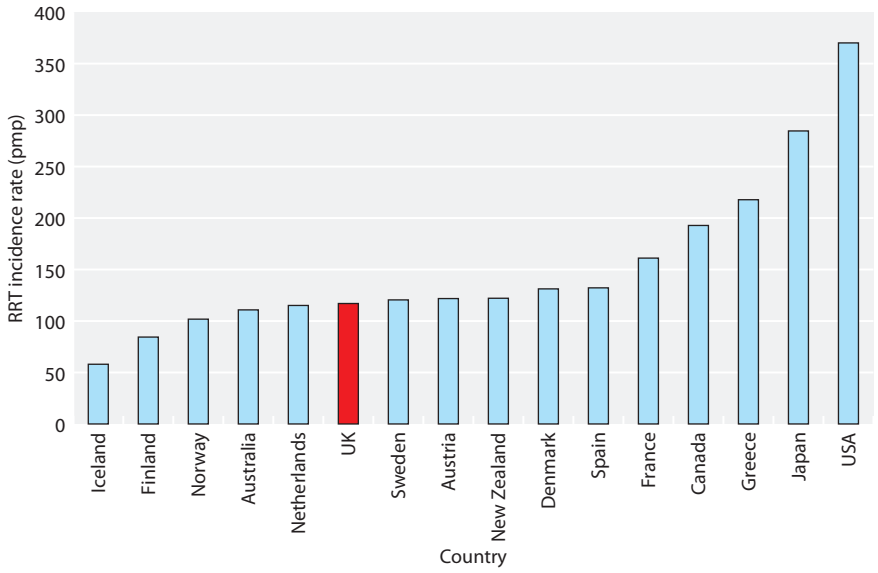

Fig. 1.14. International comparison of RRT incidence rates in 2014
Non-UK data from USRDS [12]

International comparisons

Figure 1.14 shows the crude RRT incidence rates (including children) for 2014 for various countries. The non-UK data are from the USRDS [12]; 2014 was the latest year available at time of writing. The UK incidence rate was similar to those in many other Northern European countries, Australia and New Zealand but remained markedly lower than in some other countries, most notably Greece, Japan and the USA. There are numerous reasons for these differences which have been documented and explored in other ecological studies and summarised by this review [13].

Survival of incident patients

See chapter 5: Survival and Causes of Death of UK Adult Patients on Renal Replacement Therapy in 2015.

Discussion

Across the UK, as a whole, the renal replacement therapy (RRT) incidence rate for 2015 was higher than for 2014, 2013 and 2012. Partly because of the smaller numbers involved, rates have been more variable over the last few years for Northern Ireland, Scotland and Wales compared with England. Wales continued to have the highest incidence rate and there remained large between centre variation in incidence rates for RRT some of which is likely explained by population differences in ethnicity and age structure. There was a lot of variation between CCG/HBs in the rates of older people (>75) starting RRT and also substantial between centre variation in use of different types of RRT modality some of which suggests inefficient use of cheaper and more effective forms of treatment. Although large numbers of patients continued to present late to renal centres this proportion has dropped substantially in the last decade. Some centres' lower rates (<10%) suggest that local factors may be worth exploring with the aim of improving this aspect of renal care and one example of this is the ASSIST-CKD Study being funded by the Health Foundation. More frequent and more detailed data downloads and prospectively capturing data on patients attending renal centres from eGFR 30 ml/min/1.73 m^2 will hopefully allow the UKRR to explore these areas of variation in advanced CKD care.

4. Acute haemodialysis sessions

Introduction

The analyses presented here relate to data submitted to the UKRR about individual haemodialysis sessions, performed for acute kidney injury (AKI). These haemodialysis session data were submitted by centres for the first time on treatment undertaken during 2015.

Methods

Correct use of acute and chronic timeline codes

Patients who have acute HD sessions and do not recover renal function, becoming established on dialysis, should have two separate entries in their treatment timeline; the first, a modality code on the date of the first dialysis session; acute haemodialysis or acute peritoneal dialysis (timeline entries 81–83), the second, a chronic dialysis code, on the date it was decided that the person had ERF; for HD or PD (timeline codes 1–19 can be used to describe the appropriate form of HD or PD being provided). When the decision is made that the person has ERF, the timeline should NOT be backdated to the original date of first treatment (as was advised prior to 2009). The resultant date is the same for some purposes (such as incidence) as backdating is undertaken at the UKRR when defining the start date of incident patients (see appendix B: Definitions and Analysis Criteria (www.renalreg.org)). The advantage of the backdating procedure being undertaken by the UKRR rather than by the centres themselves is that the most granular information is provided by the acute timeline codes and can be used for other analyses such as those on acute HD sessions presented here.

Definition of an acute HD session

Session data were submitted on HD sessions for AKI, ERF and plasma exchange (PEX). A 'session type' variable was used to identify and exclude PEX sessions but the individual HD sessions were not labelled in the dataset as being acute or chronic, so the timeline was used to identify if an HD session was undertaken for AKI or ERF, using the following logic (applied in this order);

i) If a timeline entry for AKI was submitted and the HD session dates were within the period defined as AKI by the timeline dates, then the session was defined as acute.
ii) If there was a timeline entry of ERF before the date a HD session occurred then the session was defined as chronic.
iii) If there was a timeline entry for ERF, and no prior timeline entry of acute dialysis, but the dates of the HD sessions preceded the stated date for chronic HD, then the HD sessions were defined as acute. There is potential for misclassification error here due to the assumption being made (that there is a missing acute timeline code, rather than that the date of starting chronic RRT was wrong).

Completeness and other data issues

If multiple HD sessions were recorded as occurring within a six hour period, only the first session was included in the analysis on the assumption that these additional HD sessions were duplicates or a result of technical problems, for example problems with an HD machine, and that they only represented one treatment.

HD session data were submitted to the UKRR for the first time for treatments undertaken in 2015, and there were some early issues with missing data. In the first quarter of 2015, a significant proportion of the 'session type' variable was missing, so HD sessions could not be reliably differentiated from PEX sessions (after this it was 100% complete). In addition, data submission began at staggered time-points over the first half of 2015. Therefore only session data from July–December 2015 have been included in this analysis.

The submission of data regarding HD sessions has been mandated by NHS England. Submission of these data from renal centres in Northern Ireland and Wales is optional. The Scottish Renal Registry does not collect these data.

Results

Forty of the 52 adult renal centres in England submitted individual HD session data. Of these, London Guys and Manchester Royal Infirmary submitted only HD session data pertaining to chronic HD sessions (according to the logic described in the methods section to identify acute sessions). All five Northern Ireland renal centres submitted data regarding acute and chronic sessions. In Wales, four centres (all except Clwyd) submitted HD sessions data, but only Swansea submitted data on acute HD sessions.

From the HD sessions data supplied by these 49 renal centres, our algorithm defined sessions as acute HD sessions for 998 patients. Of these, 929 were defined using step i) of the algorithm, i.e. using timeline entries of acute dialysis. The remaining 69 patients had sessions defined as acute HD sessions despite having no acute timeline entries (these are the cases where the third step of the algorithm defined in the methods section was used). See table 1.20.

From these same 49 centres, there were 1,038 people who, according to the timeline, had a spell of acute dialysis that included a period during July to December 2015. Of these, 929 people had HD sessions data supplied which were defined as acute sessions by our algorithm. The remaining 109 people had no HD session data supplied for the time period that they were on acute dialysis according to the timeline. (Some of these people had no HD sessions data supplied at all and others had some sessions supplied but only for after the time period when the timeline defined them as acute patients).

Table 1.21 shows the number of individual HD sessions reported to the UKRR, and what proportion were defined as acute sessions by our algorithm.

Data completeness of variables associated with haemodialysis sessions

Centres were asked to report details related to each HD session, such as vascular access used for the session and dialysate sodium concentration. Completeness varied by centre from 0–100% and these are shown for those sessions defined as acute, in table F.4.1 in appendix F: Additional Data Tables.

Table 1.20. Cross-tabulation demonstrating use of the algorithm to differentiate between acute and chronic dialysis sessions, July to December 2015

	Time on acute dialysis within July–Dec 2015 according to the timeline		
	Yes	No	**Total**
People defined as having acute HD sessions	929	69	**998**
People not defined as having any acute HD sessions	109		
Total	**1,038**		

Table 1.21. Individual haemodialysis session data for July–December 2015, by centre, for England, Wales and Northern Ireland.

Centre	Number of prevalent HD patients* (31/12/15)	Total number of HD sessions	Number of sessions defined as chronic	Number of sessions defined as acute	% of sessions defined as acute
Antrim	122	1,159	1,146	13	1
B Heart	420	4,661	4,581	80	2
B QEH	1,007	10,700	10,483	217	2
Bangor	84	874	874	0	0
Basldn	163	1,743	1,678	65	4
Belfast	183	2,335	2,193	142	6
Bradfd	233	190	66	124	65
Bristol	525	5,538	5,380	158	3
Cardff	497	2,501	2,501	0	0
Carlis	81	1,542	1,540	2	0
Carsh	817	11,641	10,621	1,020	9
Chelms	144	2,301	2,135	166	7
Colchr	120	1,462	1,430	32	2
Covnt	354	3,713	3,415	298	8
Derby	244	2,215	2,117	98	4
Donc	181	1,455	1,432	23	2
Dorset	289	3,040	2,651	389	13
Dudley	172	1,479	1,239	240	16
Exeter	436	5,078	4,720	358	7
Glouc	228	3,234	3,181	53	2
Hull	357	224	9	215	96
Ipswi	143	2,248	2,225	23	1
Kent	424	5,793	5,789	4	0
L Guys	676	7,276	7,276	0	0
L Kings	566	6,325	6,205	120	2
L Rfree	713	7,197	7,039	158	2
L West	1,445	12,696	12,677	19	0
Leeds	512	198	58	140	71
Leic	917	10,689	10,387	302	3
M RI	526	956	956	0	0
Middlbr	353	5,322	5,131	191	4
Newc	315	3,949	3,778	171	4
Newry	88	801	793	8	1
Nottm	388	4,679	4,536	143	3
Oxford	438	2,567	2,563	4	0
Plymth	137	1,749	1,724	25	1
Ports	667	9,667	9,410	257	3
Redng	302	3,008	2,885	123	4
Salford	400	5,431	5,116	315	6

Table 1.21. Continued

Centre	Number of prevalent HD patients* (31/12/15)	Total number of HD sessions	Number of sessions defined as chronic	Number of sessions defined as acute	% of sessions defined as acute
Shrew	203	3,018	2,764	254	8
Stevng	509	6,093	5,870	223	4
Sthend	126	1,666	1,650	16	1
Swanse	365	4,643	4,121	522	11
Truro	160	2,508	2,495	13	1
Ulster	107	1,886	1,843	43	2
West NI	123	1,568	1,530	38	2
Wolve	318	3,038	2,790	248	8
Wrexm	112	1,230	1,230	0	0
York	160	56	0	56	100
Total	**17,850**	**183,342**	**176,233**	**7,109**	**4**

*Number of prevalent HD patients at year end given as a measure of centre size

Renal recovery and survival of patients receiving acute haemodialysis sessions

As data collection for this report is only up to 31st December 2015 follow-up is truncated for those who were receiving acute dialysis in July–December 2015. Therefore renal recovery and survival cannot yet be reported for this cohort.

Discussion

The collection of data regarding acute dialysis performed in renal centres was undertaken for the first time using data from January 2015 onwards. A significant proportion of renal centres in England, Wales and Northern Ireland returned data regarding acute dialysis sessions to the UKRR, with data completeness for associated variables varying from 0–100%. There were large between centre differences in the number of acute HD sessions reported to the UKRR, which may be a result of differing use of the timeline and subsequent misclassification, incomplete data returns, or may represent true clinical differences (such as the proportion of people with dialysis dependent AKI treated in renal centres versus intensive care units).

This is a major addition to the previous scope of the UKRR and requires significant input from all contributing renal centres to ensure data of adequate quality are returned in order to draw accurate and meaningful conclusions. These data are being collected and reported for several purposes. Firstly, they have been mandated by NHS England to monitor acute dialysis activity in renal centres in England. Secondly the UKRR will analyse these data to assess whether they can account for some of the observed difference between centres in 90 day survival of incident patients. One hypothesis for the differences between centres relates to how nephrologists describe and define the kidney disease of patients who then subsequently suffer an early death after commencing RRT. For example, a person has made an unplanned start on RRT for diabetic kidney disease with a possible intercurrent infection. They were not known to a nephrologist, but had underlying progressive and advanced kidney disease. In renal centre 1, the patient may be described as having AKI, whilst the nephrologists of renal centre 2 would quickly describe the same patient as having ERF. Such differences led to differences in the reporting of incident patients to the UKRR. Therefore, in 2009, in order to address this and allow like-for-like comparison of incident rates and early survival between renal centres, the UKRR introduced a new rule; ***'The UKRR now asks all nephrologists to complete the timeline as accurately as possible, recording the date of first dialysis or haemofiltration and, separately, the date on which the patient was deemed to be chronic. This will allow us to distinguish between patients who have an acute start and those whose start on RRT was planned. If the patient recovers renal function an entry in the Timeline – TXT – 'Recovered function' should be made'***.

Despite the introduction of this rule, the UKRR continued to observe a pattern in the submitted data that suggested that not all patients who suffered early mortality were being included in the UKRR returns (i.e. there was evidence of immortal time bias). Collection of these additional data regarding acute sessions seeks to address

this issue; by collecting data on all acute and chronic dialysis sessions these discrepancies can be identified and accounted for, and true clinical differences and/or practice pattern variation highlighted (rather than those resulting purely from misclassification). However, in order to allow the accurate collection of these data and to progress the renal community's understanding of acute dialysis provision in the UK, it is essential that all renal centres are consistent in how they report data to the UKRR. From the data for 2015, some centres returned no HD sessions defined as acute sessions by our algorithm (while simultaneously returning HD session data for patients on long-term HD). One possible explanation is incorrect use of the timeline, i.e. backdating of the start date of chronic RRT to the original (acute) date of first treatment (as was advised prior to 2009).

Acknowledgement

The (non-UK) data reported in the section on International comparisons have been supplied by the United States Renal Data System (USRDS). The interpretation and reporting of these data are the responsibility of the author(s) and in no way should be seen as an official policy or interpretation of the U.S. government.

Conflicts of interest: the authors declare no conflicts of interest

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