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THE RENAL ASSOCIATION
founded 1950

UK Renal Registry

22nd Annual Report

Data to 31/12/2018

Incidence

Prevalence

Transplant

In-centre haemodialysis

Peritoneal dialysis

Home haemodialysis

Paediatrics

UK Renal Registry 22nd Annual Report

Data to 31/12/2018

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Available from renal.org/audit-research/annual-report

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Summary of the UKRR 22nd Annual Report – adults

UK Renal Registry (2020) UK Renal Registry Summary of Annual Report – analyses of adult data to the end of 2018, Bristol, UK.
Available from renal.org/audit-research/annual-report

Summary of the UKRR 22nd Annual Report – children and young people

UK Renal Registry (2020) UK Renal Registry Summary of Annual report – analyses of paediatric data to the end of 2018, Bristol, UK.
Available from renal.org/audit-research/annual-report

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Foreword

Professor James Medcalf
Medical director, The Renal Association

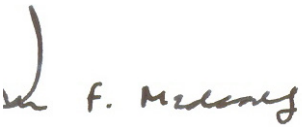
It is a pleasure to write a foreword for the 2018 UK Renal Registry (UKRR) Annual Report. This report was entirely typeset in-house, with substantial savings in production time and money. This will give us much more flexibility on how we publish reports, for example, the recent acute kidney injury (AKI) report, and also ad hoc publications, where time is of the essence.

Highlights of this year's report include a comorbidity adjusted survival analysis for all renal centres, made possible by the now routine linkage of UKRR data with Hospital Episode Statistics and Patient Episode Database for Wales. This is just the beginning of the analyses possible through these linkages. Our collaboration with Getting It Right First Time has shown that there are other useful measures (and differences) in hospital resource use, which we should incorporate into our regular reporting too. We also have a new chapter summarising home haemodialysis care, and for next year are expecting to publish at least a basic analysis of the chronic kidney disease stage 4–5 data, which some renal centres are submitting.

All reports in the last three months have referenced the extraordinary impact of coronavirus on the normal ways we work. For us at the UKRR it has highlighted the power of collecting a small number of items consistently and reporting on them in very quick time. Our regular weekly or fortnightly reporting of COVID-19 cases and deaths has been widely used to help deliver safe and effective care. We plan to learn from this experience over the next few months and are looking critically at the list of items we routinely collect, from where, and how. Also, with the increasing use of the UKRR data portal, we plan to develop it to be ready to tackle current and crucially any future changes in kidney care.

Behind the scenes, we have changed the process to share data with others for research, with a streamlined initial expression of interest, followed by a full data application. To improve transparency, details of successful data applications and collaborators will be available on the soon to be released new Renal Association website. We are very sensitive to the fact that we need to make data available in a safe and secure manner to advance knowledge and health. It is therefore a persistent frustration about how hard it is to collaborate with others using any of our linked data for research when we are constrained in how we can share it. We are working with the wider Renal Association on possible ways to improve this, but these are longstanding restrictions, and are not limited to the kidney world.

Above all, the annual report of the UKRR provides the opportunity to thank all the renal centres, their and our staff and all our collaborators for their commitment to consistently measure the quality of kidney care in the UK. As we develop over the next year we will take care not to lose sight of the trust and support that we share to produce analyses useful to everyone.



Professor James Medcalf
Medical director, The Renal Association, July 2020

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Appendices available from renal.org/audit-research/annual-report

Introduction: Welcome to the UK Renal Registry's 22nd Annual Report

The UK Renal Registry (UKRR) collects and reports data annually on approximately 70,000 kidney patients on renal replacement therapy (RRT) in the UK. The annual report is an audit of the care provided to these patients at each of the 71 adult and 13 paediatric centres against national standards, in particular, the Renal Association's guidelines – renal.org/health-professionals/guidelines/guidelines-commentaries.

The 22nd Annual Report includes the 8,000 patients who commenced RRT in 2018, as well as all 67,000 patients who were on RRT at the end of 2018. The chapters are split by treatment modality (transplant, in-centre haemodialysis, peritoneal dialysis and home haemodialysis), as well as by adults and children.

The online appendices cover the methodologies, including how data are collected and coded (appendix A) and include basic analyses at clinical commissioning group and health board level (appendix B) – renal.org/audit-research/annual-report.

Plain English summaries of the annual report have been developed in partnership with the Renal Association's Patient Council – renal.org/audit-research/annual-report.

Finally, all graphs used in the report are available for use in presentations – renal.org/audit-research/annual-report.

What's new?

This is the first report where the UKRR derived the audit variables for a renal centre (King's College Hospital) from the UK Renal Data Collaboration (UKRDC) database. Although only one centre provided data via this route, it proves the principle that the current audit standards can be monitored using this daily data flow. For King's College Hospital we could now report measures back to them in 'real time' and we are working on tools that can message renal centres regarding the quality and completeness of their data, and that can be used to visualise audit measures and patient numbers in a much more timely manner.

For the first time, people on home haemodialysis (HHD) were analysed separately from other haemodialysis patients. The numbers of people on HHD are much smaller than in-centre haemodialysis, but the differences in patient characteristics, and in particular their common dialysis regimens mean it is important that they are considered separately.

Also, for the first time, Hospital Episode Statistics (HES – England) and Patient Episode Database for Wales (PEDW) data were used in combination with UKRR data to adjust survival for case-mix. Using this adjustment, which will now form a routine analysis, there were no centres with significantly poorer patient survival.

Whilst the full report is a great resource for clinicians in renal centres, it is quite dense for a first understanding of key messages. Building on last year's co-production of a series of infographics summarising the adult data, this year we now have a separate summary of the paediatric data.

This is also the first time that we have entirely produced the report in-house.

Next steps?

Work is underway to assess and improve the quality and completeness of the advanced chronic kidney disease (CKD) dataset, so that these data can be included in future annual reports. Several analyses of these data were to be presented at UK Kidney Week in June to allow the analysis and conclusions to be debated and challenged. Some of this will still be available later in the year, and from next year we plan to include at least summary statistics in a chapter of the annual report.

Next year several other centres will be using UKRDC to send data for audit.

The completeness and quality of data items submitted to the UKRR varies by renal centre, but continues to cause significant challenges. Throughout the report, each analysis includes only those renal centres that submitted the data item for at least 70% of their patients. In the next year we will look carefully at the data we want to collect and the route by which we collect them. We need to be clearer about which data are essential to produce reliable comparisons and which data are desirable, but less commonly used. The NHS and the Renal Association standards are not static and changes in evidence and clinical practice need to be included. Poor data completeness may result from failure to undertake a test or to accurately capture patient data. Data may also be lost during the transfer and in the validation processes. Once we have consulted on the data to collect we will need to help centres understand why they have gaps. We hope the new data completeness portal (renal.org/audit-research/data-portal/completeness) will be a valuable tool for renal centres and researchers.

Completeness of comorbidity data at the start of RRT has been a challenge to collect since the beginning of the UKRR 25 years ago, and the change to version 4.2 of the dataset did not improve this. We will increasingly use linkage between the UKRR and HES and PEDW to adjust for comorbidity in survival analyses and, after consultation, may reduce the amount of comorbidity data we ask centres to provide.

How to interpret centre analyses and outlying centres

The UKRR continues to advise caution when comparing centre-specific attainment of clinical audit measures provided in this report. For many of these analyses no adjustment can be made for the range of factors known to influence the measured variable. The UKRR does not test for significant differences between centres – arbitrary 95% and 99% confidence intervals are created from the data to illustrate variability between centres and the outlying status of centres. Centre comparisons will become more meaningful when more comorbidity data are included in analyses via the data linkages and when advanced CKD data are included to understand differences in the transition of patients onto both RRT and conservative non-dialysis pathways.

Despite these shortcomings, for a number of years identifiable centre-specific analyses on the survival of RRT patients have been published in the annual report.

The UKRR has no statutory powers. However, because the UKRR provides centre-specific analyses of important clinical outcomes, including survival, it is important to define how the UKRR responds to apparent under-performance. The UKRR senior management team communicates survival outlier status with the renal centres prior to publication. Centres are asked to report their outlying status internally at trust level and to follow-up with robust mortality and morbidity meetings. They are also asked to provide evidence that the clinical governance department and chief executive of the trust housing the service have been informed. In the event that no such evidence is provided, the chief executive officer or medical director of the UKRR informs the president of the Renal Association, who then takes action to ensure that the findings are properly investigated.

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Chapter 1

Adults starting renal replacement therapy (RRT) for end-stage kidney disease (ESKD) in the UK in 2018

Contents

Introduction

This chapter describes the population of patients who developed end-stage kidney disease (ESKD) and started renal replacement therapy (RRT) in the UK in 2018 (figure 1.1). This includes patients starting dialysis therapies – haemodialysis (HD) and peritoneal dialysis (PD) – and patients who received a pre-emptive kidney transplant (Tx). Patients with a failed Tx who returned to dialysis are not included. Patients who received dialysis for acute kidney injury (AKI), as coded by their reporting renal centre, were only included if their dialysis was subsequently recoded as being for ESKD, when they failed to recover native renal function. Recoding is automatically applied at 90 days for individuals still on RRT (unless advised otherwise by the renal centre – see appendix A for details), but can be applied earlier by reporting centres that identify ESKD before day 90. Individuals who commenced dialysis for AKI and subsequently recovered renal function, died or withdrew from dialysis within the first 90 days of treatment are being analysed separately to this report and are therefore not included in this chapter (although they are shown in figure 1.1). Patients who died, or withdrew from dialysis after being coded as ESKD are included in this chapter, but patients who recovered renal function are not included if they recovered before 90 days on dialysis.

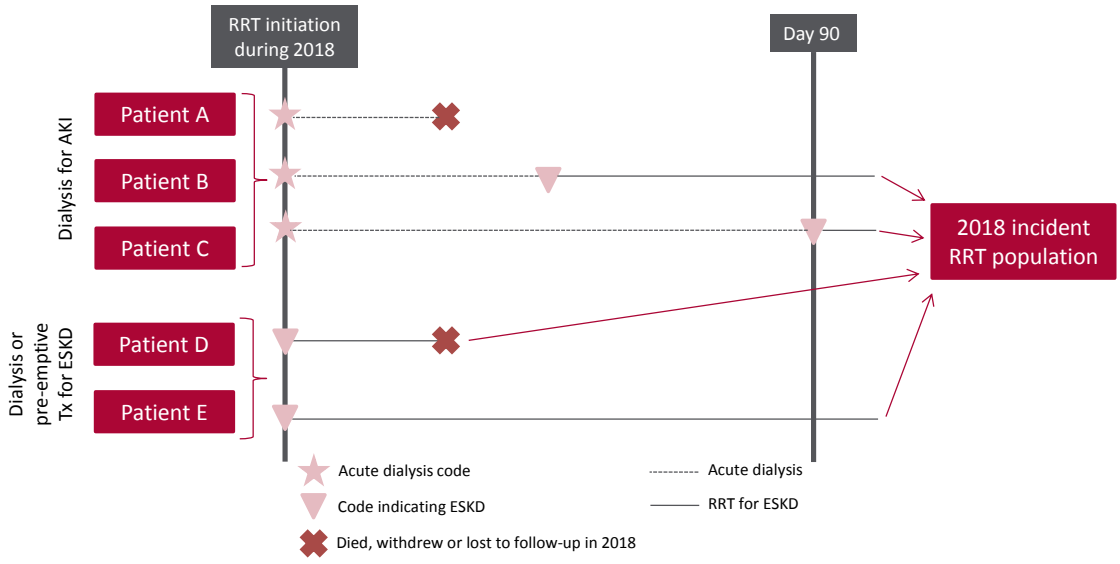

Figure 1.1 Example histories for patients starting RRT, illustrating the use of timeline codes to define dialysis as being 'acute' or for ESKD

Note that patients who recovered renal function before 90 days on dialysis are not included in this chapter, whether they were coded as AKI or ESKD.
Note that patients who followed patterns B–E received RRT for ESKD and are counted as 'incident to RRT' throughout this report. Patients who followed pattern A are not counted as 'incident to RRT' and do not feature in this chapter.

Survival and cause of death analyses were undertaken on historic incident cohorts to allow sufficient follow-up time and numbers of patients. Dialysis access data were collected separately to the main UKRR quarterly data returns via the 2018 Multisite Dialysis Access Audit and some analyses included two year cohorts to describe outcomes.

This chapter addresses the following key aspects of the care of patients incident to RRT for which there are Renal Association guidelines (table 1.1):

- **Modality selection, pre-emptive transplantation and Tx wait-listing:** the percentage of patients starting on each RRT modality, including a home therapy – home HD (HHD) or PD – or a kidney Tx, as well as the percentage of patients pre-emptively listed for a Tx, are reported in this chapter
- **Late presentation:** a patient first seen by renal services within 90 days of starting RRT for ESKD is defined as a 'late presentation' (in this report 'late presentation' is used interchangeably with 'late referral')
- **Complications associated with ESKD:** these include anaemia and mineral bone disorders
- **Type of dialysis access:** definitive access – either a surgically created arteriovenous fistula (AVF) or arteriovenous graft (AVG), or a PD catheter. Alternatively, more temporary access can be provided through a central venous catheter (CVC) – either a tunnelled line (TL) or a non-tunnelled line (NTL).

Rationale for analyses

The analyses begin with a description of the 2018 incident adult RRT population, including the incident number on RRT per million population (pmp). The inclusion of centre-specific reports on the survival of RRT patients reflects the need for transparency following the Francis and Keogh enquiries and the ongoing Care Quality Commission inspections of patient care and outcomes at a number of hospital trusts. Survival analyses have been adjusted for age, sex and comorbidity using renal centre data. Comorbidity data have been augmented using Hospital Episode Statistics (HES) for English renal centres and Patient Episode Database for Wales (PEDW) for Welsh renal centres.

The Renal Association guidelines (renal.org/health-professionals/guidelines/guidelines-commentaries) provide audit measures relevant to the care of patients incident to RRT and, where data permit, their attainment by UK renal centres in 2018 is reported in this chapter (table 1.1). Audit measures in guidelines that have been archived are not included.

Some audit measures – for example, the target for glycated haemoglobin (HbA1c) in those on hypoglycaemia-inducing treatment – cannot be reported because the completeness of the required data is too low. Further detail about the completeness of data returned to the UK Renal Registry (UKRR) is available through the UKRR data completeness portal (renal.org/audit-research/data-portal/completeness). Audit measures that cannot be reported because the required data items were not collected by the UKRR are omitted.

For definitions and methods relating to this chapter see appendix A. Centres were exluded from caterpillar plots and cells were blanked in tables where data completeness for a biochemical variable fell <70% and/or the number of patients reported was <10. The number preceding the centre name in each caterpillar plot indicates the percentage of missing data for that centre, except in the dialysis access data where the number following the centre name indicates the number of patients in the centre with data.

Cambridge renal centre (Addenbrooke's Hospital) was unable to submit patient level data for 2017–2018. While data extraction issues have now been resolved, the UKRR and Cambridge are working to load and validate the backlog of data for these years, which should be completed for next year's report. Using aggregate numbers of patients starting RRT by treatment modality, it was possible to report treatment rates for Cambridge, but no other quality assurance for the service provided. Coventry renal centre submitted patient level data for more than a third of their new patients only after the closing date for submission to the UKRR. In this report only analyses on treatment rates could be corrected using the late submitted data.

Table 1.1 The Renal Association audit measures relevant to RRT incidence that are reported in this chapter

The Renal Association guideline	Audit criteria	Related analysis/analyses
Planning, initiating and withdrawing RRT (2014)	Proportion of patients commencing PD or HHD	Table 1.3
	Proportion of patients remaining on initial treatment modality 3 and 12 months post initiation of RRT	Tables 1.6–1.8, figure 1.6
	Percentage of patients commencing RRT referred <3 months and <12 months before date of starting RRT	Tables 1.9–1.12, figure 1.7
	Proportion of patients on UK Tx waiting list at RRT initiation	Table 1.3
	Proportion of RRT patients transplanted pre-emptively from living and deceased donors	Table 1.3 (partly addressed)
	Estimated glomerular filtration rate (eGFR) at start of RRT and at time of pre-emptive Tx	Figure 1.8
	Proportion of planned initiations with established access or pre-emptive Tx	Table 1.16, figure 1.16
	Number of patients withdrawing from dialysis as a proportion of all deaths on dialysis	Table 1.23
Anaemia (2017)	Proportion of patients initiating RRT with haemoglobin <100 g/L not on erythropoiesis stimulating agent (ESA)	Table 1.13, figure 1.9 (ESA data completeness poor so not included)
Chronic kidney disease (CKD) mineral bone disorder (2018)	Percentage of RRT patients with serum calcium above the normal reference range of 2.2–2.5 mmol/L	Table 1.14, figure 1.11
Vascular access (2015)	>60% of all patients with established ESKD commencing planned HD should receive dialysis via a functioning AVF or AVG	Table 1.16, figure 1.17
Peritoneal access (2009)	>80% of catheters should be patent at 1 year (censoring for death and elective modality change)	Figures 1.22–1.24
	Complications following PD catheter insertion	Table 1.18, figures 1.21–1.24 (partly addressed)
	Peritonitis within 2 weeks of catheter insertion <5%	Table 1.18, figure 1.21

AVF – arteriovenous fistula; AVG – arteriovenous graft

Key findings

- 7,959 adult patients started RRT for ESKD in the UK in 2018, a decrease of 1.4% from 2017
- RRT incidence in adults was 152 pmp. This corresponds to a rate of 120 pmp when including the entire general population in the denominator, comparable to the rate of 121 pmp in 2017 (see appendix B for details)
- The median age of incident RRT patients was 64.0 years, but this was dependent on ethnicity (White 65.9 years, South Asian 61.2 years and Black 56.2 years)
- 62.9% of incident RRT patients were male
- Diabetes remained the most common identifiable primary renal disease (PRD) for patients starting RRT (29.8%)
- By 90 days, 65.9% of patients were on HD (including HHD), 18.9% on PD, 9.3% had a functioning Tx and 5.9% had died or stopped treatment
- The mean eGFR at the start of RRT was 7.4 mL/min/1.73m^2 (HD 7.2 mL/min/1.73m^2, PD 7.5 mL/min/1.73m^2 and pre-emptive Tx 10.1 mL/min/1.73m^2)
- Late presentation remained stable at 17.5% in 2018
- Of the 6,173 incident dialysis patients with dialysis access data, 52.8% started dialysis with definitive access (21.8% PD and 30.9% HD with an AVF or AVG), 27.2% with a TL and 20.1% with an NTL
- Short-term (90 day) age-adjusted survival of incident RRT patients in a combined 2 year cohort (2016–2017) was 96.7% (compared to 96.6% in the previous analysis of the 2015–2016 cohort)
- 1 year after 90 day age-adjusted survival for incident RRT patients in a combined 2 year cohort (2016–2017) was 90.9% (compared to 90.4% in the previous analysis of the 2015–2016 cohort)
- There were 4 outlying centres in the funnel plot showing 1 year after 90 day age-adjusted survival for incident RRT patients in a combined 4 year cohort (2014–2017): 1 centre below the lower 95% limit (Shrewsbury) and 3 centres above the upper 95% limit (Ipswich, Gloucester and London King's). There were more outlying centres in this recent survival analysis compared to the 2 outliers in the previous 4 year cohort (2013–2016) and it would be expected that 3 centres would be outside the limits by chance. After further adjustment for sex and comorbidities, only Ipswich and Gloucester remained outliers above the 95% limit
- There was no cause of death data available for 43.0% of deaths in the first 90 days of RRT. For those with data, the leading causes of death in the first 90 days were cardiac disease (24.7%) and infection (20.0%).

Analyses

Changes to the incident adult RRT population

For the 71 adult renal centres, the number of incident patients on RRT was calculated as a proportion of the estimated centre catchment population (calculated as detailed in appendix A).

Table 1.2 Number of incident adult RRT patients by year and by centre; number of RRT patients as a proportion of the adult catchment population

Centre	N on RRT					Estimated catchment population (millions)	2018 crude rate (pmp)
	2014	2015	2016	2017	2018		
ENGLAND							
B Heart	100	123	137	127	116	0.61	190
B QEH	247	243	240	262	249	1.41	177
Basldn	46	53	49	47	48	0.34	140
Bradfd	84	91	88	82	69	0.54	128
Brightn	148	143	149	155	175	1.07	163
Bristol	148	145	154	158	167	1.19	140
Camb	119	101	99	90	112	0.96	117
Carlis	37	47	36	42	33	0.27	124
Carsh	264	260	246	232	226	1.59	143
Chelms	55	50	55	43	31	0.42	73
Colchr	39	28	29	45	34	0.25	137
Covnt	126	110	128	117	128	0.74	173
Derby	80	61	87	89	85	0.58	146
Donc	54	39	64	57	51	0.34	150
Dorset	78	75	71	103	104	0.71	146
Dudley	43	51	53	59	47	0.37	128
Exeter	144	138	144	140	129	0.90	143
Glouc	74	72	70	81	69	0.49	142
Hull	98	123	92	107	101	0.85	119
Ipswi	34	67	43	53	54	0.33	163
Kent	150	144	144	140	137	1.01	135
L Barts	303	309	290	343	350	1.52	231
L Guys	154	177	167	167	182	0.90	203
L Kings	150	181	153	170	149	0.97	153
L Rfree	229	238	237	236	244	1.26	194
L St.G	92	114	91	91	85	0.66	129
L West	355	333	386	408	393	1.99	198
Leeds	168	144	166	176	178	1.38	129
Leic	251	270	322	288	309	2.02	153
Liv Ain	67	61	51	55	67	0.40	167
Liv Roy	135	141	111	136	97	0.83	117
M RI	163	197	212	226	187	1.27	147
Middlbr	103	134	100	117	117	0.83	141
Newc	109	124	132	145	136	0.93	146
Norwch	78	118	103	80	79	0.65	121
Nottm	109	124	122	134	123	0.90	136
Oxford	188	192	213	216	220	1.40	157
Plymth	53	53	62	92	64	0.39	164
Ports	230	200	195	211	201	1.68	120
Prestn	164	163	141	167	178	1.24	144
Redng	104	87	95	104	101	0.75	134

Table 1.2 Continued

Centre	N on RRT 2014	2015	2016	2017	2018	Estimated catchment population (millions)	2018 crude rate (pmp)
Salford	162	173	192	174	160	1.24	130
Sheff	164	147	150	159	183	1.14	161
Shrew	65	62	58	64	77	0.41	186
Stevng	150	134	163	141	178	1.00	178
Sthend	30	35	48	50	43	0.26	164
Stoke	117	119	114	98	98	0.74	133
Sund	62	63	94	95	89	0.51	174
Truro	41	70	48	58	60	0.34	175
Wirral	55	63	66	61	58	0.47	122
Wolve	80	87	69	84	90	0.55	162
York	63	60	73	59	53	0.41	130
N IRELAND							
Antrim	35	36	40	47	56	0.23	238
Belfast	64	89	95	77	73	0.51	144
Newry	21	31	28	28	31	0.21	149
Ulster	23	33	31	31	32	0.21	151
West NI	35	41	36	34	39	0.28	139
SCOTLAND							
Abrdn	53	66	52	54	57	0.50	114
Airdrie	50	64	62	66	63	0.46	137
D&Gall	22	12	12	16	18	0.12	146
Dundee	50	46	44	55	36	0.39	93
Edinb	90	96	86	126	107	0.80	133
Glasgw	173	221	198	202	204	1.35	151
Inverns	21	34	20	25	37	0.22	165
Klmarnk	34	39	53	49	38	0.30	126
Krkcldy	36	44	32	41	38	0.26	144
WALES							
Bangor	22	29	23	27	26	0.19	140
Cardff	168	160	165	180	191	1.21	158
Clwyd	32	28	18	24	31	0.16	192
Swanse	120	135	129	134	140	0.75	186
Wrexm	42	45	47	25	28	0.20	137
TOTALS							
England	**6,362**	**6,537**	**6,602**	**6,834**	**6,714**	**44.02**	**153**
N Ireland	**178**	**230**	**230**	**217**	**231**	**1.44**	**160**
Scotland	**529**	**622**	**559**	**634**	**598**	**4.41**	**136**
Wales	**384**	**397**	**382**	**390**	**416**	**2.51**	**166**
UK	**7,453**	**7,786**	**7,773**	**8,075**	**7,959**	**52.38**	**152**

Country RRT populations were calculated by summing the RRT patients from centres in each country. Estimated country populations were derived from Office for National Statistics figures. See appendix A for details on estimated catchment population by renal centre. Rates appear higher than in previous reports because general population estimates now include only those aged ≥18 years (see appendix B).

Cambridge submitted only aggregate data for 2017 and 2018. Coventry submitted data for 40% of their new patients in 2018 after the closing date. Results shown here and in table 1.3 were corrected using the additional data.

pmp – per million population

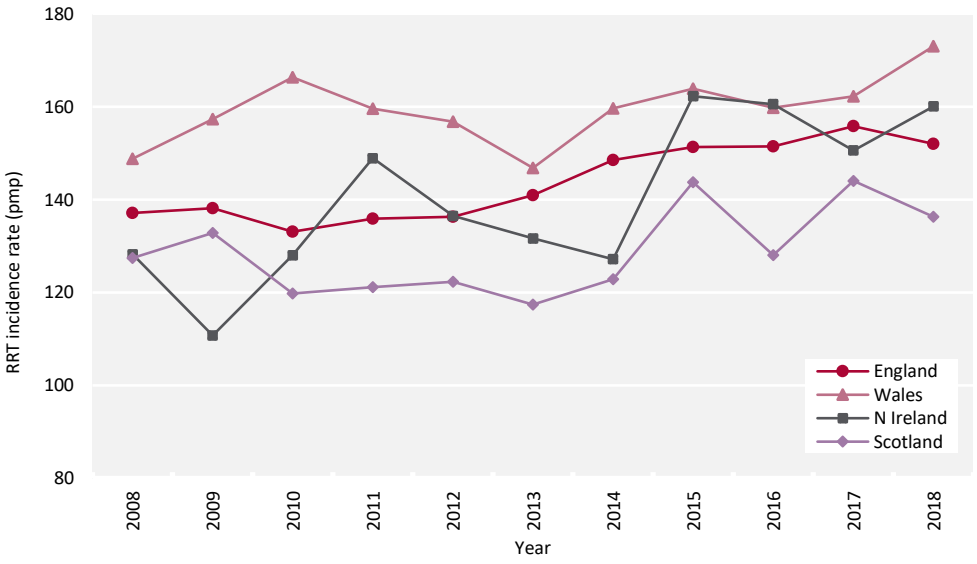

Figure 1.2 Adult RRT incidence rates by country between 2008 and 2018

Country was determined by patient postcode. Rates appear higher than in previous reports, because from this year those <18 years were excluded from estimated populations.
pmp – per million population

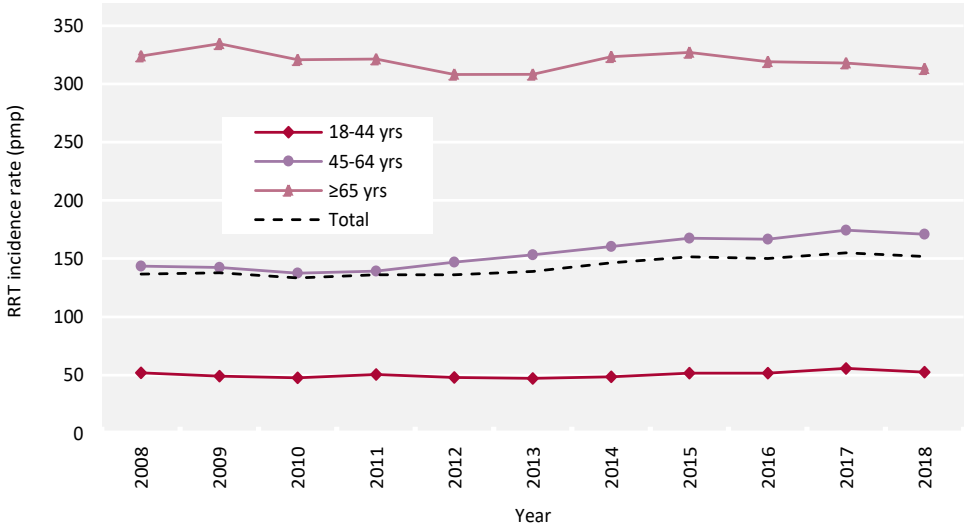

Figure 1.3 Adult RRT incidence rates by age group between 2008 and 2018

pmp – per million population

Demographics and start modality of incident adult RRT patients

The proportion of RRT patients from each ethnic group is shown for patients with ethnicity data – the proportion of centre patients with no ethnicity data is shown separately.

Table 1.3 Demographics and start modality of adult patients incident to RRT in 2018 by centre

Centre	N on RRT	% on ICHD	% on PD	% on HHD	% with Tx	% pre-emptive listing/ Tx	Median age (yrs)	% male	Ethnicity				
									% White	% South Asian	% Black	% Other	% missing
ENGLAND													
B Heart	116	69.0	29.3	0.9	0.9	5.2	65.0	67.2	52.6	34.5	12.1	0.9	0.0
B QEH	249	68.7	21.3	0.4	9.6	20.1	60.3	57.8	61.7	24.8	8.7	4.8	7.6
Basldn	48	85.4	12.5	0.0	2.1	8.3	65.4	72.9	81.3	6.3	6.3	6.3	0.0
Bradfd	69	76.8	13.0	0.0	10.1	20.3	61.1	63.8	46.0	39.7	4.8	9.5	8.7
Brightn	175	76.0	17.7	0.6	5.7	10.3	68.5	63.4	88.0	7.2	0.0	4.8	5.1
Bristol	167	71.9	16.2	0.0	12.0	23.4	61.0	57.5	87.9	3.0	6.7	2.4	1.2
Camb	112												
Carlis	33	63.6	33.3	0.0	3.0	3.0	64.4	63.6	100.0	0.0	0.0	0.0	0.0
Carsh	226	74.3	18.6	0.0	7.1	17.3	64.1	63.3	68.8	15.3	10.9	5.0	10.6
Chelms	31	54.8	41.9	0.0	3.2	19.4	68.4	74.2	100.0	0.0	0.0	0.0	6.5
Colchr	34	100.0	0.0	0.0	0.0	8.8	65.5	58.8	91.2	0.0	5.9	2.9	0.0
Covnt	128	83.6	9.4	0.0	7.0	24.4	64.3	50.0	78.9	15.8	5.3	0.0	2.6
Derby	85	52.9	37.7	4.7	4.7	15.3	64.9	64.7	88.1	8.3	3.6	0.0	1.2
Donc	51	82.4	13.7	2.0	2.0	15.7	67.2	64.7	92.2	5.9	2.0	0.0	0.0
Dorset	104	79.8	14.4	0.0	5.8	18.3	67.3	69.2	94.1	1.0	0.0	5.0	2.9
Dudley	47	76.6	17.0	0.0	6.4	12.8	69.1	53.2	87.2	4.3	8.5	0.0	0.0
Exeter	129	73.6	17.1	1.6	7.8	14.7	70.8	68.2	97.7	0.8	0.0	1.6	0.0
Glouc	69	69.6	26.1	0.0	4.4	11.6	67.8	65.2	97.0	3.0	0.0	0.0	2.9
Hull	101	64.4	30.7	0.0	5.0	15.8	63.1	61.4	94.0	4.0	0.0	2.0	1.0
Ipswi	54	74.1	16.7	0.0	9.3	14.8	70.6	61.1	85.7	2.0	0.0	12.2	9.3
Kent	137	80.3	13.1	0.0	6.6	13.1	64.4	62.0	90.6	7.0	2.3	0.0	6.6
L Barts	350	58.3	33.1	0.9	7.7	18.3	59.0	62.9	26.6	29.2	17.9	26.3	1.1
L Guys	182	72.5	13.7	0.0	13.7	27.5	59.6	56.0	51.5	7.3	32.7	8.5	9.3
L Kings	149	71.8	25.5	0.0	2.7	10.7	61.2	67.1	43.0	10.1	35.6	11.4	0.0
L Rfree	244	63.5	29.5	0.0	7.0	24.2	62.2	61.9	42.4	21.0	26.2	10.5	13.9
L St.G	85	68.2	18.8	0.0	12.9	25.9	60.0	54.1	49.4	19.5	27.3	3.9	9.4
L West	393	76.3	16.0	0.3	7.4	17.0	63.7	62.1	39.7	41.7	16.3	2.3	0.0
Leeds	178	71.4	16.3	0.0	12.4	33.1	58.0	66.3	73.3	15.9	7.4	3.4	1.1
Leic	309	78.3	12.3	0.3	9.1	21.7	62.3	60.5	74.0	18.6	6.0	1.4	7.8
Liv Ain	67	68.7	26.9	4.5	0.0	13.4	67.6	53.7	100.0	0.0	0.0	0.0	1.5
Liv Roy	97	67.0	17.5	1.0	14.4	23.7	62.6	57.7	91.3	1.1	4.3	3.3	5.2
M RI	187	69.0	18.2	0.0	12.8	21.9	61.2	61.5	61.3	18.8	15.5	4.4	3.2
Middlbr	117	77.8	14.5	0.0	7.7	18.8	61.6	67.5	92.3	6.8	0.9	0.0	0.0
Newc	136	69.1	19.9	0.0	11.0	22.1	64.1	61.8	94.1	3.7	0.0	2.2	0.0
Norwch	79	83.5	11.4	0.0	5.1	7.6	70.7	62.0	97.4	1.3	0.0	1.3	2.5
Nottm	123	69.1	24.4	0.0	6.5	16.3	64.0	69.1	84.6	7.3	5.7	2.4	0.0
Oxford	220	62.3	21.8	0.0	15.9	25.0	63.4	66.8	80.1	12.4	2.5	5.0	26.8
Plymth	64	62.5	28.1	1.6	7.8	18.8	69.1	84.4	96.9	0.0	1.6	1.6	0.0
Ports	201	68.7	21.4	1.5	8.5	22.4	67.4	69.7	93.7	3.4	1.1	1.7	12.9
Prestn	178	74.2	11.8	0.0	14.0	23.6	63.6	68.5	87.0	11.9	1.1	0.0	0.6
Redng	101	72.3	17.8	0.0	9.9	23.8	67.3	62.4	67.1	22.0	7.3	3.7	18.8
Salford	160	66.3	22.5	0.0	11.3	21.3	65.0	61.9	77.5	16.3	1.9	4.4	0.0
Sheff	183	76.5	16.9	0.6	6.0	14.2	65.1	66.1	89.2	4.5	2.3	4.0	3.8
Shrew	77	58.4	36.4	1.3	3.9	11.7	74.6	62.3	93.4	1.3	1.3	3.9	1.3
Stevng	178	78.7	15.7	3.9	1.7	13.5	65.8	66.3	74.2	10.6	4.5	10.6	25.8
Sthend	43	65.1	27.9	0.0	7.0	14.0	71.3	62.8	88.4	4.7	0.0	7.0	0.0

Table 1.3 Continued

Centre	N on RRT	% on ICHD	% on PD	% on HHD	% with Tx	% pre-emptive listing/ Tx	Median age (yrs)	% male	Ethnicity				
									% White	% South Asian	% Black	% Other	% missing
Stoke	98	59.2	33.7	0.0	7.1	17.3	66.9	67.3	90.7	5.8	1.2	2.3	12.2
Sund	89	84.3	11.2	0.0	4.5	7.9	71.3	62.9	93.3	4.5	1.1	1.1	0.0
Truro	60	83.3	16.7	0.0	0.0	10.0	68.6	65.0	100.0	0.0	0.0	0.0	0.0
Wirral	58	75.9	22.4	0.0	1.7	12.1	64.7	58.6	93.1	1.7	1.7	3.4	0.0
Wolve	90	76.7	23.3	0.0	0.0	7.8	61.6	63.3	54.4	27.8	13.3	4.4	0.0
York	53	62.3	28.3	0.0	9.4	26.4	69.0	66.0	100.0	0.0	0.0	0.0	5.7
N IRELAND													
Antrim	56	67.9	19.6	0.0	12.5	23.2	71.8	62.5	100.0	0.0	0.0	0.0	0.0
Belfast	73	53.4	16.4	1.4	28.8	42.5	64.8	57.5	98.2	0.0	0.0	1.8	24.7
Newry	31	74.2	9.7	0.0	16.1	19.4	67.8	58.1	100.0	0.0	0.0	0.0	0.0
Ulster	32	78.1	15.6	0.0	6.3	12.5	67.1	53.1	100.0	0.0	0.0	0.0	0.0
West NI	39	79.5	10.3	2.6	7.7	23.1	62.0	56.4	100.0	0.0	0.0	0.0	0.0
SCOTLAND													
Abrdn	57	70.2	29.8	0.0	0.0	7.0	64.1	73.7					100.0
Airdrie	63	77.8	22.2	0.0	0.0	23.8	61.0	58.7	100.0	0.0	0.0	0.0	22.2
D&Gall	18	72.2	27.8	0.0	0.0	22.2	71.0	61.1					88.9
Dundee	36	77.8	22.2	0.0	0.0	19.4	60.9	63.9					100.0
Edinb	107	60.8	15.0	0.0	24.3	40.2	59.8	57.0					96.3
Glasgw	204	77.5	14.2	0.0	8.3	27.9	63.3	57.4					99.5
Inverns	37	75.7	24.3	0.0	0.0	10.8	65.7	62.2					100.0
Klmarnk	38	94.7	5.3	0.0	0.0	7.9	68.6	73.7					100.0
Krkcldy	38	84.2	15.8	0.0	0.0	23.7	62.0	81.6					100.0
WALES													
Bangor	26	65.4	26.9	0.0	7.7	19.2	65.0	61.5	100.0	0.0	0.0	0.0	0.0
Cardff	191	78.5	14.1	0.0	7.3	17.8	63.8	56.0	89.9	6.2	0.6	3.4	6.8
Clwyd	31	67.7	22.6	0.0	9.7	12.9	68.8	71.0	100.0	0.0	0.0	0.0	9.7
Swanse	140	77.1	18.6	0.0	4.3	10.0	69.3	62.1	97.9	2.1	0.0	0.0	0.0
Wrexm	28	53.6	39.3	0.0	7.1	25.0	62.0	60.7	96.4	0.0	3.6	0.0	0.0
TOTALS													
England	**6,714**	**71.3**	**20.3**	**0.5**	**7.9**	**18.4**	**63.9**	**63.3**	**73.0**	**13.8**	**8.3**	**4.9**	**5.5**
N Ireland	**231**	**67.5**	**15.2**	**0.9**	**16.5**	**27.3**	**67.0**	**58.0**	**99.5**	**0.0**	**0.0**	**0.5**	**7.8**
Scotland	**598**	**75.1**	**17.7**	**0.0**	**7.2**	**24.4**	**62.8**	**62.4**					**90.6**
Wales	**416**	**74.8**	**18.8**	**0.0**	**6.5**	**15.4**	**65.9**	**59.9**	**94.5**	**3.5**	**0.5**	**1.5**	**3.8**
UK	**7,959**	**71.6**	**19.9**	**0.4**	**8.1**	**18.9**	**64.0**	**62.9**	**75.3**	**12.7**	**7.5**	**4.5**	**12.0**

Blank cells – no data returned by the centre or data completeness <70%.
Breakdown by ethnicity is not shown for centres with <70% data completeness, but these centres were included in national averages. Cambridge submitted only aggregate data and breakdown by start modality was not available. Coventry submitted data for 40% of their new patients after the closing date. Only the number on RRT and modality breakdown (but not the % pre-emptive listing) were corrected using the additional Coventry data.

PRDs were grouped into categories as shown in table 1.4, with the mapping of disease codes into groups explained in more detail in appendix A. The proportion of RRT patients in each ethnic group and with each PRD is shown for patients with ethnicity and PRD data, respectively, and these total 100% of patients with data. The proportions of patients with no ethnicity and no PRD data are shown on separate lines.

The longitudinal trend of the PRD distribution, showing an increase in diabetes as the PRD, is presented in table 1.5 and figure 1.5.

Table 1.4 Demographics, primary renal diseases (PRDs), referral time and start modality of adult patients incident to RRT in 2018 by age group

Characteristic	Age group (yrs)							Total	Median age (yrs)
	18-34	35-44	45-54	55-64	65-74	75-84	≥85		
Total									
N	528	661	1,198	1,689	1,943	1,533	245	7,797	64.0
%	6.8	8.5	15.4	21.7	24.9	19.7	3.1		
Sex (%)									
Male	60.8	61.0	59.7	60.9	64.0	66.9	68.6	62.9	64.9
Female	39.2	39.0	40.3	39.1	36.0	33.1	31.4	37.1	62.7
Ethnicity (%)									
White	71.0	65.8	68.7	70.5	81.1	81.9	83.0	75.1	65.9
South Asian	12.9	16.2	13.6	15.6	11.9	9.5	8.9	12.8	61.2
Black	7.7	11.8	12.0	9.1	3.6	5.7	6.3	7.6	56.2
Other	8.4	6.3	5.8	4.9	3.4	2.9	1.8	4.5	56.8
Missing	4.9	4.7	4.8	5.8	5.9	5.9	4.7	5.5	65.8
PRD (%)									
Diabetes	17.6	28.2	29.8	38.3	31.6	24.7	18.1	29.8	63.4
Glomerulonephritis	27.5	19.8	15.7	13.1	10.8	8.0	3.5	13.1	57.0
Hypertension	4.0	5.5	6.9	5.5	6.0	8.8	8.0	6.5	67.0
Polycystic kidney disease	3.4	9.6	15.7	8.5	4.9	2.7	1.3	7.1	55.4
Pyelonephritis	7.6	5.9	4.9	4.3	4.6	4.5	8.8	5.0	64.0
Renal vascular disease	0.2	1.2	2.1	2.9	7.3	11.8	12.4	5.6	74.6
Other	24.8	19.1	15.3	17.0	20.2	18.9	19.9	18.7	65.2
Uncertain aetiology	14.9	10.7	9.7	10.5	14.7	20.6	27.9	14.3	69.6
Missing	9.8	9.8	9.3	8.9	8.7	9.0	7.8	9.1	63.2
Referral time (%)									
<90 days	25.6	17.2	14.5	14.3	15.6	13.5	17.4	15.6	63.5
≥90 days	74.4	82.8	85.5	85.7	84.4	86.5	82.6	84.4	64.7
Missing	9.2	8.3	6.8	7.3	5.8	4.4	7.2	6.5	60.8
Start modality (%)									
ICHD	55.5	59.6	62.9	71.0	76.7	81.1	85.3	71.6	66.1
HHD	0.6	0.8	0.8	0.6	0.2	0.2	0.0	0.4	55.1
PD	25.4	21.8	23.2	19.4	18.1	18.3	14.7	19.9	61.7
Tx	18.6	17.9	13.1	8.9	5.0	0.4	0.0	8.1	51.4

Scotland was excluded both from analyses of ethnicity and referral time, because Scottish renal centres had low completeness of ethnicity data and used a different definition of referral time.

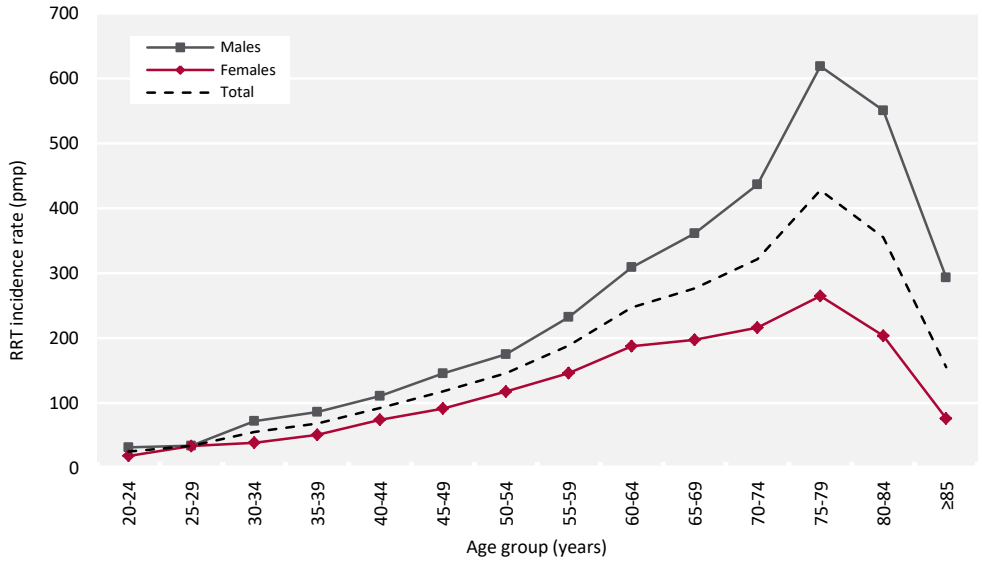

Figure 1.4 Incidence rates for adult patients starting RRT in 2018 by age group and sex
pmp – per million population

Table 1.5 Change in primary renal disease (PRD) of adult patients incident to RRT from 2009 to 2018

	Year of RRT start									
PRD	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Diabetes	24.4	23.7	23.9	25.3	25.2	25.9	26.9	27.4	28.7	29.8
Glomerulonephritis	12.6	13.4	12.9	13.7	14.2	12.9	13.4	13.4	13.8	13.1
Hypertension	6.9	6.7	6.9	7.3	7.5	6.2	6.6	6.1	6.2	6.5
Polycystic kidney disease	6.5	6.9	7.4	6.8	7.5	6.4	7.2	6.7	6.6	7.1
Pyelonephritis	7.2	7.2	6.7	6.7	6.6	5.7	6.3	6.2	5.6	5.0
Renal vascular disease	6.1	7.2	6.6	6.2	5.3	6.0	5.9	6.2	5.8	5.6
Other	16.2	15.9	16.7	17.4	18.2	19.6	18.6	18.6	18.9	18.7
Uncertain aetiology	20.3	19.0	18.8	16.5	15.5	17.2	15.1	15.5	14.5	14.3
Missing	3.0	3.0	4.1	2.2	4.3	2.0	3.1	3.7	8.6	9.1

The percentages in each PRD category add up to 100% in each year; the percentages with missing PRD data are shown separately.

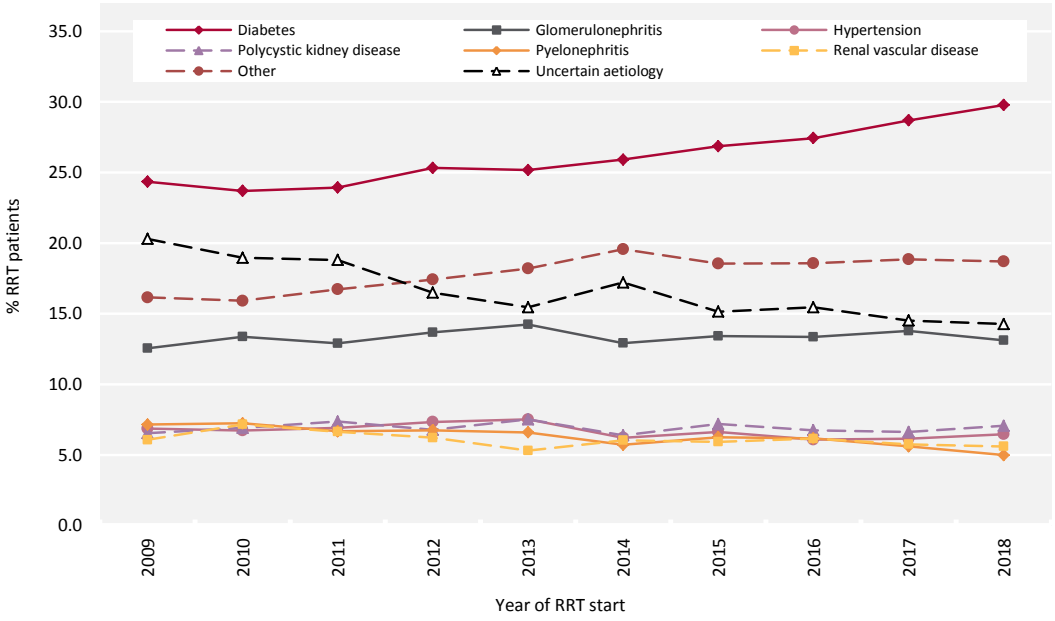

Figure 1.5 Change in primary renal disease (PRD) of adult patients incident to RRT from 2009 to 2018

Modality changes of incident adult RRT patients

Many patients start on HD, but then switch to other modalities, so the modality in use at 90 days may be more representative of the first elective modality. The analysis of the proportion of patients by treatment modality at three months post-RRT initiation is shown over time (table 1.6) and by UK country (table 1.7). Changes from start modality and deaths during the first five years are shown by start modality (table 1.8). Due to small numbers, the percentage of incident patients on HHD and ICHD at start and 90 days after start of RRT is shown at a UK level (table 1.6), but all HD patients are combined for other analyses.

Table 1.6 RRT modality at start and 90 days after start of RRT for incident adult RRT patients by year of start

RRT start year	% on ICHD	% on HHD	% on PD	% with Tx
Day 0 modality				
2013	72.0	0.1	19.5	8.5
2014	71.6	0.3	20.1	8.1
2015	72.8	0.1	19.3	7.8
2016	72.1	0.1	20.3	7.5
2017	71.7	0.2	19.3	8.8
2018	71.9	0.2	19.9	8.1
Day 90 modality				
Oct 2012 - Sept 2013	69.4	0.5	20.3	9.8
Oct 2013 - Sept 2014	68.7	0.9	20.3	10.1
Oct 2014 - Sept 2015	70.5	0.6	19.5	9.4
Oct 2015 - Sept 2016	68.6	0.9	20.6	10.0
Oct 2016 - Sept 2017	68.4	0.8	20.3	10.5
Oct 2017 - Sept 2018	69.1	1.0	20.1	9.9

For 90 day analyses, the incident cohort from the 12 months starting 1 October of the previous year was used, so that follow-up to 90 days was possible for all patients.

Table 1.7 RRT modality at 90 days for adult patients incident to RRT between 01/10/2017 and 30/09/2018 by country

		Patients who started RRT					Patients still on RRT at 90 days		
Country	N	% on HD[1]	% on PD	% with Tx	% discontinued[2]	% died	% on HD[1]	% on PD	% with Tx
England	6,649	65.1	19.5	9.2	1.1	5.1	69.4	20.8	9.8
N Ireland	218	61.9	12.8	18.8	3.2	3.2	66.2	13.7	20.1
Scotland	625	72.3	14.4	8.5	0.2	4.6	76.0	15.1	8.9
Wales	421	70.6	19.7	6.9	0.2	2.6	72.6	20.3	7.1
UK	7,913	65.9	18.9	9.3	1.0	4.9	70.0	20.1	9.9

[1]HD included ICHD and HHD.
[2]Discontinued did not include patients who recovered function within 90 days, because by definition they were not included in the incident cohort.

Table 1.8 Start and subsequent RRT modalities for adult patients incident to RRT in 2013 by time after start

			Time after start (%)			
Start modality	N	Later modality	90 days	1 yr	3 yrs	5 yrs
HD	4,961	HD	90.0	73.6	45.9	27.4
		PD	2.1	2.9	0.8	0.3
		Tx	1.2	5.0	13.7	17.7
		Other[1]	0.6	2.0	2.4	2.5
		Died	6.2	16.4	37.2	52.0
PD	1,342	HD	5.2	14.6	20.9	17.0
		PD	89.7	61.7	22.1	6.2
		Tx	2.7	14.5	33.0	39.5
		Other[1]	0.1	0.9	1.1	1.4
		Died	2.2	8.3	23.0	35.9
Tx	583	HD	0.5	1.5	2.9	3.3
		PD	0.0	0.2	0.2	0.3
		Tx	98.3	95.7	91.1	86.8
		Other[1]	0.5	1.0	1.7	1.9
		Died	0.7	1.5	4.1	7.7

Shading indicates proportion of individuals maintained on their initial modality.
[1]Other is discontinued, recovered, moved away or currently transferring between centres.

The modality at one year after RRT initiation is shown in figure 1.6 by centre using incident patients starting RRT in 2017 to allow one year follow-up time.

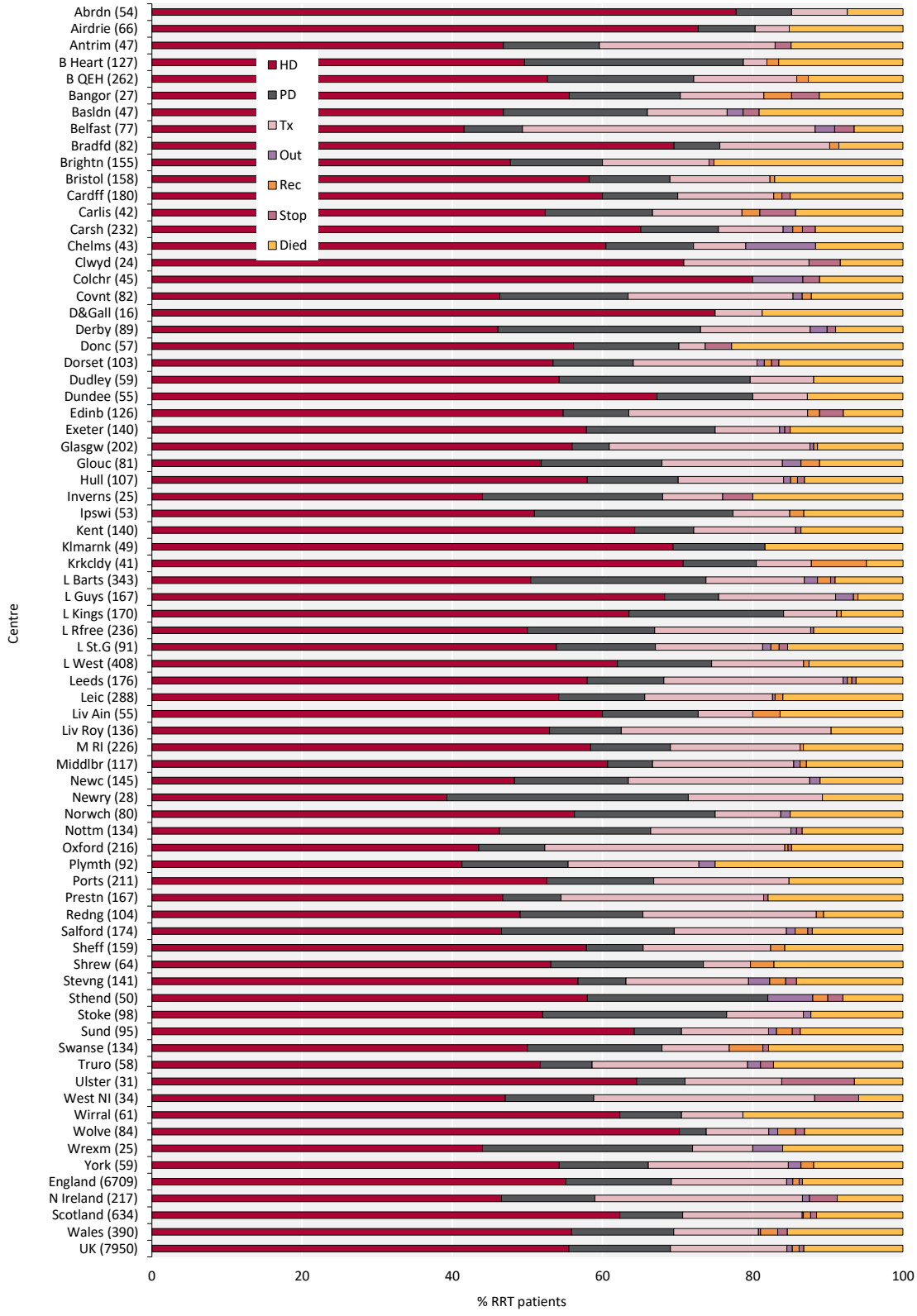

Figure 1.6 RRT modality at 1 year for incident adult RRT patients who started RRT in 2017 by centre

Number of patients in a centre in brackets.

Out – moved out of a centre but did not reappear in another centre; Rec – recovered kidney function; Stop – treatment withdrawal

Late presentation to nephrology services of incident adult RRT patients

Late presentation to a nephrologist is defined as a patient being seen by the renal service for the first time within 90 days of starting RRT and is used interchangeably with referral time in this report. However, the Scottish Renal Registry provided date of referral to nephrology by general practitioner (GP) rather than the date first seen by renal services. Scottish centres are included in this section, but late referral will be underestimated compared to the rest of the UK and Scotland was therefore excluded from UK totals. Due to small numbers, a two year cohort (2017–2018) was used at a centre level to estimate late referral to a nephrologist and centres with a completeness of <70% were excluded. A seven year cohort was used to show national longitudinal trends (table 1.12).

Table 1.9 Referral times of incident adult RRT patients by centre (2017–2018 2 year cohort)

	N on RRT		N with referral data	% data completeness		% presenting <90 days before RRT start		% presenting <1 yr before RRT start
Centre	2017	2018		2017	2018	All PRDs	Non-diabetes PRDs	All PRDs
ENGLAND								
B Heart	127	116	241	99.2	99.1	9.1	11.7	17.8
B QEH	262	249	511	100.0	100.0	17.8	21.5	35.2
Basldn	47	48	95	100.0	100.0	18.9	21.1	40.0
Bradfd	82	69	151	100.0	100.0	11.3	13.6	20.5
Brightn	155	175	329	99.4	100.0	22.8	25.1	36.2
Bristol	158	167	310	91.1	99.4	17.1	21.5	25.8
Camb								
Carlis	42	33	73	95.2	100.0	19.2	16.0	24.7
Carsh	232	226	457	99.6	100.0	19.0	18.8	34.8
Chelms	43	31	65	79.1	100.0	18.5	16.7	30.8
Colchr	45	34	68	86.7	85.3	17.6	22.0	47.1
Covnt	82	78	142					
Derby	89	85	174	100.0	100.0	16.1	20.5	27.0
Donc	57	51	107	100.0	98.0	8.4	11.3	20.6
Dorset	103	104	207	100.0	100.0	14.5	19.0	21.3
Dudley	59	47	106	100.0	100.0	9.4	12.7	22.6
Exeter	140	129	269	100.0	100.0	14.1	16.2	26.4
Glouc	81	69	148	100.0	97.1	14.9	19.0	23.0
Hull	107	101	207	99.1	100.0	23.2	25.9	36.2
Ipswi	53	54		1.9	0.0			
Kent	140	137	273	99.3	97.8	11.4	11.5	18.3
L Barts	343	350		1.5	4.6			
L Guys	167	182	340	95.8	98.9	15.3		28.8
L Kings	170	149	316	98.2	100.0	15.5	20.5	22.5
L Rfree	236	244	472	98.7	98.0	11.7	11.9	23.1
L St.G	91	85	146	85.7	80.0	32.2		54.1
L West	408	393	796	99.5	99.2	17.3	19.0	31.9
Leeds	176	178	354	100.0	100.0	12.1	14.9	29.1
Leic	288	309	595	99.7	99.7	17.0	12.2	25.2
Liv Ain	55	67	121	100.0	98.5	13.2	17.4	22.3
Liv Roy	136	97	227	97.1	97.9	16.3	15.1	28.6
M RI	226	187	372	83.6	97.9	17.2		33.9
Middlbr	117	117	234	100.0	100.0	17.5	20.5	32.5
Newc	145	136	281	100.0	100.0	14.6	17.7	24.2
Norwch	80	79	156	100.0	96.2	27.6	29.4	42.3
Nottm	134	123	256	100.0	99.2	11.3	14.8	18.8
Oxford	216	220	435	99.5	100.0	16.8	17.8	28.5

Table 1.9 Continued

Centre	N on RRT 2017	N on RRT 2018	N with referral data	% data completeness 2017	% data completeness 2018	% presenting <90 days before RRT start: All PRDs	% presenting <90 days before RRT start: Non-diabetes PRDs	% presenting <1 yr before RRT start: All PRDs
Plymth	92	64	152	96.7	98.4	16.4	17.0	29.6
Ports	211	201	396	92.4	100.0	9.3	5.4	23.7
Prestn	167	178	344	99.4	100.0	17.2	20.4	29.9
Redng	104	101	205	100.0	100.0	14.1	17.9	20.0
Salford	174	160	305	83.9	99.4	20.7	24.4	32.8
Sheff	159	183	342	100.0	100.0	15.2	17.9	26.6
Shrew	64	77	141	100.0	100.0	19.9	24.5	30.5
Stevng	141	178	319	100.0	100.0	11.0	13.6	17.2
Sthend	50	43	88	94.0	95.3	20.5	26.7	31.8
Stoke	98	98	195	99.0	100.0	22.6	24.8	40.5
Sund	95	89	184	100.0	100.0	17.9	21.3	28.8
Truro	58	60	117	100.0	98.3	18.8	23.5	33.3
Wirral	61	58	119	100.0	100.0	25.2	25.0	42.0
Wolve	84	90	174	100.0	100.0	10.9	14.0	23.6
York	59	53	112	100.0	100.0	8.9	10.6	22.3
N IRELAND								
Antrim	47	56	97	91.5	96.4	11.3	13.3	20.6
Belfast	77	73	132	87.0	89.0	15.9	19.7	20.5
Newry	28	31	59	100.0	100.0	20.3	23.4	30.5
Ulster	31	32	61	96.8	96.9	18.0	23.3	26.2
West NI	34	39	72	97.1	100.0	12.5	12.3	23.6
SCOTLAND								
Abrdn	54	57	97	96.3	78.9	15.5	19.4	28.9
Airdrie	66	63	127	97.0	100.0	9.4	11.8	22.8
D&Gall	16	18	30	100.0	77.8	16.7	15.0	26.7
Dundee	55	36	78	89.1	80.6	11.5	17.0	34.6
Edinb	126	107	195	90.5	75.7	14.9	16.3	25.1
Glasgw	202	204	374	98.5	85.8	10.4	14.8	16.6
Inverns	25	37	56	100.0	83.8	14.3	20.0	28.6
Klmarnk	49	38	85	100.0	94.7	15.3	19.3	20.0
Krkcldy	41	38	73	97.6	86.8	20.5	26.3	28.8
WALES								
Bangor	27	26	53	100.0	100.0	9.4	10.8	17.0
Cardff	180	191	371	100.0	100.0	10.8	14.2	21.6
Clwyd	24	31	53	91.7	100.0	11.3	14.3	39.6
Swanse	134	140	274	100.0	100.0	13.5	18.3	22.3
Wrexm	25	28	53	100.0	100.0	17.0	20.0	34.0
TOTALS								
England	**6,709**	**6,552**	**12,249**	**91.7**	**93.0**	**16.0**	**17.9**	**28.2**
N Ireland	**217**	**231**	**421**	**92.6**	**95.2**	**15.2**	**17.8**	**23.3**
Scotland	**634**	**598**	**1,115**	**95.9**	**84.8**	**13.0**	**16.7**	**23.0**
Wales	**390**	**416**	**804**	**99.5**	**100.0**	**12.1**	**15.7**	**23.5**
E, W & NI	**7,316**	**7,199**	**13,474**	**92.2**	**93.5**	**15.7**	**17.7**	**27.7**

Blank cells – no data returned by the centre or data completeness <70%.
If a centre had low referral completeness (<70%) for 1 of the 2 years, only a 1 year cohort was included in the analysis.
For the analysis of late referral in non-diabetics, patients with missing PRD were excluded from the analysis and the results not shown if the completeness of PRD was <70%.
Scottish referral data were not included in the UK totals because of a difference in definition (see appendix A).
Coventry was excluded because data for 40% of their new patients were submitted after the closing date with no referral data, taking completeness to <70%.
PRD – primary renal disease

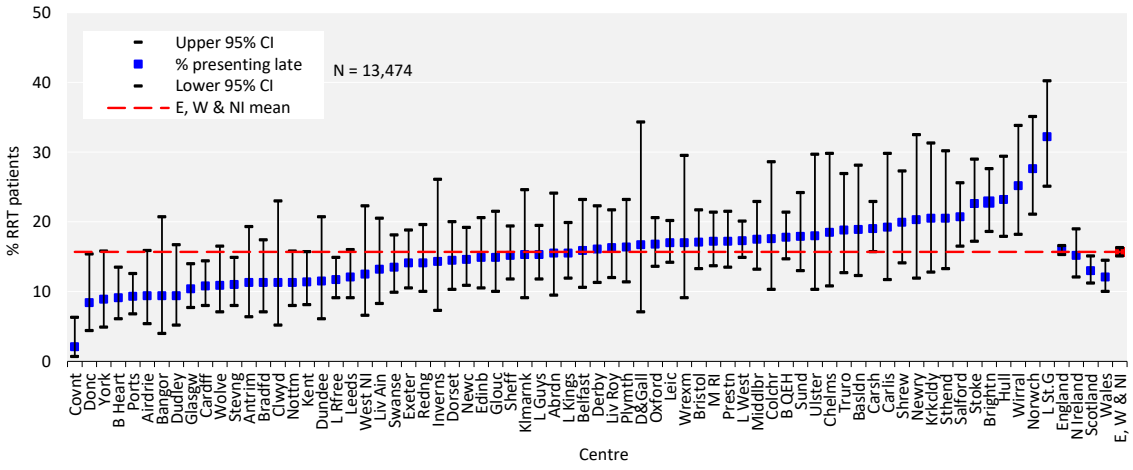

Figure 1.7 Percentage of incident adult RRT patients presenting late (<90 days) to a nephrologist (2017–2018 2 year cohort)

Scottish data on referral were not used to calculate the UK mean because of a different definition (see appendix A).
CI – confidence interval

Table 1.10 Characteristics of incident adult RRT patients by referral time (2017–2018 2 year cohort)

	Referral time	
Characteristic	<90 days	≥90 days
Median age (yrs)	63.9	64.3
% male	64.1	63.5
% starting on PD	7.4	20.8
% on PD at 90 days	9.6	21.1
Mean haemoglobin at RRT start (g/L)[1]	94	100
Mean eGFR at RRT start (mL/min/1.73m^2)[1]	6.7	7.5

[1]Data available for approximately 50% of patients.
eGFR – estimated glomerular filtration rate

Late presentation is shown by PRDs, which were grouped into categories as shown in table 1.11, with the mapping of disease codes into groups explained in more detail in appendix A. The proportion of patients with each PRD presenting late is shown for patients with PRD data. The proportion of patients with no PRD data is shown on a separate line.

Table 1.11 Referral time of incident adult RRT patients by primary renal disease (PRD) (2017–2018 2 year cohort)

		Referral time			
		<90 days		≥90 days	
PRD	N with data	N	%	N	%
Diabetes	3,916	296	7.6	3,620	92.4
Glomerulonephritis	1,829	218	11.9	1,611	88.1
Hypertension	849	107	12.6	742	87.4
Polycystic kidney disease	927	34	3.7	893	96.3
Pyelonephritis	741	91	12.3	650	87.7
Renal vascular disease	779	92	11.8	687	88.2
Other	2,533	844	33.3	1,689	66.7
Uncertain aetiology	1,904	302	15.9	1,602	84.1
Total (with data)	**13,478**	**1,984**	**14.7**	**11,494**	**85.3**
Missing	1,111	277	24.9	834	75.1

Table 1.12 Referral time of incident adult RRT patients by year of start (restricted to centres reporting continuous data for 2012–2018)

	RRT start year (%)						
Referral time	2012	2013	2014	2015	2016	2017	2018
<90 days	18.0	18.2	18.1	18.4	17.6	18.1	17.5
3-6 mths	5.4	5.1	5.8	5.1	5.5	5.6	5.1
6-12 mths	8.1	7.4	9.0	9.1	9.3	8.3	8.5
≥12 mths	68.5	72.1	75.7	80.7	82.5	84.5	84.7

Start estimated glomerular filtration rate in incident adult RRT patients

Start eGFR was calculated using the CKD Epidemiology Collaboration method for incident RRT patients by age group and by start modality. Care needs to be taken in interpreting these data because (i) start eGFR data completeness is poor (39% overall), (ii) if the date of RRT start is incorrect, the documented start eGFR may have been taken after the patient had started RRT.

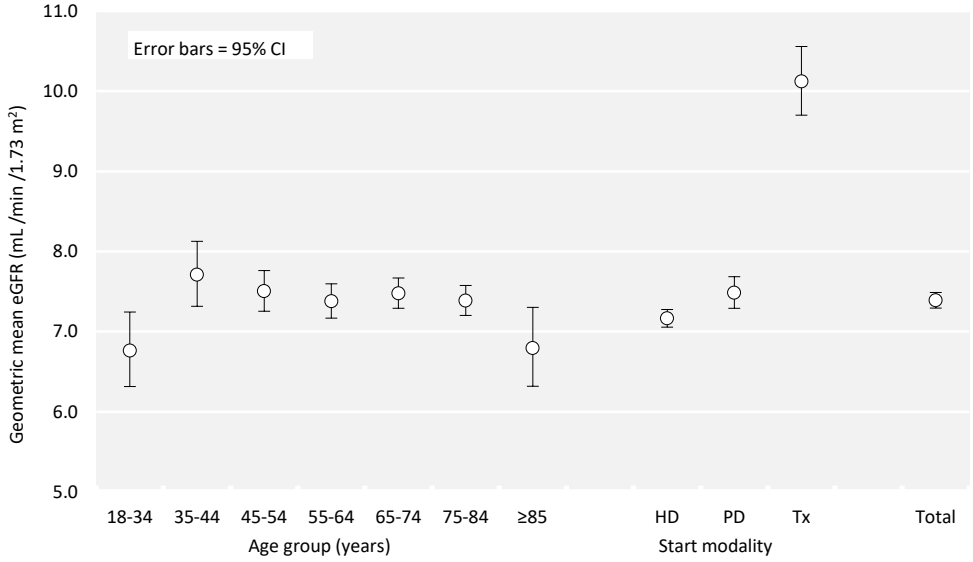

Figure 1.8 Geometric mean estimated glomerular filtration rates (eGFR) for adult patients incident to RRT in 2018 by age group and start modality
CI – confidence interval

Management of anaemia in incident adult RRT patients

The analyses of haemoglobin by modality and timing of presentation used haemoglobin measurements from after the start of RRT but still within the same quarter. The poor data completeness for ESA data in the incident RRT population limited analysis to the proportion of patients with haemoglobin measurements of ≥100 g/L.

Table 1.13 Haemoglobin (Hb) data for adult patients incident to RRT in 2018 by centre

	All RRT patients		Median Hb (g/L) by modality			Median Hb (g/L) by presentation time		
Centre	Median Hb (g/L)	% Hb ≥100 g/L	Tx	PD	HD	≥90 days	<90 days	% data completeness
ENGLAND								
B Heart	96	41.1		102	94	98		96.6
B QEH	100	50.6	104	107	96	101	94	99.2
Basldn	94	39.6			93	95		100.0
Bradfd	96	39.3			94	98		88.4
Brightn	100	51.2	98	110	98	101	94	92.6
Bristol	104	74.9	111	107	103	105	103	100.0
Camb								
Carlis	99	48.5		103	97	100		100.0
Carsh	97	42.0	108	105	95	98	95	96.9
Chelms	106	63.3		111	91	107		96.8
Colchr								52.9
Covnt	97	48.0	96	105	94	99		96.2
Derby	100	50.6		100	99	101	96	100.0
Donc	89	34.7			89	90		96.1
Dorset	98	49.5		112	95	99		99.0
Dudley	95	32.6			93	97		97.9
Exeter	104	76.6	114	111	103	105	102	96.1
Glouc	99	44.9		104	94	99		100.0
Hull	99	48.8		108	92	100	92	83.2
Ipswi	94	34.7			91			90.7
Kent	95	41.6	100	99	94	97	90	100.0
L Barts	97	45.0	120	102	91			97.7
L Guys	92	31.1	106	102	89	93	90	98.9
L Kings	99	47.2		103	96	100	87	95.3
L Rfree	99	49.6	114	104	94	101	92	99.2
L St.G	94	34.7	106	109	90	95	84	84.7
L West	101	53.0	113	104	99	101	98	84.5
Leeds	92	29.5	103	105	87	93	83	93.3
Leic	96	42.6	112	104	93	98	87	95.8
Liv Ain	99	46.2		108	95	99		97.0
Liv Roy	103	56.4	116	109	100	104	104	96.9
M RI	95	37.7	95	99	94	95	86	97.9
Middlbr	99	49.1		108	97	102	92	94.0
Newc	96	40.2	107	102	90	96	92	97.1
Norwch	98	39.7			97	99	96	86.1
Nottm	96	41.2		103	93	96	83	96.8
Oxford	97	44.8	104	109	92	99	92	99.6
Plymth	101	53.1		113	96	106	83	100.0
Ports	104	58.9	110	113	99	105	88	98.0
Prestn	98	44.6	105	110	95	98	98	94.4
Redng	93	38.5	109	107	88	94	89	95.1
Salford	99	48.4	104	108	93	101	92	95.6

Table 1.13 Continued

Centre	All RRT patients		Median Hb (g/L) by modality			Median Hb (g/L) by presentation time		% data completeness
	Median Hb (g/L)	% Hb ≥100 g/L	Tx	PD	HD	≥90 days	<90 days	
Sheff	99	48.4	115	113	95	100	88	99.5
Shrew	103	56.6		105	102	103	101	98.7
Stevng	95	32.0		103	94	96	92	94.9
Sthend	99	47.5		103	95	103	90	93.0
Stoke	108	70.9		113	102	108	106	87.8
Sund	100	50.0		116	96	101	94	96.6
Truro	97	44.1			97	98	86	98.3
Wirral	103	56.1		103	102	103	101	98.3
Wolve	90	35.4		98	90	91		87.8
York	93	28.0		97	89	93		94.3
N IRELAND								
Antrim	101	53.6		111	95	100		100.0
Belfast	105	67.1	113	112	100	108		95.9
Newry	96	45.2			92	94		100.0
Ulster	107	71.9			105	108		100.0
West NI	103	54.1			99	104		94.9
SCOTLAND								
Abrdn	97	44.4		106	93	95		79.0
Airdrie	97	48.0		110	90	103		79.4
D&Gall								66.7
Dundee	98	46.2			95	95		72.2
Edinb	103	64.4	121	103	99	102	88	84.1
Glasgw								68.6
Inverns	98	50.0			94	94		91.9
Klmarnk	93	37.9			93	94		76.3
Krkcldy	103	60.0			101	99		79.0
WALES								
Bangor	97	44.0			96	96		96.2
Cardff	98	42.6	101	101	94	98	95	99.5
Clwyd	99	45.8			94	98		77.4
Swanse	99	48.6		111	96	99	91	100.0
Wrexm	99	45.8			90	99		85.7
TOTALS								
England	**98**	**46.6**	**107**	**105**	**95**	**99**	**92**	**95.3**
N Ireland	**103**	**59.3**	**115**	**110**	**98**	**103**	**96**	**97.8**
Scotland	**98**	**48.3**	**120**	**110**	**94**	**97**	**90**	**76.3**
Wales	**98**	**45.2**	**103**	**109**	**95**	**98**	**94**	**96.9**
UK[1]	**98**	**47.1**	**108**	**106**	**95**	**99***	**92***	**94.0**

Blank cells – no data returned by the centre, data completeness (including referral time) <70% or N<10.
[1]Scottish referral data were not used to calculate UK averages because of a difference in definition (see appendix A).

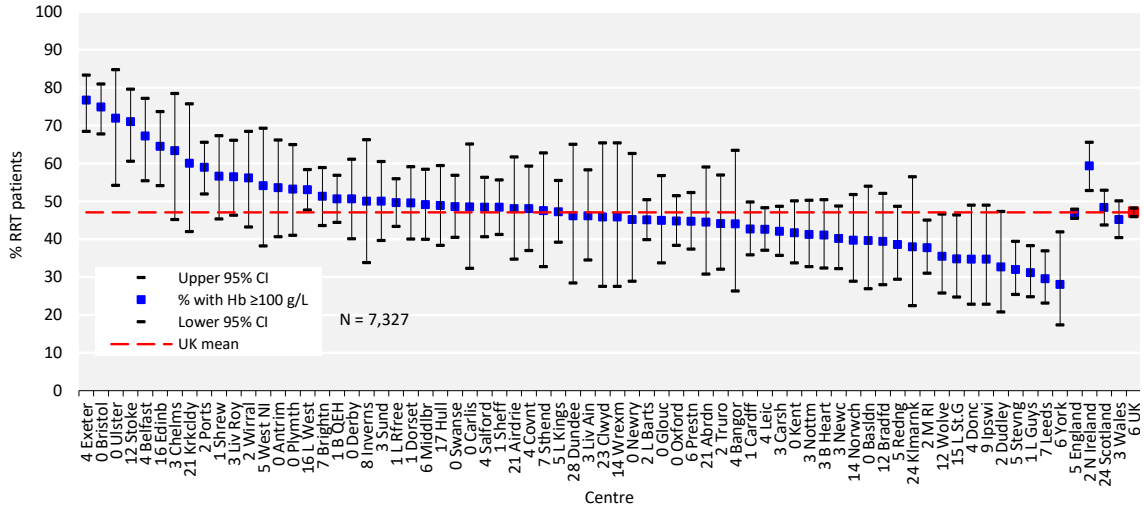

Figure 1.9 Percentage of adult patients incident to RRT in 2018 with haemoglobin (Hb) ≥100 g/L at start of RRT treatment by centre.
CI – confidence interval

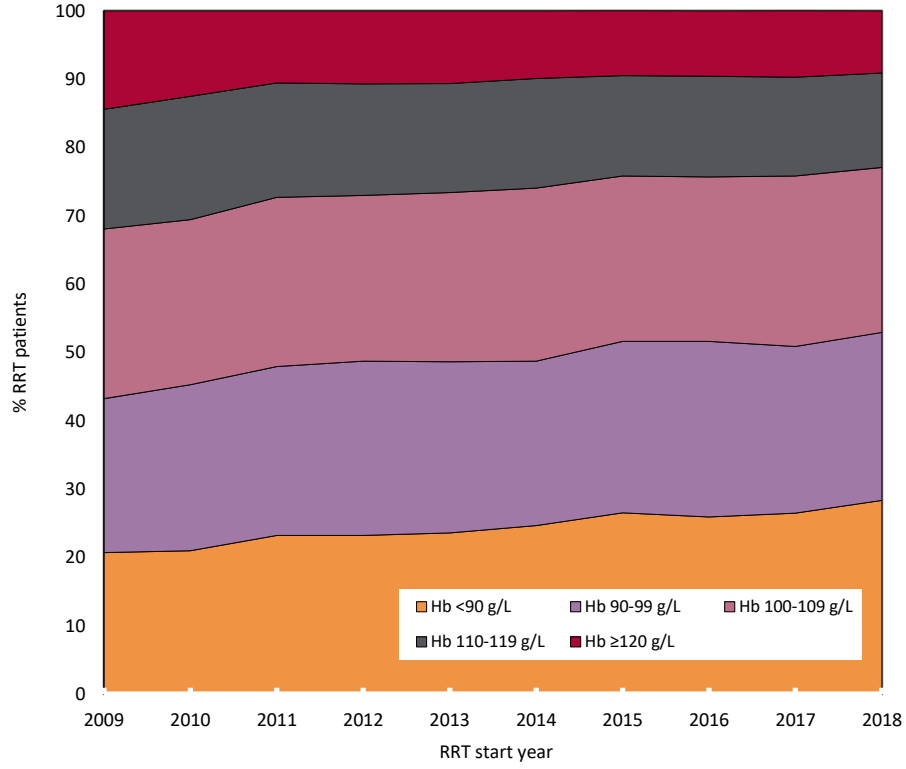

Figure 1.10 Distribution of haemoglobin (Hb) in incident adult RRT patients by year of start between 2009 and 2018

Biochemistry parameters in incident adult RRT patients

The latest Renal Association guideline on CKD mineral bone disease contains only one audit measure, which applies to patients with CKD and patients on RRT. It is the percentage of patients with adjusted calcium above the target range.

Table 1.14 Median adjusted calcium (Ca) and percentage with adjusted Ca within and above the target range (2.2–2.5 mmol/L) in adult patients incident to RRT in 2018 by centre

Centre	Median adj Ca (mmol/L)	% adj Ca 2.2–2.5 mmol/L	% adj Ca >2.5 mmol/L	% data completeness
ENGLAND				
B Heart	2.3	81.6	6.1	98.3
B QEH	2.3	83.5	2.8	99.6
Basldn	2.4	91.7	6.3	100.0
Bradfd	2.4	74.2	9.1	95.7
Brightn	2.3	74.6	9.8	98.9
Bristol	2.3	92.2	7.2	100.0
Camb				
Carlis	2.3	63.6	9.1	100.0
Carsh	2.3	77.0	5.5	96.0
Chelms	2.2	73.3	3.3	96.8
Colchr	2.3	78.1	3.1	94.1
Covnt	2.3	81.8	2.6	98.7
Derby	2.4	90.6	4.7	100.0
Donc	2.3	94.0	2.0	98.0
Dorset	2.3	79.4	3.9	98.1
Dudley	2.4	71.7	19.6	97.9
Exeter	2.3	89.8	7.0	99.2
Glouc	2.3	82.1	10.5	97.1
Hull	2.4	80.2	9.4	95.1
Ipswi	2.3	72.2	9.3	100.0
Kent	2.4	83.2	11.0	100.0
L Barts	2.3	77.6	2.0	99.4
L Guys	2.3	82.1	10.1	98.4
L Kings	2.3	74.5	2.1	97.3
L Rfree	2.3	80.6	5.4	99.2
L St.G	2.4	74.0	18.2	90.6
L West	2.4	71.6	16.6	86.0
Leeds	2.3	81.3	5.1	98.9
Leic	2.3	81.8	8.3	97.7
Liv Ain	2.3	91.0	4.5	100.0
Liv Roy	2.3	83.3	4.2	99.0
M RI	2.4	82.2	10.3	98.9
Middlbr	2.2	48.7	2.6	100.0
Newc	2.3	77.8	13.3	99.3
Norwch	2.4	83.6	12.3	92.4
Nottm	2.3	78.9	4.1	100.0
Oxford	2.3	81.8	8.2	100.0
Plymth	2.3	88.9	4.8	98.4
Ports	2.3	76.9	5.5	99.0
Prestn	2.3	75.5	4.9	91.6
Redng	2.3	81.0	5.0	99.0
Salford	2.3	76.9	12.2	97.5
Sheff	2.3	83.6	6.6	100.0
Shrew	2.4	84.4	11.7	100.0
Stevng	2.3	74.0	4.0	99.4

Table 1.14 Continued

Centre	Median adj Ca (mmol/L)	% adj Ca 2.2–2.5 mmol/L	% adj Ca >2.5 mmol/L	% data completeness
Sthend	2.4	83.3	14.3	97.7
Stoke	2.3	80.2	9.3	87.8
Sund	2.3	78.4	8.0	98.9
Truro	2.4	78.3	11.7	100.0
Wirral	2.3	72.7	7.3	94.8
Wolve	2.4	79.8	10.7	93.3
York	2.4	86.0	12.0	94.3
N IRELAND				
Antrim	2.4	83.9	10.7	100.0
Belfast	2.3	78.6	2.9	95.9
Newry	2.3	93.6	3.2	100.0
Ulster	2.4	83.9	16.1	96.9
West NI	2.2	76.9	0.0	100.0
SCOTLAND				
Abrdn	2.4	77.4	13.2	93.0
Airdrie	2.3	90.3	3.2	98.4
D&Gall	2.2	68.8	0.0	88.9
Dundee	2.4	83.3	8.3	100.0
Edinb	2.4	80.4	7.8	95.3
Glasgw	2.3	79.2	5.5	89.7
Inverns	2.3	83.8	0.0	100.0
Klmarnk	2.4	94.3	2.9	92.1
Krkcldy	2.3	89.5	2.6	100.0
WALES				
Bangor	2.3	88.0	0.0	96.2
Cardff	2.4	76.4	18.9	100.0
Clwyd	2.4	86.7	13.3	96.8
Swanse	2.3	80.0	4.3	100.0
Wrexm	2.3	89.3	7.1	100.0
TOTALS				
England	**2.3**	**79.5**	**7.5**	**97.3**
N Ireland	**2.3**	**82.4**	**6.2**	**98.3**
Scotland	**2.3**	**82.4**	**5.7**	**94.0**
Wales	**2.4**	**80.0**	**11.6**	**99.5**
UK	**2.3**	**79.8**	**7.6**	**97.2**

Blank cells – no data returned by the centre or data completeness <70%.

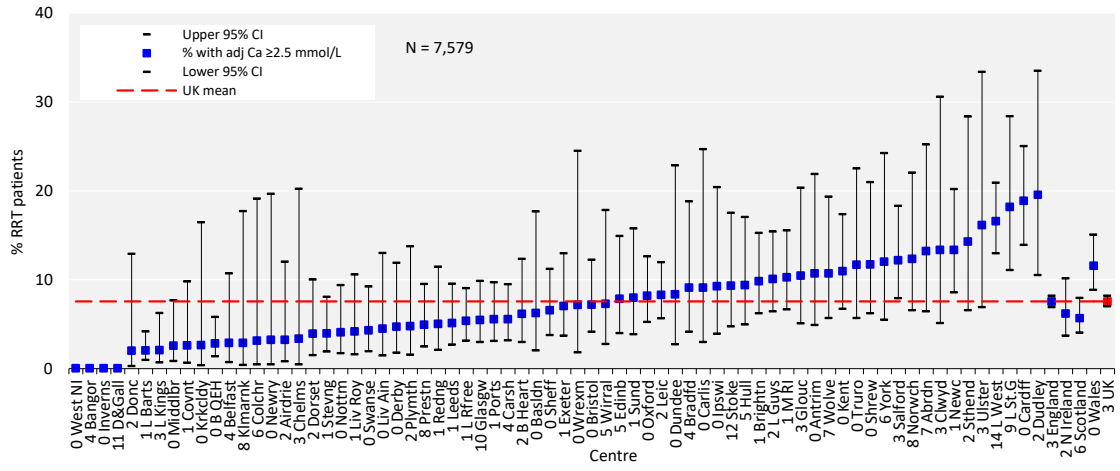

Figure 1.11 Percentage of adult patients incident to RRT in 2018 with adjusted calcium (Ca) above the normal range (>2.5 mmol/L) by centre
CI – confidence interval

Dialysis access in incident adult dialysis patients

Incident dialysis access data were collected separately to the main UKRR quarterly data returns via the 2018 Multisite Dialysis Access Audit (see appendix A). This year, patients who did not start dialysis for the first time in 2018 based on UKRR quarterly data submissions were excluded.

For the first time, data on access at start for Scotland were included. Data on PD catheter insertion technique and surgical assessment were not submitted and presentation to renal services is measured differently (see appendix A), so Scottish centres were excluded from these analyses.

There are different techniques for PD catheter insertion. Surgical techniques include open and laparoscopic. Non-surgical techniques include percutaneous and peritoneoscopic insertion.

Table 1.15 Demographics and characteristics of patients in the 2018 Multisite Dialysis Access Audit by first dialysis access type

Characteristic		HD – first dialysis access type				PD – first dialysis access type					Total
		N	AVF/ AVG	TL	NTL	N	Open surgery	Laparo-scopic	Peritoneoscopic/ percutaneous	Missing PD technique	
Total											
N		4,825	1,909	1,677	1,239	1,348	418	283	407	240	6,173
%			39.6	34.8	25.7		31.0	21.0	30.2	17.8	
Age (%)	Median (yrs)	66	68	64	66	62	63	61	61	61	65
	IQR (yrs)	54,75	57,76	51,74	54,75	50,73	51,74	50,71	48,73	49,74	53,75
	<45 yrs	596	26.0	45.5	28.5	245	28.6	19.2	34.3	18.0	841
	45-54 yrs	676	37.9	37.6	24.6	242	30.6	24.0	27.3	18.2	918
	55-64 yrs	1,033	41.1	34.9	23.9	281	29.5	20.3	32.0	18.1	1,314
	65-74 yrs	1,284	40.8	32.8	26.4	295	31.5	24.4	28.1	15.9	1,579
	≥75 yrs	1,236	44.4	29.9	25.6	285	34.4	17.2	29.5	18.9	1,521
Body mass index (%)	<20	128	18.8	43.0	38.3	29	34.5	27.6	34.5	3.4	157
	20-24	529	38.8	35.5	25.7	165	44.8	24.8	25.5	4.8	694
	25-29	666	44.1	31.5	24.3	259	47.9	32.0	18.1	1.9	925
	30-34	428	48.1	32.9	18.9	119	49.6	26.1	21.0	3.4	547
	≥35	426	45.8	32.4	21.8	65	49.2	32.3	13.8	4.6	491
	Missing	191	23.0	25.7	51.3	46	17.4	23.9	54.3	4.3	237
PRD (%)	Diabetes	1,459	41.8	36.0	22.2	352	24.4	21.9	33.0	20.7	1,811
	Glomerulonephritis	518	37.6	41.1	21.2	215	37.7	14.4	31.2	16.7	733
	Hypertension	282	46.5	31.2	22.3	95	27.4	32.6	27.4	12.6	377
	Polycystic kidney	227	68.7	25.1	6.2	110	39.1	21.8	13.6	25.5	337
	Pyelonephritis	216	48.1	29.6	22.2	45	33.3	31.1	22.2	13.3	261
	Renal vascular	276	42.8	28.3	29.0	75	33.3	18.7	30.7	17.3	351
	Other	862	19.8	38.6	41.5	182	22.0	17.0	39.0	22.0	1,044
	Uncertain aetiology	674	47.9	31.6	20.5	199	39.2	15.1	33.7	12.1	873
	Missing	181	30.9	37.0	32.0	50	26.0	34.0	24.0	16.0	231
Referral time (%)	<90 days	771	3.1	40.9	56.0	61	26.2	19.7	39.3	14.8	832
	90-179 days	176	22.2	50.0	27.8	54	44.4	25.9	16.7	13.0	230
	180-364 days	327	34.3	43.7	22.0	91	31.9	30.8	22.0	15.4	418
	≥365 days	2,649	52.4	30.5	17.0	878	39.3	21.6	27.8	11.3	3,527
	Missing	65	30.8	41.5	27.7	4		25.0	50.0	25.0	69
Assessed by surgeon (%)	Yes	1,846	70.1	20.6	9.3	631	37.6	24.7	26.3	11.4	2,477
	No	1,711	9.4	47.3	43.3	333	40.8	25.5	26.1	7.5	2,044
	Missing	40		67.5	32.5	31	9.7	9.7	64.5	16.1	71
Sex (%)	Male	3,099	39.9	34.4	25.7	855	31.9	19.1	32.6	16.4	3,954
	Female	1,726	39.0	35.4	25.6	493	29.4	24.3	26.0	20.3	2,219
Ethnicity (%)	White	2,974	40.0	33.0	27.1	828	39.0	19.9	30.1	11.0	3,802
	South Asian	555	38.9	37.3	23.8	169	18.9	18.9	43.2	18.9	724
	Black	328	27.7	41.8	30.5	102	18.6	24.5	43.1	13.7	430
	Other	161	32.9	44.7	22.4	60	15.0	31.7	41.7	11.7	221
	Missing	211	39.8	30.8	29.4	41	31.7	34.1	24.4	9.8	252
eGFR at start[1]	Median	7	7	7	7	8	8	8	8	8	7
	IQR	6,9	6,9	5,9	5,10	6,9	6,9	6,9	6,9	6,9	6,9

Table 1.15 Continued

Characteristic		HD – first dialysis access type N	AVF/ AVG	TL	NTL	PD – first dialysis access type N	Open surgery	Laparo-scopic	Peritoneoscopic/ percutaneous	Missing PD technique	Total
Diabetes[2]	Yes	1,766	41.4	34.9	23.7	398	27.1	26.1	35.7	11.1	2,164
(%)	No	1,841	37.5	34.4	28.1	642	34.7	23.8	31.6	9.8	2,483
	Missing	40	20.0	60.0	20.0	15	6.7	20.0	6.7	66.7	55

[1]eGFR units are mL/min/1.73m^2.
[2]Diabetes at start of dialysis as per the Multisite Dialysis Access Audit, or as a comorbidity or PRD from the UKRR database.
A centre was excluded from the analysis of a particular variable if it returned data for <70% of patients. As data from Scotland were now included, but those centres did not return data on PD technique, the proportion of missing data is higher than in previous years.
AVF – arteriovenous fistula; AVG – arteriovenous graft; eGFR – estimated glomerular filtration rate; IQR – interquartile range; NTL – non-tunnelled line; PRD – primary renal disease; TL – tunnelled line

Dialysis access is best interpreted in the context of all patients starting RRT, so data were supplemented with pre-emptive Tx numbers.

Dialysis access data are described in relation to age, PRD, timing of presentation and the timing of surgical review for definitive access formation. Delayed presentation/referral to renal services and delayed surgical review are both defined as being within 90 days (3 months) prior to the start of RRT.

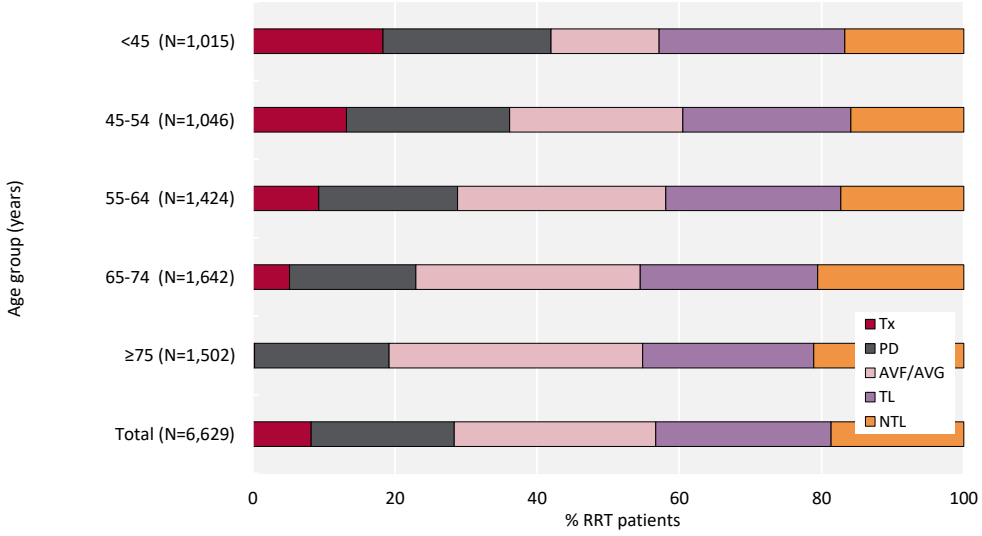

Figure 1.12 Dialysis access used for adult patients incident to RRT in 2018 by age group (2018 Multisite Dialysis Access Audit)
AVF – arteriovenous fistula; AVG – arteriovenous graft; NTL – non-tunnelled line; TL – tunnelled line

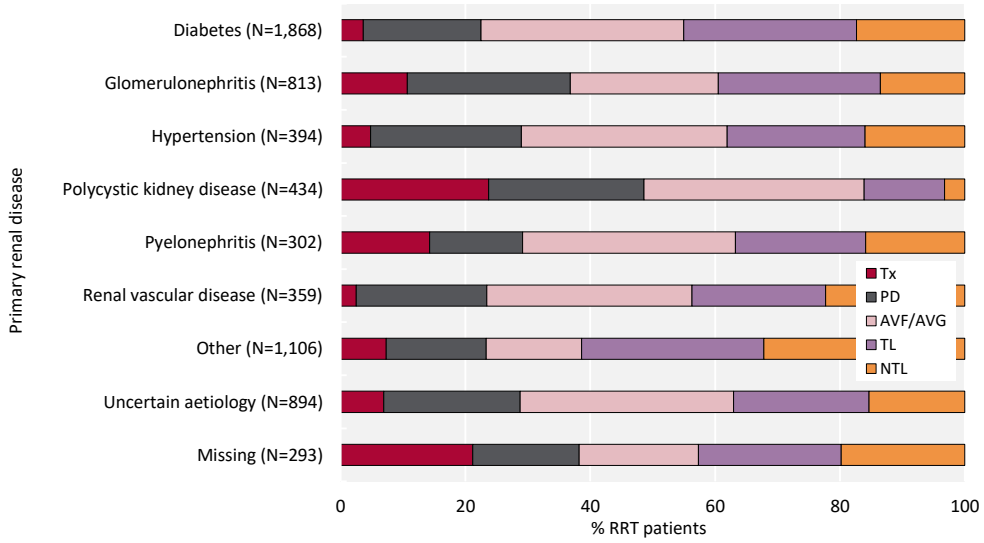

Figure 1.13 Dialysis access used for adult patients incident to RRT in 2018 by primary renal disease (2018 Multisite Dialysis Access Audit)
AVF – arteriovenous fistula; AVG – arteriovenous graft; NTL – non-tunnelled line; TL – tunnelled line

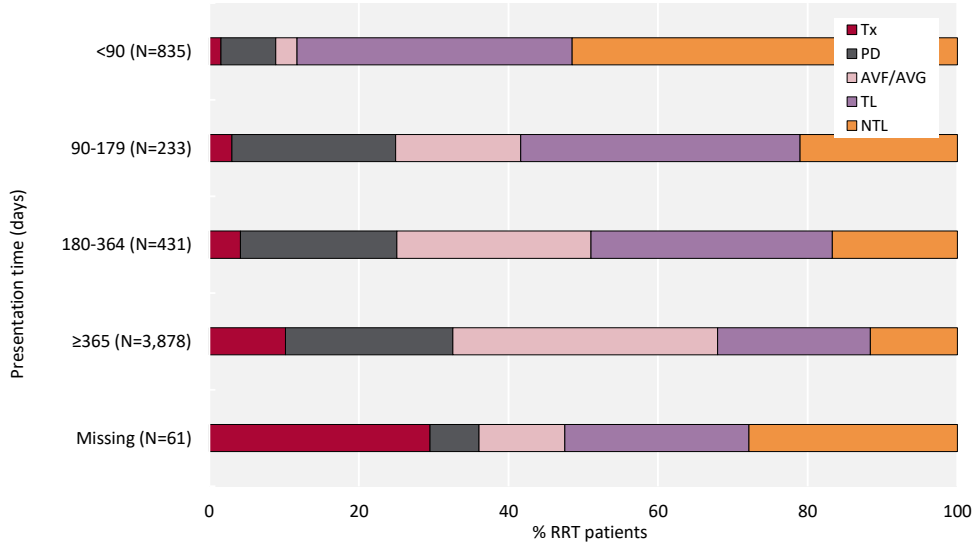

Figure 1.14 Dialysis access used for adult patients incident to RRT in 2018 by presentation time (2018 Multisite Dialysis Access Audit)
AVF – arteriovenous fistula; AVG – arteriovenous graft; NTL – non-tunnelled line; TL – tunnelled line

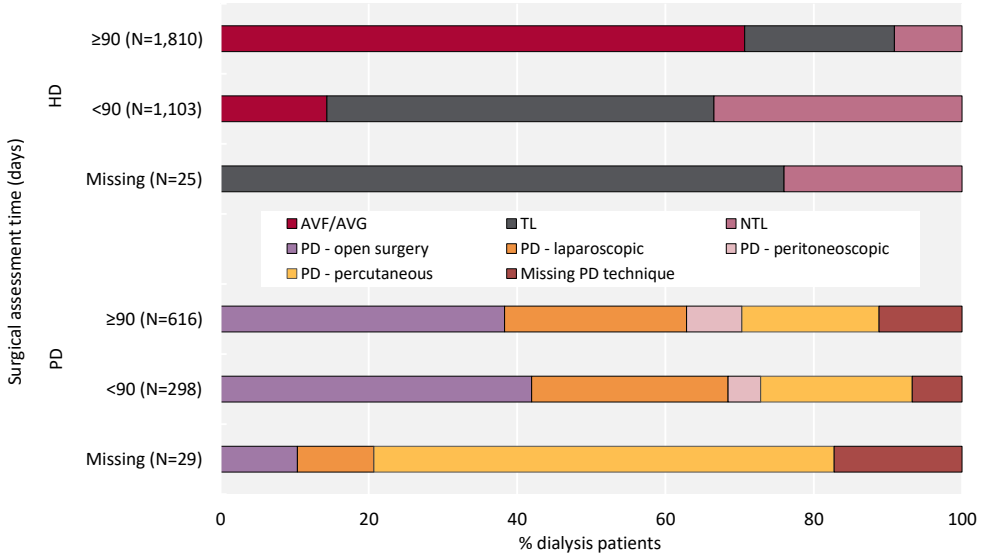

Figure 1.15 Dialysis access used for adult patients incident to dialysis in 2018 by surgical assessment time (2018 Multisite Dialysis Access Audit)

AVF – arteriovenous fistula; AVG – arteriovenous graft; NTL – non-tunnelled line; TL – tunnelled line

The audit measures related to dialysis access at RRT start include the proportion of planned starts on RRT with a pre-emptive Tx or with definitive access. In addition, at least 60% of the planned HD starts should be with either an AVF or an AVG. The proportions of patients who commenced dialysis with definitive access (AVF/AVG/PD catheter) were reported for centres returning adequate data.

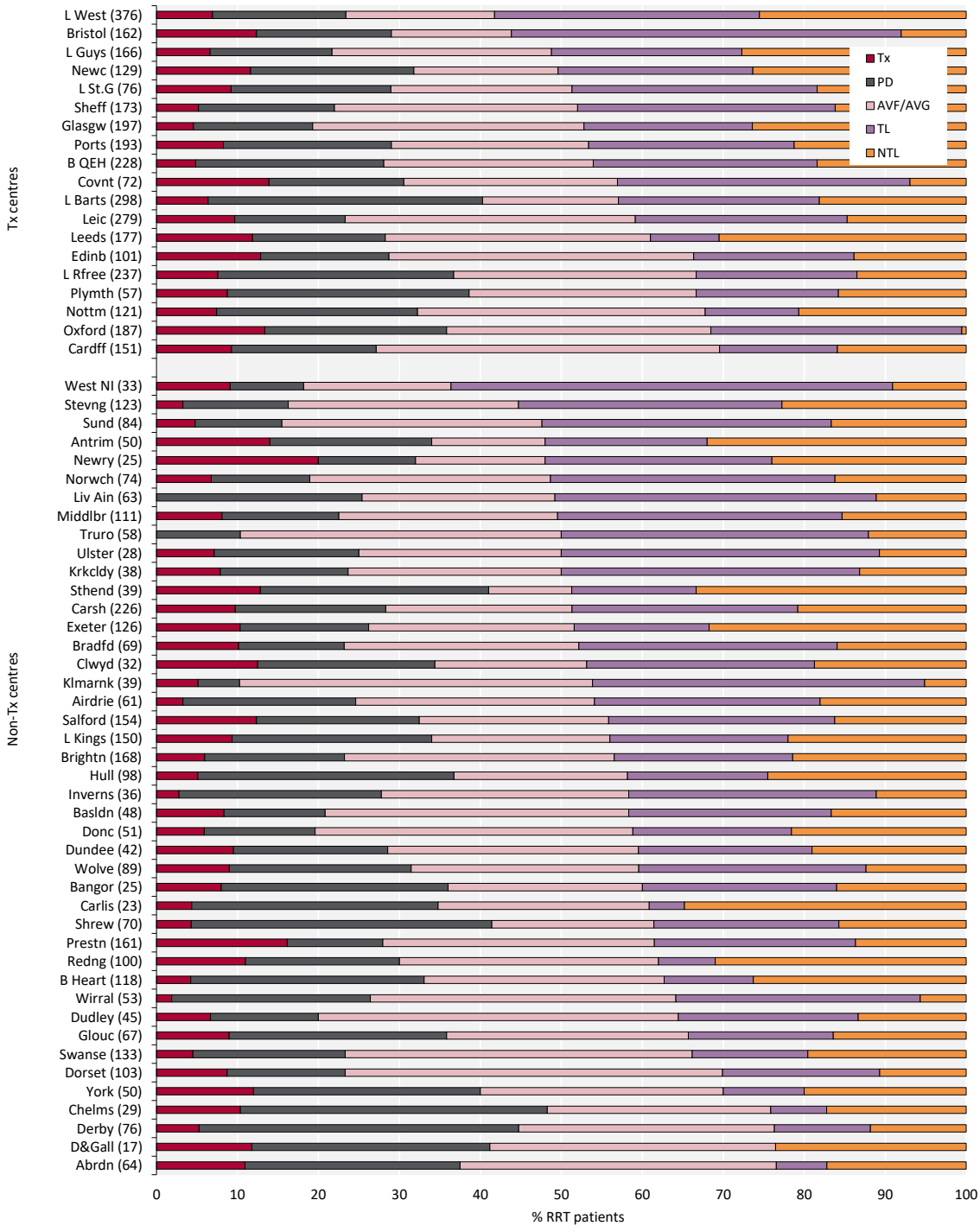

Figure 1.16 First dialysis access used for adult patients incident to RRT in 2018 by centre (2018 Multisite Dialysis Access Audit)

Number of incident patients on RRT in a centre in brackets (centres with <70% access data for the incident RRT population were excluded).
Centres are ordered by decreasing use of lines.
AVF – arteriovenous fistula; AVG – arteriovenous graft; NTL – non-tunnelled line; TL – tunnelled line

Table 1.16 Start modality and dialysis access used for adult patients incident to dialysis in 2018 by presentation and surgical assessment time before start of dialysis by centre (2018 Multisite Dialysis Access Audit)

	Early presenters (≥90 days)(%)					Late presenters (<90 days) (%)					Early surgical assessment (≥90 days) (%)		Start modality (%)		
Centre	N	PD	AVF/ AVG	TL	NTL	N	PD	AVF/ AVG	TL	NTL	Yes	No	HD	PD	Tx
Antrim	36	27.8	19.4	27.8	25.0	7	0.0	0.0	0.0	100.0	60.5	39.5	66.0	20.0	14.0
B Heart	110	30.0	31.8	11.8	26.4	3	33.3	0.0	0.0	66.7	68.1	31.9	66.9	28.8	4.2
B QEH	167	31.1	35.3	22.2	11.4	50	2.0	0.0	52.0	46.0	63.1	36.9	71.9	23.2	4.8
Bangor	21	33.3	28.6	28.6	9.5	0					69.6	30.4	64.0	28.0	8.0
Basldn	37	16.2	48.6	29.7	5.4	7	0.0	0.0	14.3	85.7	72.7	27.3	79.2	12.5	8.3
Bradfd	53	15.1	37.7	37.7	9.4	9	11.1	0.0	22.2	66.7	66.1	33.9	76.8	13.0	10.1
Brightn	121	23.1	43.8	19.8	13.2	36	2.8	8.3	33.3	55.6	85.7	14.3	76.8	17.3	6.0
Bristol	108	24.1	21.3	48.1	6.5	31	0.0	0.0	80.6	19.4	43.0	57.0	71.0	16.7	12.3
Camb	53	26.4	30.2	43.4	0.0	10	0.0	0.0	80.0	20.0	46.1	53.9			
Cardff	125	20.8	50.4	14.4	14.4	12	8.3	8.3	33.3	50.0	67.7	32.3	72.8	17.9	9.3
Carlis	19	36.8	31.6	0.0	31.6	3	0.0	0.0	33.3	66.7	47.6	52.4	65.2	30.4	4.3
Carsh	95	27.4	32.6	28.4	11.6	16	6.3	0.0	43.8	50.0			71.7	18.6	9.7
Chelms	20	45.0	40.0	5.0	10.0	6	33.3	0.0	16.7	50.0	92.3	7.7	51.7	37.9	10.3
Clwyd	22	27.3	22.7	36.4	13.6	6	16.7	16.7	16.7	50.0	60.0	40.0	65.6	21.9	12.5
Covnt	34	32.4	14.7	44.1	8.8	2	0.0	50.0	50.0	0.0	78.3	21.7	69.4	16.7	13.9
Derby	57	43.9	40.4	8.8	7.0	15	33.3	6.7	26.7	33.3	31.9	68.1	55.3	39.5	5.3
Donc	43	16.3	46.5	20.9	16.3	5	0.0	0.0	20.0	80.0	54.2	45.8	80.4	13.7	5.9
Dorset	85	17.6	56.5	18.8	7.1	9	0.0	0.0	44.4	55.6	58.5	41.5	76.7	14.6	8.7
Dudley	38	15.8	50.0	21.1	13.2	4	0.0	25.0	50.0	25.0	54.8	45.2	80.0	13.3	6.7
Exeter	92	21.7	33.7	17.4	27.2	21	0.0	4.8	23.8	71.4	28.3	71.7	73.8	15.9	10.3
Glouc	53	34.0	37.7	17.0	11.3	8	0.0	0.0	37.5	62.5	62.3	37.7	64.2	26.9	9.0
Hull	68	42.6	30.9	11.8	14.7	25	8.0	0.0	36.0	56.0	63.4	36.6	63.3	31.6	5.1
L Barts											32.4	67.6	59.7	33.9	6.4
L Guys	124	19.4	36.3	26.6	17.7	31	3.2	0.0	19.4	77.4	54.2	45.8	78.3	15.1	6.6
L Kings	112	29.5	29.5	26.8	14.3	23	13.0	0.0	13.0	73.9	67.7	32.3	66.0	24.7	9.3
L Rfree	193	35.2	36.8	19.2	8.8	25	4.0	0.0	40.0	56.0	75.5	24.5	63.3	29.1	7.6
L St.G	52	25.0	30.8	32.7	11.5	16	6.3	6.3	37.5	50.0	58.0	42.0	71.1	19.7	9.2
L West	289	19.7	23.2	36.3	20.8	61	8.2	3.3	29.5	59.0	59.7	40.3	76.6	16.5	6.9
Leeds	133	19.5	43.6	10.5	26.3	23	13.0	0.0	4.3	82.6	68.6	31.4	71.8	16.4	11.9
Leic	222	16.7	45.0	26.1	12.2	30	3.3	0.0	50.0	46.7	38.5	61.5	76.7	13.6	9.7
Liv Ain	58	27.6	25.9	36.2	10.3	5	0.0	0.0	80.0	20.0	53.2	46.8	74.6	25.4	0.0
Middlbr	86	18.6	34.9	39.5	7.0	16	0.0	0.0	31.3	68.8	29.4	70.6	77.5	14.4	8.1
Newc	95	27.4	23.2	21.1	28.4	19	0.0	5.3	57.9	36.8	51.8	48.2	68.2	20.2	11.6
Newry	16	18.8	25.0	31.3	25.0	4	0.0	0.0	50.0	50.0	55.6	44.4	68.0	12.0	20.0
Norwch	40	17.5	37.5	32.5	12.5	19	10.5	5.3	47.4	36.8			81.1	12.2	6.8
Nottm	100	29.0	43.0	11.0	17.0	12	8.3	0.0	25.0	66.7	47.3	52.7	67.8	24.8	7.4
Oxford	141	26.2	41.8	31.9	0.0	19	26.3	10.5	57.9	5.3	48.8	51.2	64.2	22.5	13.4
Plymth	46	34.8	34.8	17.4	13.0	3	33.3	0.0	66.7	0.0	7.7	92.3	61.4	29.8	8.8
Ports	140	24.3	30.7	25.7	19.3	37	16.2	10.8	35.1	37.8			71.0	20.7	8.3
Prestn	108	16.7	48.1	28.7	6.5	27	3.7	7.4	33.3	55.6	58.5	41.5	72.0	11.8	16.1
Redng	75	24.0	42.7	5.3	28.0	14	7.1	0.0	21.4	71.4	34.8	65.2	70.0	19.0	11.0
Salford	101	26.7	35.6	27.7	9.9	34	11.8	0.0	44.1	44.1	56.3	43.7	67.5	20.1	12.3
Sheff	126	21.4	41.3	28.6	8.7	25	8.0	0.0	52.0	40.0	60.1	39.9	78.0	16.8	5.2
Shrew	56	42.9	25.0	21.4	10.7	10	20.0	0.0	40.0	40.0	64.6	35.4	58.6	37.1	4.3
Stevng	94	17.0	37.2	33.0	12.8	25	0.0	0.0	36.0	64.0	51.7	48.3	83.7	13.0	3.3
Sthend	20	50.0	20.0	20.0	10.0	10	10.0	0.0	10.0	80.0	11.8	88.2	59.0	28.2	12.8
Sund	59	13.6	42.4	35.6	8.5	21	4.8	9.5	42.9	42.9	50.0	50.0	84.5	10.7	4.8
Swanse	116	21.6	49.1	14.7	14.7	11	0.0	0.0	18.2	81.8	33.1	66.9	76.7	18.8	4.5
Truro	45	13.3	51.1	31.1	4.4	13	0.0	0.0	61.5	38.5	51.7	48.3	89.7	10.3	0.0
Ulster	22	22.7	31.8	45.5	0.0	4	0.0	0.0	25.0	75.0	76.9	23.1	75.0	17.9	7.1
West NI	24	12.5	20.8	66.7	0.0	6	0.0	16.7	33.3	50.0	56.7	43.3	81.8	9.1	9.1
Wirral	43	27.9	46.5	20.9	4.7	9	11.1	0.0	77.8	11.1	48.1	51.9	73.6	24.5	1.9
Wolve	69	24.6	36.2	30.4	8.7	11	18.2	0.0	36.4	45.5	45.3	54.7	68.5	22.5	9.0
York	42	31.0	35.7	11.9	21.4	2	50.0	0.0	0.0	50.0	81.8	18.2	60.0	28.0	12.0
Total	**4,304**	**24.6**	**36.6**	**25.1**	**13.6**	**850**	**7.3**	**2.9**	**38.0**	**51.8**	**54.1**	**45.9**	**71.3**	**20.4**	**8.3**

Blank cells – no data returned by the centre or data completeness <70%. Centres with <70% access, time of referral or assessment data were excluded. Start modality breakdown includes patients with missing referral time or surgical assessment data.

AVF – arteriovenous fistula; AVG – arteriovenous graft; NTL – non-tunnelled line; TL – tunnelled line

Table 1.17 Dialysis access used by adult patients incident to RRT in 2018 at 3 months after start of RRT by presentation time and by centre (2018 Multisite Dialysis Access Audit)

	Early presenters (≥ 90 days) (%)							Late presenters (<90 days) (%)							All patients 3 months after RRT start (%)						
				AVF/							AVF/							AVF/			
Centre	N	Tx	PD	AVG	TL	NTL	Other	N	Tx	PD	AVG	TL	NTL	Other	N	Tx	PD	AVG	TL	NTL	Other
Antrim	36	0.0	27.8	16.7	47.2	0.0	8.3	7	0.0	14.3	0.0	85.7	0.0	0.0	43	0.0	25.6	14.0	53.5	0.0	7.0
B Heart	110	0.9	32.7	39.1	21.8	0.0	5.5	3	0.0	0.0	0.0	66.7	33.3	0.0	113	0.9	31.9	38.1	23.0	0.9	5.3
B QEH	167	1.8	31.1	35.3	26.9	0.0	4.8	50	0.0	4.0	2.0	84.0	0.0	10.0	217	1.4	24.9	27.6	40.1	0.0	6.0
Bangor	21	0.0	33.3	23.8	42.9	0.0	0.0	0							23	0.0	30.4	21.7	47.8	0.0	0.0
Basldn	37	0.0	16.2	43.2	37.8	0.0	2.7	7	0.0	14.3	0.0	85.7	0.0	0.0	44	0.0	15.9	36.4	45.5	0.0	2.3
Bradfd	53	0.0	17.0	37.7	43.4	0.0	1.9	9	0.0	11.1	0.0	88.9	0.0	0.0	62	0.0	16.1	32.3	50.0	0.0	1.6
Brightn	121	1.7	21.5	39.7	30.6	0.0	6.6	36	0.0	0.0	11.1	77.8	0.0	11.1	158	1.3	16.5	32.9	41.8	0.0	7.6
Bristol	108	1.9	20.4	25.0	44.4	0.0	7.4	31	0.0	3.2	0.0	83.9	0.0	12.9	142	1.4	16.9	19.7	52.8	0.0	8.5
Camb	53	3.8	20.8	34.0	39.6	0.0	1.9	10	0.0	0.0	20.0	50.0	0.0	30.0	89	2.2	13.5	37.1	42.7	0.0	4.5
Cardff	125	1.6	19.2	52.8	8.0	12.0	3.2	12	0.0	8.3	8.3	25.0	50.0	0.0	137	1.5	18.2	48.9	9.5	15.3	2.9
Carlis	19	0.0	36.8	26.3	0.0	26.3	10.5	3	0.0	33.3	0.0	33.3	33.3	0.0	22	0.0	36.4	22.7	4.5	27.3	9.1
Carsh	95	1.1	25.3	29.5	38.9	1.1	4.2	16	0.0	6.3	0.0	93.8	0.0	0.0	204	1.5	18.1	24.0	51.5	1.0	3.9
Chelms	20	5.0	35.0	35.0	15.0	0.0	10.0	6	0.0	33.3	0.0	50.0	16.7	0.0	26	3.8	34.6	26.9	23.1	3.8	7.7
Clwyd	22	4.5	27.3	22.7	40.9	0.0	4.5	6	0.0	16.7	16.7	66.7	0.0	0.0	28	3.6	25.0	21.4	46.4	0.0	3.6
Covnt	34	5.9	35.3	23.5	32.4	0.0	2.9	2	0.0	0.0	50.0	50.0	0.0	0.0	62	3.2	19.4	38.7	35.5	0.0	3.2
Derby	57	3.5	38.6	43.9	10.5	0.0	3.5	15	0.0	33.3	33.3	33.3	0.0	0.0	72	2.8	37.5	41.7	15.3	0.0	2.8
Donc	43	2.3	14.0	39.5	37.2	0.0	7.0	5	0.0	0.0	0.0	60.0	0.0	40.0	48	2.1	12.5	35.4	39.6	0.0	10.4
Dorset	85	1.2	14.1	56.5	20.0	0.0	8.2	9	0.0	0.0	0.0	88.9	0.0	11.1	94	1.1	12.8	51.1	26.6	0.0	8.5
Dudley	38	0.0	15.8	44.7	34.2	0.0	5.3	4	0.0	0.0	25.0	75.0	0.0	0.0	42	0.0	14.3	42.9	38.1	0.0	4.8
Exeter	92	3.3	20.7	34.8	28.3	0.0	13.0	21	0.0	4.8	9.5	76.2	4.8	4.8	113	2.7	17.7	30.1	37.2	0.9	11.5
Glouc	53	0.0	35.8	37.7	22.6	0.0	3.8	8	0.0	12.5	0.0	87.5	0.0	0.0	61	0.0	32.8	32.8	31.1	0.0	3.3
Hull	68	2.9	35.3	25.0	29.4	2.9	4.4	25	0.0	4.0	4.0	76.0	8.0	8.0	93	2.2	26.9	19.4	41.9	4.3	5.4
L Barts															279	0.4	35.5	17.6	41.6	1.1	3.9
L Guys	124	3.2	17.7	34.7	33.9	1.6	8.9	31	0.0	3.2	3.2	74.2	0.0	19.4	155	2.6	14.8	28.4	41.9	1.3	11.0
L Kings	112	0.9	29.5	27.7	37.5	0.0	4.5	23	0.0	21.7	0.0	73.9	0.0	4.3	136	0.7	28.7	22.8	43.4	0.0	4.4
L Rfree	193	1.6	35.8	33.7	23.8	0.0	5.2	25	0.0	8.0	0.0	76.0	0.0	16.0	219	1.4	32.4	29.7	30.1	0.0	6.4
L St.G	52	0.0	26.9	30.8	34.6	3.8	3.8	16	0.0	6.3	6.3	56.3	0.0	31.3	69	0.0	23.2	24.6	39.1	2.9	10.1
L West	289	1.4	19.7	24.9	51.6	0.0	2.4	61	0.0	8.2	4.9	83.6	0.0	3.3	350	1.1	17.7	21.4	57.1	0.0	2.6
Leeds	133	6.8	19.5	42.1	26.3	1.5	3.8	23	0.0	17.4	0.0	73.9	4.3	4.3	156	5.8	19.2	35.9	33.3	1.9	3.8
Leic	222	1.8	16.2	44.1	33.3	0.5	4.1	30	0.0	6.7	6.7	73.3	0.0	13.3	252	1.6	15.1	39.7	38.1	0.4	5.2
Liv Ain	58	1.7	25.9	29.3	34.5	0.0	8.6	5	0.0	0.0	0.0	20.0	0.0	80.0	63	1.6	23.8	27.0	33.3	0.0	14.3
Middlbr	86	2.3	15.1	36.0	45.3	0.0	1.2	16	0.0	0.0	0.0	100.0	0.0	0.0	102	2.0	12.7	30.4	53.9	0.0	1.0
Newc	95	1.1	27.4	24.2	43.2	1.1	3.2	19	0.0	0.0	10.5	78.9	0.0	10.5	114	0.9	22.8	21.9	49.1	0.9	4.4
Newry	16	0.0	18.8	18.8	62.5	0.0	0.0	4	0.0	25.0	0.0	50.0	0.0	25.0	20	0.0	20.0	15.0	60.0	0.0	5.0
Norwch	40	0.0	17.5	37.5	45.0	0.0	0.0	19	0.0	10.5	5.3	73.7	0.0	10.5	69	0.0	13.0	30.4	53.6	0.0	2.9
Nottm	100	0.0	27.0	45.0	22.0	1.0	5.0	12	0.0	33.3	0.0	50.0	0.0	16.7	112	0.0	27.7	40.2	25.0	0.9	6.3
Oxford	141	4.3	19.1	38.3	35.5	0.0	2.8	19	0.0	26.3	10.5	52.6	0.0	10.5	162	3.7	19.8	34.6	38.3	0.0	3.7
Plymth	46	8.7	19.6	45.7	13.0	0.0	13.0	3	0.0	33.3	66.7	0.0	0.0	0.0	52	7.7	19.2	44.2	15.4	1.9	11.5
Ports	140	0.7	24.3	32.1	32.1	0.7	10.0	37	0.0	18.9	10.8	62.2	0.0	8.1	177	0.6	23.2	27.7	38.4	0.6	9.6
Prestn	108	0.9	13.9	47.2	34.3	0.0	3.7	27	0.0	3.7	7.4	74.1	0.0	14.8	135	0.7	11.9	39.3	42.2	0.0	5.9
Redng	75	2.7	22.7	38.7	30.7	0.0	5.3	14	0.0	7.1	0.0	78.6	7.1	7.1	89	2.2	20.2	32.6	38.2	1.1	5.6
Salford	101	0.0	22.8	32.7	34.7	1.0	8.9	34	0.0	14.7	0.0	76.5	0.0	8.8	135	0.0	20.7	24.4	45.2	0.7	8.9
Sheff	126	0.0	21.4	42.1	33.3	0.0	3.2	25	0.0	8.0	0.0	76.0	0.0	12.0	164	0.6	17.7	32.3	43.9	0.0	4.9
Shrew	56	0.0	39.3	30.4	28.6	0.0	1.8	10	0.0	10.0	0.0	90.0	0.0	0.0	67	0.0	34.3	25.4	38.8	0.0	1.5
Stevng	94	2.1	16.0	36.2	36.2	0.0	9.6	25	0.0	0.0	8.0	80.0	0.0	12.0	119	1.7	12.6	30.3	45.4	0.0	10.1
Sthend	20	0.0	55.0	25.0	15.0	0.0	5.0	10	0.0	20.0	0.0	70.0	10.0	0.0	34	0.0	41.2	17.6	32.4	2.9	5.9
Sund	59	0.0	13.6	35.6	45.8	0.0	5.1	21	0.0	9.5	9.5	81.0	0.0	0.0	80	0.0	12.5	28.8	55.0	0.0	3.8
Swanse	116	1.7	20.7	45.7	30.2	0.0	1.7	11	0.0	9.1	0.0	81.8	0.0	9.1	127	1.6	19.7	41.7	34.6	0.0	2.4
Truro	45	2.2	13.3	46.7	26.7	0.0	11.1	13	0.0	0.0	7.7	61.5	0.0	30.8	58	1.7	10.3	37.9	34.5	0.0	15.5
Ulster	22	0.0	22.7	27.3	50.0	0.0	0.0	4	25.0	0.0	0.0	75.0	0.0	0.0	26	3.8	19.2	23.1	53.8	0.0	0.0
West NI	24	4.2	12.5	16.7	58.3	0.0	8.3	6	0.0	0.0	16.7	66.7	0.0	16.7	30	3.3	10.0	16.7	60.0	0.0	10.0

Table 1.17 Continued

	Early presenters (≥ 90 days) (%)							Late presenters (<90 days) (%)							All patients 3 months after RRT start (%)						
				AVF/							AVF/							AVF/			
Centre	N	Tx	PD	AVG	TL	NTL	Other	N	Tx	PD	AVG	TL	NTL	Other	N	Tx	PD	AVG	TL	NTL	Other
Wirral	43	0.0	27.9	41.9	25.6	0.0	4.7	9	0.0	11.1	0.0	77.8	0.0	11.1	52	0.0	25.0	34.6	34.6	0.0	5.8
Wolve	69	0.0	15.9	36.2	40.6	0.0	4.3	11	0.0	27.3	0.0	72.7	0.0	0.0	81	0.0	18.5	30.9	44.4	0.0	3.7
York	42	2.4	21.4	47.6	19.0	2.4	7.1	2	0.0	50.0	0.0	50.0	0.0	0.0	44	2.3	22.7	45.5	20.5	2.3	6.8
Total	**4,304**	**1.8**	**23.1**	**36.3**	**32.8**	**0.8**	**5.1**	**850**	**0.1**	**9.4**	**5.3**	**73.5**	**1.8**	**9.6**	**5,621**	**1.4**	**21.2**	**30.5**	**40.1**	**1.0**	**0.2**

9 patients from 4 centres had missing access; percentages were calculated excluding these missing data.
AVF – arteriovenous fistula; AVG – arteriovenous graft; NTL – non-tunnelled line; TL – tunnelled line

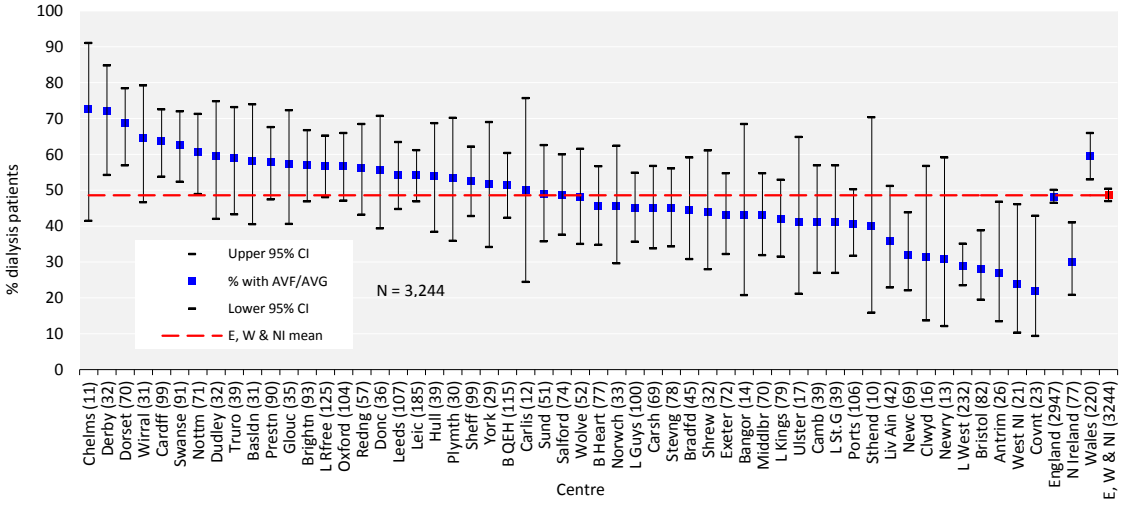

Figure 1.17 Percentage of adult patients incident to dialysis in 2018 who started dialysis using either an arteriovenous fistula (AVF) or an arteriovenous graft (AVG) by centre (2018 Multisite Dialysis Access Audit)

Numbers in brackets represent the number of patients with data in each centre rather than missing data.
CI – confidence interval

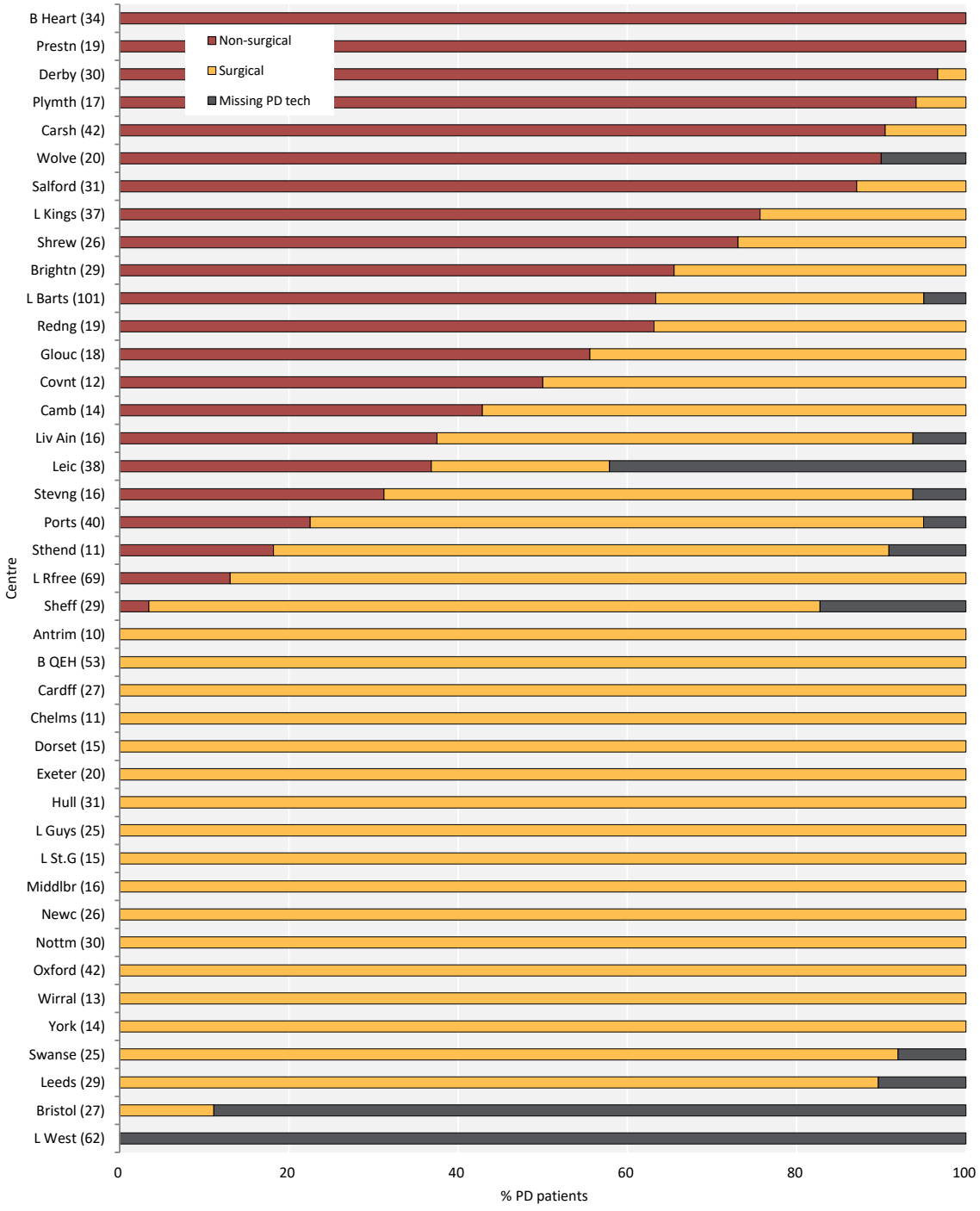

Figure 1.18 PD catheter insertion technique for adult patients incident to PD in 2018 by centre (2018 Multisite Dialysis Access Audit)

Centres with <10 incident PD patients were excluded.
Number of incident patients on PD in a centre in brackets.
Centres are ordered by decreasing use of non-surgical PD insertion technique.

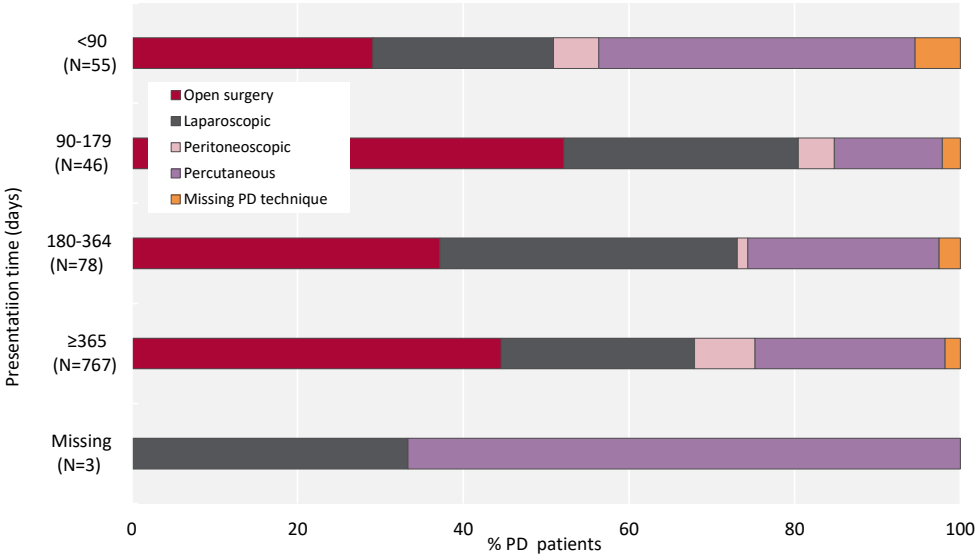

Figure 1.19 PD catheter insertion technique for adult patients incident to PD in 2018 by presentation time (2018 Multisite Dialysis Access Audit)

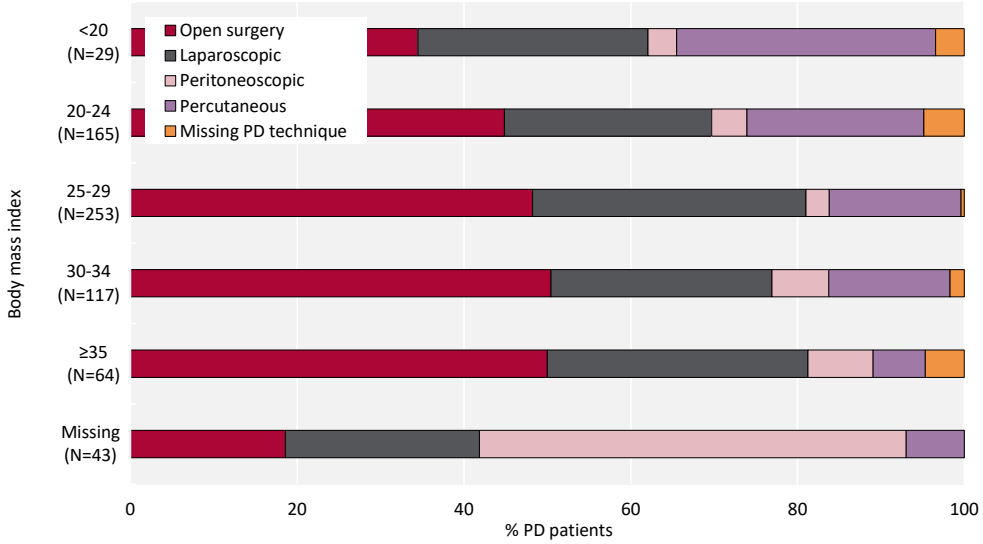

Figure 1.20 PD catheter insertion technique for adult patients incident to PD in 2018 by body mass index (2018 Multisite Dialysis Access Audit)

Figure 1.21 and table 1.18 relate to peritonitis within 2 weeks of catheter insertion for adult patients incident to PD in 2017 and 2018. Additionally, peritonitis in all adults receiving PD in 2018 in England is reported in chapter 5.

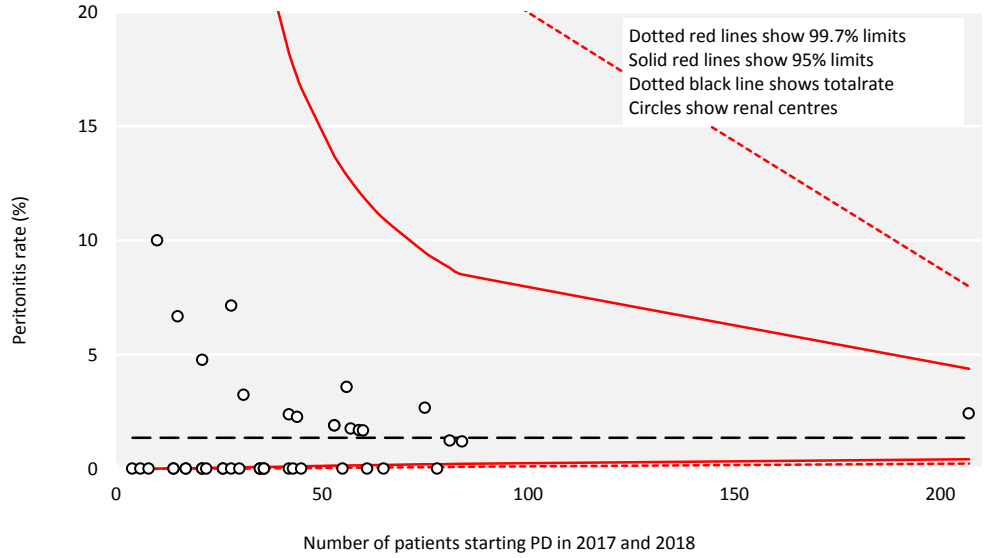

Figure 1.21 Peritonitis within 2 weeks of catheter insertion for adult patients incident to PD in 2017 and 2018 (2017 and 2018 Multisite Dialysis Access Audits)

Table 1.18 Peritonitis within 2 weeks of catheter insertion for adult patients incident to PD in 2017 and 2018 (2017 and 2018 Multisite Dialysis Access Audits)

Centre	N on PD	N peritonitis cases	Peritonitis rate (%)
Antrim	15	1	6.7
Bangor	14	0	0.0
Bradfd	17	0	0.0
Brightn	53	1	1.9
Camb	21	0	0.0
Cardff	61	0	0.0
Carlis	10	1	10.0
Clwyd	8	0	0.0
Covnt	36	0	0.0
Derby	65	0	0.0
Donc	17	0	0.0
Dorset	35	0	0.0
Dudley	22	0	0.0
Exeter	43	0	0.0
Hull	57	1	1.8
L Barts	207	5	2.4
L Guys	42	0	0.0
L Kings	84	1	1.2
L St.G	31	1	3.2
Leeds	60	1	1.7
Liv Ain	26	0	0.0
Middlbr	36	0	0.0
Newc	56	2	3.6
Norwch	26	0	0.0
Nottm	59	1	1.7
Oxford	78	0	0.0
Plymth	42	1	2.4
Ports	81	1	1.2
Prestn	44	1	2.3
Redng	45	0	0.0

Table 1.18 Continued

Centre	N on PD	N peritonitis cases	Peritonitis rate (%)
Salford	75	2	2.7
Sheff	53	1	1.9
Stevng	30	0	0.0
Sthend	21	1	4.8
Sund	21	0	0.0
Swanse	55	0	0.0
Truro	14	0	0.0
Ulster	6	0	0.0
West NI	4	0	0.0
Wirral	28	2	7.1
Wolve	35	0	0.0
York	28	0	0.0
Total	**1,761**	**24**	**1.4**

The Renal Association audit measure advises that PD catheter patency at one year should exceed 80% adjusting for those patients who have either died or changed modality for other reasons. A funnel plot (figure 1.22) shows the percentage of PD catheter failures within one year of initiating dialysis, with catheter failure censored for Tx, elective transfer to HD or death. Patients starting PD in 2017 were used in this analysis to allow one year follow-up.

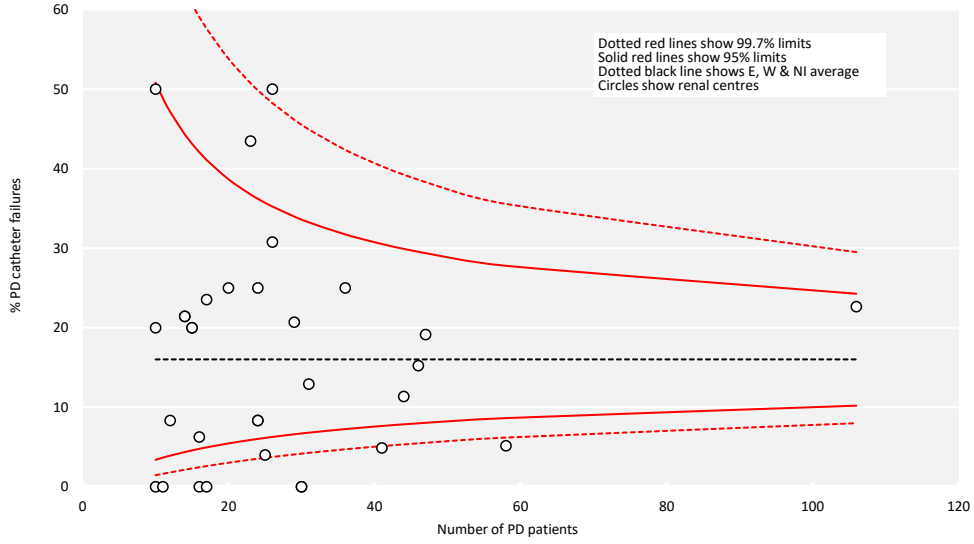

Figure 1.22 Percentage of PD catheter failures within 1 year of first ever PD session for adult patients incident to PD in 2017 (2018 Multisite Dialysis Access Audit)
Centres with follow-up data for <10 PD patients were excluded.

Comparative access failures by access type within three months of initiating dialysis are shown using data drawn from both the 2017 and 2018 Multisite Dialysis Access Audits. Access failure was defined as a documented date of failure/discontinuation recorded within three months of starting dialysis, unless a centre comment indicated that it was a planned discontinuation.

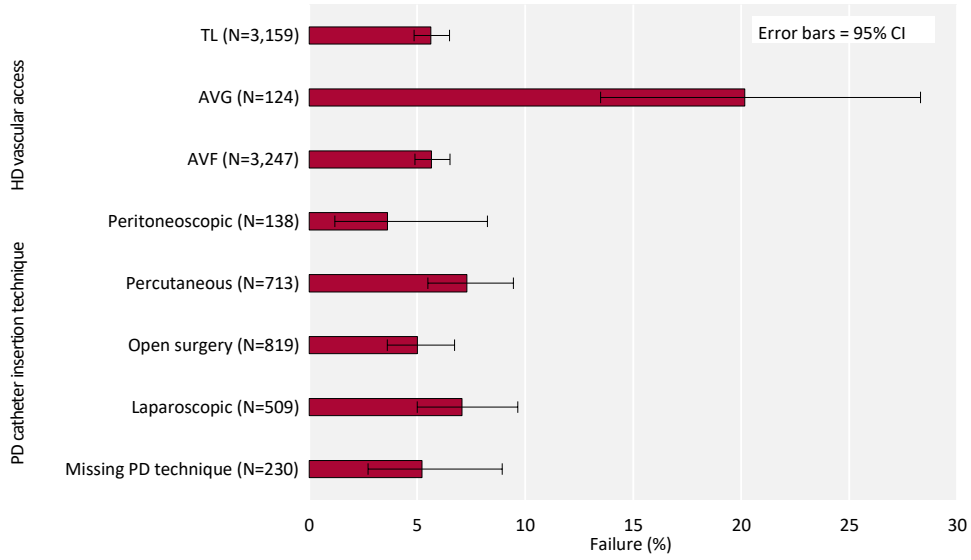

Figure 1.23 Percentage of incident adult dialysis patients experiencing failure of first access within 3 months by type of first access (2017 and 2018 Multisite Dialysis Access Audits)
AVF – arteriovenous fistula; AVG – arteriovenous graft; CI – confidence interval; TL – tunnelled line

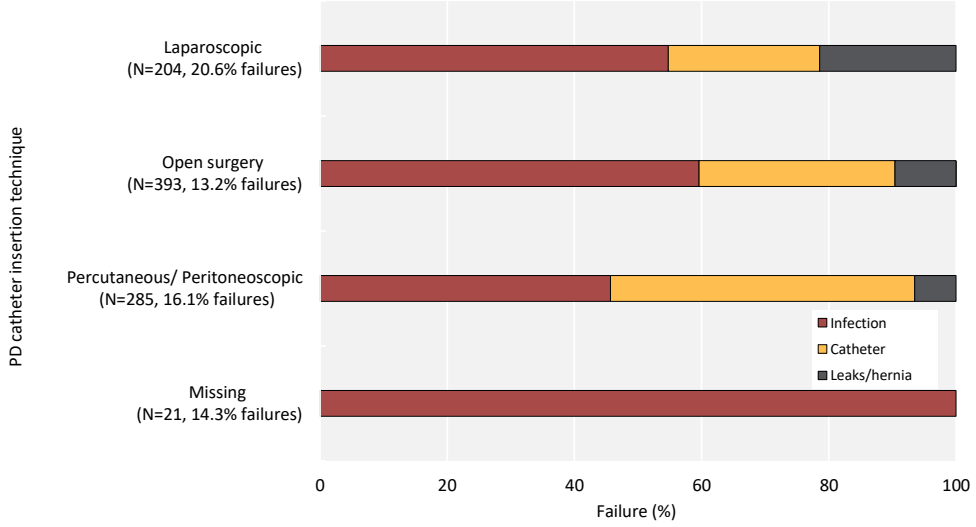

Figure 1.24 Cause of PD catheter access failure within 1 year of first ever PD session for adult patients incident to PD in 2017 (2018 Multisite Dialysis Access Audit)

Survival in incident adult RRT patients

The survival of patients who started RRT for ESKD is described, with primary focus on the one year incident to RRT in 2017 cohort, followed up for a year. Some analyses used rolling incident cohorts over several years (two years or more as stated) to increase cohort patient numbers and more reliably identify survival differences between compared countries or centres. Analyses included patients who were coded as being on chronic dialysis for ESKD who died during the first 90 days (unless stated otherwise), provided that data were returned to the UKRR. Analyses were often adjusted to age 60 years to allow comparisons between centres with different age distributions and one analysis was also adjusted for sex and comorbidity. However, analyses were not generally adjusted for differences in ethnicity, PRD, socioeconomic status or comorbidity.

To enable comparisons with international registries, survival was described to day 90, one year and one year after the first 90 days. The UKRR defines day 0 as the first day of RRT, but some countries define day 90 of RRT as day 0 and do not include patients who died in the first 90 days. Analyses were not censored for Tx unless stated (for more details see appendix A).

Table 1.19 90 days and 1 year after 90 days survival (adjusted to age 60 years) of incident adult RRT patients (2016–2017 2 year cohort) by country

Interval	England	N Ireland	Scotland	Wales	UK
Survival at 90 day (%)	96.7	98.3	96.4	97.2	96.7
95% CI	96.3-97.0	97.3-99.2	95.5-97.3	96.3-98.2	96.4-97.1
Survival 1 year after 90 days (%)	91.0	93.9	90.1	89.7	90.9
95% CI	90.4-91.5	92.0-95.8	88.6-91.7	87.8-91.7	90.4-91.4

CI – confidence interval

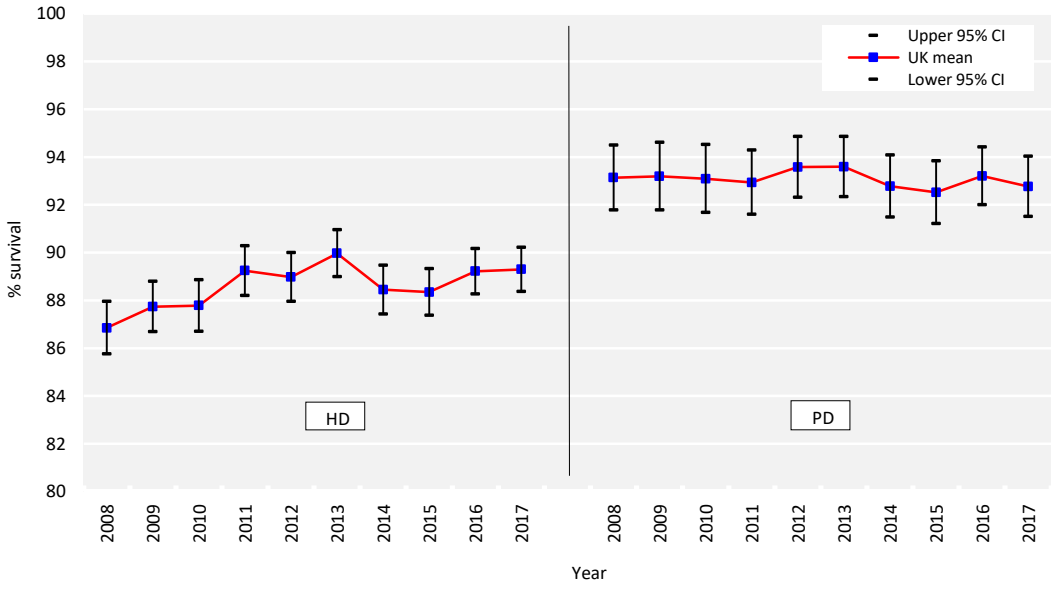

Figure 1.25 1 year after 90 days survival (adjusted to age 60 years) of incident adult RRT patients by start modality between 2008 and 2017

CI – confidence interval

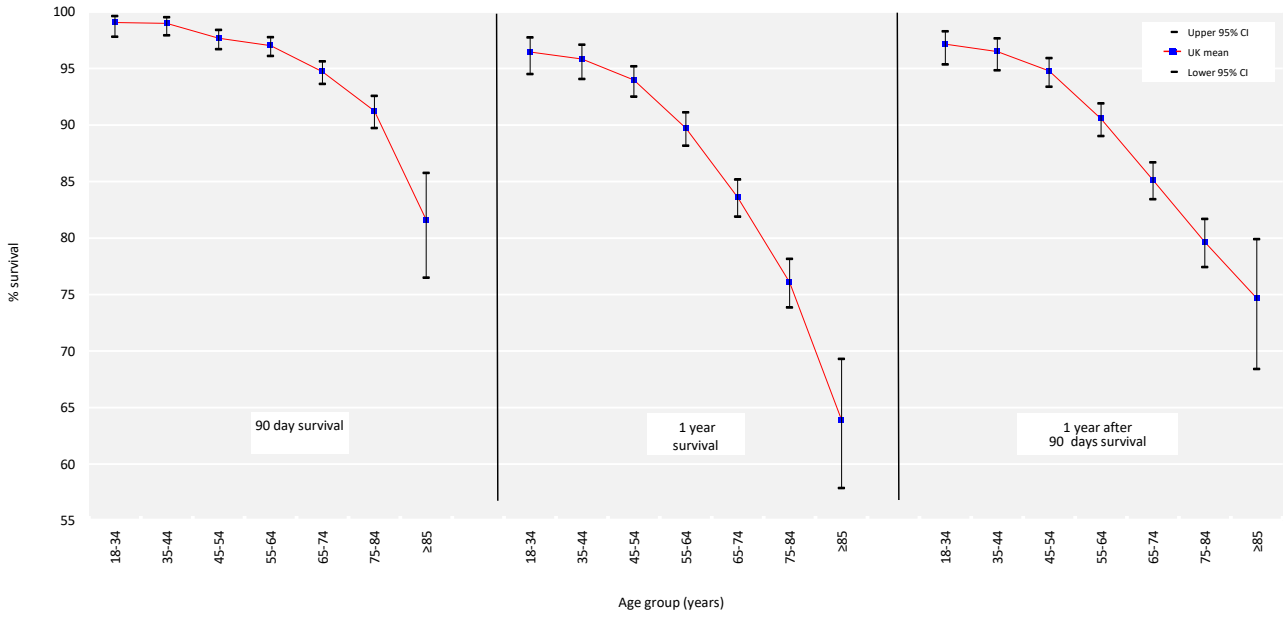

Figure 1.26 90 days, 1 year and 1 year after 90 days survival of incident adult RRT patients by age group (2017 cohort)
CI – confidence interval

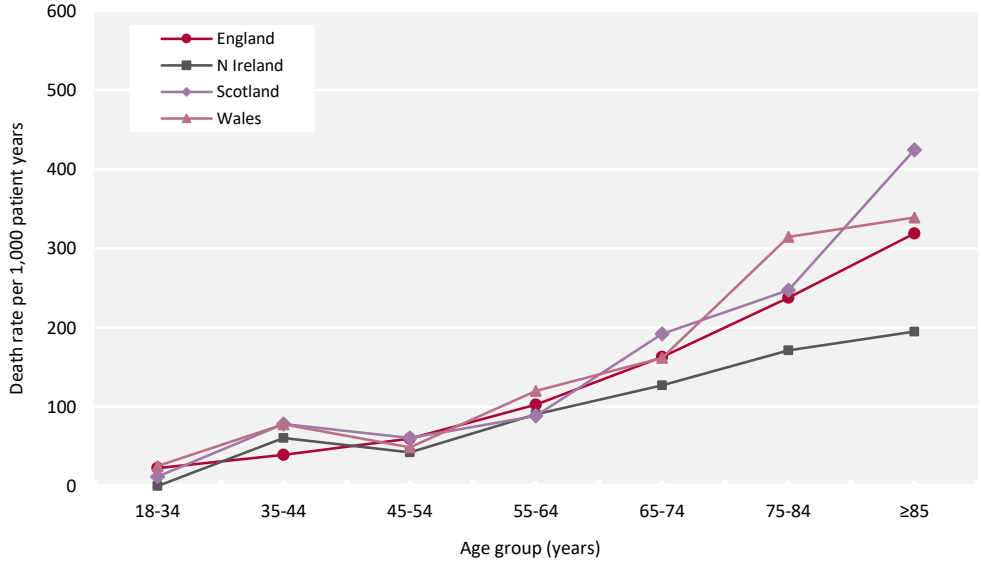

Figure 1.27 1 year after 90 days death rate per 1,000 incident RRT adult patient years by age group and country (2014–2017 4 year cohort)

A ten year rolling cohort was used to analyse the long term survival of incident patients from start of RRT (day 0), according to age at RRT start (figure 1.28), with median survival identifiable from the y-axis. The same cohort was used in analyses of the monthly and six monthly hazard of death on RRT by age group (figures 1.29 and 1.30).

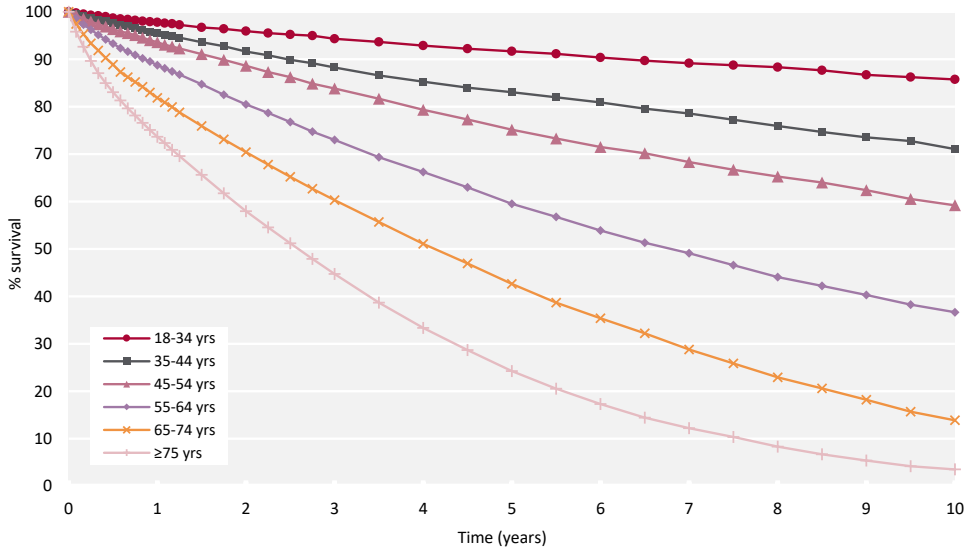

Figure 1.28 Survival (unadjusted) of incident adult RRT patients from day 0 by age group (2008–2017 10 year cohort)

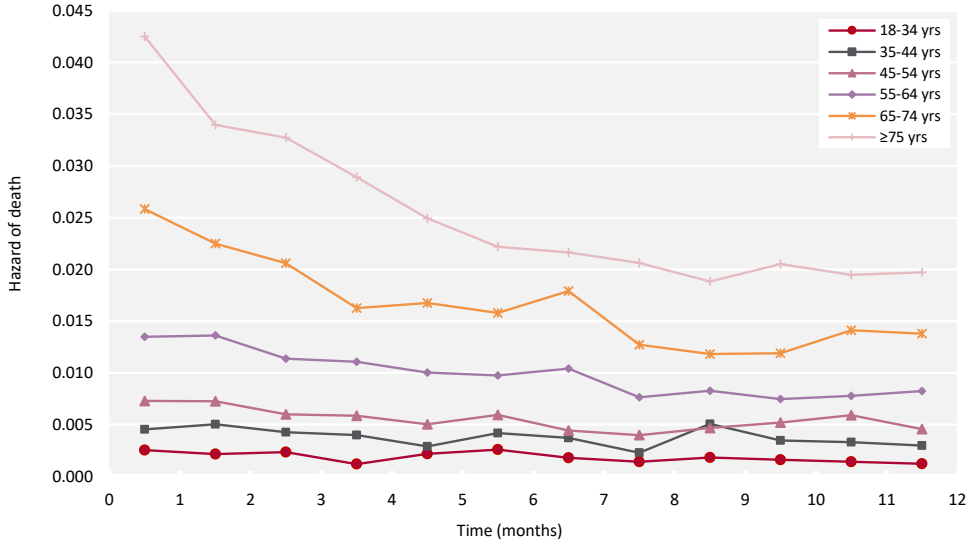

Figure 1.29 Monthly hazard of death (unadjusted) of incident adult RRT patients from day 0 to 1 year by age group (2008–2017 10 year cohort)

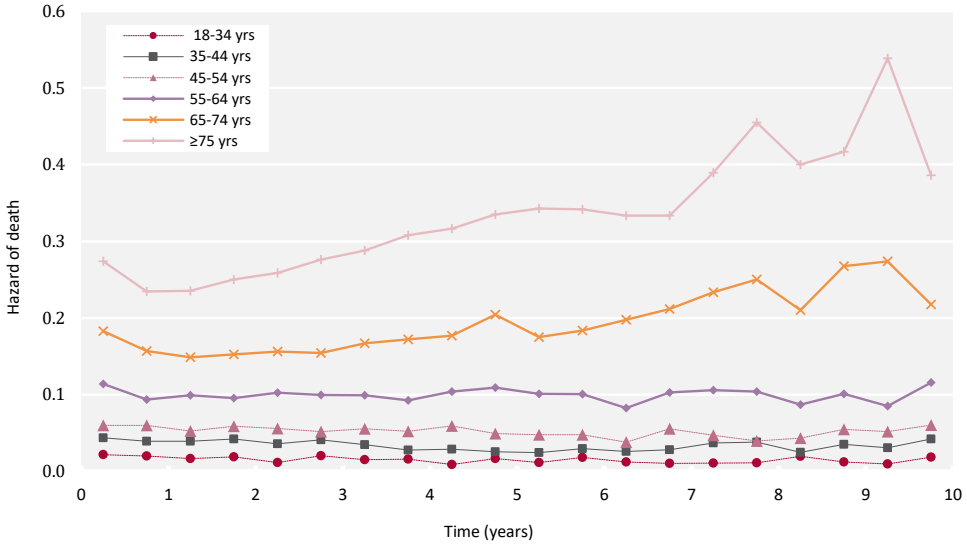

Figure 1.30 6 monthly hazard of death (unadjusted) of incident adult RRT patients from day 0 to 10 years by age group (2008–2017 10 year cohort)

Table 1.20 Survival (unadjusted) of incident adult RRT patients aged <65 years (1998–2017)

	Unadjusted survival (%)											
Cohort	1 yr	2 yr	3 yr	4 yr	5 yr	6 yr	7 yr	8 yr	9 yr	10 yr	95% CI for latest year	N
2017	**92.9**										**92.1-93.7**	**4,156**
2016	92.9	87.4									86.4-88.4	4,001
2015	92.3	86.5	81.4								80.1-82.6	3,929
2014	92.8	86.8	81.4	76.9							75.5-78.3	3,674
2013	93.7	88.2	83.1	77.7	73.2						71.7-74.7	3,573
2012	93.1	87.4	82.0	76.9	72.5	68.6					67.0-70.1	3,524
2011	93.3	88.6	83.6	79.0	74.5	70.9	67.7				66.1-69.3	3,346
2010	92.3	86.6	81.7	77.3	72.8	69.6	66.4	62.5			60.8-64.1	3,364
2009	91.3	85.1	80.4	76.3	71.1	67.0	63.8	60.4	57.3		55.6-59.0	3,388
2008	91.5	86.0	81.1	76.8	73.1	69.5	65.6	62.3	59.3	56.4	54.7-58.0	3,443
2007	92.5	87.0	81.8	76.8	73.0	69.3	65.9	62.6	59.2	56.2	54.5-57.9	3,324
2006	90.6	85.0	80.1	75.6	71.9	68.1	63.9	61.0	58.0	55.4	53.6-57.1	3,158
2005	89.7	83.6	78.5	73.9	69.2	65.6	62.5	59.5	56.5	53.9	52.0-55.8	2,830
2004	89.6	83.3	77.9	72.4	67.8	64.0	60.9	57.0	54.6	52.9	51.0-54.9	2,560
2003	89.3	82.6	77.1	72.2	67.1	62.9	59.2	56.5	53.8	51.4	49.3-53.5	2,264
2002	88.6	80.7	74.8	69.2	65.2	61.2	57.8	54.7	51.7	49.6	47.4-51.8	2,018
2001	87.9	80.9	75.2	69.8	64.9	60.1	56.2	52.7	49.7	47.5	45.1-49.8	1,735
2000	89.0	81.0	74.2	69.0	63.5	58.7	55.2	52.2	49.7	47.0	44.4-49.5	1,524
1999	87.0	80.8	73.3	67.8	62.2	58.2	53.9	50.9	48.5	46.9	44.2-49.6	1,346
1998	87.4	80.1	74.0	69.5	64.2	59.2	55.0	52.9	50.0	47.4	44.5-50.3	1,164

CI – confidence interval

Table 1.21 Survival (unadjusted) of incident adult RRT patients aged ≥65 years (1998–2017)

	Unadjusted survival (%)											
Cohort	1 yr	2 yr	3 yr	4 yr	5 yr	6 yr	7 yr	8 yr	9 yr	10 yr	95% CI for latest year	N
2017	**79.1**										**77.8-80.4**	**3,755**
2016	80.0	65.0									63.4-66.5	3,755
2015	78.2	64.9	52.2								50.6-53.8	3,812
2014	78.5	64.2	52.2	41.3							39.6-42.9	3,589
2013	78.5	64.6	53.2	43.0	34.6						33.0-36.2	3,439
2012	77.2	65.1	54.2	44.0	35.4	27.6					26.1-29.2	3,327
2011	77.1	62.7	51.3	41.1	32.4	24.7	18.9				17.6-20.3	3,352
2010	76.0	63.1	51.2	41.9	32.2	25.5	19.8	14.6			13.4-15.9	3,281
2009	76.4	63.0	52.4	41.4	32.8	26.1	20.0	15.3	11.2		10.1-12.3	3,372
2008	74.6	61.0	49.7	40.4	32.0	25.6	20.5	16.1	12.1	9.0	8.0-10.0	3,177
2007	74.9	61.1	49.6	40.3	31.8	25.3	20.1	15.4	11.8	9.2	8.2-10.2	3,219
2006	72.0	58.2	46.9	37.2	28.9	23.1	17.5	13.4	10.6	8.5	7.5-9.5	3,114
2005	71.1	57.3	45.4	36.3	27.9	21.2	16.6	12.5	9.9	7.8	6.8-8.8	2,942
2004	68.8	53.9	42.3	33.8	26.7	20.8	16.2	12.8	9.7	7.4	6.5-8.5	2,630
2003	68.3	53.6	41.6	31.6	24.1	18.0	14.0	10.8	8.2	6.5	5.5-7.5	2,314
2002	65.9	50.7	40.3	31.8	23.8	18.2	13.5	10.7	8.1	6.3	5.3-7.4	2,090
2001	66.3	51.7	38.1	28.7	21.5	15.7	11.7	8.7	7.0	5.3	4.3-6.5	1,706
2000	65.9	52.0	39.3	28.5	22.0	16.8	12.7	9.3	7.2	5.4	4.3-6.6	1,491
1999	68.0	51.6	39.0	29.7	22.1	15.9	11.4	8.2	6.0	4.6	3.5-5.9	1,214
1998	62.4	44.9	35.5	26.2	19.4	13.6	10.1	7.3	5.4	4.3	3.2-5.7	1,014

CI – confidence interval

Due to small numbers of incident patients in a given year, centre one year after the first 90 days survival is compared using a rolling four year cohort (table 1.22). Centre-specific one year survival rates were adjusted for not only age (figure 1.31), but also sex and comorbidities for centres with at least 85% completeness (figure 1.32). This is the first time that UKRR comorbidity data have been augmented using diagnostic and procedure codes from HES in England and PEDW in Wales (see appendix A for details). Centres can be identified in the funnel plots using the number of patients in the centre in table 1.22. Given there are 70 centres with data, it would be expected that three centres would fall outside the 95% (1 in 20) confidence limits, entirely by chance.

Table 1.22 1 year after 90 days adjusted survival (60 years, male and median comorbidity score) of incident adult RRT patients by centre (2014–2017 4 year cohort)

	Age-adjusted survival				Case-mix adjusted survival[1]			
Centre	N on RRT	1 yr after 90 days (%)	Lower 95% limit	Upper 95% limit	N on RRT	1 yr after 90 days (%)	Lower 95% limit	Upper 95% limit
D&Gall	61	91.7	80.3	95.8				
Bangor	92	88.5	82.7	95.1	92	91.6	83.7	95.7
Clwyd	94	88.8	82.8	95.0	94	89.8	83.8	95.6
Inverns	96	89.6	82.9	95.0				
Newry	98	95.0	83.0	95.0	98	94.4	84.0	95.6
Ulster	116	93.7	83.7	94.7	116	93.2	84.7	95.3
Colchr	127	88.6	84.1	94.6	127	89.0	85.1	95.2
West NI	140	93.4	84.5	94.4	140	92.4	85.5	95.0
Antrim	141	89.9	84.5	94.4	138	88.6	85.4	95.1
Krkcldy	142	92.3	84.5	94.4				
Sthend	146	92.6	84.6	94.3	146	92.2	85.6	95.0
Wrexm	149	94.0	84.7	94.3	149	94.4	85.7	95.0
Carlis	159	90.9	84.9	94.2	156	92.1	85.9	94.9
Klmarnk	166	91.7	85.1	94.2				
Basldn	178	89.1	85.3	94.1	177	90.6	86.3	94.7
Ipswi	181	94.8	85.3	94.0	176	95.4	86.2	94.7
Dundee	191	89.4	85.5	94.0				

Table 1.22 Continued

Centre	Age-adjusted survival				Case-mix adjusted survival[1]			
	N on RRT	1 yr after 90 days (%)	Lower 95% limit	Upper 95% limit	N on RRT	1 yr after 90 days (%)	Lower 95% limit	Upper 95% limit
Truro	202	90.4	85.7	93.9	202	91.7	86.7	94.6
Dudley	203	92.4	85.7	93.9	203	93.6	86.7	94.6
Chelms	203	93.2	85.7	93.9	202	93.2	86.7	94.6
Liv Ain	206	86.6	85.7	93.9	206	89.2	86.7	94.5
Donc	210	90.7	85.8	93.8	208	90.8	86.7	94.5
Wirral	214	87.8	85.8	93.8	212	90.2	86.8	94.5
Abrdn	220	92.5	85.9	93.8				
York	231	89.0	86.0	93.7	231	90.0	87.0	94.4
Airdrie	231	87.1	86.0	93.7				
Plymth	234	87.0	86.1	93.7	230	88.1	87.0	94.4
Shrew	240	85.7	86.1	93.7	239	87.4	87.1	94.3
Glouc	288	93.7	86.6	93.4	284	94.1	87.5	94.1
Derby	300	91.2	86.7	93.4	300	91.8	87.6	94.1
Wolve	302	87.7	86.7	93.4	301	89.6	87.7	94.1
Sund	303	88.9	86.7	93.4	303	89.9	87.7	94.1
Belfast	305	92.8	86.7	93.4				
Dorset	313	90.5	86.8	93.3	312	90.8	87.7	94.0
Bradfd	322	87.8	86.8	93.3	322	89.5	87.8	94.0
Norwch	354	90.4	87.0	93.2	354	90.7	88.0	93.9
Redng	360	92.5	87.1	93.2	360	93.4	88.0	93.9
L St.G	361	91.3	87.1	93.2	348	92.3	88.0	93.9
Edinb	375	91.0	87.1	93.1				
Hull	384	91.7	87.2	93.1	384	92.2	88.1	93.8
Covnt	410	90.0	87.3	93.0	401	90.1	88.2	93.8
Middlbr	427	90.3	87.4	93.0	427	92.3	88.3	93.7
Stoke	432	89.0	87.4	93.0	430	90.0	88.3	93.7
B Heart	463	89.1	87.5	92.9	461	90.4	88.5	93.6
Nottm	466	90.8	87.5	92.9	466	91.7	88.5	93.6
Newc	471	89.4	87.6	92.9	469	91.6	88.5	93.6
Swanse	478	88.6	87.6	92.9	478	90.4	88.5	93.6
Liv Roy	484	89.7	87.6	92.9	471	90.8	88.5	93.6
Brightn	537	90.3	87.8	92.8	526	91.2	88.7	93.5
Exeter	539	92.0	87.8	92.7	536	92.9	88.7	93.5
Stevng	541	91.3	87.8	92.7	541	91.3	88.7	93.5
Kent	544	89.7	87.8	92.7	544	90.5	88.7	93.5
Bristol	569	90.6	87.9	92.7	564	91.4	88.8	93.4
Sheff	582	91.6	87.9	92.7	579	92.5	88.8	93.4
Prestn	604	89.1	87.9	92.6	576	90.0	88.8	93.4
Cardff	620	88.8	88.0	92.6	620	90.4	88.9	93.4
Leeds	623	91.2	88.0	92.6	622	92.1	88.9	93.4
L Guys	632	92.1	88.0	92.6	629	92.6	88.9	93.3
L Kings	635	92.8	88.0	92.6	628	93.3	88.9	93.4
Salford	640	89.8	88.0	92.6	633	90.9	88.9	93.3
M RI	740	89.7	88.2	92.5	720	90.7	89.1	93.2
Glasgw	750	88.2	88.2	92.4				
Oxford	758	90.9	88.3	92.4	753	91.3	89.2	93.2
Ports	805	90.1	88.3	92.4	792	90.7	89.2	93.2
L Rfree	891	91.7	88.4	92.3	872	92.5	89.3	93.1
Carsh	938	91.3	88.5	92.3	905	91.5	89.4	93.1
B QEH	942	91.2	88.5	92.3	938	91.5	89.4	93.0
Leic	1,058	90.7	88.6	92.2	1,041	91.4	89.5	93.0
L Barts	1,166	91.0	88.7	92.1	1,132	91.9	89.6	92.9
L West	1,398	91.5	88.9	92.0	1,365	92.0	89.8	92.8

[1]Centres excluded if <85% comorbidity data were available – this included Belfast and all Scottish renal centres.

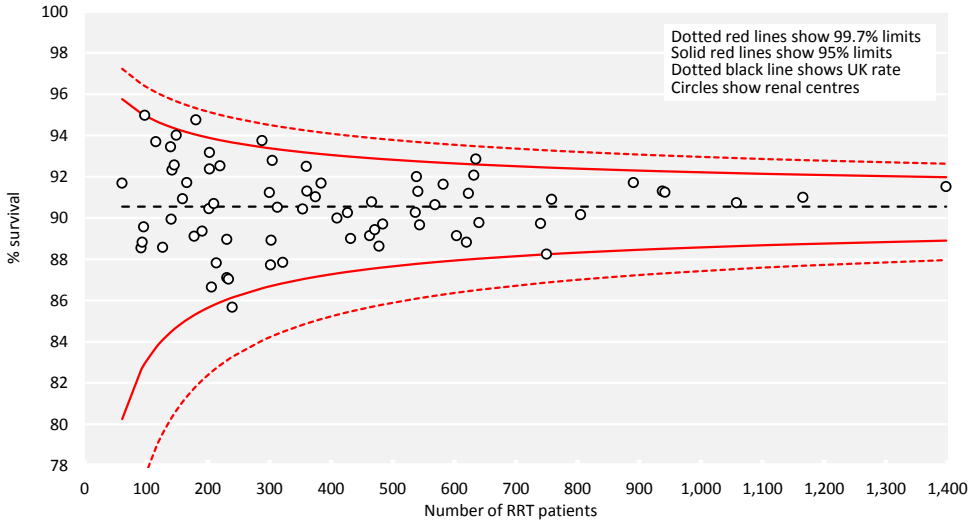

Figure 1.31 1 year after 90 days survival (adjusted to age 60 years) of incident adult RRT patients by centre (2014–2017 4 year cohort)

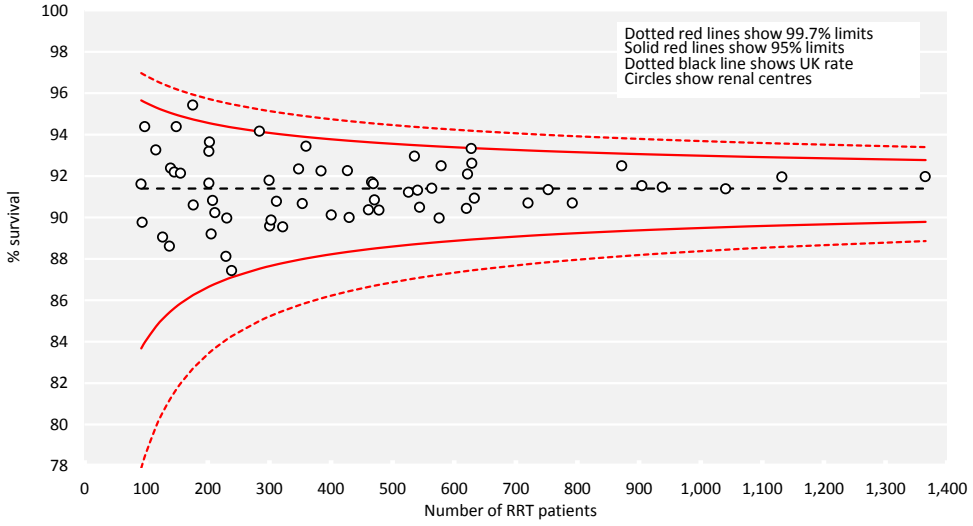

Figure 1.32 1 year after 90 days survival (adjusted to age 60 years, male and median comorbidity score) of incident adult RRT patients by centre (2014–2017 4 year cohort)

Cause of death in incident adult RRT patients

Cause of death was analysed in incident RRT patients using a four year incident cohort followed up for 90 days and 1 year after 90 days. The proportion of incident adult RRT patients with each cause of death is shown for patients with cause of death data and these total 100% of patients with data. The proportion of patients with no cause of death data is shown on a separate line.

Table 1.23 Cause of death in the first 90 days and one year after 90 days in incident adult RRT patients by age group (2014–2017 4 year cohort)

	First 90 days				1 year after 90 days			
	All ages				All ages			
Cause of death	N	%	<65 yrs (%)	≥65 yrs (%)	N	%	<65 yrs (%)	≥65 yrs (%)
Cardiac disease	205	24.7	23.1	25.2	460	20.4	25.0	18.6
Cerebrovascular disease	27	3.3	5.0	2.7	105	4.7	5.9	4.2
Infection	166	20.0	20.6	19.8	476	21.1	20.7	21.3
Malignancy	79	9.5	14.6	7.9	263	11.7	10.8	12.0
Treatment withdrawal	149	18.0	9.6	20.6	395	17.5	10.8	20.2
Other	160	19.3	22.6	18.3	408	18.1	20.7	17.1
Uncertain aetiology	43	5.2	4.5	5.4	146	6.5	6.0	6.7
Total (with data)	**829**	**100.0**	**100.0**	**100.0**	**2,253**	**100.0**	**100.0**	**100.0**
Missing	626	43.0	43.5	43.5	1,214	35.0	34.3	35.3

THE RENAL ASSOCIATION
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Chapter 2

Adults on renal replacement therapy (RRT) in the UK at the end of 2018

Contents

Introduction

This chapter describes the population of adult patients with end-stage kidney disease (ESKD) who were on renal replacement therapy (RRT) in the UK at the end of 2018 (figure 2.1). Patients may have started RRT prior to 2018 or during 2018. Three RRT modalities are available to patients with ESKD – haemodialysis (HD), peritoneal dialysis (PD) and kidney transplantation. HD may be undertaken in-centre (ICHD) or at home (HHD).

The size of the prevalent population on each RRT modality reflects uptake to the modality by new RRT patients (chapter 1); the number of patients switching from one modality to another; and the length of time patients remain on a modality before they switch to another, withdraw from RRT or die.

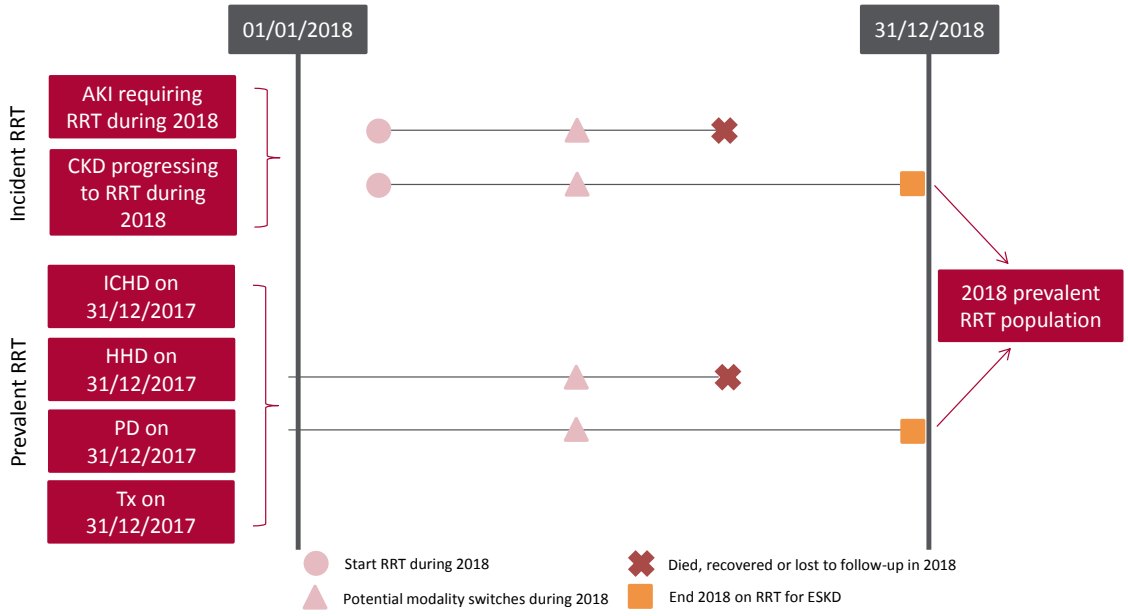

Figure 2.1 Pathways adult patients could follow to be included in the UK 2018 prevalent RRT population

Note that patients receiving dialysis for acute kidney injury (AKI) are only included in this chapter if they had a timeline or RRT modality code for chronic RRT at the end of 2018 or if they had been on RRT for ≥90 days and were on RRT at the end of 2018.

CKD – chronic kidney disease; Tx – transplant

Survival and cause of death analyses were undertaken on historic prevalent cohorts to allow sufficient follow-up time.

Rationale for analyses

The analyses focus on a description of the 2018 prevalent adult RRT population, including the number on RRT per million population (pmp). These analyses are performed annually to help clinicians and policy makers plan future RRT requirements in the UK. Variation in case-mix is also reported to aid understanding of how to improve equity of RRT provision in the UK.

The Renal Association guidelines (renal.org/guidelines) provide audit measures relevant to the care of patients on RRT, but these are treatment-specific – for further details see the guideline tables in each chapter.

For definitions and methods relating to this chapter see appendix A.

Cambridge renal centre (Addenbrooke's Hospital) was unable to submit patient level data for 2017–2018. While data extraction issues have now been resolved, the UKRR and Cambridge are working to load and validate the backlog of data for these years, which should be completed for next year's report. Using aggregate numbers of patients on RRT by treatment modality, it was possible to report treatment rates for Cambridge, but no other quality assurance for the service provided. Coventry renal centre submitted patient level data for more than a third of their new patients only after the closing date for submission to the UKRR. In this report only the analyses on treatment rates could be corrected using the late submitted data.

Key findings

- 66,612 adult patients were receiving RRT for ESKD in the UK on 31/12/2018, an increase of 2.8% from 2017
- RRT prevalence was 1,272 pmp for adults and the prevalence in the total population was 1,018 pmp, in trend with a 2.0% increase in recent years
- The median age of RRT patients was 59.5 years (ICHD 67.4 years, HHD 56.0 years, PD 64.3 years and Tx 55.2 years). In 2000 the median age was 54.8 years (HD 63.3 years, PD 58.5 years and Tx 48.6 years)
- 61.1% of RRT patients were male
- Tx continued as the most common treatment modality (55.7%) – ICHD comprised 36.8%, PD 5.5% and HHD 2.0% of the RRT population
- The most common identifiable primary renal disease was glomerulonephritis (19.5%), followed by diabetes (18.0%)
- There was only 1 outlying centre in the funnel plots showing 1 year survival for prevalent dialysis patients – London West was above the upper 95% limit in both the age adjusted and sex and comorbidities adjusted funnel plots. It would be expected that up to 3 centres would be outside the limits by chance
- There was no cause of death data available for 31.2% of deaths. For those with data, the leading cause of death in younger patients (<65 years) was cardiac disease (25.3%) and in older patients (≥65 years) was treatment withdrawal (20.6%).

Analyses

Changes to the prevalent adult RRT population

For the 71 adult renal centres, the number of prevalent patients on RRT was calculated as a proportion of the estimated centre catchment population (calculated as detailed in appendix A).

Table 2.1 Number of prevalent adult RRT patients by year and by centre; number of RRT patients as a proportion of the catchment population

Centre	N on RRT					Estimated catchment population (millions)	2018 crude rate (pmp)
	2014	2015	2016	2017	2018		
ENGLAND							
B Heart	635	652	652	655	679	0.61	1,110
B QEH	2,133	2,249	2,390	2,513	2,569	1.41	1,824
Basldn	278	274	274	301	314	0.34	913
Bradfd	548	583	636	673	686	0.54	1,269
Brightn	915	950	992	1,011	1,055	1.07	981
Bristol	1,458	1,477	1,468	1,472	1,469	1.19	1,231
Camb	1,234	1,306	1,327	1,420	1,417	0.96	1,476
Carlis	250	281	281	282	293	0.27	1,102
Carsh	1,550	1,581	1,641	1,685	1,736	1.59	1,095
Chelms	262	282	271	277	270	0.42	638
Colchr	119	120	123	129	121	0.25	488
Covnt	960	959	974	965	1,042	0.74	1,409
Derby	514	538	542	556	589	0.58	1,012
Donc	284	302	331	333	332	0.34	977
Dorset	665	681	686	734	765	0.71	1,071
Dudley	305	315	346	369	361	0.37	986
Exeter	945	968	1,013	1,058	1,088	0.90	1,205
Glouc	428	444	472	507	510	0.49	1,048
Hull	802	856	854	873	883	0.85	1,044
Ipswi	367	401	413	433	428	0.33	1,294
Kent	1,014	1,040	1,073	1,091	1,114	1.01	1,098
L Barts	2,208	2,279	2,369	2,492	2,610	1.52	1,721
L Guys	1,916	2,012	2,098	2,159	2,225	0.90	2,480
L Kings	1,023	1,084	1,109	1,149	1,186	0.97	1,222
L Rfree	2,006	2,093	2,175	2,192	2,234	1.26	1,775
L St.G	791	843	849	838	837	0.66	1,266
L West	3,215	3,294	3,392	3,475	3,566	1.99	1,794
Leeds	1,503	1,525	1,550	1,618	1,687	1.38	1,219
Leic	2,142	2,177	2,297	2,370	2,468	2.02	1,222
Liv Ain	217	222	227	209	218	0.40	543
Liv Roy	1,257	1,237	1,214	1,252	1,277	0.83	1,541
M RI	1,791	1,880	1,971	2,045	2,073	1.27	1,633
Middlbr	855	901	890	905	925	0.83	1,111
Newc	977	1,009	1,050	1,114	1,155	0.93	1,243
Norwch	686	721	770	776	786	0.65	1,206
Nottm	1,060	1,113	1,153	1,175	1,196	0.90	1,327
Oxford	1,650	1,690	1,766	1,873	1,940	1.40	1,385
Plymth	501	503	513	540	539	0.39	1,384
Ports	1,592	1,669	1,690	1,748	1,764	1.68	1,052
Prestn	1,171	1,215	1,204	1,270	1,322	1.24	1,068
Redng	761	775	789	795	810	0.75	1,074

Table 2.1 Continued

Centre	N on RRT					Estimated catchment population (millions)	2018 crude rate (pmp)
	2014	2015	2016	2017	2018		
Salford	971	974	1,019	1,114	1,173	1.24	950
Sheff	1,360	1,383	1,421	1,439	1,481	1.14	1,303
Shrew	349	369	377	384	424	0.41	1,022
Stevng	783	813	886	890	957	1.00	959
Sthend	238	246	236	254	260	0.26	990
Stoke	775	788	826	810	808	0.74	1,096
Sund	450	459	507	542	557	0.51	1,087
Truro	380	413	426	424	437	0.34	1,276
Wirral	278	281	337	385	395	0.47	833
Wolve	575	582	571	583	602	0.55	1,086
York	462	490	535	555	568	0.41	1,392
N IRELAND							
Antrim	231	241	252	255	274	0.23	1,166
Belfast	745	769	812	837	877	0.51	1,728
Newry	207	225	236	241	249	0.21	1,196
Ulster	149	169	166	182	190	0.21	896
West NI	274	293	307	313	324	0.28	1,155
SCOTLAND							
Abrdn	501	531	555	563	573	0.50	1,148
Airdrie	395	425	439	467	487	0.46	1,060
D&Gall	130	130	131	135	145	0.12	1,174
Dundee	401	419	418	435	445	0.39	1,155
Edinb	747	769	777	825	862	0.80	1,075
Glasgw	1,607	1,710	1,754	1,774	1,812	1.35	1,341
Inverns	225	253	259	263	279	0.22	1,242
Klmarnk	299	310	317	337	342	0.30	1,137
Krkcldy	277	295	294	303	300	0.26	1,139
WALES							
Bangor	107	182	179	195	202	0.19	1,090
Cardff	1,593	1,613	1,627	1,683	1,721	1.21	1,427
Clwyd	170	185	177	180	190	0.16	1,179
Swanse	705	765	774	796	824	0.75	1,096
Wrexm	283	293	310	322	315	0.20	1,544
TOTALS							
England	**49,609**	**51,299**	**52,976**	**54,712**	**56,201**	**44.02**	**1,277**
N Ireland	**1,606**	**1,697**	**1,773**	**1,828**	**1,914**	**1.44**	**1,326**
Scotland	**4,582**	**4,842**	**4,944**	**5,102**	**5,245**	**4.41**	**1,190**
Wales	**2,858**	**3,038**	**3,067**	**3,176**	**3,252**	**2.51**	**1,296**
UK	**58,655**	**60,876**	**62,760**	**64,818**	**66,612**	**52.38**	**1,272**

Country RRT populations were calculated by summing the RRT patients from centres in each country. Estimated country populations were derived from Office for National Statistics figures. See appendix A for details on estimated catchment population by renal centre. Rates appear higher than in previous reports because general population estimates now include only those aged ≥18 years (see appendix B).

Cambridge submitted only aggregate data for 2017 and 2018. Coventry submitted data for 83 prevalent patients after the closing date. Results shown here and in table 2.2 were corrected using the additional data.

pmp – per million population

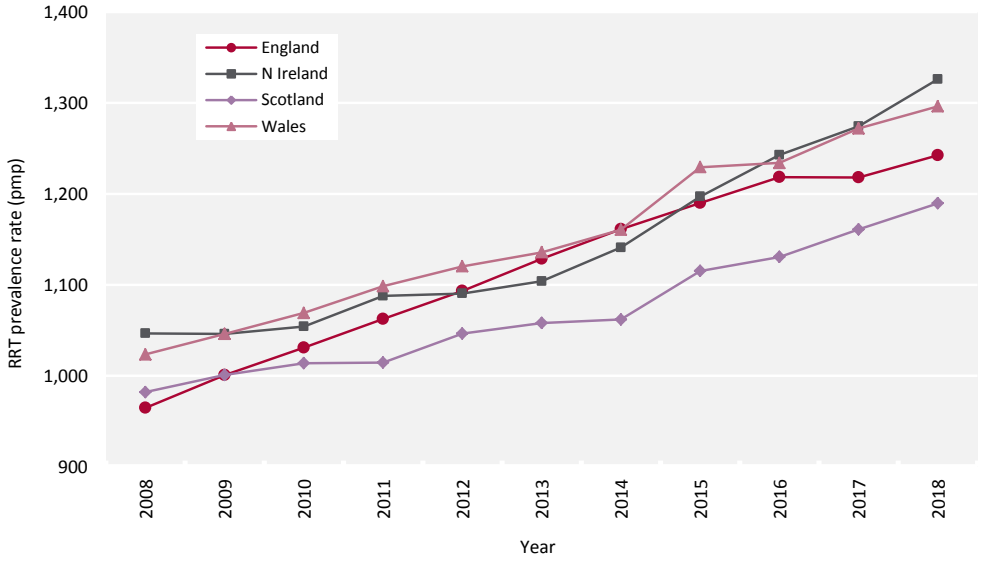

Figure 2.2 Adult RRT prevalence rates by country between 2008 and 2018

Rates appear higher than in previous reports, because from this year those <18 years were excluded from estimated populations.
pmp – per million population

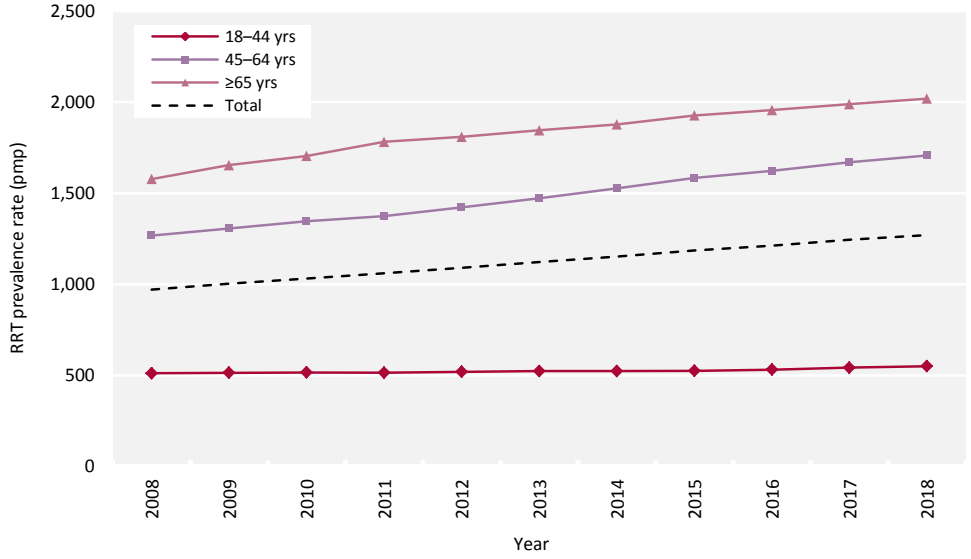

Figure 2.3 Adult RRT prevalence rates by age group between 2008 and 2018

pmp – per million population

Demographics and treatment modality of prevalent adult RRT patients

The proportion of RRT patients from each ethnic group is shown for patients with ethnicity data – the proportion of centre patients with no ethnicity data is shown separately.

Table 2.2 Demographics and treatment modality of adult patients prevalent to RRT on 31/12/2018 by centre

								Ethnicity				
Centre	N on RRT	% on ICHD	% on PD	% on HHD	% with Tx	Median age (yrs)	% male	% White	% South Asian	% Black	% Other	% missing
ENGLAND												
B Heart	679	56.1	14.0	3.1	26.8	62.8	61.9	56.2	31.0	11.1	1.8	0.1
B QEH	2,569	37.4	6.3	1.8	54.5	57.7	58.7	59.1	26.9	10.2	3.8	1.9
Basldn	314	54.5	8.9	3.2	33.4	61.7	67.8	84.9	4.5	5.8	4.8	0.6
Bradfd	686	37.9	3.8	1.3	57.0	56.7	60.2	51.3	43.9	2.7	2.2	1.3
Brightn	1,055	42.2	5.7	3.7	48.4	61.5	62.9	90.2	5.7	1.9	2.1	2.4
Bristol	1,469	32.3	3.8	1.0	62.8	58.7	61.7	88.5	3.8	5.5	2.1	0.2
Camb	1,417	22.4	3.1	*	74.5							
Carlis	293	34.5	10.6	0.0	54.9	60.9	63.8	98.6	1.4	0.0	0.0	1.0
Carsh	1,736	48.7	5.6	1.7	44.0	61.8	62.0	68.5	14.8	11.0	5.7	2.8
Chelms	270	41.5	12.2	0.7	45.6	64.7	69.6	90.3	2.2	3.0	4.5	0.7
Colchr	121	100.0	0.0	0.0	0.0	73.0	61.2	96.7	0.8	1.7	0.8	0.0
Covnt	1,042	36.5	5.7	2.1	55.8	58.7	61.9	78.2	15.6	5.3	0.8	0.3
Derby	589	33.4	13.8	9.0	43.8	60.0	61.1	82.3	11.2	3.1	3.4	0.2
Donc	332	53.9	7.2	2.7	36.1	64.3	62.7	93.7	3.0	0.9	2.4	0.0
Dorset	765	38.0	5.0	1.7	55.3	65.2	59.7	96.6	1.2	0.4	1.8	0.8
Dudley	361	56.8	10.2	3.0	29.9	63.8	62.3	82.3	11.9	4.7	1.1	0.0
Exeter	1,088	41.3	7.2	1.9	49.6	63.4	62.4	96.7	0.5	0.8	2.0	0.1
Glouc	510	46.1	7.1	0.6	46.3	64.0	62.0	93.1	3.4	1.8	1.8	0.6
Hull	883	39.8	5.3	0.6	54.4	58.9	63.5	97.0	1.7	0.3	0.9	1.1
Ipswi	428	35.3	9.3	1.2	54.2	62.3	65.7	83.1	1.9	3.4	11.6	3.0
Kent	1,114	37.5	3.9	1.6	56.9	61.3	59.4	93.5	3.7	1.0	1.8	0.8
L Barts	2,610	40.9	9.1	1.4	48.6	57.0	60.6	32.6	31.2	22.7	13.5	0.1
L Guys	2,225	31.1	1.9	1.7	65.3	55.5	59.2	60.4	8.0	25.5	6.0	1.8
L Kings	1,186	50.3	7.6	1.4	40.6	59.5	61.2	44.4	12.2	37.0	6.4	0.1
L Rfree	2,234	30.6	7.4	0.5	61.5	58.3	59.4	45.1	21.7	23.2	10.0	3.4
L St.G	837	35.1	4.8	0.7	59.4	59.8	57.9	46.1	23.3	23.7	7.0	4.1
L West	3,566	40.1	3.8	0.5	55.6	60.6	60.6	39.4	33.7	18.4	8.5	0.0
Leeds	1,687	32.3	3.9	1.4	62.5	57.0	60.7	77.5	15.3	5.0	2.1	0.3
Leic	2,468	37.2	4.5	2.6	55.8	59.5	59.6	73.5	19.8	4.5	2.1	3.4
Liv Ain	218	71.1	11.9	8.3	8.7	65.4	61.0	98.1	0.0	1.4	0.5	0.9
Liv Roy	1,277	28.2	4.5	3.1	64.3	57.3	61.2	91.1	1.8	3.1	4.0	1.0
M RI	2,073	24.5	3.3	3.5	68.7	56.8	60.3	69.3	14.2	13.5	3.0	0.9
Middlbr	925	37.2	3.0	1.4	58.4	59.8	63.8	93.7	5.1	0.4	0.8	0.0
Newc	1,155	29.4	5.2	1.9	63.5	59.0	61.6	92.9	4.0	1.1	2.0	0.1
Norwch	786	37.7	4.6	1.7	56.1	62.4	61.8	96.7	1.1	0.6	1.5	0.1
Nottm	1,196	29.3	6.0	2.8	61.9	57.8	60.3	81.3	8.8	6.9	3.1	0.1
Oxford	1,940	23.2	3.6	0.9	72.3	57.3	63.0	80.7	10.2	4.4	4.7	9.5
Plymth	539	23.7	7.4	1.9	67.0	62.2	67.2	96.7	0.4	0.4	2.6	0.2
Ports	1,764	29.9	5.3	4.0	60.8	59.8	61.9	93.0	3.6	1.2	2.2	3.5
Prestn	1,322	39.4	2.9	3.3	54.5	60.4	61.7	84.9	13.8	0.8	0.5	0.0
Redng	810	36.2	5.1	1.0	57.8	62.5	61.7	67.2	24.5	5.8	2.5	6.3
Salford	1,173	34.0	9.8	3.0	53.2	58.4	59.3	81.0	14.2	2.9	2.0	0.1
Sheff	1,481	37.1	4.1	3.4	55.4	59.2	63.1	88.6	5.6	2.7	3.1	1.2
Shrew	424	48.6	13.9	4.7	32.8	64.0	64.4	94.3	2.8	0.9	1.9	0.2

Table 2.2. Continued

Centre	N on RRT	% on ICHD	% on PD	% on HHD	% with Tx	Median age (yrs)	% male	Ethnicity				
								% White	% South Asian	% Black	% Other	% missing
Stevng	957	51.4	2.9	4.5	41.2	60.7	61.3	71.2	15.4	8.3	5.2	6.9
Sthend	260	49.2	11.5	0.4	38.8	63.0	58.8	83.5	5.4	4.6	6.5	0.0
Stoke	808	35.3	10.0	2.7	52.0	60.4	62.0	91.8	4.8	1.4	2.0	2.2
Sund	557	43.6	3.1	3.9	49.4	61.2	60.9	95.9	2.9	0.7	0.5	0.0
Truro	437	38.4	3.9	0.7	57.0	62.5	58.8	98.6	0.2	0.0	1.1	0.0
Wirral	395	51.4	4.8	2.0	41.8	61.5	58.5	95.9	1.8	0.8	1.5	0.0
Wolve	602	52.3	9.1	5.5	33.1	59.5	61.6	64.1	22.9	10.9	2.2	0.5
York	568	32.4	5.1	3.0	59.5	61.3	63.0	97.3	1.1	0.7	0.9	3.9
N IRELAND												
Antrim	274	43.4	7.3	1.5	47.8	63.2	62.4	99.6	0.0	0.4	0.0	0.0
Belfast	877	19.7	2.6	1.1	76.5	56.6	59.7	97.6	1.1	0.6	0.7	6.2
Newry	249	32.5	6.4	0.8	60.2	62.1	55.8	98.4	0.4	0.8	0.4	0.0
Ulster	190	55.8	5.3	0.0	38.9	68.6	56.8	95.8	1.6	1.1	1.6	0.0
West NI	324	34.6	2.8	0.6	62.0	59.4	58.6	98.5	0.9	0.3	0.3	0.0
SCOTLAND												
Abrdn	573	37.3	4.5	0.7	57.4	58.0	58.6					65.8
Airdrie	487	39.4	4.3	0.0	56.3	57.5	58.9	96.3	2.5	0.6	0.6	27.3
D&Gall	145	37.9	4.1	0.7	57.2	60.7	62.1					76.6
Dundee	445	35.7	4.9	1.8	57.5	59.3	59.8					67.0
Edinb	862	34.8	4.2	0.3	60.7	58.2	62.1					75.3
Glasgw	1,812	32.4	2.9	1.0	63.7	58.5	59.3					79.9
Inverns	279	32.3	4.7	2.5	60.6	58.7	55.9					46.2
Klmarnk	342	41.2	6.4	3.8	48.5	59.7	59.9					60.8
Krkcldy	300	45.0	3.7	0.0	51.3	61.2	58.0					80.0
WALES												
Bangor	202	34.7	9.9	6.4	49.0	62.7	65.3	98.5	0.0	0.5	1.0	0.0
Cardff	1,721	32.2	3.5	2.0	62.3	58.5	62.5	92.0	5.2	0.5	2.3	1.0
Clwyd	190	39.5	7.9	1.1	51.6	64.0	65.8	97.9	1.6	0.0	0.5	1.6
Swanse	824	45.3	8.5	4.2	42.0	63.8	63.0	97.8	1.5	0.2	0.5	1.0
Wrexm	315	36.2	7.6	1.6	54.6	60.2	62.9	96.8	0.6	1.0	1.6	0.0
TOTALS												
England	**56,201**	**37.2**	**5.7**	**2.1**	**55.1**	**59.5**	**61.2**	**73.3**	**13.8**	**8.8**	**4.1**	**1.6**
N Ireland	**1,914**	**30.9**	**4.1**	**0.9**	**64.1**	**59.5**	**59.1**	**98.0**	**0.9**	**0.6**	**0.6**	**2.8**
Scotland	**5,245**	**35.7**	**4.0**	**1.0**	**59.3**	**58.6**	**59.6**					**68.5**
Wales	**3,252**	**36.5**	**5.8**	**2.7**	**55.0**	**60.6**	**63.0**	**94.7**	**3.3**	**0.5**	**1.6**	**0.9**
UK	**66,612**	**36.8**	**5.5**	**2.0**	**55.7**	**59.5**	**61.1**	**75.4**	**12.6**	**8.1**	**3.9**	**7.0**

Blank cells – no data returned by the centre or data completeness <70%.
Breakdown by ethnicity is not shown for centres with <70% data completeness, but these centres were included in national averages.
*Cambridge submitted only aggregate data by modality, with ICHD being the total HD percentage. Coventry submitted only aggregate data by modality for 83 prevalent patients after the closing date. Additional data from Cambridge and Coventry were included in country totals only for the number on RRT.

PRDs were grouped into categories as shown in table 2.3, with the mapping of disease codes into groups explained in more detail in appendix A. The proportion of RRT patients in each ethnic group and with each PRD is shown for patients with ethnicity and PRD data, respectively, and these total 100% of patients with data. The proportions of patients with no ethnicity and no PRD data are shown on separate lines.

Table 2.3 Demographics, primary renal diseases (PRDs) and prevalent treatment modality of adult patients prevalent to RRT on 31/12/2018 by age group

Characteristic	Age group (yrs)							Total	Median age (yrs)
	18–34	35–44	45–54	55–64	65–74	75–84	≥85		
Total									
N on RRT	5,140	7,228	13,044	15,651	13,804	8,507	1,738	65,112	59.5
% on RRT	7.9	11.1	20.0	24.0	21.2	13.1	2.7		.
Sex (%)									
Male	7.7	10.9	19.8	24.2	21.2	13.4	2.9	61.1	59.7
Female	8.2	11.5	20.4	23.8	21.2	12.5	2.3	38.9	59.0
Ethnicity (%)									
White	7.8	10.5	19.9	23.2	21.9	13.9	3.0	75.4	59.9
South Asian	9.4	13.8	17.8	25.1	21.8	10.6	1.5	12.6	59.2
Black	6.2	12.7	25.9	28.2	13.6	11.0	2.3	8.1	56.6
Other	10.5	14.5	20.9	23.0	19.3	10.3	1.5	3.9	56.4
Missing	7.1	9.5	18.6	26.8	22.6	12.9	2.5	7.0	60.6
PRD (%)									
Diabetes	2.3	8.8	19.4	28.2	25.0	14.1	2.2	18.0	61.9
Glomerulonephritis	9.4	13.9	22.7	25.7	18.7	8.5	1.2	19.5	56.5
Hypertension	2.9	8.4	19.9	23.8	21.7	18.7	4.7	6.2	62.5
Polycystic kidney disease	1.7	5.8	21.7	33.2	26.9	9.8	0.9	10.4	61.1
Pyelonephritis	10.9	14.7	24.9	21.2	15.7	10.1	2.5	9.9	54.8
Renal vascular disease	1.8	2.5	5.5	12.7	29.0	39.0	9.6	2.9	74.6
Other	15.6	13.8	18.4	20.0	19.0	11.0	2.1	18.0	56.0
Uncertain aetiology	7.8	11.2	18.1	20.5	20.7	16.7	4.9	15.0	61.1
Missing	14.5	9.9	17.7	19.3	20.3	14.6	3.7	2.6	59.5
Modality (%)									
ICHD	4.3	6.3	13.6	20.5	24.8	24.3	6.3	36.8	67.4
HHD	9.0	12.5	25.8	27.2	18.2	7.1	0.2	2.0	56.0
PD	6.6	7.8	15.2	21.8	23.7	21.1	3.8	5.5	64.3
Tx	10.4	14.5	24.5	26.5	18.7	5.1	0.2	55.7	55.2

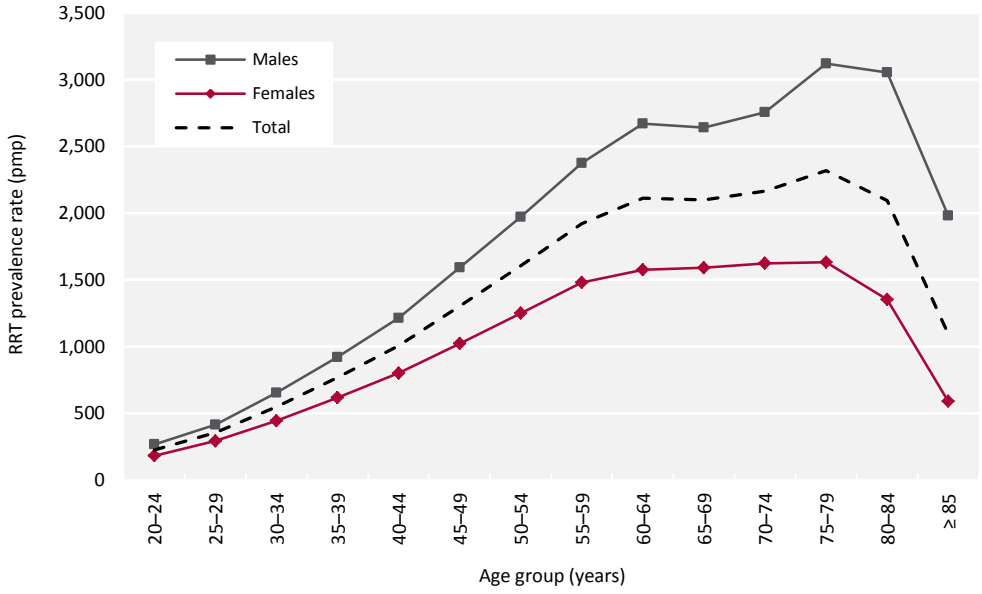

Figure 2.4 Prevalence rates for adult patients on RRT on 31/12/2018 by age group and sex

For each modality, the percentage of patients of each year of age is shown in figure 2.5, with the totals of each modality adding to 100%.

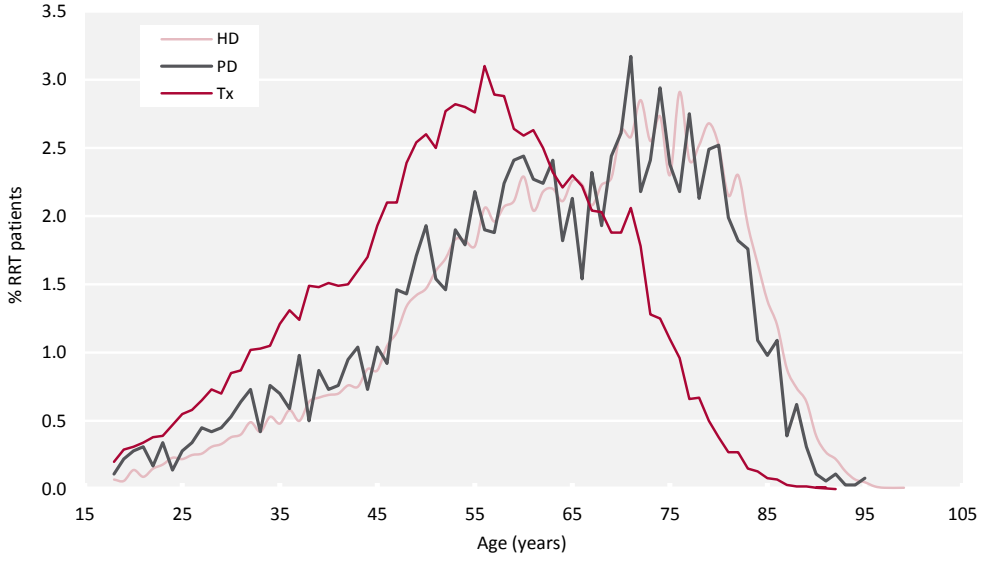

Figure 2.5 Age profile of adult patients prevalent to RRT on 31/12/2018 by RRT modality

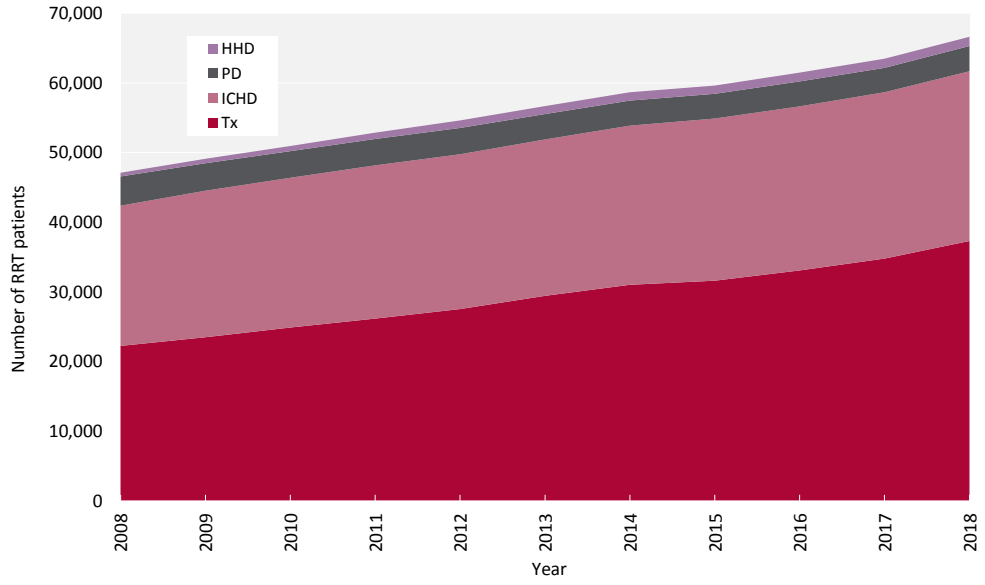

Figure 2.6 Growth in numbers of prevalent adult RRT patients by treatment modality between 2008 and 2018

Table 2.4 Change in adult RRT prevalence rates by modality between 2014 and 2018

	Prevalence rate (pmp)					% growth in prevalence rate				
Year	HD	PD	Dialysis	Tx	RRT	HD	PD	Dialysis	Tx	RRT
2014	472	71	543	609	1,152					
2015	483	70	553	633	1,186	2.3	-1.5	1.8	3.9	2.9
2016	486	70	556	657	1,212	0.6	-0.1	0.5	3.8	2.2
2017	491	68	558	686	1,245	0.9	-2.9	0.4	4.5	2.7
2018	490	69	560	712	1,272	-0.0	2.3	0.2	3.7	2.2
Average annual growth 2014-2018						**0.9**	**-0.5**	**0.7**	**4.0**	**2.5**

Rates appear higher than in previous reports, because from this year those <18 years were excluded from the estimated populations.
pmp – per million population

In table 2.5, for each PRD category, the proportion of patients on each treatment modality is shown for patients with PRD data and these total 100% of patients with data. The proportion of patients with no PRD data is shown on a separate line. Table 2.6 shows changes in PRDs between 2009 and 2018, in particular the increase in diabetes.

Table 2.5 Treatment modality of adult patients prevalent to RRT on 31/12/2018 by primary renal disease (PRD)

PRD	N on RRT	% RRT population	Modality (%)		
			HD	PD	Tx
Diabetes	11,393	18.0	56.8	7.0	36.2
Glomerulonephritis	12,396	19.5	28.8	4.4	66.8
Hypertension	3,955	6.2	44.7	6.8	48.5
Polycystic kidney disease	6,569	10.4	21.1	3.8	75.0
Pyelonephritis	6,309	9.9	29.8	3.2	67.0
Renal vascular disease	1,857	2.9	67.0	10.6	22.4
Other	11,444	18.0	37.7	4.8	57.5
Uncertain aetiology	9,502	15.0	39.5	6.1	54.4
Total (with data)	**63,425**	**100.0**	**38.4**	**5.4**	**56.2**
Missing	1,687	2.6	53.9	10.1	36.0

Table 2.6 Change in primary renal disease (PRD) of adult patients prevalent to RRT between 2009 and 2018

PRD	Year									
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Diabetes	15.3	15.4	15.8	16.2	16.5	16.7	17.1	17.3	17.7	18.0
Glomerulonephritis	19.3	19.4	19.3	19.4	19.5	19.4	19.4	19.4	19.5	19.5
Hypertension	6.0	6.1	6.1	6.3	6.3	6.3	6.3	6.2	6.3	6.2
Polycystic kidney disease	9.8	9.9	10.0	10.0	10.2	10.1	10.2	10.2	10.3	10.4
Pyelonephritis	12.2	11.8	11.6	11.4	11.2	10.9	10.6	10.4	10.3	9.9
Renal vascular disease	3.5	3.6	3.5	3.3	3.1	3.1	3.0	3.0	3.0	2.9
Other	16.1	16.3	16.4	16.6	16.8	17.2	17.4	17.7	17.8	18.0
Uncertain aetiology	17.7	17.6	17.4	16.9	16.4	16.3	16.0	15.8	15.2	15.0
Missing	0.5	0.4	0.7	0.6	1.0	0.9	1.1	1.2	1.9	2.6

The percentages in each PRD category add up to 100% in each year; the percentages with missing PRD data are shown separately.

The treatment modality distribution for prevalent adult RRT patients was further divided by treatment location for HD patients – hospital unit, satellite unit or home – and for PD patients by type of PD – automated PD (APD) and continuous ambulatory PD (CAPD).

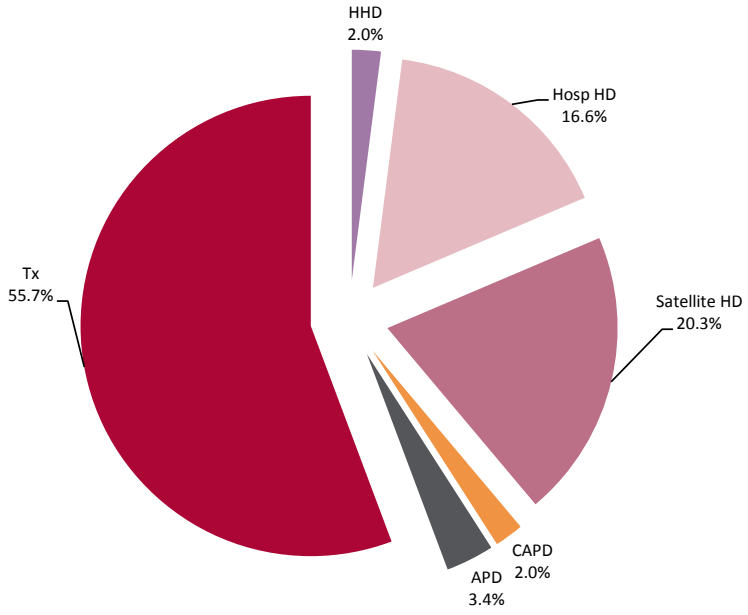

Figure 2.7 Detailed treatment modality of adult patients prevalent to RRT on 31/12/2018

No Scottish centres were included because data on satellite HD were not available.
APD – automated PD; CAPD – continuous ambulatory PD

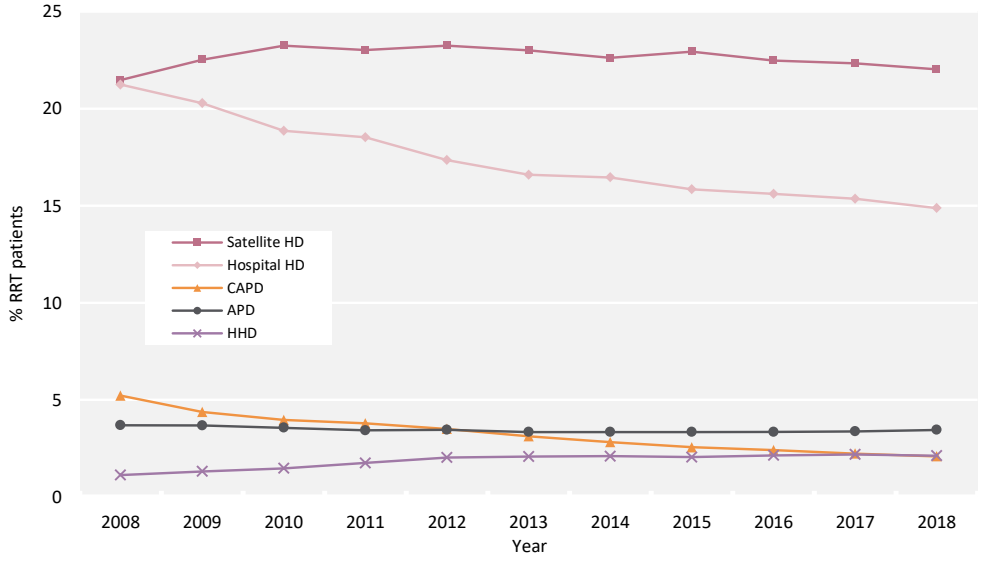

Figure 2.8 Detailed dialysis modality changes in prevalent adult RRT patients between 2008 and 2018

No Scottish centres were included because data on satellite HD were not available.
APD – automated PD; CAPD – continuous ambulatory PD

Table 2.7 Adult patients prevalent to dialysis on 31/12/2018 by detailed dialysis modality and centre

Centre	N on dialysis	% Tx wait-listed <65 yrs	% Tx wait-listed ≥65 yrs	% on HD				% on PD		
				All HD	HHD	Hospital	Satellite	All PD	CAPD	APD
ENGLAND										
B Heart	497	20.1	2.3	80.9	4.2	72.6	4.0	19.1	2.6	16.5
B QEH	1,170	28.2	4.5	86.1	4.0	13.1	69.0	13.9	3.3	10.6
Basldn	209	45.2	6.0	86.6	4.8	63.2	18.7	13.4	2.9	10.5
Bradfd	295	30.7	6.2	91.2	3.1	74.6	13.6	8.8	2.0	6.8
Brightn	544	29.2	3.7	89.0	7.2	38.4	43.4	11.0	7.0	4.0
Bristol	546	34.1	4.0	89.7	2.8	18.7	68.3	10.3	6.2	4.0
Camb	361									
Carlis	132	27.3	9.1	76.5	0.0	50.0	26.5	23.5	6.8	16.7
Carsh	973	32.9	4.9	89.9	3.0	18.3	68.7	10.1	2.4	7.5
Chelms	147	25.5	3.3	77.6	1.4	76.2	0.0	22.5	6.1	16.3
Colchr	121	27.8	3.5	100.0	0.0	100.0	0.0	0.0	0.0	0.0
Covnt	378	30.4	2.8	86.2	5.8	80.4	0.0	13.8	13.8	0.0
Derby	331	31.1	6.6	75.5	16.0	59.5	0.0	24.5	13.9	10.6
Donc	212	43.9	6.9	88.7	4.3	44.3	40.1	11.3	2.4	9.0
Dorset	342	33.3	7.4	88.9	3.8	18.7	66.4	11.1	2.6	8.5
Dudley	253	26.1	3.6	85.4	4.4	37.2	43.9	14.6	8.7	5.9
Exeter	548	35.1	2.1	85.8	3.8	8.8	73.2	14.2	5.7	8.6
Glouc	274	35.1	5.0	86.9	1.1	62.8	23.0	13.1	1.1	12.0
Hull	403	26.9	8.6	88.3	1.2	44.4	42.7	11.7	7.2	4.5
Ipswi	196	29.9	2.5	79.6	2.6	67.9	9.2	20.4	8.2	11.2
Kent	480	28.5	3.6	90.8	3.8	27.7	59.4	9.2	6.7	2.5
L Barts	1,341	36.1	7.7	82.3	2.7	34.6	45.0	17.7	2.7	15.0
L Guys	772	37.0	10.5	94.4	4.9	14.4	75.1	5.6	0.9	4.7
L Kings	704	29.7	6.1	87.2	2.4	19.6	65.2	12.8	5.3	7.5
L Rfree	861	43.3	10.0	80.7	1.4	2.9	76.4	19.3	6.7	12.5
L St.G	340	41.6	12.8	88.2	1.8	19.4	67.1	11.8	4.7	5.6
L West	1,583	48.6	13.7	91.5	1.2	17.7	72.6	8.5	4.8	3.7
Leeds	633	39.0	11.2	89.7	3.6	19.4	66.7	10.3	3.5	6.8
Leic	1,091	34.3	7.1	89.9	5.9	18.1	66.0	10.1	1.9	8.2
Liv Ain	199	29.3	4.7	86.9	9.1	5.0	72.9	13.1	0.0	13.1
Liv Roy	456	27.2	13.1	87.5	8.6	32.9	46.1	12.5	6.8	5.7
M RI	649	36.5	14.6	89.5	11.3	23.4	54.9	10.5	3.7	6.8
Middlbr	385	38.0	10.3	92.7	3.4	24.2	65.2	7.3	7.3	0.0
Newc	422	37.4	11.1	85.8	5.2	64.0	16.6	14.2	1.0	13.3
Norwch	345	27.2	2.7	89.6	3.8	52.2	33.6	10.4	8.7	1.7
Nottm	456	28.2	2.8	84.2	7.5	31.4	45.4	15.8	3.7	12.1
Oxford	538	43.5	5.2	87.2	3.4	31.0	52.8	12.8	2.8	9.9
Plymth	178	29.3	12.5	77.5	5.6	62.4	9.6	22.5	5.6	16.9
Ports	691	33.5	11.1	86.4	10.1	16.9	59.3	13.6	12.9	0.7
Prestn	602	30.2	10.0	93.7	7.1	22.1	64.5	6.3	2.3	4.0
Redng	342	36.8	4.3	88.0	2.3	35.7	50.0	12.0	7.3	4.7
Salford	549	37.5	17.1	79.1	6.4	21.0	51.7	21.0	6.0	14.9
Sheff	661	34.4	8.2	90.8	7.6	45.2	38.0	9.2	3.0	6.2
Shrew	285	22.2	4.0	79.3	7.0	41.1	31.2	20.7	3.9	16.8
Stevng	563	42.3	5.3	95.0	7.6	41.6	45.8	5.0	5.0	0.0
Sthend	159	31.9	4.6	81.1	0.6	80.5	0.0	18.9	18.9	0.0
Stoke	388	26.2	1.3	79.1	5.7	47.7	25.8	20.9	2.3	13.9
Sund	282	35.2	7.1	94.0	7.8	47.5	38.7	6.0	2.8	3.2
Truro	188	34.9	8.8	91.0	1.6	56.4	33.0	9.0	4.3	4.8
Wirral	230	28.4	6.1	91.7	3.5	41.3	47.0	8.3	0.9	7.4
Wolve	403	19.3	2.0	86.4	8.2	63.8	14.4	13.7	2.5	8.4

Table 2.7 Continued

Centre	N on dialysis	% Tx wait-listed <65 yrs	% Tx wait-listed ≥65 yrs	% on HD				% on PD		
				All HD	HHD	Hospital	Satellite	All PD	CAPD	APD
York	230	37.1	2.8	87.4	7.4	29.6	50.4	12.6	10.0	2.6
N IRELAND[1]										
Antrim	143	41.0	4.8	86.0	2.8	83.2	0.0	14.0	0.7	13.3
Belfast	206	41.8	9.3	88.8	4.9	84.0	0.0	11.2	0.5	10.7
Newry	99	29.4	7.7	83.8	2.0	81.8	0.0	16.2	0.0	16.2
Ulster	116	29.6	3.4	91.4	0.0	91.4	0.0	8.6	0.9	4.3
West NI	123	25.0	8.9	92.7	1.6	91.1	0.0	7.3	1.6	5.7
SCOTLAND[2]										
Abrdn	244	33.9	10.6	89.3	1.6	87.7	0.0	10.7	9.0	1.6
Airdrie	213	48.0	18.2	90.1	0.0	90.1	0.0	9.9	4.2	5.6
D&Gall	62	54.2	13.2	90.3	1.6	88.7	0.0	9.7	4.8	4.8
Dundee	189	35.3	3.8	88.4	4.2	84.1	0.0	11.6	0.5	11.1
Edinb	339	33.3	12.4	89.4	0.9	88.5	0.0	10.6	2.7	8.0
Glasgw	658	52.5	12.8	92.0	2.7	89.2	0.0	8.1	2.6	5.5
Inverns	110	38.1	4.4	88.2	6.4	81.8	0.0	11.8	11.8	0.0
Klmarnk	176	31.5	11.9	87.5	7.4	80.1	0.0	12.5	0.6	11.9
Krkcldy	146	32.3	6.0	92.5	0.0	92.5	0.0	7.5	0.0	7.5
WALES										
Bangor	103	37.2	8.3	80.6	12.6	46.6	21.4	19.4	5.8	13.6
Cardff	649	30.8	6.1	90.8	5.2	2.5	83.1	9.2	5.1	4.2
Clwyd	92	25.8	8.2	83.7	2.2	81.5	0.0	16.3	8.7	7.6
Swanse	478	23.3	3.6	85.4	7.3	46.2	31.8	14.6	7.1	7.5
Wrexm	143	29.4	5.3	83.2	3.5	68.5	11.2	16.8	0.0	16.8
TOTALS										
England	**24,577**	**34.3**	**7.2**	**87.4**	**4.7**	**32.0**	**50.7**	**12.6**	**4.7**	**7.7**
N Ireland	**687**	**35.5**	**6.7**	**88.7**	**2.6**	**86.0**	**0.0**	**11.4**	**0.7**	**10.0**
Scotland	**2,137**	**41.8**	**10.9**	**90.2**	**2.5**	**87.7**	**0.0**	**9.8**	**3.5**	**6.3**
Wales	**1,465**	**28.6**	**5.5**	**87.1**	**6.1**	**31.3**	**49.8**	**12.9**	**5.5**	**7.4**
UK	**28,866**	**34.6**	**7.4**	**87.6**	**4.6**	**37.4**	**45.7**	**12.4**	**4.6**	**7.6**

Blank cells – no data returned by the centre.

[1]There were no satellite units in Northern Ireland.

[2]All HD patients in Scotland were shown as receiving treatment at home or in hospital because no data were available regarding satellite dialysis.

APD – automated PD; CAPD – continuous ambulatory PD

The proportion of patients on HHD versus satellite HD is shown in figure 2.9, with the remaining patients on hospital HD.

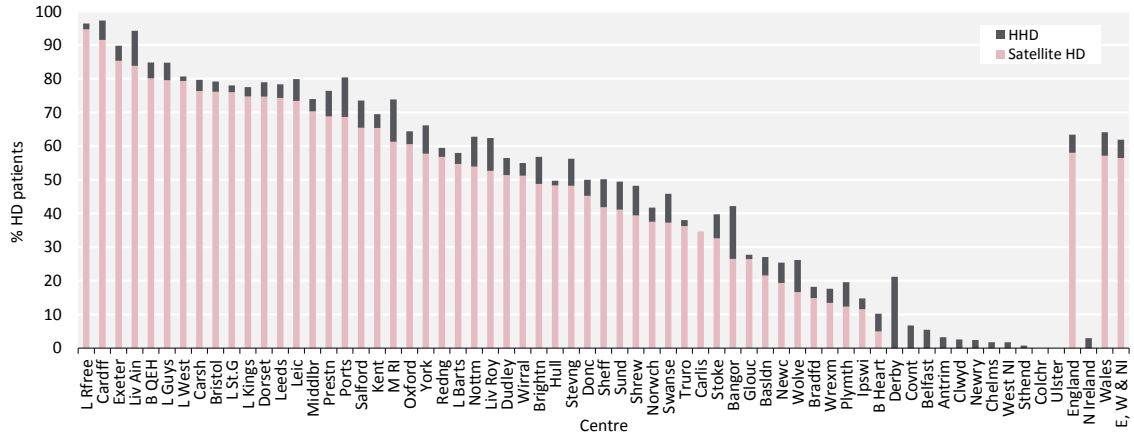

Figure 2.9 Adult patients prevalent to HD on 31/12/2018 treated with satellite HD or HHD by centre

There were no satellite units in Northern Ireland and Scottish centres were excluded because data on satellite HD were not available.

Dialysis access in prevalent adult dialysis patients

The type of dialysis access used by the prevalent dialysis population is described in chapter 4.

Survival in adult dialysis patients

Survival was analysed in prevalent patients receiving dialysis on 31/12/2017 and followed-up for one year in 2018. Survival in patients with a Tx is presented in chapter 3.

Survival analyses, where stated, were adjusted to age 60 years to allow comparisons between centres with different age distributions. Centre-specific survival rates were further adjusted for not only age (figure 2.10), but also sex and comorbidities for centres with at least 85% completeness (figure 2.11). For the first time, UKRR comorbidity data were augmented using diagnostic and procedure codes from Hospital Episode Statistics (HES) in England and Patient Episode Database for Wales (PEDW) in Wales (see appendix A for details). Centres are identifiable from the x-axis by using the number of prevalent dialysis patients by centre in table 2.8.

Table 2.8 1 year adjusted survival (age and case-mix) of adult patients prevalent to dialysis on 31/12/2017 by centre

	Age adjusted survival				Case-mix adjusted survival[1]			
Centre	N on dialysis	1 yr (%)	Lower 95% limit	Upper 95% limit	N on dialysis	1 yr (%)	Lower 95% limit	Upper 95% limit
D&Gall	58	86.5	76.8	94.2				
Clwyd	82	85.9	79.0	93.4	82	86.9	80.6	94.4
Newry	93	88.0	79.6	93.2	90	85.3	81.1	94.3
Inverns	94	91.4	79.7	93.1				
Bangor	95	88.4	79.7	93.1	95	89.9	81.4	94.2
Carlis	118	88.6	80.8	92.7	115	89.4	82.3	93.8
Colchr	122	86.3	80.9	92.6	122	87.8	82.5	93.7
Ulster	124	92.5	81.0	92.6	122	91.0	82.5	93.7
Antrim	129	89.3	81.1	92.5	121	87.2	82.5	93.7
West NI	137	90.4	81.4	92.4	126	86.7	82.7	93.7
Wrexm	141	85.0	81.5	92.4	140	85.0	83.1	93.5
Krkcldy	143	83.3	81.5	92.4				
Sthend	148	86.7	81.7	92.3	148	86.2	83.3	93.4
Chelms	167	91.6	82.1	92.1	166	92.3	83.7	93.2
Truro	170	90.9	82.2	92.1	170	92.3	83.8	93.2
Klmarnk	170	86.3	82.2	92.1				
Liv Ain	183	89.5	82.4	91.9	183	91.6	84.0	93.1
Plymth	186	85.6	82.4	91.9	183	87.2	84.0	93.1
Ipswi	187	90.2	82.5	91.9	182	91.6	84.0	93.1
Airdrie	196	84.6	82.6	91.8				
Dundee	197	89.0	82.6	91.8				
Basldn	201	87.8	82.7	91.8	199	89.4	84.3	92.9
Donc	210	89.5	82.8	91.7	207	89.6	84.4	92.9
York	217	88.3	82.9	91.7	217	89.5	84.5	92.8
Belfast	220	90.6	83.0	91.6				
Wirral	227	86.1	83.0	91.6	224	88.9	84.6	92.8
Shrew	230	90.4	83.1	91.6	230	91.3	84.7	92.7
Abrdn	237	85.1	83.2	91.5				
Dudley	261	88.2	83.4	91.4	261	89.2	85.0	92.6
Sund	263	85.0	83.4	91.4	263	86.8	85.0	92.6
Glouc	274	91.1	83.5	91.3	270	91.6	85.1	92.5
Bradfd	287	84.8	83.7	91.2	285	87.2	85.2	92.4
Derby	305	87.4	83.8	91.2	304	88.2	85.4	92.4
Edinb	320	89.2	83.9	91.1				
Redng	321	86.1	83.9	91.1	321	88.1	85.5	92.3
Dorset	324	90.4	83.9	91.1	323	91.0	85.5	92.3
Middlbr	329	85.6	84.0	91.1	329	88.4	85.5	92.3
L St.G	338	90.4	84.0	91.0	325	91.5	85.5	92.3
Wolve	367	88.6	84.2	90.9	367	90.3	85.8	92.1
Norwch	367	89.5	84.2	90.9	367	89.8	85.8	92.1
Hull	381	86.8	84.3	90.9	380	88.0	85.8	92.1
Newc	381	86.6	84.3	90.9	381	89.4	85.8	92.1
Covnt	383	90.2	84.3	90.9	374	90.9	85.8	92.1
Stoke	394	86.1	84.4	90.8	393	87.6	85.9	92.0
Swanse	430	86.8	84.5	90.7	430	88.9	86.1	91.9
Nottm	440	88.3	84.6	90.7	439	89.5	86.1	91.9
Liv Roy	448	88.3	84.6	90.7	439	90.3	86.1	91.9
B Heart	465	88.4	84.7	90.6	463	89.4	86.2	91.9
Kent	470	85.9	84.7	90.6	470	87.1	86.2	91.8
Brightn	491	88.3	84.8	90.6	482	89.5	86.3	91.8
Salford	504	85.3	84.8	90.5	504	88.5	86.4	91.8
Oxford	511	86.1	84.8	90.5	502	87.4	86.3	91.8

Table 2.8 Continued

Centre	Age adjusted survival				Case-mix adjusted survival[1]			
	N on dialysis	1 yr (%)	Lower 95% limit	Upper 95% limit	N on dialysis	1 yr (%)	Lower 95% limit	Upper 95% limit
Stevng	513	88.4	84.8	90.5	511	89.3	86.4	91.8
Exeter	523	89.7	84.9	90.5	520	90.9	86.4	91.7
Bristol	537	85.3	84.9	90.5	535	87.8	86.5	91.7
Prestn	567	87.8	85.0	90.4	547	89.5	86.5	91.7
Glasgw	578	86.8	85.0	90.4				
Leeds	581	87.3	85.1	90.4	579	89.4	86.6	91.6
Cardff	586	85.1	85.1	90.4	585	87.2	86.6	91.6
M RI	615	86.9	85.1	90.3	608	88.7	86.7	91.6
Sheff	621	89.0	85.2	90.3	619	90.5	86.7	91.6
L Kings	656	89.3	85.2	90.2	650	90.7	86.7	91.5
Ports	657	85.4	85.2	90.2	648	87.3	86.7	91.5
L Guys	692	88.7	85.3	90.2	691	89.8	86.8	91.5
L Rfree	802	87.5	85.5	90.0	790	88.9	87.0	91.3
Carsh	930	89.7	85.7	89.9	909	90.5	87.2	91.2
Leic	1,007	87.4	85.8	89.8	1,001	88.3	87.3	91.1
B QEH	1,123	89.6	85.9	89.7	1,119	90.6	87.4	91.0
L Barts	1,220	89.1	86.0	89.7	1,208	90.5	87.5	91.0
L West	1,501	90.0	86.2	89.5	1,444	90.9	87.7	90.9

Centres are ordered by increasing number of patients.
[1]Centres excluded if <85% comorbidity data were available – this included Belfast and all Scottish renal centres.

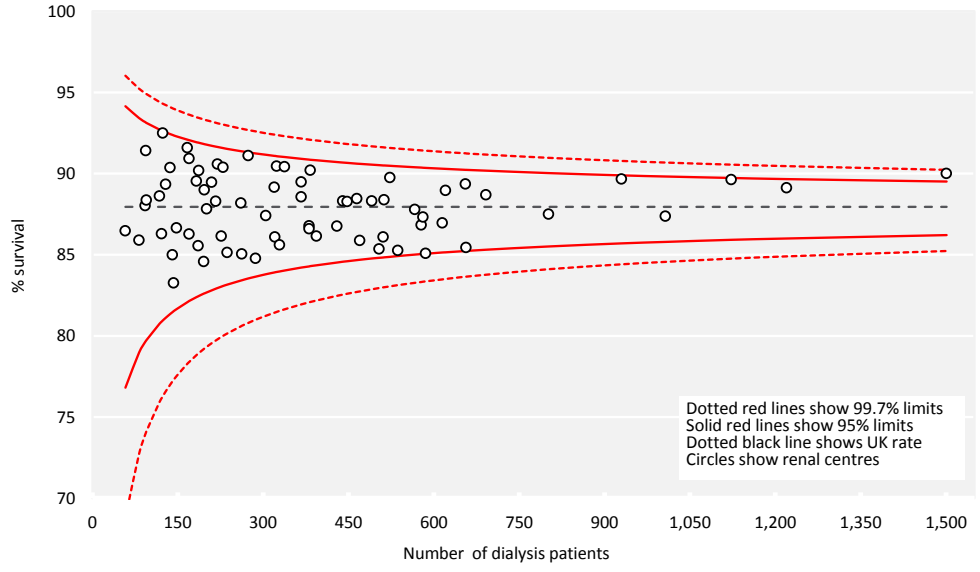

Figure 2.10 1 year survival (adjusted to age 60 years) of adult patients prevalent to dialysis on 31/12/2017 by centre

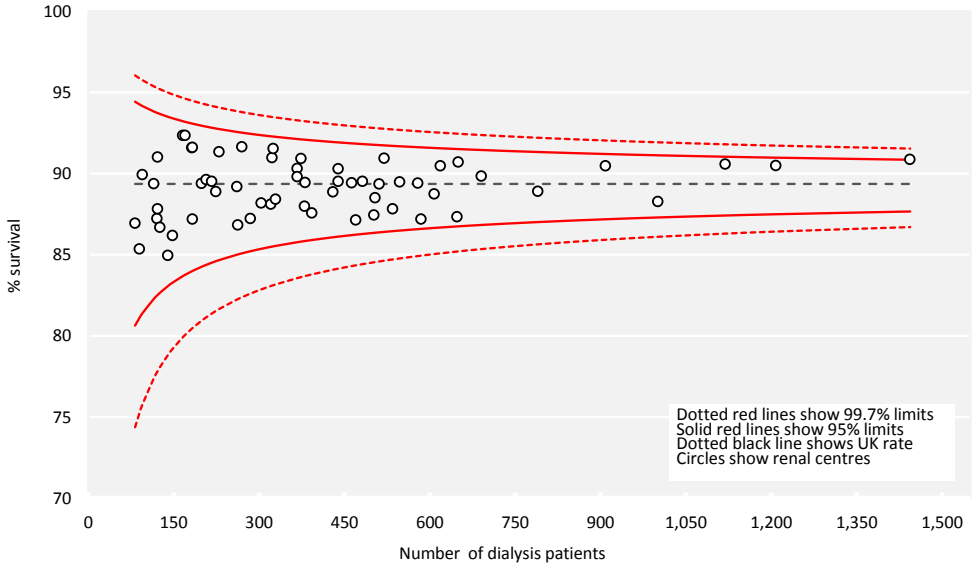

Figure 2.11 1 year survival (adjusted to 60 years, male and median comorbidity score) of adult patients prevalent to dialysis on 31/12/2017 by centre

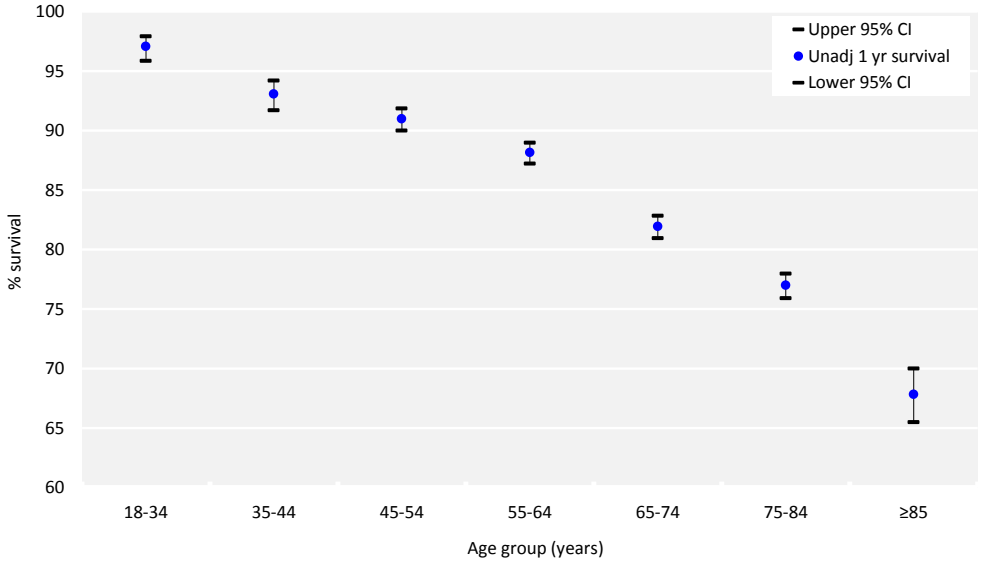

Figure 2.12 1 year survival (unadjusted) of adult patients prevalent to dialysis on 31/12/2017 by age group

CI – confidence interval

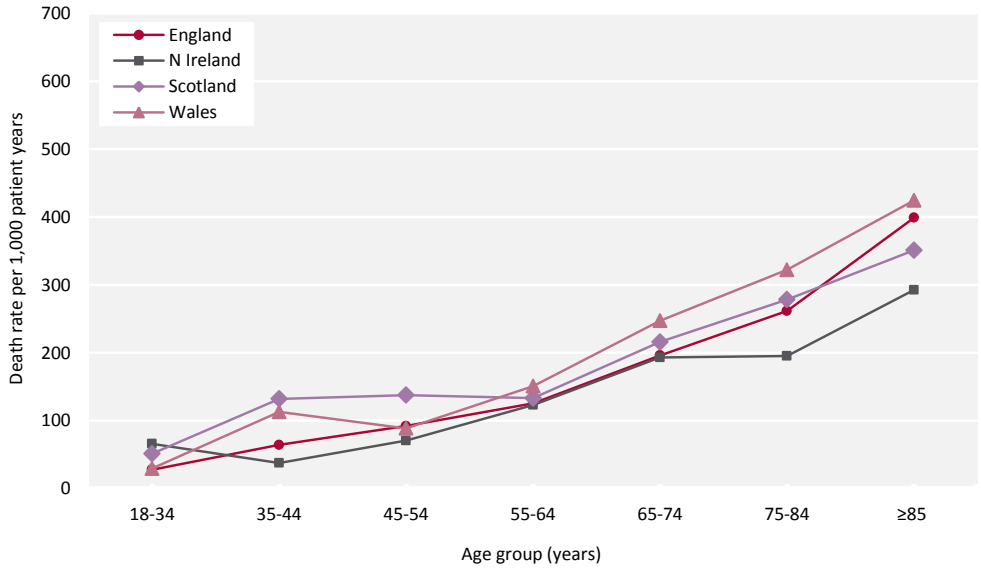

Figure 2.13 1 year death rate per 1,000 patient years for adult patients prevalent to dialysis on 31/12/2017 by country and age group

The serial one year death rate in prevalent adult dialysis patients by country is shown in figure 2.14, adjusted to age 60 years.

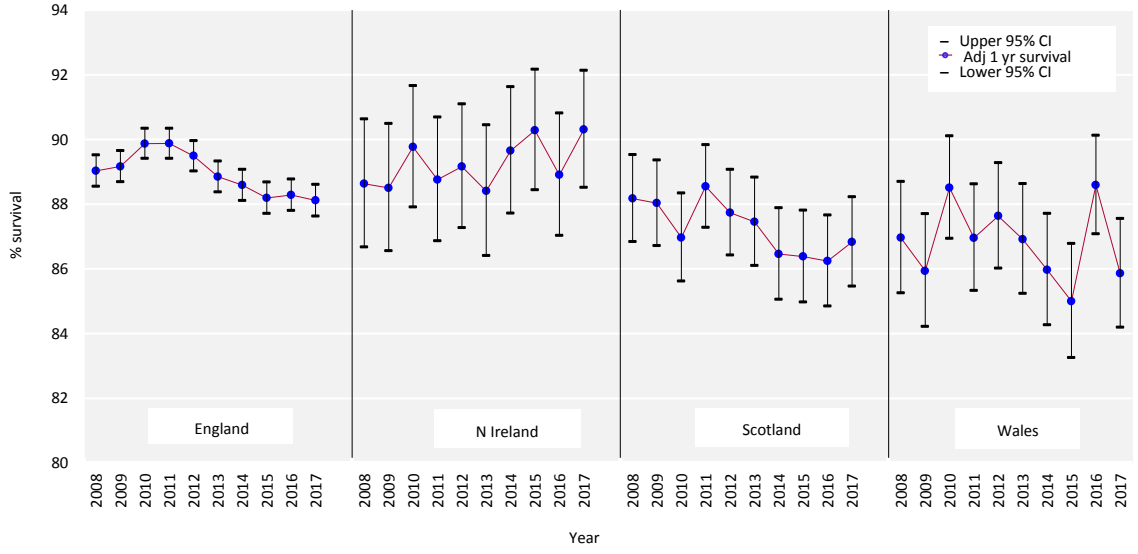

Figure 2.14 1 year survival (adjusted to age 60 years) for prevalent adult dialysis patients by country between 2008 and 2017

CI – confidence interval

The relative risk of death by age group for prevalent RRT patients compared to the general population's risk of death, calculated using Office for National Statistics UK population and deaths data, is shown in table 2.9.

Table 2.9 Death rate by age group for adult patients prevalent to RRT on 31/12/2017 followed-up for 1 year compared with the general population and with previous analyses in the 1998–2001 cohort

Age group (yrs)	UK population mid-2018 (thousands)	UK deaths in 2018	Death rate per 1,000 population	Expected number of deaths in UKRR population	UKRR deaths in 2018	UKRR death rate per 1,000 prevalent RRT patients	Relative risk of death in 2018	Relative risk of death 1998-2001 cohort
20-24	4,185	1,589	0.4	0	7	8	19.9	41.1
25-29	4,527	2,185	0.5	1	17	11	22.2	41.8
30-34	4,463	2,989	0.7	2	30	13	19.1	31.2
35-39	4,372	4,282	1.0	3	57	18	18.3	26.0
40-44	3,993	5,928	1.5	6	100	26	17.6	22.6
45-49	4,507	10,152	2.3	13	172	30	13.4	19.0
50-54	4,674	15,116	3.2	22	310	45	13.8	12.8
55-59	4,294	21,169	4.9	37	391	52	10.5	10.1
60-64	3,673	28,297	7.7	53	532	77	10.0	10.4
65-69	3,396	41,405	12.2	78	746	116	9.5	7.9
70-74	3,252	62,099	19.1	115	877	146	7.6	7.2
75-79	2,236	75,062	33.6	150	891	199	5.9	5.3
80-84	1,673	98,915	59.1	172	816	280	4.7	4.0
≥85	1,608	241,938	150.4	212	558	397	2.6	3.0
Total	**50,853**	**611,126**	**12.0**	**864**	**5,504**	**91**	**6.4**	**7.7**

Cause of death in adult RRT patients

Cause of death was analysed in prevalent patients receiving RRT on 31/12/2017 and followed-up for one year in 2018. The proportion of RRT patients with each cause of death is shown for patients with cause of death data and these total 100% of patients with data. The proportion of patients with no cause of death data is shown on a separate line.

Table 2.10 Cause of death in adult patients prevalent to RRT on 31/12/2017 followed-up in 2018 by age group

	RRT all ages		RRT <65 yrs		RRT ≥65 yrs	
Cause of death	N	%	N	%	N	%
Cardiac disease	786	20.7	284	25.3	502	18.8
Cerebrovascular disease	147	3.9	63	5.6	84	3.2
Infection	715	18.9	213	19.0	502	18.8
Malignancy	335	8.8	117	10.4	218	8.2
Treatment withdrawal	666	17.6	117	10.4	549	20.6
Other	769	20.3	228	20.3	541	20.3
Uncertain aetiology	371	9.8	99	8.8	272	10.2
Total (with data)	**3,789**	**100.0**	**1,121**	**100.0**	**2,668**	**100.0**
Missing	1,717	31.2	497	30.7	1,220	31.4

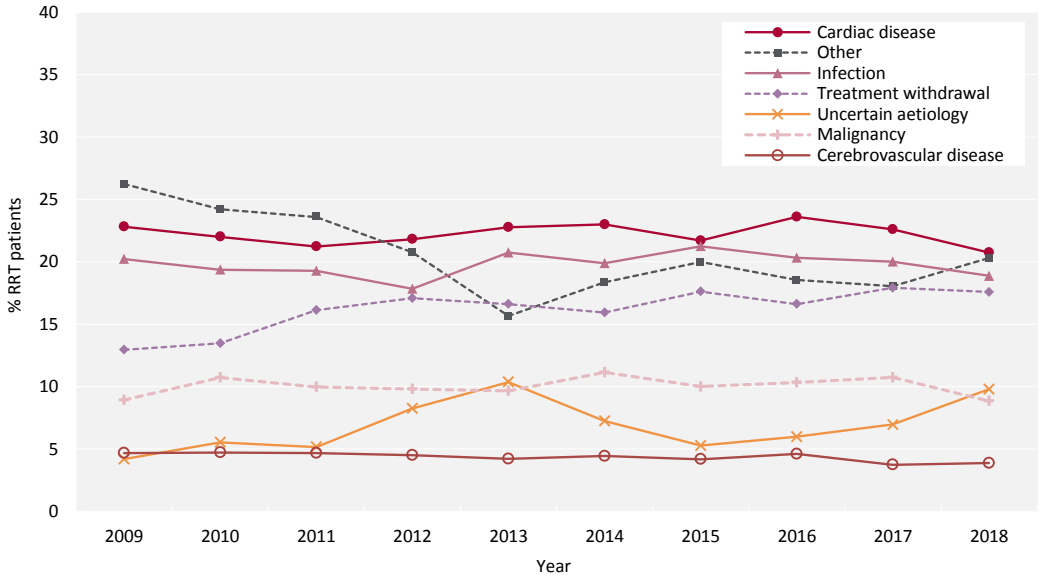

Figure 2.15 Cause of death between 2009 and 2018 for adult patients prevalent to RRT at the beginning of the year

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Chapter 3

Adults with a kidney transplant (Tx) in the UK at the end of 2018

Contents

Introduction

This chapter describes the population of patients with end-stage kidney disease (ESKD) who had a functioning kidney transplant (Tx) in the UK at the end of 2018 (figure 3.1). Patients can receive their first Tx either pre-emptively, i.e. without spending any time on dialysis, or while on dialysis. Donors in both pathways may be either a living kidney donor (LKD) or a deceased kidney donor – receiving a kidney from a donor after brain death (DBD) or a donor after circulatory death (DCD). If a Tx begins to fail a patient may be considered for a second (or subsequent) Tx, which again can come from a living or deceased donor.

Potential Tx recipients who pass rigorous assessments are wait-listed, which can occur before or after they have started dialysis. The majority of kidneys received through wait-listing are from deceased donors. The cohort of patients living with a kidney Tx in a centre not only reflects differences in underlying population case-mix, but also differences in the rates of acceptance onto renal replacement therapy (RRT).This includes wait-listing rates and live donor programmes, survival of the Tx graft and its recipient, as well as the care and survival of patients on dialysis therapies, as described in other chapters of this report.

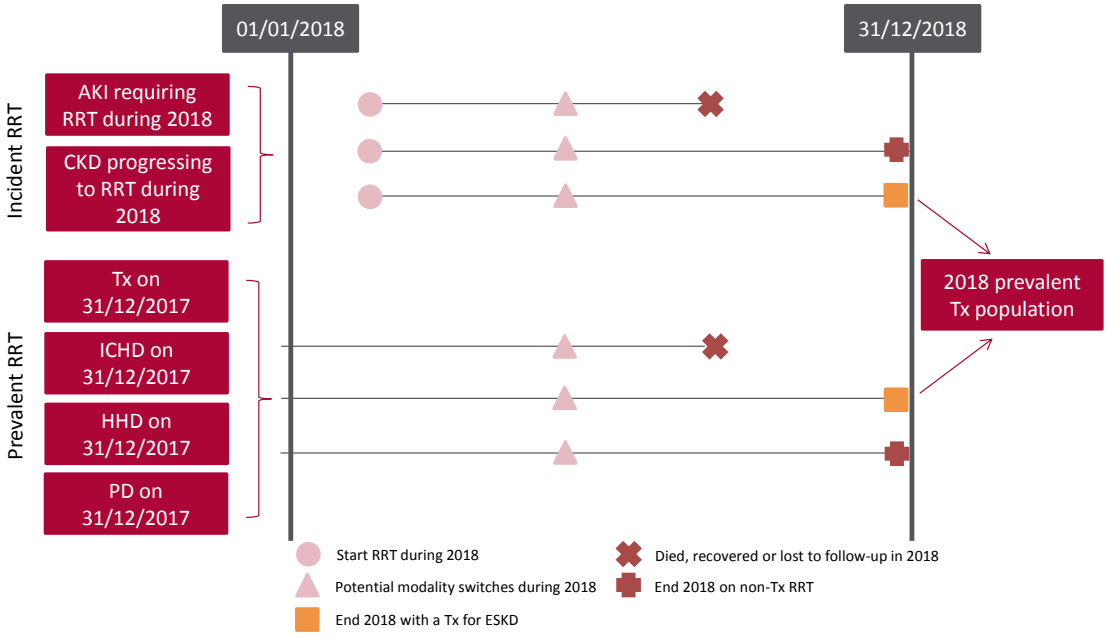

Figure 3.1 Pathways adult patients could follow to be included in the UK 2018 prevalent Tx population

Note that patients receiving dialysis for acute kidney injury (AKI) are only included in this chapter if they had a timeline or RRT modality code for chronic ICHD at the end of 2018 or if they had been on RRT for ≥90 days and were on ICHD at the end of 2018.
AKI – acute kidney injury; CKD – chronic kidney disease; HHD – home haemodialysis; ICHD – in-centre haemodialysis; PD – peritoneal dialysis

Patient survival, graft survival and cause of death analyses were undertaken on historic incident and prevalent cohorts to allow sufficient follow-up time.

The analyses were undertaken using UK Renal Registry (UKRR) data combined with NHS Blood and Transplant (NHSBT) data through a data sharing agreement.

This chapter addresses the following key aspects of the care of patients with a functioning kidney Tx for which there are Renal Association guidelines (table 3.1):

- **Complications associated with CKD and kidney transplantation:** these include anaemia, mineral bone disorders and dyslipidaemia
- **Blood pressure:** attainment of blood pressure targets are reported, although data completeness does not allow differentiation based on levels of proteinuria.

Rationale for analyses

The analyses begin with a brief summary of the number and type of kidney Tx undertaken in recent years in the UK as well as early graft and patient survival. More detailed results are available at organdonation.nhs.uk/statistics. The 2018 prevalent adult Tx population is described, including the number transplanted per million population (pmp).

The Renal Association guidelines (renal.org/health-professionals/guidelines/guidelines-commentaries) provide audit measures relevant to the care of patients with a Tx, and where data permit, their attainment by UK renal centres in 2018 is reported in this chapter (table 3.1). Audit measure in guidelines that have been archived are not included.

Some audit measures in current guidelines cannot be reported because the completeness of the required data items is too low. Further detail about the completeness of data returned to the UKRR is available through the UKRR data completeness portal (renal.org/audit-research/data-portal/completeness). Audit measures that cannot be reported because the required data items were not collected by the UKRR are omitted.

Table 3.1 The Renal Association audit measures relevant to Tx that are reported in this chapter

The Renal Association guideline	Audit criteria	Related analysis/analyses
Post-operative care in the kidney Tx recipient (2017)	Proportion of patients receiving a target blood pressure of 140/90 mmHg or 130/80 mmHg in the presence of proteinuria – protein:creatinine ratio >100 mg/mmol or albumin:creatinine ratio >70 mg/mmol	Table 3.8, figures 3.11, 3.12 (proteinuria was not adequately collected)
	Proportion of patients achieving dyslipidaemia targets	Table 3.8
	Incidence of hyperparathyroidism	Table 3.8
	Prevalence of anaemia	Table 3.8, figures 3.9, 3.10
Anaemia (2017)	Treatment guidelines for anaemia in kidney Tx patients should be similar to those for CKD patients not on dialysis	Table 3.8, figures 3.9, 3.10

In 2018, 23 of the 71 adult renal centres in the UK were Tx centres – 19 in England, two in Scotland and one in each of Northern Ireland and Wales.

For definitions and methods relating to this chapter see appendix A. Centres were excluded from caterpillar plots and cells were blanked in tables where data completeness for a biochemical variable was <70% and/or the number of patients reported was <10. The number preceding the centre name in each caterpillar plot indicates the percentage of missing data for that centre.

As Colchester renal centre did not have any Tx patients they were excluded from some of the analyses, although their dialysis patients were included in the relevant dialysis population denominators.

Cambridge renal centre (Addenbrooke's Hospital), a Tx centre, was unable to submit patient level data for 2017–2018. While data extraction issues have now been resolved, the UKRR and Cambridge are working to load and validate the backlog of data for these years, which should be completed for next year's report. Using aggregate numbers of patients on RRT by treatment modality, it was possible to report treatment rates for Cambridge, but no other quality assurance for the service provided.

Key findings

- 37,302 adult patients had a kidney Tx for ESKD in the UK on 31/12/2018, which represented 55.7% of the RRT population
- The median age of kidney Tx patients was 55.2 years and 60.8% were male
- There was a 5% increase in overall kidney Tx performed in 2018 compared to 2017, with an increase in kidney Tx from DBDs (8%), DCDs (5%) and from LKDs (2%)
- The median eGFR for kidney Tx patients 1 year after transplantation was 57.3 mL/min/1.73m^2 from LKD, 50.9 mL/min/1.73m^2 from DBD and 47.3 mL/min/1.73m^2 from DCD
- 15.9% of kidney Tx patients had eGFR <30 mL/min/1.73m^2
- The median decline in eGFR slope beyond the first year after transplantation was 0.8 mL/min/1.73m^2/year
- There was no cause of death data available for 33.5% of deaths on Tx. For those Tx patients with data, the leading cause of death was infection (23.6%), followed by malignancy (21.0%), which was previously the most common cause of death for these patients.

Analyses

Kidney Tx activity

NHSBT provided the UKRR with summary data on kidney Tx activity (table 3.2). More detailed results are available at organdonation.nhs.uk/statistics. The number of patients receiving a pre-emptive Tx is reported by centre in chapter 1.

Table 3.2 Number of kidney and kidney plus other organ Tx (adult and paediatric) in the UK, 2016–2018 calendar years

Organ	2016	2017	2018	% change 2017-2018
Kidney DBD[1]	1,234	1,362	1,466	8
Kidney DCD[2]	909	894	940	5
Kidney LKD	1,021	1,016	1,036	2
Kidney and liver	18	14	18	29
Kidney and heart[3]	1	0	0	-
Kidney and pancreas[4]	147	172	174	1
Kidney and pancreas islets[3]	0	4	7	75
Small bowel (inc kidney)	1	1	3	200
Total kidney Tx	**3,331**	**3,463**	**3,644**	**5**

[1]Includes en bloc kidney Tx (6 in 2016, 3 in 2017 and 6 in 2018) and double kidney Tx (15 in 2016, 14 in 2017 and 14 in 2018).
[2]Includes en bloc kidney Tx (8 in 2016, 7 in 2017 and 8 in 2018) and double kidney Tx (39 in 2016, 26 in 2017 and 15 in 2018).
[3]Includes DCD Tx (1 kidney and heart transplant in 2016, 1 kidney and pancreas islet transplant in 2017 and 3 kidney and pancreas islet transplants in 2018).
[4]Includes DCD Tx (44 in 2016, 48 in 2017 and 48 in 2018).
DBD – donor after brain death; DCD – donor after circulatory death; LKD – living kidney donor

Early kidney Tx outcomes

Kidney Tx recipient outcome data from NHSBT were reported against the Tx centre rather than the referring centre (table 3.3). Note that the survival rates were risk-adjusted and used financial year cohorts as per NHSBT methodology (see table footnote).

Table 3.3 Risk-adjusted first adult kidney-only Tx, graft and patient survival by Tx type and Tx centre[1] (cohorts detailed in footnote)

	Deceased donor				Living donor			
	Adj 1 yr survival (%)		Adj 5 yr survival (%)		Adj 1 yr survival (%)		Adj 5 yr survival (%)	
Centre	Graft	Patient	Graft	Patient	Graft	Patient	Graft	Patient
B QEH	92	97	83	91	97	98	94	94
Belfast	92	98	87	85	97	99	95	95
Bristol	95	95	87	84	98	100	95	96
Camb	97	98	90	88	99	99	95	95
Cardff	95	95	90	85	95	96	90	95
Covnt	95	96	76	80	100	100	92	97
Edin	96	99	84	87	100	100	91	97
Glasgw	93	96	91	87	96	100	93	88
L Barts	90	97	82	81	97	100	90	93
L Guy's	94	97	89	92	96	99	94	94
L Rfree	94	98	85	90	99	100	95	96

Table 3.3 Continued

	Deceased donor				Living donor			
	Adj 1 yr survival (%)		Adj 5 yr survival (%)		Adj 1 yr survival (%)		Adj 5 yr survival (%)	
Centre	Graft	Patient	Graft	Patient	Graft	Patient	Graft	Patient
L St.G	93	96	89	95	98	99	93	96
L West	95	97	83	89	96	97	90	93
Leeds	93	97	86	88	97	99	90	96
Leic	95	97	86	92	98	99	90	91
Liv Roy	95	97	89	82	97	99	89	96
M RI	96	96	89	88	97	99	96	94
Newc	94	94	81	81	99	100	93	95
Nottm	97	99	87	87	96	97	92	93
Oxford	96	98	88	88	98	99	93	94
Plymth	93	94	82	92	99	100	87	95
Ports	93	97	83	84	100	99	96	93
Sheff	94	98	89	85	99	98	95	100
UK total	**94**	**97**	**86**	**87**	**98**	**99**	**93**	**94**

Cohorts for survival rate estimation: 1 year survival: 1/4/2013–31/03/2017; 5 year survival: 1/4/2009–31/3/2013; first grafts only – re-grafts excluded for patient survival estimation. Since the cohorts to estimate 1 and 5 year survival are different, some centres may appear to have 5 year survival better than 1 year survival.
[1]Information courtesy of NHSBT: number of Tx, patients and 95% confidence intervals (CI) for each estimate; statistical methodology for computing risk-adjusted estimates can be obtained from NHSBT (nhsbtdbe.blob.core.windows.net/umbraco-assets-corp/4607/kidney-annual-report-2016-17.pdf).

Kidney graft function at one year post-Tx was assessed using median eGFR by donor type and by centre using a seven year cohort (patients with graft failure including death with a functioning graft were excluded). The data completeness at one year after Tx (for Tx occurring 2011–2017) was 97.0%.

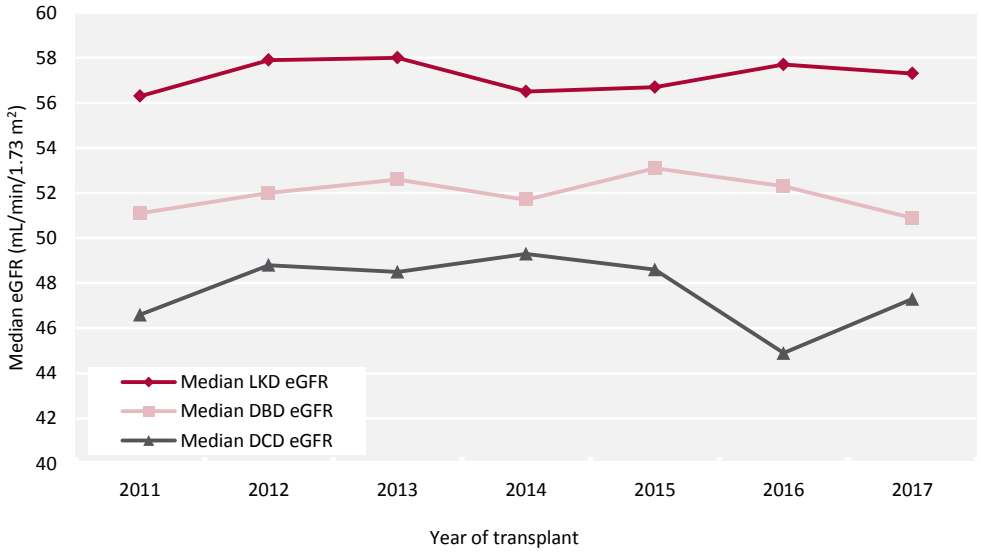

Figure 3.2 Median estimated glomerular filtration rate (eGFR) for kidney Tx at 1 year by donor type and year of transplantation between 2011 and 2017
DBD – donor after brain death; DCD – donor after circulatory death; LKD – living kidney donor

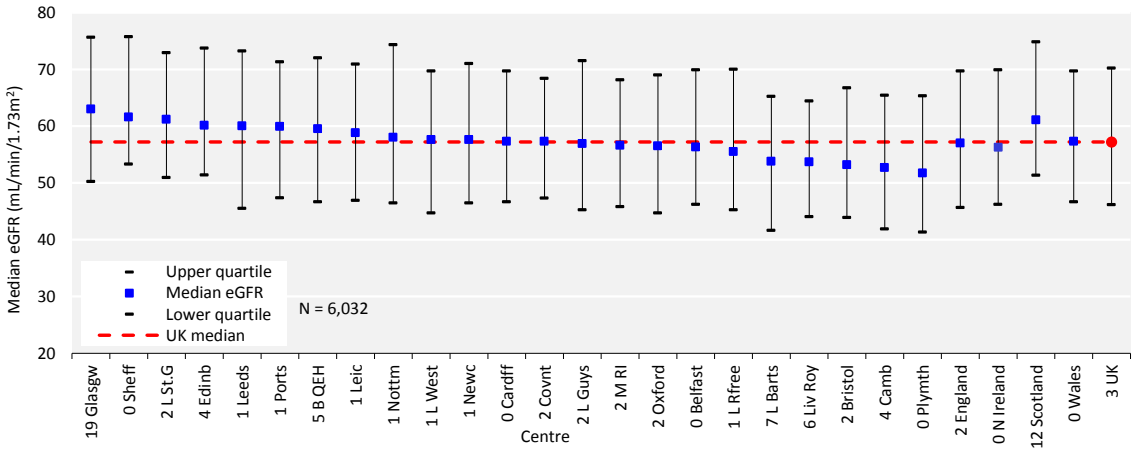

Figure 3.3 Median estimated glomerular filtration rate (eGFR) at 1 year post-living kidney donor (LKD) Tx by transplanting centre and year of transplantation between 2011 and 2017

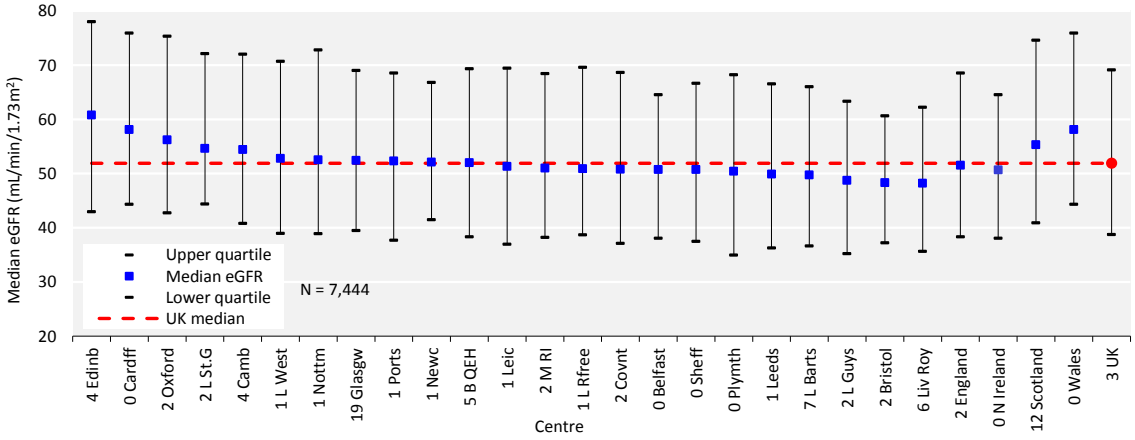

Figure 3.4 Median estimated glomerular filtration rate (eGFR) at 1 year post-donor after brain death (DBD) Tx by transplanting centre and by year of transplantation between 2011 and 2017

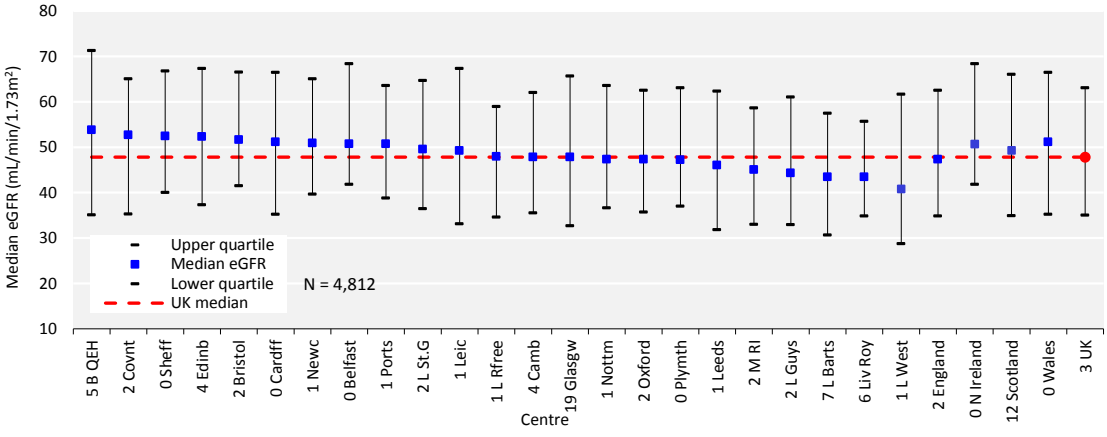

Figure 3.5 Median estimated glomerular filtration rate (eGFR) at 1 year post-donor after circulatory death (DCD) Tx by transplanting centre and by year of transplantation between 2011 and 2017

Changes to the prevalent adult kidney Tx population

Tx recipients are under the care of a Tx centre around the time of transplantation, but the policy of when to repatriate to the referring centre varies. When data entries for patients were received from more than one centre they were attributed to the referring centre.

Table 3.4 Percentage completeness of estimated glomerular filtration rate (eGFR), blood pressure, haemoglobin, total cholesterol, adjusted calcium, phosphate and parathyroid hormone (PTH) by centre for adult patients prevalent to Tx on 31/12/2018

		Data completeness (%)						
Centre	N with Tx	eGFR	Blood pressure	Haemoglobin	Total cholesterol	Adjusted calcium	Phosphate	PTH
TX CENTRES								
B QEH	1,363	94.4	94.2	94.1	86.9	94.5	93.7	0.0
Belfast	647	99.2	90.9	98.8	99.5	98.9	98.5	33.5
Bristol	907	99.6	79.7	99.3	93.7	98.7	98.4	97.8
Camb								
Cardff	1,041	98.9	94.9	98.8	94.0	98.6	98.6	26.5
Covnt	568	95.1	76.8	94.9	72.4	94.9	56.7	39.3
Edinb	499	74.4		97.0		87.6	86.2	
Glasgw	1,122	99.0		98.7		98.0	98.0	
L Barts	1,215	67.7	0.0	99.0	98.9	99.0	99.0	97.9
L Guys	1,404	98.8	0.0	98.7	46.2	96.2	96.2	37.2
L Rfree	1,342	97.4	85.4	97.1	63.2	93.5	93.6	62.4
L St.G	475	95.6	88.2	95.6	68.8	95.4	95.6	29.9
L West	1,932	96.6	0.0	96.5	56.4	96.1	96.6	43.0
Leeds	1,015	99.1	96.3	98.7	97.1	96.5	92.2	31.9
Leic	1,344	95.9	17.7	95.8	93.8	94.9	94.5	44.2
Liv Roy	787	95.6	1.0	95.2	53.9	94.3	94.8	72.8
M RI	1,356	95.5	3.1	95.4	64.8	95.4	95.4	61.2
Newc	709	99.2	96.6	99.2	77.2	98.9	98.9	77.7
Nottm	712	99.0	97.2	98.5	70.7	98.2	97.6	91.6
Oxford	1,345	98.4	5.1	98.1	50.3	98.1	97.9	39.7
Plymth	349	98.3	92.8	98.3	61.3	98.0	98.0	49.6
Ports	1,051	93.9	36.8	93.3	59.1	93.2	89.6	35.7
Sheff	795	99.3	96.1	99.3	58.4	99.0	99.0	4.5
DIALYSIS CENTRES								
Abrdn	316	98.1		98.1		94.3	94.3	
Airdrie	267	89.1		95.5		95.9	95.1	
Antrim	129	99.2	76.0	99.2	96.9	99.2	99.2	95.4
B Heart	176	94.9	0.0	94.9	72.2	93.8	93.2	34.1
Bangor	97	97.9	73.2	97.9	100.0	97.9	97.9	21.7
Basldn	101	98.0	63.4	97.0	61.4	98.0	91.1	23.8
Bradfd	377	97.9	54.1	97.4	81.4	85.4	79.3	48.8
Brightn	499	97.6	30.3	97.0	77.6	95.6	95.8	50.9
Carlis	158	89.2	0.0	88.0	64.6	87.3	84.2	30.4
Carsh	751	82.6	4.5	82.4	43.0	81.0	80.7	23.7
Chelms	120	86.7	89.2	85.0	82.5	86.7	73.3	30.8
Clwyd	95	96.8	32.6	96.8	99.0	96.8	96.8	81.1
D&Gall	82	93.9		93.9		92.7	90.2	
Derby	253	96.8	94.5	96.4	92.1	96.1	95.7	93.3
Donc	119	100.0	98.3	99.2	84.0	99.2	99.2	23.5
Dorset	404	87.9	45.8	86.9	65.6	86.4	67.3	38.6
Dudley	103	97.1	12.6	97.1	85.4	97.1	97.1	1.0

Table 3.4 Continued

Centre	N with Tx	Data completeness (%)						
		eGFR	Blood pressure	Haemoglobin	Total cholesterol	Adjusted calcium	Phosphate	PTH
Dundee	245	99.2		98.4		98.4	97.6	
Exeter	521	99.6	91.2	99.6	91.9	98.9	97.9	62.6
Glouc	230	97.4	78.7	97.0	50.9	95.2	90.0	17.4
Hull	462	99.1	2.2	96.8	34.4	95.0	94.6	23.8
Inverns	165	89.7		92.7		90.3	90.9	
Ipswi	225	99.6	93.8	99.6	74.7	99.1	99.1	62.2
Kent	614	96.4	95.9	95.9	67.4	95.1	95.0	15.8
Klmarnk	161	97.5		98.1		96.3	96.3	
Krkcldy	152	84.2		98.0		97.4	97.4	
L Kings	445	97.1	0.0	96.9	73.3	96.9	96.9	69.2
Liv Ain	17	94.1	0.0	88.2	58.8	94.1	94.1	70.6
Middlbr	539	93.3	17.3	91.8	38.4	92.0	90.7	10.0
Newry	147	99.3	87.8	98.6	100.0	98.0	98.0	98.6
Norwch	428	99.1	4.4	98.6	98.4	97.7	97.4	29.2
Prestn	697	97.9	0.0	97.6	65.1	95.3	93.3	37.7
Redng	447	99.8	96.4	99.8	66.7	99.3	82.3	48.3
Salford	609	99.0	59.3	99.0	81.1	98.9	99.0	0.2
Shrew	136	86.8	11.0	86.8	80.9	84.6	83.8	17.7
Stevng	385	97.4	0.0	99.2	38.4	94.6	93.0	66.8
Sthend	96	100.0	2.1	100.0	65.6	97.9	92.7	26.0
Stoke	407	99.3	0.3	99.5	99.8	99.0	99.0	78.6
Sund	270	97.8	0.4	97.4	26.7	97.0	97.8	96.3
Swanse	333	99.7	96.7	99.4	66.4	99.1	99.1	64.6
Truro	242	99.2	0.0	99.6	92.2	98.4	98.4	90.5
Ulster	71	98.6	95.8	95.8	98.6	94.4	95.8	9.9
West NI	194	97.4	91.2	92.8	99.0	96.9	96.9	94.3
Wirral	158	93.0	0.6	90.5	42.4	90.5	90.5	47.5
Wolve	197	91.9	63.5	87.8	62.9	85.8	28.9	28.4
Wrexm	168	98.8	88.1	98.8	99.4	98.2	98.2	99.4
York	334	97.9	77.5	97.6	71.3	95.5	95.2	26.1
TOTALS								
England	**29,189**	**95.4**	**41.4**	**96.4**	**69.3**	**95.4**	**93.1**	**46.2**
N Ireland	**1,188**	**98.9**	**89.2**	**97.6**	**99.2**	**98.2**	**98.1**	**56.8**
Scotland	**3,009**	**92.5**		**97.5**		**95.1**	**94.6**	
Wales	**1,734**	**98.9**	**90.0**	**98.7**	**89.8**	**98.5**	**98.5**	**43.6**
UK	**35,120**	**95.4**	**41.9**	**96.6**	**65.4**	**95.6**	**93.6**	**42.0**

Blank cells – no data returned by the centre.
Patients who had been on Tx for <3 months were excluded from this analysis, including N with Tx.
Scottish centres were excluded from blood pressure, cholesterol and PTH analyses because data were not provided by the Scottish Renal Registry. UK completeness excludes Scotland for these analyses.
Patients with missing ethnicity were classed as White for the eGFR calculation.

For the 71 adult renal centres, the number of prevalent patients with a Tx was calculated as both a proportion of the prevalent patients on RRT and as a proportion of the estimated centre catchment population (calculated as detailed in appendix A).

Table 3.5 Number of prevalent adult Tx patients and proportion of adult RRT patients with a Tx by year and by centre; number of Tx patients as a proportion of the catchment population

Centre	N with Tx					% with Tx					Estimated catchment population (millions)	2018 crude rate (pmp)
	2014	2015	2016	2017	2018	2014	2015	2016	2017	2018		
TX CENTRES												
B QEH	1,038	1,100	1,235	1,340	1,399	48.7	48.9	51.7	53.3	54.5	1.41	993.4
Belfast	525	562	594	633	671	70.5	73.1	73.2	75.6	76.5	0.51	1321.8
Bristol	862	895	907	906	923	59.1	60.6	61.8	61.6	62.8	1.19	773.7
Camb	850	922	956	1,043	1,056	68.9	70.6	72.0	73.5	74.5	0.96	1100.3
Cardff	1,021	1,036	1,035	1,044	1,072	64.1	64.2	63.6	62.0	62.3	1.21	888.7
Covnt	499	518	529	567	581	52.0	54.0	54.3	58.8	55.8	0.74	785.8
Edinb	458	458	453	483	523	61.3	59.6	58.3	58.6	60.7	0.80	652.0
Glasgw	1,002	1,050	1,106	1,137	1,154	62.4	61.4	63.1	64.1	63.7	1.35	854.1
L Barts	1,026	1,067	1,138	1,195	1,269	46.5	46.8	48.0	48.0	48.6	1.52	836.6
L Guys	1,232	1,302	1,366	1,412	1,453	64.3	64.7	65.1	65.4	65.3	0.90	1619.6
L Rfree	1,152	1,224	1,287	1,344	1,373	57.4	58.5	59.2	61.3	61.5	1.26	1091.1
L St.G	433	456	459	481	497	54.7	54.1	54.1	57.4	59.4	0.66	751.6
L West	1,737	1,784	1,824	1,897	1,983	54.0	54.2	53.8	54.6	55.6	1.99	997.4
Leeds	918	954	977	997	1,054	61.1	62.6	63.0	61.6	62.5	1.38	761.3
Leic	1,115	1,153	1,246	1,302	1,377	52.1	53.0	54.2	54.9	55.8	2.02	682.0
Liv Roy	827	788	779	791	821	65.8	63.7	64.2	63.2	64.3	0.83	990.6
M RI	1,200	1,293	1,382	1,400	1,424	67.0	68.8	70.1	68.5	68.7	1.27	1122.0
Newc	638	647	678	709	733	65.3	64.1	64.6	63.6	63.5	0.93	788.8
Nottm	611	644	678	718	740	57.6	57.9	58.8	61.1	61.9	0.90	820.8
Oxford	1,105	1,164	1,223	1,340	1,402	67.0	68.9	69.3	71.5	72.3	1.40	1000.6
Plymth	326	332	328	339	361	65.1	66.0	63.9	62.8	67.0	0.39	927.2
Ports	895	928	978	1,051	1,073	56.2	55.6	57.9	60.1	60.8	1.68	639.7
Sheff	715	728	752	784	820	52.6	52.6	52.9	54.5	55.4	1.14	721.3
DIALYSIS CENTRES												
Abrdn	271	287	303	311	329	54.1	54.1	54.6	55.2	57.4	0.50	659.2
Airdrie	205	214	230	257	274	51.9	50.4	52.4	55.0	56.3	0.46	596.6
Antrim	95	99	112	120	131	41.1	41.1	44.4	47.1	47.8	0.23	557.6
B Heart	186	182	169	170	182	29.3	27.9	25.9	26.0	26.8	0.61	297.5
Bangor	7	83	89	94	99	6.5	45.6	49.7	48.2	49.0	0.19	534.2
Basldn	78	75	80	99	105	28.1	27.4	29.2	32.9	33.4	0.34	305.2
Bradfd	304	329	360	375	391	55.5	56.4	56.6	55.7	57.0	0.54	723.6
Brightn	421	451	472	487	511	46.0	47.5	47.6	48.2	48.4	1.07	475.4
Carlis	149	162	149	156	161	59.6	57.7	53.0	55.3	55.0	0.27	605.5
Carsh	633	643	680	721	763	40.8	40.7	41.4	42.8	44.0	1.59	481.3
Chelms	100	112	107	117	123	38.2	39.7	39.5	42.2	45.6	0.42	290.7
Clwyd	67	81	89	94	98	39.4	43.8	50.3	52.2	51.6	0.16	608.3
D&Gall	67	65	71	76	83	51.5	50.0	54.2	56.3	57.2	0.12	672.2
Derby	194	213	223	234	258	37.7	39.6	41.1	42.1	43.8	0.58	443.1
Donc	74	97	110	117	120	26.1	32.1	33.2	35.1	36.1	0.34	353.1
Dorset	336	347	368	394	423	50.5	51.0	53.6	53.7	55.3	0.71	592.3
Dudley	75	84	94	95	108	24.6	26.7	27.2	25.8	29.9	0.37	295.0
Dundee	210	216	219	232	256	52.4	51.6	52.4	53.3	57.5	0.39	664.2
Exeter	436	446	477	513	540	46.1	46.1	47.1	48.5	49.6	0.90	598.2
Glouc	172	178	186	214	236	40.2	40.1	39.4	42.2	46.3	0.49	484.9
Hull	395	423	454	460	480	49.3	49.4	53.2	52.7	54.4	0.85	567.5
Inverns	141	147	155	165	169	62.7	58.1	59.9	62.7	60.6	0.22	752.2
Ipswi	210	221	229	233	232	57.2	55.1	55.5	53.8	54.2	0.33	701.6
Kent	539	554	584	594	634	53.2	53.3	54.4	54.5	56.9	1.01	624.8
Klmarnk	128	137	143	159	166	42.8	44.2	45.1	47.2	48.5	0.30	552.1

Table 3.5 Continued

Centre	N with Tx					% with Tx					Estimated catchment population (millions)	2018 crude rate (pmp)
	2014	2015	2016	2017	2018	2014	2015	2016	2017	2018		
Krkcldy	119	125	132	149	154	43.0	42.4	44.9	49.2	51.3	0.26	584.5
L Kings	391	428	434	459	482	38.2	39.5	39.1	40.0	40.6	0.97	496.4
Liv Ain	15	15	14	14	19	6.9	6.8	6.2	6.7	8.7	0.40	47.4
Middlbr	507	524	532	536	540	59.3	58.2	59.8	59.2	58.4	0.83	648.9
Newry	99	115	126	138	150	47.8	51.1	53.4	57.3	60.2	0.21	720.4
Norwch	327	347	391	417	441	47.7	48.1	50.8	53.7	56.1	0.65	676.4
Prestn	551	588	601	670	720	47.1	48.4	49.9	52.8	54.5	1.24	581.7
Redng	397	409	431	447	468	52.2	52.8	54.6	56.2	57.8	0.75	620.5
Salford	465	478	510	569	624	47.9	49.1	50.1	51.1	53.2	1.24	505.2
Shrew	124	136	133	137	139	35.5	36.9	35.3	35.7	32.8	0.41	335.0
Stevng	269	295	338	373	394	34.4	36.3	38.2	41.9	41.2	1.00	394.9
Sthend	102	103	92	97	101	42.9	41.9	39.0	38.2	38.9	0.26	384.7
Stoke	356	380	402	408	420	45.9	48.2	48.7	50.4	52.0	0.74	569.6
Sund	223	220	239	262	275	49.6	47.9	47.1	48.3	49.4	0.51	536.5
Swanse	318	329	328	335	346	45.1	43.0	42.4	42.1	42.0	0.75	460.0
Truro	211	231	239	242	249	55.5	55.9	56.1	57.1	57.0	0.34	727.2
Ulster	46	55	58	66	74	30.9	32.5	34.9	36.3	39.0	0.21	349.0
West NI	143	158	169	188	201	52.2	53.9	55.1	60.1	62.0	0.28	716.7
Wirral	51	74	117	155	165	18.4	26.3	34.7	40.3	41.8	0.47	348.1
Wolve	183	185	186	194	199	31.8	31.8	32.6	33.3	33.1	0.55	359.0
Wrexm	140	144	155	170	172	49.5	49.2	50.0	52.8	54.6	0.20	842.8
York	290	301	304	324	338	62.8	61.4	56.8	58.4	59.5	0.41	828.5
TOTALS												
England	**25,943**	**27,130**	**28,427**	**29,899**	**31,180**	**52.3**	**52.9**	**53.7**	**54.2**	**55.1**	**44.02**	**708.3**
N Ireland	**908**	**989**	**1,059**	**1,145**	**1,227**	**56.5**	**58.3**	**59.7**	**62.6**	**64.1**	**1.44**	**850.2**
Scotland	**2,601**	**2,699**	**2,812**	**2,969**	**3,108**	**56.8**	**55.7**	**56.9**	**58.2**	**59.3**	**4.41**	**704.9**
Wales	**1,553**	**1,673**	**1,696**	**1,737**	**1,787**	**54.3**	**55.1**	**55.3**	**54.7**	**55.0**	**2.51**	**712.3**
UK	**31,005**	**32,491**	**33,994**	**35,750**	**37,302**	**52.9**	**53.4**	**54.2**	**54.7**	**55.7**	**52.38**	**712.1**

Country Tx populations were calculated by summing the Tx patients from centres in each country. Estimated country populations were derived from Office for National Statistics figures. See appendix A for details on estimated catchment population by renal centre.
Rates appear higher than in previous reports because general population estimates now include only those aged ≥18 years (see appendix B).
Cambridge submitted only aggregate data for 2017 and 2018 and are included in this table, but not elsewhere in the chapter.
pmp – per million population

Demographics of prevalent adult kidney Tx patients

The proportion of Tx patients from each ethnic group is shown for patients with ethnicity data – the proportion of centre patients with no ethnicity data is shown separately.

Table 3.6 Demographics of adult patients prevalent to Tx on 31/12/2018 by centre

Centre	N on RRT	N with Tx	% with Tx	Median age (yrs)	% male	Ethnicity				
						% White	% South Asian	% Black	% Other	% missing
TX CENTRES										
B QEH	2,569	1,399	54.5	53.0	58.5	64.3	25.7	7.1	3.0	0.8
Belfast	877	671	76.5	55.0	58.9	97.4	1.4	0.6	0.6	3.6
Bristol	1,469	923	62.8	55.6	60.8	90.1	3.8	4.0	2.1	0.1
Camb										
Cardff	1,721	1,072	62.3	55.0	64.0	93.2	4.2	0.2	2.4	0.2
Covnt	1,042	581	55.8	54.0	63.5	81.1	14.5	3.6	0.9	0.0
Edinb	862	523	60.7	55.4	62.1					72.1
Glasgw	1,812	1,154	63.7	55.3	60.9					75.1
L Barts	2,610	1,269	48.6	52.8	61.0	40.4	30.3	17.5	11.8	0.0
L Guys	2,225	1,453	65.3	52.4	59.4	67.7	8.7	17.7	5.8	0.8
L Rfree	2,234	1,373	61.5	54.1	58.9	49.0	20.7	19.7	10.6	2.0
L St.G	837	497	59.4	56.1	57.8	53.9	21.7	17.3	7.1	3.6
L West	3,566	1,983	55.6	56.8	62.3	44.6	31.0	14.2	10.2	0.0
Leeds	1,687	1,054	62.5	54.6	60.6	80.3	14.1	3.4	2.2	0.2
Leic	2,468	1,377	55.8	55.8	57.8	74.5	20.0	3.9	1.7	1.9
Liv Roy	1,277	821	64.3	55.0	61.5	93.2	1.7	1.8	3.3	0.2
M RI	2,073	1,424	68.7	54.3	60.5	76.9	14.7	5.3	3.1	0.8
Newc	1,155	733	63.5	56.0	59.6	94.3	3.7	0.6	1.5	0.0
Nottm	1,196	740	61.9	54.0	60.3	84.7	8.0	4.6	2.7	0.1
Oxford	1,940	1,402	72.3	54.9	63.2	81.9	10.1	3.7	4.4	7.1
Plymth	539	361	67.0	58.0	66.5	96.4	0.6	0.3	2.8	0.3
Ports	1,764	1,073	60.8	56.1	59.7	93.6	4.0	0.8	1.7	1.3
Sheff	1,481	820	55.4	54.4	62.8	90.3	5.4	1.7	2.6	0.7
DIALYSIS CENTRES										
Abrdn	573	329	57.4	50.8	57.1					49.9
Airdrie	487	274	56.3	54.3	60.6					33.9
Antrim	274	131	47.8	54.8	61.8	100.0	0.0	0.0	0.0	0.0
B Heart	679	182	26.8	54.2	64.3	65.2	24.3	7.7	2.8	0.6
Bangor	202	99	49.0	55.8	62.6	98.0	0.0	1.0	1.0	0.0
Basldn	314	105	33.4	52.6	68.6	85.7	4.8	4.8	4.8	0.0
Bradfd	686	391	57.0	52.5	60.1	55.1	41.5	2.1	1.3	0.3
Brightn	1,055	511	48.4	55.5	61.5	91.0	5.3	2.0	1.8	0.0
Carlis	293	161	54.9	56.3	66.5	97.5	2.5	0.0	0.0	0.0
Carsh	1,736	763	44.0	56.3	63.2	72.4	13.9	8.1	5.7	0.8
Chelms	270	123	45.6	57.4	68.3	86.9	1.6	4.9	6.6	0.8
Colchr	121	0								
Clwyd	190	98	51.6	56.0	61.2	96.9	2.1	0.0	1.0	1.0
D&Gall	145	83	57.2	55.8	60.2					72.3
Derby	589	258	43.8	56.2	61.2	81.0	12.0	2.7	4.3	0.0
Donc	332	120	36.1	56.5	72.5	95.8	2.5	0.0	1.7	0.0
Dorset	765	423	55.3	59.4	57.2	98.1	0.5	0.0	1.4	0.2
Dudley	361	108	29.9	57.3	67.6	82.4	13.0	2.8	1.9	0.0
Dundee	445	256	57.5	55.2	60.2					53.1
Exeter	1,088	540	49.6	56.0	58.0	98.2	0.2	0.6	1.1	0.0

Table 3.6 Continued

Centre	N on RRT	N with Tx	% with Tx	Median age (yrs)	% male	Ethnicity				
						% White	% South Asian	% Black	% Other	% missing
Glouc	510	236	46.3	56.4	61.4	94.5	3.4	0.9	1.3	0.0
Hull	883	480	54.4	54.6	63.8	96.9	1.5	0.4	1.3	0.8
Inverns	279	169	60.6	54.0	55.0	95.9	0.8	3.3	0.0	28.4
Ipswi	428	232	54.2	57.6	66.8	85.3	2.6	1.7	10.4	0.4
Kent	1,114	634	56.9	56.5	58.4	92.9	4.1	0.8	2.2	0.0
Klmarnk	342	166	48.5	56.0	59.6					39.8
Krkcldy	300	154	51.3	56.3	59.1					69.5
L Kings	1,186	482	40.6	56.8	63.7	50.1	12.9	30.4	6.7	0.2
Liv Ain	218	19	8.7	47.9	57.9	100.0	0.0	0.0	0.0	0.0
Middlbr	925	540	58.4	56.4	63.5	95.0	3.7	0.2	1.1	0.0
Newry	249	150	60.2	55.8	54.7	98.0	0.0	1.3	0.7	0.0
Norwch	786	441	56.1	57.0	60.1	96.6	1.4	0.9	1.1	0.0
Prestn	1,322	720	54.5	55.3	61.1	87.4	11.5	0.6	0.6	0.0
Redng	810	468	57.8	57.5	63.3	67.1	25.3	5.2	2.5	4.5
Salford	1,173	624	53.2	55.0	56.9	84.9	12.0	1.8	1.3	0.2
Shrew	424	139	32.8	54.9	59.0	94.2	2.9	1.4	1.4	0.0
Stevng	957	394	41.2	54.8	61.7	71.7	17.7	7.2	3.3	1.3
Sthend	260	101	38.8	55.4	56.4	83.2	3.0	3.0	10.9	0.0
Stoke	808	420	52.0	54.3	60.7	91.6	5.3	1.2	1.9	1.0
Sund	557	275	49.4	55.8	60.0	96.4	2.9	0.7	0.0	0.0
Swanse	824	346	42.0	57.3	61.3	98.0	1.7	0.0	0.3	0.6
Truro	437	249	57.0	56.3	57.4	97.6	0.4	0.0	2.0	0.0
Ulster	190	74	38.9	55.4	58.1	97.3	1.4	1.4	0.0	0.0
West NI	324	201	62.0	52.7	60.7	98.0	1.0	0.5	0.5	0.0
Wirral	395	165	41.8	57.0	62.4	96.4	1.8	0.6	1.2	0.0
Wolve	602	199	33.1	53.0	55.8	72.6	19.3	7.1	1.0	1.0
Wrexm	315	172	54.6	52.3	66.9	95.9	1.2	0.0	2.9	0.0
York	568	338	59.5	56.1	58.6	97.3	1.2	0.3	1.2	3.0
TOTALS										
England	**54,784**	**30,124**	**55.0**	**55.2**	**60.8**	**76.5**	**13.0**	**6.5**	**4.0**	**1.0**
N Ireland	**1,914**	**1,227**	**64.1**	**54.8**	**58.9**	**97.8**	**1.0**	**0.7**	**0.5**	**2.0**
Scotland	**5,245**	**3,108**	**59.3**	**54.8**	**60.1**					**61.7**
Wales	**3,252**	**1,787**	**55.0**	**55.5**	**63.5**	**94.8**	**3.1**	**0.2**	**1.9**	**0.3**
UK	**65,195**	**36,246**	**55.6**	**55.2**	**60.8**	**78.4**	**11.9**	**6.0**	**3.7**	**6.2**

Blank cells – no data returned by the centre or data completeness <70%.
Breakdown by ethnicity is not shown for centres with <70% data completeness, but these centres were included in national averages.

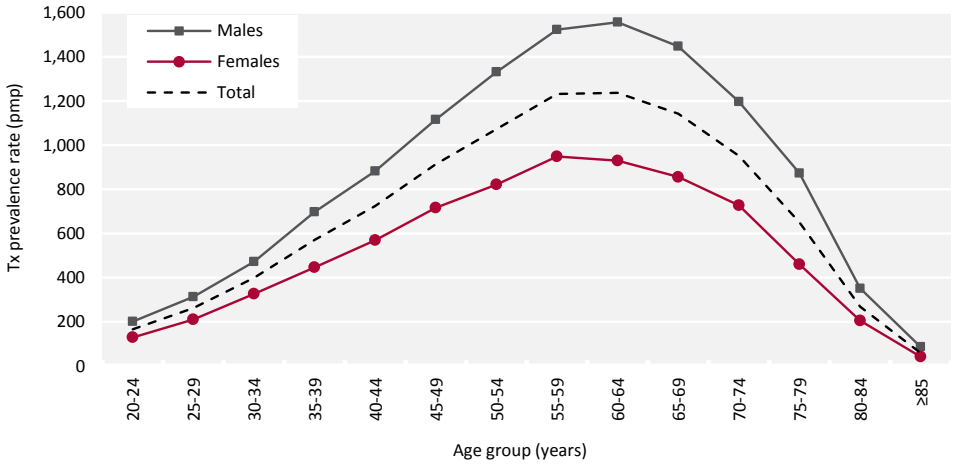

Figure 3.6 Adult Tx prevalence rate on 31/12/2018 by age group and sex
pmp – per million population

The distribution of primary renal diseases (PRDs) as a cause of ESKD in the incident Tx population is compared to the prevalent Tx population (table 3.7). Comparison to dialysis populations is shown in chapter 2. PRDs were grouped into categories, with the mapping of disease codes into groups explained in more detail in appendix A. The proportion of Tx patients with each PRD is shown for patients with PRD data and these total 100% of patients with data. The proportion of patients with no PRD data is shown on a separate line.

Table 3.7 Primary renal diseases (PRDs) of adult patients incident to Tx in 2018 and adult patients prevalent to Tx on 31/12/2018

	Incident Tx		Prevalent Tx	
PRD	N	%	N	%
Diabetes	556	18.0	4,123	11.6
Glomerulonephritis	663	21.4	8,278	23.2
Hypertension	197	6.4	1,918	5.4
Polycystic kidney disease	377	12.2	4,929	13.8
Pyelonephritis	254	8.2	4,227	11.9
Renal vascular disease	52	1.7	416	1.2
Other	585	18.9	6,579	18.5
Uncertain aetiology	411	13.3	5,169	14.5
Total (with data)	**3,095**	**100.0**	**35,639**	**100.0**
Missing	173	5.3	606	1.7

Graft function and anaemia in prevalent adult kidney Tx patients

Accepting the limitations of interpreting eGFR in the post-Tx population, analyses by centres were divided into the proportion of patients with eGFR greater or less than 30 mL/min/1.73m^2 and the proportion of patients achieving an adequate haemoglobin level (defined as a haemoglobin ≥100 g/L).

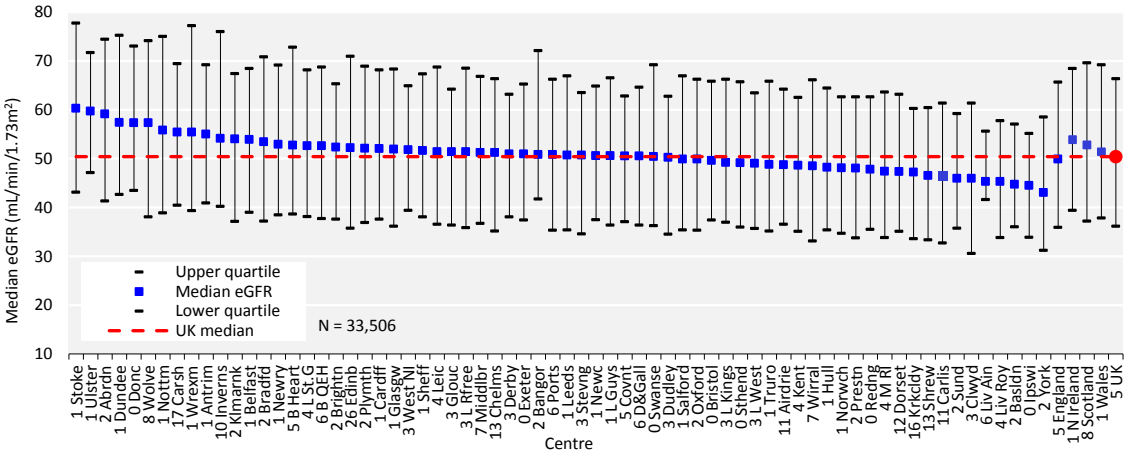

Figure 3.7 Median estimated glomerular filtration rate (eGFR) in adult patients prevalent to Tx on 31/12/2018 by centre

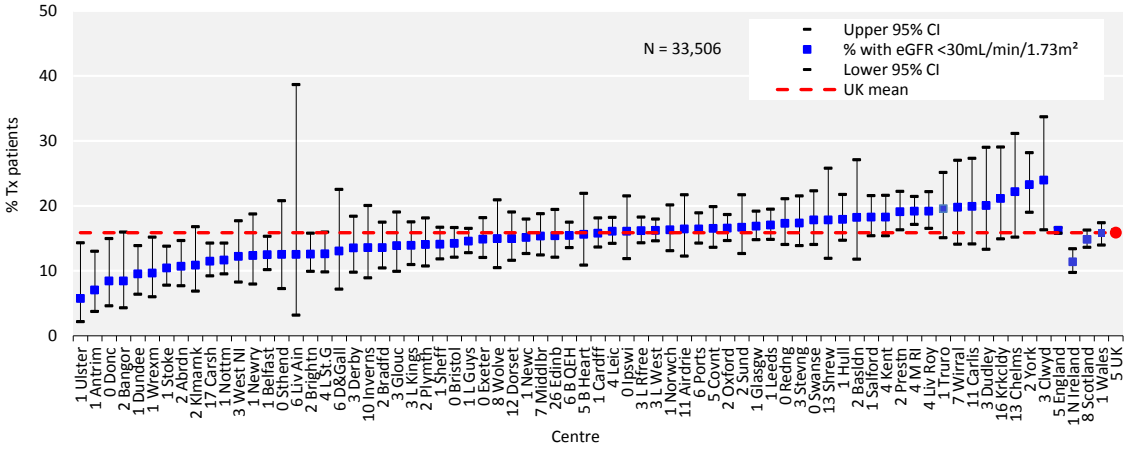

Figure 3.8 Percentage of adult patients prevalent to Tx on 31/12/2018 with an estimated glomerular filtration rate (eGFR) <30mL/min/1.73m^2 by centre
CI – confidence interval

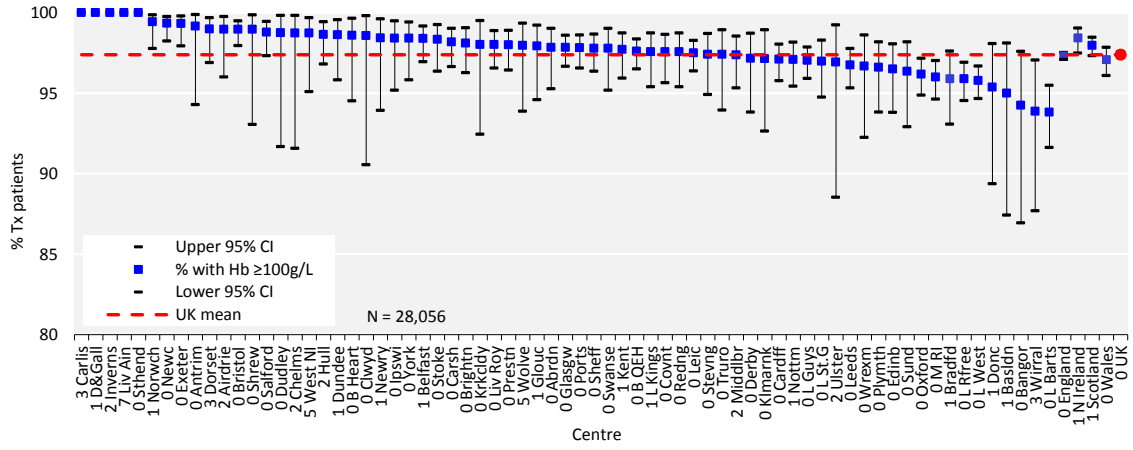

Figure 3.9 Percentage of adult patients prevalent to Tx on 31/12/2018 with an estimated glomerular filtration rate (eGFR) ≥30mL/min/1.73m^2 achieving haemoglobin (Hb) ≥100g/L by centre
CI – confidence interval

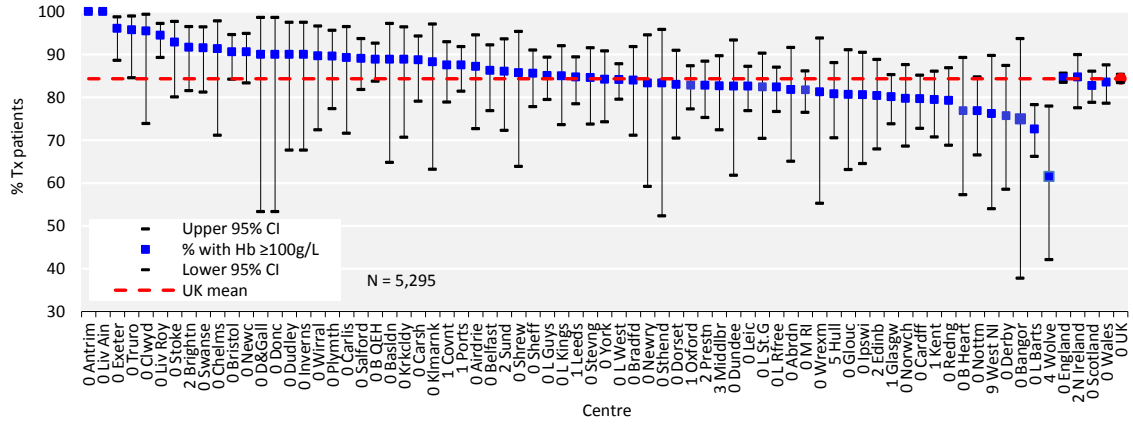

Figure 3.10 Percentage of adult patients prevalent to Tx on 31/12/2018 with an estimated glomerular filtration rate (eGFR) <30mL/min/1.73m^2 achieving haemoglobin (Hb) ≥100g/L by centre
CI – confidence interval

Blood pressure in prevalent adult kidney Tx patients

Blood pressure data completeness was variable (table 3.4) and only centres with ≥70% data completeness were included in the analysis. It is possible that bias may be introduced if blood pressure readings in particular ranges were more frequently reported. A lack of data on proteinuria did not allow differentiation for the purposes of reporting against the audit measure.

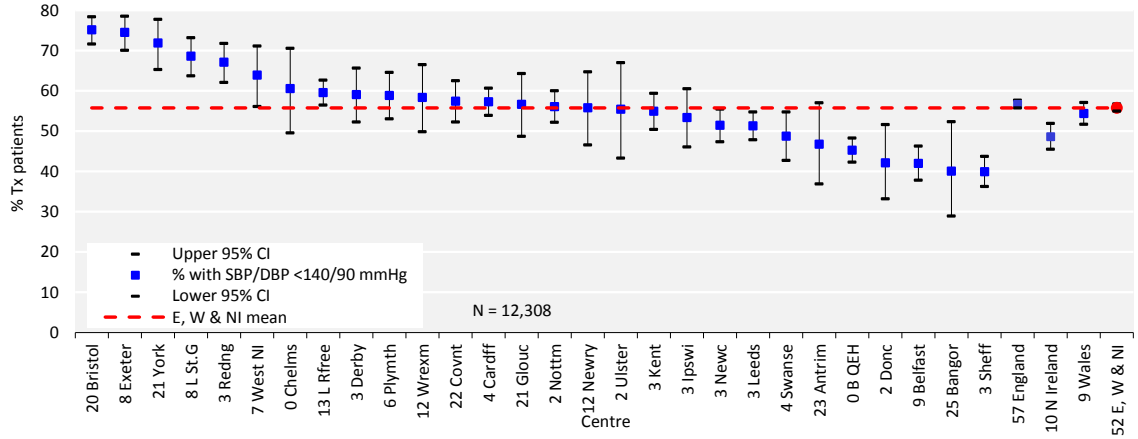

Figure 3.11 Percentage of adult patients prevalent to Tx on 31/12/2018 with estimated glomerular filtration rate (eGFR) ≥30 mL/min/1.73m^2 achieving blood pressure of <140/90 mmHg by centre
CI – confidence interval; DBP – diastolic blood pressure; SBP – systolic blood pressure

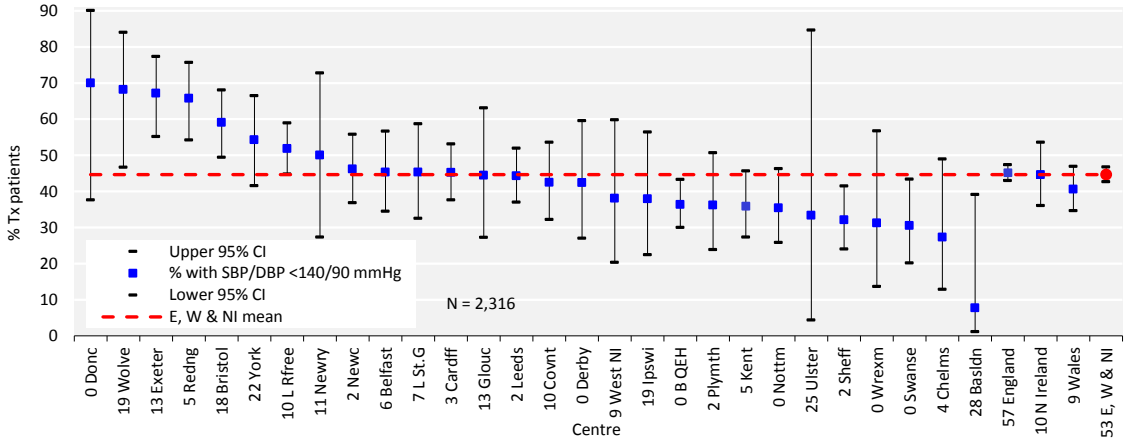

Figure 3.12 Percentage of adult patients prevalent to Tx on 31/12/2018 with estimated glomerular filtration rate (eGFR) <30 mL/min/1.73m^2 achieving blood pressure of <140/90 mmHg by centre
CI – confidence interval; DBP – diastolic blood pressure; SBP – systolic blood pressure

Biochemistry parameters in prevalent adult kidney Tx patients

The attainment of audit standards is shown by stage of Tx renal function in the prevalent Tx population and by comparing to the prevalent dialysis population.

Table 3.8 Estimated glomerular filtration rate (eGFR), blood pressure and biochemical parameters in adult patients prevalent to Tx on 31/12/2018 compared with adult patients prevalent to dialysis on 31/12/2018 by CKD stage

Characteristic	Tx CKD stage (eGFR)				Prevalent dialysis Stage 5D
	Stage 1-2T (≥60 mL/min/1.73 m²)	Stage 3T (30-59 mL/min/1.73 m²)	Stage 4T (15-29 mL/min/1.73 m²)	Stage 5T (<15 mL/min/1.73 m²)	
N	11,294	16,899	4,539	781	22,016
%	33.7	50.4	13.5	2.3	
eGFR (mL/min/1.73m²)					
mean ± SD	76.8 ± 13.4	45.3 ± 8.4	23.7 ± 4.1	11.8 ± 2.4	
median	73.9	45.4	24.2	12.5	
SBP (mmHg)					
mean ± SD	135 ± 17	138 ± 18	141 ± 19	144 ± 20	134 ± 25
% ≥140 mmHg	35.2	42.1	50.8	58.6	39.5
DBP (mmHg)					
mean ± SD	80 ± 10	80 ± 11	80 ± 11	82 ± 12	69 ± 15
% ≥90 mmHg	17.3	17.5	17.3	22.9	8.7
Total cholesterol (mmol/L)					
mean ± SD	4.3 ± 1.0	4.4 ± 1.1	4.5 ± 1.2	4.5 ± 1.3	3.8 ± 1.1
% ≥4.0 mmol/L	62.8	65.4	65.3	63.6	39.7
Haemoglobin (g/L)					
mean ± SD	137 ± 16	129 ± 17	116 ± 16	107 ± 16	110 ± 14
% <100 g/L	1.5	3.4	13.0	30.9	20.1
Phosphate (mmol/L)					
mean ± SD	0.9 ± 0.2	1.0 ± 0.2	1.1 ± 0.3	1.4 ± 0.4	1.6 ± 0.4
% >1.7 mmol/L	0.1	0.3	1.6	18.3	39.6
Adjusted Ca (mmol/L)					
mean ± SD	2.4 ± 0.1	2.4 ± 0.1	2.4 ± 0.2	2.4 ± 0.2	2.4 ± 0.2
% >2.5 mmol/L	26.1	26.3	21.6	16.7	16.2
% <2.2 mmol/L	3.1	3.6	7.7	15.8	16.4
PTH (pmol/L)					
median	8.6	9.7	15.1	27.5	31.9
% >72 pmol/L	0.5	0.5	2.6	12.1	17.1

Scottish centres were excluded from blood pressure, cholesterol and PTH analyses because data were not provided by the Scottish Renal Registry.
Ca – adjusted calcium; DBP – diastolic blood pressure; PTH – parathyroid hormone; SBP – systolic blood pressure; SD – standard deviation

Differences in the median eGFR slope in Tx patients is reported by patient and Tx graft characteristics. All UK patients aged at least 18 years receiving their first kidney Tx between 01/01/2008 and 31/12/2016 were considered for inclusion. A minimum duration of 18 months graft function was required and three or more creatinine measurements from the second year of graft function onwards were used to plot eGFR slope. If a Tx failed, but there were at least three creatinine measurements between one year post-Tx and graft failure, the patient was included, but no creatinine measurements after the quarter preceding the recorded date of Tx failure were analysed.

Table 3.9 Differences in median estimated glomerular filtration rate (eGFR) slope between demographic subgroups of adult patients who received their first kidney Tx between 01/01/2008 and 31/12/2016

Characteristic	N	Median slope	Lower quartile	Upper quartile
Age at Tx (yrs)				
<40	4,800	-1.38	-4.58	0.81
40-55	7,152	-0.61	-2.85	1.24
>55	7,091	-0.70	-3.12	1.10
Ethnicity				
White	13,753	-0.64	-3.00	1.13
South Asian	2,252	-1.40	-4.31	0.93
Black	1,328	-1.63	-4.80	0.70
Other	624	-1.01	-3.66	1.12
Sex				
Male	11,676	-0.52	-2.91	1.29
Female	7,367	-1.31	-3.98	0.70
Diabetes				
No Diabetes	15,966	-0.69	-3.16	1.14
Diabetes	2,897	-1.46	-4.20	0.73
Tx donor				
Deceased	12,352	-0.81	-3.38	1.16
Living	6,691	-0.76	-3.23	1.00
Year of Tx				
2008	1,813	-0.80	-2.44	0.46
2009	1,904	-0.88	-2.72	0.42
2010	1,990	-0.78	-2.66	0.60
2011	1,966	-0.72	-2.93	0.91
2012	2,175	-0.95	-3.11	0.81
2013	2,387	-0.99	-3.54	0.98
2014	2,323	-0.67	-3.51	1.66
2015	2,267	-0.63	-4.07	2.38
2016	2,218	-0.46	-5.78	4.27
Status of Tx patients at end of follow-up				
Died	1,540	-1.16	-4.13	1.24
Graft failed	1,524	-6.43	-12.68	-3.27
Re-transplanted	86	-3.96	-7.29	-1.62
Graft functioning	15,979	-0.49	-2.61	1.25
Total	**19,043**	**-0.80**	**-3.33**	**1.09**

Survival of adult kidney Tx patients

Survival of incident and prevalent RRT patients is described in detail in chapters 1 and 2, respectively. Survival of incident Tx patients is reported in table 3.3. NHSBT reports the survival of Tx recipients.

Cause of death in adult kidney Tx patients

Cause of death was analysed in patients prevalent to RRT on 31/12/2017 and followed-up for one year in 2018, with comparisons between Tx and dialysis presented in table 3.10. Work is being undertaken to better understand and code the cause of death in Tx recipients. The proportion of RRT patients with each cause of death is shown for patients with cause of death data and these total 100% of patients with data. The proportion of patients with no cause of death data is shown on a separate line.

Table 3.10 Cause of death in adult patients prevalent to RRT on 31/12/2017 followed-up in 2018 by modality

	All modalities		Dialysis		Tx	
Cause of death	N	%	N	%	N	%
Cardiac disease	786	20.7	662	21.5	124	17.5
Cerebrovascular disease	147	3.9	122	4.0	25	3.5
Infection	715	18.9	548	17.8	167	23.6
Malignancy	335	8.8	186	6.0	149	21.0
Treatment withdrawal	666	17.6	647	21.0	19	2.7
Other	769	20.3	623	20.2	146	20.6
Uncertain aetiology	371	9.8	293	9.5	78	11.0
Total (with data)	**3,789**	**100.0**	**3,081**	**100.0**	**708**	**100.0**
Missing	1,717	31.2	1,360	30.6	357	33.5

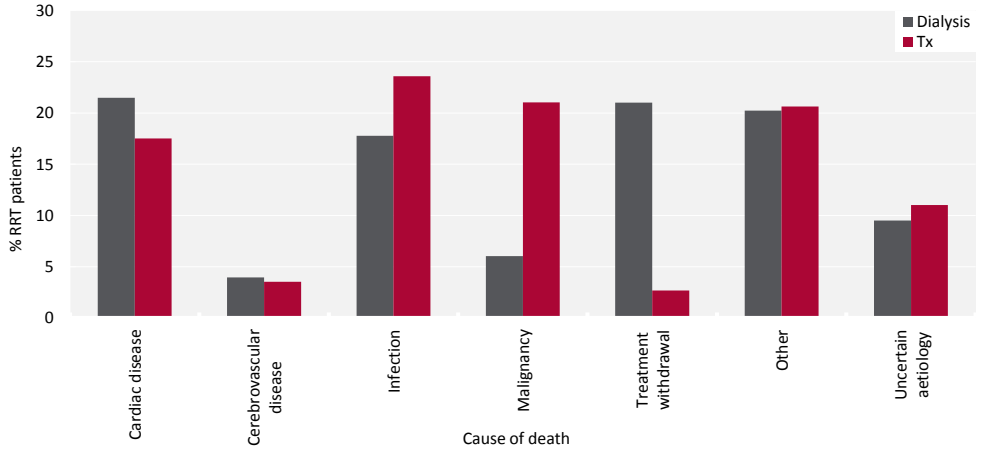

Figure 3.13 Cause of death for adult patients prevalent to RRT on 31/12/2017 followed-up in 2018 by modality

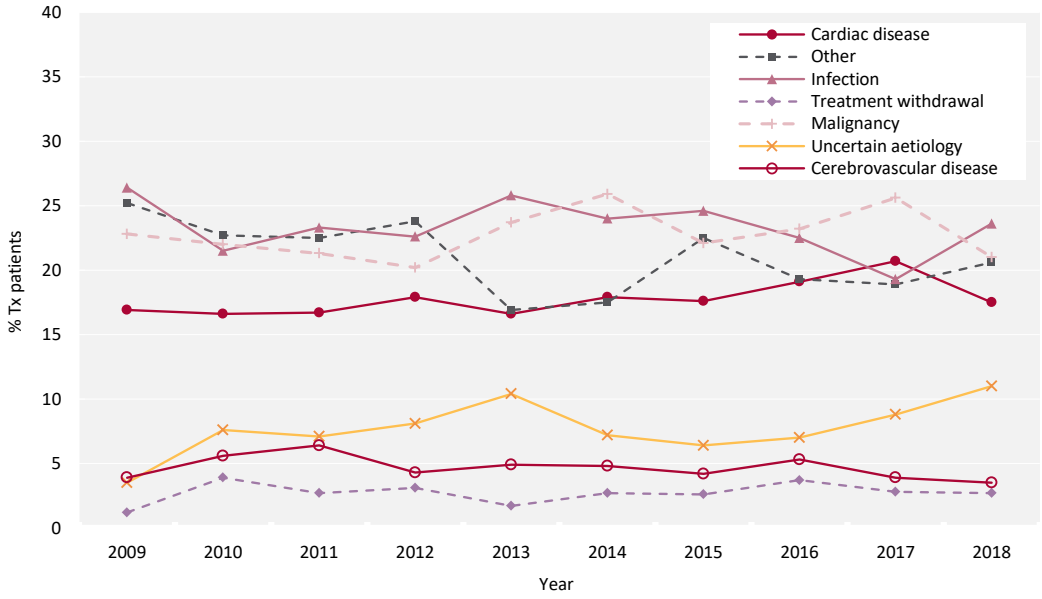

Figure 3.14 Cause of death between 2009 and 2018 for adult patients prevalent to Tx at the beginning of the year

THE RENAL ASSOCIATION
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Chapter 4

Adults on in-centre haemodialysis (ICHD) in the UK at the end of 2018

Contents

Introduction

This chapter describes the population of adult patients with end-stage kidney disease (ESKD) who were receiving regular in-centre haemodialysis (ICHD) in the UK at the end of 2018 (figure 4.1). This population comprises patients who were on ICHD at the end of 2017 and remained on ICHD throughout 2018, as well as patients who commenced/re-commenced ICHD in 2018. This latter group includes both incident renal replacement therapy (RRT) patients who ended 2018 on ICHD and prevalent RRT patients who switched to ICHD from home haemodialysis (HHD), peritoneal dialysis (PD), or a transplant (Tx) in 2018. Consequently, the cohort of patients receiving ICHD in a centre not only reflects differences in underlying population case-mix, but also differences in the rates of acceptance onto RRT, survival on ICHD, transplantation and home therapies (HHD and PD), and the care of patients on those other modalities, as described in other chapters of this report.

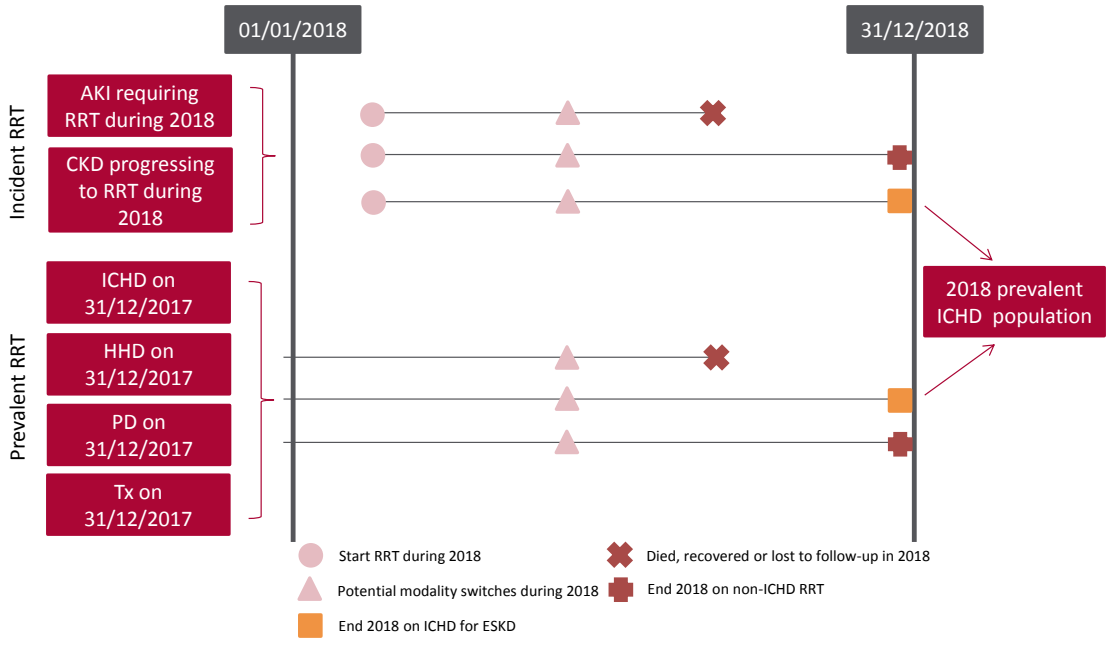

Figure 4.1 Pathways adult patients could follow to be included in the UK 2018 prevalent ICHD population

Note that patients receiving dialysis for acute kidney injury (AKI) are only included in this chapter if they had a timeline or RRT modality code for chronic ICHD at the end of 2018 or if they had been on RRT for ≥90 days and were on ICHD at the end of 2018.

CKD – chronic kidney disease

The infection analyses used a rolling two year cohort as per the audit measures (table 4.1). The cause of death analyses were undertaken on historic prevalent cohorts to allow sufficient follow-up time.

This chapter addresses the following key aspects of the care of patients on ICHD for which there are Renal Association guidelines (table 4.1):

- **Complications associated with ESKD and ICHD:** these include anaemia and mineral bone disorders
- **Adequacy of ICHD:** measures of dialysis care include urea clearance and frequency and length of dialysis sessions. Currently, the urea reduction ratio (URR) is the only urea clearance measure routinely reported to the UK Renal Registry (UKRR)
- **Type of ICHD access:** definitive access – either a surgically created arteriovenous fistula (AVF) or arteriovenous graft (AVG). Alternatively, more temporary access can be provided through a central venous catheter (CVC) – either a tunnelled line (TL) or a non-tunnelled line (NTL)
- **Infections associated with haemodialysis (ICHD and HHD):** analysis of infections is presented for ICHD and HHD combined because renal centres are not required to submit changes in dialysis modality that last <30 days. It is therefore not possible to attribute accurately an infection to HHD or ICHD. Rates of the four infections subject to mandatory reporting to Public Health England (PHE) are reported in this chapter – methicillin-resistant *Staphylococcus aureus* (MRSA), methicillin-sensitive *Staphylococcus aureus* (MSSA), *Escherichia coli* bacteraemia and *Clostridium difficile*.

Rationale for analyses

The analyses begin with a description of the 2018 prevalent adult ICHD population, including the number on ICHD per million population (pmp), dialysis duration and frequency.

The Renal Association guidelines (renal.org/health-professionals/guidelines/guidelines-commentaries) provide audit measures relevant to the care of patients on ICHD and, where data permit, their attainment by UK renal centres in 2018 is reported in this chapter (table 4.1). Audit measures in guidelines that have been archived are not included. Some audit measures – for example, the target for glycated haemoglobin (HbA1c) in those on hypoglycaemia-inducing treatment – cannot be reported because the completeness of the required data items is too low. Further detail about the completeness of data returned to the UKRR is available through the UKRR data completeness portal (renal.org/audit-research/data-portal/completeness). Audit measures that cannot be reported because the required data items were not collected by the UKRR are omitted.

Table 4.1 The Renal Association audit measures relevant to ICHD that are reported in this chapter

The Renal Association guideline	Audit criteria	Related analysis/analyses
CKD mineral bone disorder (2018)	Percentage of patients with serum calcium above the normal reference range of 2.2–2.5 mmol/L	Table 4.6, figure 4.6
HD (2019)	Proportion of patients with pre-dialysis bicarbonate 18–26 mmol/L	Table 4.7, figure 4.8
	Proportion of patients with pre-dialysis potassium 4.0–6.0 mmol/L	Table 4.7, figure 4.9
Anaemia (2017)	Proportion of patients with serum ferritin <100 µg/L at start of treatment with erythropoiesis stimulating agent (ESA)	Table 4.8, figure 4.13 (the UKRR does not hold treatment with ESA start dates)
	Proportion of patients with haemoglobin <100 g/L not on ESA	Table 4.9
	Proportion of patients on ESA with haemoglobin >120 g/L	Table 4.9, figure 4.15
	Mean (median) ESA dose in patients maintained on ESA therapy	Table 4.9
Vascular access (2015)	Proportion of prevalent dialysis patients with definitive access (AVF/AVG/PD catheter) – ≥80%	Figure 4.17
	Annual rate of MRSA <1 episode/100 patient years (measured over 2 years)	Table 4.10, figures 4.18, 4.20
	Annual rate of MSSA <2.5 episodes/100 patient years (measured over 2 years)	Table 4.10, figures 4.19, 4.21
Planning, initiating and withdrawing RRT (2014)	Number of patients withdrawing from ICHD as a proportion of all deaths on ICHD	Table 4.11, figure 4.22

AVF – arteriovenous fistula; AVG – arteriovenous graft; ESA – erythropoiesis stimulating agent; MRSA – methicillin-resistant *Staphylococcus aureus*; MSSA – methicillin-sensitive *Staphylococcus aureus*

For definitions and methods relating to this chapter see appendix A. Centres were exluded from caterpillar plots and cells were blanked in tables where data completeness for a biochemical variable was <70% and/or the number of patients reported was <10. The number preceding the centre name in each caterpillar plot indicates the percentage of missing data for that centre.

Cambridge renal centre (Addenbrooke's Hospital) was unable to submit patient level data for 2017–2018. While data extraction issues have now been resolved, the UKRR and Cambridge are working to load and validate the backlog of data for these years, which should be completed for next year's report. Using aggregate numbers of patients on RRT by treatment modality, it was possible to report treatment rates for Cambridge, but no other quality assurance for the service provided. Coventry renal centre submitted patient level data for more than a third of their new patients only after the closing date for submission to the UKRR. In this report only the analyses on treatment rates could be corrected using the late submitted data.

Key findings

- 24,366 adult patients were receiving ICHD for ESKD in the UK on 31/12/2018, which represented 36.8% of the RRT population
- The median age of ICHD patients was 67.4 years and 61.6% were male
- 86.6% of ICHD patients achieved a dialysis adequacy of URR >65%
- 93.6% of ICHD patients had dialysis 3 times a week
- 73.4% of ICHD patients had dialysis for 4–5 hours per session
- The median adjusted calcium for ICHD patients was 2.3 mmol/L and 10.3% were above the target range 2.2–2.5 mmol/L
- The median haemoglobin and ferritin for ICHD patients was 111 g/L and 419 µg/L, respectively, and 90.9% were on an ESA at a median dose of 8,000 IU/week
- 1.1% of ICHD patients had a haemoglobin <100 g/L not on an ESA and 17.3% had a haemoglobin >120 g/L on an ESA
- Of the 43 centres that provided adequate long term dialysis access data in England, Northern Ireland and Wales, 11 centres achieved the 80% target for definitive access amongst prevalent dialysis patients (AVF/AVG/PD catheter)
- The 2 year rates (2017–2018) of MRSA and MSSA bacteraemia were 0.19/100 patient years and 2.88/100 patient years, respectively
- There was no cause of death data available for 31.2% of deaths. For those with data, the leading cause of death in younger patients (<65 years) was cardiac disease (28.3%) and in older patients (≥65 years) was treatment withdrawal (24.1%).

Analyses

Changes to the prevalent adult ICHD population

For the 71 adult renal centres, the number of prevalent patients on ICHD was calculated as both a proportion of the prevalent patients on RRT and as a proportion of the estimated centre catchment population (calculated as detailed in appendix A).

Table 4.2 Number of prevalent adult ICHD patients and proportion of adult RRT patients on ICHD by year and by centre; number of ICHD patients as a proportion of the catchment population

	N on ICHD					% on ICHD					Estimated catchment population (millions)	2018 crude rate (pmp)
Centre	2014	2015	2016	2017	2018	2014	2015	2016	2017	2018		
ENGLAND												
B Heart	397	406	376	377	381	62.5	62.3	57.7	57.6	56.1	0.61	623
B QEH	900	957	956	957	960	42.2	42.6	40.0	38.1	37.4	1.41	682
Basldn	172	159	151	165	171	61.9	58.0	55.1	54.8	54.5	0.34	497
Bradfd	217	229	244	269	260	39.6	39.3	38.4	40.0	37.9	0.54	481
Brightn	379	387	419	425	445	41.4	40.7	42.2	42.0	42.2	1.07	414
Bristol	506	503	489	491	475	34.7	34.1	33.3	33.4	32.3	1.19	398
Camb	331	332	327	346	317	26.8	25.4	24.6	24.4	22.4	0.96	330
Carlis	74	81	95	98	101	29.6	28.8	33.8	34.8	34.5	0.27	380
Carsh	755	796	819	841	846	48.7	50.3	49.9	49.9	48.7	1.59	534
Chelms	133	142	129	126	112	50.8	50.4	47.6	45.5	41.5	0.42	265
Colchr	119	120	123	129	121	100	100	100	100	100	0.25	488
Covnt	359	347	366	332	380	37.4	36.2	37.6	34.4	36.5	0.74	514
Derby	200	209	200	191	197	38.9	38.8	36.9	34.4	33.4	0.58	338
Donc	175	172	185	178	179	61.6	57.0	55.9	53.5	53.9	0.34	527
Dorset	272	285	273	295	291	40.9	41.9	39.8	40.2	38.0	0.71	407
Dudley	160	161	188	206	205	52.5	51.1	54.3	55.8	56.8	0.37	560
Exeter	411	435	443	457	449	43.5	44.9	43.7	43.2	41.3	0.90	497
Glouc	209	224	235	244	235	48.8	50.5	49.8	48.1	46.1	0.49	483
Hull	320	350	324	351	351	39.9	40.9	37.9	40.2	39.8	0.85	415
Ipswi	122	143	147	147	151	33.2	35.7	35.6	33.9	35.3	0.33	457
Kent	389	410	409	424	418	38.4	39.4	38.1	38.9	37.5	1.01	412
L Barts	944	982	1,006	1,030	1,068	42.8	43.1	42.5	41.3	40.9	1.52	704
L Guys	600	628	645	667	691	31.3	31.2	30.7	30.9	31.1	0.90	770
L Kings	530	554	566	573	597	51.8	51.1	51.0	49.9	50.3	0.97	615
L Rfree	695	694	709	686	683	34.6	33.2	32.6	31.3	30.6	1.26	543
L St.G	305	335	342	315	294	38.6	39.7	40.3	37.6	35.1	0.66	445
L West	1,395	1,422	1,453	1,446	1,429	43.4	43.2	42.8	41.6	40.1	1.99	719
Leeds	503	491	509	539	545	33.5	32.2	32.8	33.3	32.3	1.38	394
Leic	837	856	889	899	917	39.1	39.3	38.7	37.9	37.2	2.02	454
Liv Ain	151	159	173	160	155	69.6	71.6	76.2	76.6	71.1	0.40	386
Liv Roy	338	345	325	352	360	26.9	27.9	26.8	28.1	28.2	0.83	434
M RI	467	473	466	498	508	26.1	25.2	23.6	24.4	24.5	1.27	400
Middlbr	324	340	321	334	344	37.9	37.7	36.1	36.9	37.2	0.83	413
Newc	265	292	295	326	340	27.1	28.9	28.1	29.3	29.4	0.93	366
Norwch	294	311	315	302	296	42.9	43.1	40.9	38.9	37.7	0.65	454
Nottm	332	358	365	354	350	31.3	32.2	31.7	30.1	29.3	0.90	388
Oxford	443	412	429	450	451	26.8	24.4	24.3	24.0	23.2	1.40	322
Plymth	133	129	136	142	128	26.5	25.6	26.5	26.3	23.7	0.39	329
Ports	573	614	562	548	527	36.0	36.8	33.3	31.4	29.9	1.68	314

Table 4.2 Continued

Centre	N on ICHD					% on ICHD					Estimated catchment population (millions)	2018 crude rate (pmp)
	2014	2015	2016	2017	2018	2014	2015	2016	2017	2018		
Prestn	524	533	522	517	521	44.7	43.9	43.4	40.7	39.4	1.24	421
Redng	285	295	295	303	293	37.5	38.1	37.4	38.1	36.2	0.75	388
Salford	395	387	375	387	399	40.7	39.7	36.8	34.7	34.0	1.24	323
Sheff	540	546	560	549	550	39.7	39.5	39.4	38.2	37.1	1.14	484
Shrew	178	178	186	183	206	51.0	48.2	49.3	47.7	48.6	0.41	496
Stevng	459	480	501	464	492	58.6	59.0	56.5	52.1	51.4	1.00	493
Sthend	115	124	111	121	128	48.3	50.4	47.0	47.6	49.2	0.26	488
Stoke	303	300	311	302	285	39.1	38.1	37.7	37.3	35.3	0.74	386
Sund	208	219	245	243	243	46.2	47.7	48.3	44.8	43.6	0.51	474
Truro	139	150	160	158	168	36.6	36.3	37.6	37.3	38.4	0.34	491
Wirral	197	174	188	202	203	70.9	61.9	55.8	52.5	51.4	0.47	428
Wolve	294	295	286	303	315	51.1	50.7	50.1	52.0	52.3	0.55	568
York	132	149	184	183	184	28.6	30.4	34.4	33.0	32.4	0.41	451
N IRELAND												
Antrim	122	120	123	117	119	52.8	49.8	48.8	45.9	43.4	0.23	507
Belfast	192	174	185	179	173	25.8	22.6	22.8	21.4	19.7	0.51	341
Newry	90	85	86	77	81	43.5	37.8	36.4	32.0	32.5	0.21	389
Ulster	95	106	101	109	106	63.8	62.7	60.8	59.9	55.8	0.21	500
West NI	114	119	125	113	112	41.6	40.6	40.7	36.1	34.6	0.28	399
SCOTLAND												
Abrdn	197	213	227	226	214	39.3	40.1	40.9	40.1	37.3	0.50	429
Airdrie	181	195	185	192	192	45.8	45.9	42.1	41.1	39.4	0.46	418
D&Gall	46	51	47	51	55	35.4	39.2	35.9	37.8	37.9	0.12	445
Dundee	164	184	176	183	159	40.9	43.9	42.1	42.1	35.7	0.39	413
Edinb	262	279	282	305	300	35.1	36.3	36.3	37.0	34.8	0.80	374
Glasgw	538	579	571	574	587	33.5	33.9	32.6	32.4	32.4	1.35	434
Inverns	66	90	86	83	90	29.3	35.6	33.2	31.6	32.3	0.22	401
Klmarnk	124	126	133	144	141	41.5	40.6	42.0	42.7	41.2	0.30	469
Krkcldy	143	149	144	144	135	51.6	50.5	49.0	47.5	45.0	0.26	512
WALES												
Bangor	70	69	64	73	70	65.4	37.9	35.8	37.4	34.7	0.19	378
Cardff	458	470	486	529	555	28.8	29.1	29.9	31.4	32.2	1.21	460
Clwyd	87	77	69	72	75	51.2	41.6	39.0	40.0	39.5	0.16	466
Swanse	294	338	340	353	373	41.7	44.2	43.9	44.3	45.3	0.75	496
Wrexm	112	107	115	120	114	39.6	36.5	37.1	37.3	36.2	0.20	559
TOTALS												
England	**19,498**	**20,073**	**20,328**	**20,585**	**20,715**	**39.3**	**39.1**	**38.4**	**38.0**	**37.2**	**44.02**	**471**
N Ireland	**613**	**604**	**620**	**595**	**591**	**38.2**	**35.6**	**35.0**	**32.5**	**30.9**	**1.44**	**409**
Scotland	**1,721**	**1,866**	**1,851**	**1,902**	**1,873**	**37.6**	**38.5**	**37.4**	**37.3**	**35.7**	**4.41**	**425**
Wales	**1,021**	**1,061**	**1,074**	**1,147**	**1,187**	**35.7**	**34.9**	**35.0**	**36.1**	**36.5**	**2.51**	**473**
UK	**22,853**	**23,604**	**23,873**	**24,229**	**24,366**	**39.0**	**38.8**	**38.0**	**37.7**	**36.8**	**52.38**	**465**

Country ICHD populations were calculated by summing the ICHD patients from centres in each country. Estimated country populations were derived from Office for National Statistics figures. See appendix A for details on estimated catchment population by renal centre. Rates appear higher than in previous reports because general population estimates now include only those aged ≥18 years (see appendix B).

Cambridge submitted only aggregate data for 2017 and 2018. Breakdown of haemodialysis (HD) patients into ICHD and HHD was not available for Cambridge – the ICHD figure is the total HD percentage. Coventry submitted data for 76 prevalent ICHD patients after the closing date. Results shown here and in table 4.3 were corrected using the additional data.

pmp – per million population

Demographics of prevalent adult ICHD patients

The proportion of ICHD patients from each ethnic group is shown for patients with ethnicity data – the proportion of patients in each centre with no ethnicity data is shown separately.

Table 4.3 Demographics of adult patients prevalent to ICHD on 31/12/2018 by centre

Centre	N on RRT	N on ICHD	% on ICHD	Median age (yrs)	% male	Ethnicity				
						% White	% South Asian	% Black	% Other	% missing
ENGLAND										
B Heart	679	381	56.1	67.5	59.8	50.7	36.5	11.5	1.3	0.0
B QEH	2,569	960	37.4	65.6	58.1	51.1	29.8	14.4	4.7	2.5
Basldn	314	171	54.5	67.7	69.0	83.5	4.7	7.1	4.7	0.6
Bradfd	686	260	37.9	63.8	62.3	43.9	49.0	3.6	3.6	2.7
Brightn	1,055	445	42.2	70.7	64.0	89.1	5.7	2.4	2.8	5.2
Bristol	1,469	475	32.3	69.1	62.1	84.4	4.2	9.1	2.3	0.4
Camb										
Carlis	293	101	34.5	68.0	59.4	100.0	0.0	0.0	0.0	2.0
Carsh	1,736	846	48.7	68.7	61.9	63.2	16.5	13.9	6.5	4.7
Chelms	270	112	41.5	71.1	69.6	92.8	2.7	1.8	2.7	0.9
Colchr	121	121	100.0	73.0	61.2	96.7	0.8	1.7	0.8	0.0
Covnt	1,042	380	36.5	70.7	58.9	71.5	18.9	8.6	1.0	0.7
Derby	589	197	33.4	66.2	60.9	80.6	10.7	4.6	4.1	0.5
Donc	332	179	53.9	69.6	59.2	91.6	3.9	1.7	2.8	0.0
Dorset	765	291	38.0	72.5	63.6	94.1	2.4	1.0	2.4	1.0
Dudley	361	205	56.8	68.9	60.5	81.0	11.7	6.3	1.0	0.0
Exeter	1,088	449	41.3	73.5	69.5	97.1	0.7	1.1	1.1	0.2
Glouc	510	235	46.1	73.5	63.4	92.3	3.0	3.0	1.7	0.9
Hull	883	351	39.8	66.7	63.0	97.1	2.0	0.3	0.6	1.7
Ipswi	428	151	35.3	71.9	62.9	81.9	1.4	4.2	12.5	4.6
Kent	1,114	418	37.5	69.0	61.2	94.4	3.4	1.2	1.0	2.2
L Barts	2,610	1,068	40.9	62.1	60.8	24.5	31.5	29.4	14.6	0.2
L Guys	2,225	691	31.1	63.3	59.9	44.9	6.2	42.3	6.6	3.9
L Kings	1,186	597	50.3	63.4	59.0	40.2	11.7	42.2	5.9	0.0
L Rfree	2,234	683	30.6	66.0	60.8	38.6	23.2	29.4	8.9	5.9
L St.G	837	294	35.1	66.6	58.5	31.2	26.2	35.5	7.1	4.1
L West	3,566	1,429	40.1	66.7	59.1	31.6	37.9	23.9	6.6	0.0
Leeds	1,687	545	32.3	62.5	62.2	71.2	18.6	7.9	2.2	0.6
Leic	2,468	917	37.2	67.1	62.3	70.8	20.9	5.7	2.7	5.9
Liv Ain	218	155	71.1	70.9	64.5	97.4	0.0	2.0	0.7	1.3
Liv Roy	1,277	360	28.2	64.0	60.8	86.0	2.3	5.7	6.0	2.5
M RI	2,073	508	24.5	64.2	59.4	47.7	13.5	35.8	3.0	1.0
Middlbr	925	344	37.2	67.5	65.4	91.6	7.6	0.9	0.0	0.0
Newc	1,155	340	29.4	66.3	65.3	88.8	5.3	2.7	3.2	0.3
Norwch	786	296	37.7	73.5	63.5	96.9	0.7	0.0	2.4	0.3
Nottm	1,196	350	29.3	70.0	62.0	74.9	10.6	11.4	3.1	0.0
Oxford	1,940	451	23.2	69.5	61.9	76.8	10.7	6.5	6.0	15.1
Plymth	539	128	23.7	73.2	66.4	96.9	0.0	0.8	2.3	0.0
Ports	1,764	527	29.9	68.0	63.4	91.1	3.7	2.1	3.1	8.3
Prestn	1,322	521	39.4	67.8	63.0	81.0	17.3	1.3	0.4	0.0
Redng	810	293	36.2	69.2	59.0	66.2	24.8	6.8	2.3	9.2
Salford	1,173	399	34.0	63.2	61.2	72.7	19.5	4.8	3.0	0.0
Sheff	1,481	550	37.1	68.4	64.5	85.4	6.3	4.1	4.3	1.8
Shrew	424	206	48.6	71.6	65.0	93.2	3.9	0.5	2.4	0.0
Stevng	957	492	51.4	68.4	61.8	68.7	14.4	9.8	7.1	11.0

Table 4.3 Continued

Centre	N on RRT	N on ICHD	% on ICHD	Median age (yrs)	% male	Ethnicity				
						% White	% South Asian	% Black	% Other	% missing
Sthend	260	128	49.2	67.1	57.8	82.8	6.3	7.0	3.9	0.0
Stoke	808	285	35.3	72.0	65.3	91.2	4.4	1.8	2.6	4.2
Sund	557	243	43.6	69.7	64.2	95.5	2.9	0.8	0.8	0.0
Truro	437	168	38.4	71.7	58.9	100.0	0.0	0.0	0.0	0.0
Wirral	395	203	51.4	65.2	54.2	96.1	1.5	0.5	2.0	0.0
Wolve	602	315	52.3	66.7	64.8	60.2	24.5	13.1	2.2	0.3
York	568	184	32.4	70.7	68.5	97.1	1.1	1.1	0.6	5.4
N IRELAND										
Antrim	274	119	43.4	74.9	62.2	99.2	0.0	0.8	0.0	0.0
Belfast	877	173	19.7	67.0	63.0	98.0	0.0	0.7	1.3	12.1
Newry	249	81	32.5	69.3	56.8	98.8	1.2	0.0	0.0	0.0
Ulster	190	106	55.8	76.8	55.7	94.3	1.9	0.9	2.8	0.0
West NI	324	112	34.6	74.0	56.3	99.1	0.9	0.0	0.0	0.0
SCOTLAND										
Abrdn	573	214	37.3	67.3	61.2					87.9
Airdrie	487	192	39.4	62.0	57.8	98.1	1.3	0.6		19.8
D&Gall	145	55	37.9	69.5	67.3					81.8
Dundee	445	159	35.7	67.3	59.7					84.3
Edinb	862	300	34.8	63.0	63.0					79.7
Glasgw	1,812	587	32.4	65.1	57.9					88.6
Inverns	279	90	32.3	70.3	58.9					73.3
Klmarnk	342	141	41.2	66.3	59.6					80.9
Krkcldy	300	135	45.0	68.8	54.8					90.4
WALES										
Bangor	202	70	34.7	71.2	68.6	98.6	0.0	0.0	1.4	0.0
Cardff	1,721	555	32.2	65.9	60.5	89.3	7.0	1.3	2.4	2.5
Clwyd	190	75	39.5	69.5	70.7	100.0	0.0	0.0	0.0	1.3
Swanse	824	373	45.3	70.1	65.7	97.6	1.1	0.5	0.8	1.1
Wrexm	315	114	36.2	68.2	58.8	99.1	0.0	0.9	0.0	0.0
TOTALS										
England	**54,784**	**20,398**	**37.2**	**67.4**	**61.8**	**67.8**	**15.3**	**12.5**	**4.3**	**2.5**
N Ireland	**1,914**	**591**	**30.9**	**72.2**	**59.4**	**97.9**	**0.7**	**0.5**	**0.9**	**3.6**
Scotland	**5,245**	**1,873**	**35.7**	**65.8**	**59.5**					**78.3**
Wales	**3,252**	**1,187**	**36.5**	**68.5**	**63.1**	**94.1**	**3.6**	**0.9**	**1.5**	**1.6**
UK	**65,195**	**24,049**	**36.9**	**67.4**	**61.6**	**70.4**	**14.2**	**11.4**	**4.0**	**8.4**

Blank cells – no data returned by the centre or data completeness <70%.
Breakdown by ethnicity is not shown for centres with <70% data completeness, but these centres were included in national averages.
Coventry submitted data for 76 prevalent ICHD patients after the closing date; these patients were not included in the age, sex or ethnicity breakdown.

Primary renal diseases (PRDs) were grouped into categories as shown in table 4.4, with the mapping of disease codes into groups explained in more detail in appendix A. The proportion of ICHD patients with each PRD is shown for patients with PRD data and these total 100% of patients with data. The proportion of patients with no PRD data is shown on a separate line.

Table 4.4 Primary renal diseases (PRDs) of adult patients prevalent to ICHD on 31/12/2018

PRD	N on ICHD	% ICHD population	Age <65 yrs		Age ≥65 yrs		M/F ratio
			N	%	N	%	
Diabetes	6,283	27.2	2,891	28.1	3,392	26.5	1.6
Glomerulonephritis	3,243	14.0	1,836	17.8	1,407	11.0	2.1
Hypertension	1,703	7.4	695	6.8	1,008	7.9	2.2
Polycystic kidney disease	1,278	5.5	653	6.3	625	4.9	1.0
Pyelonephritis	1,743	7.5	819	8.0	924	7.2	1.6
Renal vascular disease	1,215	5.3	157	1.5	1,058	8.3	2.0
Other	4,061	17.6	1,923	18.7	2,138	16.7	1.3
Uncertain aetiology	3,578	15.5	1,319	12.8	2,259	17.6	1.6
Total (with data)	**23,104**	**100.0**	**10,293**	**100.0**	**12,811**	**100.0**	
Missing	869	3.6	413	3.9	456	3.4	1.6

Adequacy of dialysis in prevalent adult ICHD patients

URR and session duration were calculated only for patients who were undertaking ICHD three times per week. Patients who had missing data for the number of dialysis sessions per week were assumed to be dialysing three times per week for the purposes of calculating the median URR. These analyses were undertaken on the 2018 prevalent ICHD population, using data collected at the end of the third quarter, because of better data completeness compared to the fourth quarter of the year.

Table 4.5 Median urea reduction ratio (URR) and distribution of session frequency and time for adult patients prevalent to ICHD on 31/12/2018 using end of third quarter data (30/09/2018)

Centre	Median URR (%)	% URR >65%	% session frequency/week			% session time			% data completeness		
			<3 sessions	3 sessions	>3 sessions	<4 hours	4–5 hours	>5 hours	URR	Session frequency	Session time
ENGLAND											
B Heart	74	80.1	8.0	90.7	1.3	9.3	90.0	0.7	97.6	85.7	83.8
B QEH	80	92.1	5.0	94.2	0.8	18.1	81.8	0.1	99.6	99.4	99.4
Basldn	72	82.5	1.3	93.5	5.2	34.3	65.7	0.0	97.3	97.5	97.3
Bradfd	71	71.4	5.4	93.8	0.8	28.3	71.7	0.0	77.4	100.0	100.0
Brightn	74	88.4	1.3	98.5	0.3	5.9	94.1	0.0	99.2	99.8	94.9
Bristol	73	80.2	4.6	94.9	0.4	24.5	75.5	0.0	99.8	99.8	99.8
Camb											
Carlis	74	81.1	4.8	95.2	0.0	16.3	83.8	0.0	100.0	89.4	88.9
Carsh			1.5	98.1	0.4	6.1	93.6	0.4	1.3	99.9	99.5
Chelms	74	82.8	3.2	92.6	4.2	35.2	64.8	0.0	92.6	94.1	93.6
Colchr	79	97.3	3.4	96.6	0.0	2.7	97.3	0.0	99.1	99.2	99.1
Covnt	76	89.6	8.5	90.4	1.1	25.3	74.7	0.0	94.7	96.9	94.7
Derby	76	84.5	1.2	95.9	2.9				98.8	100.0	29.5
Donc	76	86.5	1.2	98.8	0.0	26.9	73.1	0.0	98.8	97.0	97.0
Dorset	77	91.0	1.1	98.5	0.4	7.4	92.6	0.0	89.7	98.9	99.3
Dudley	76	90.8	3.9	96.1	0.0	11.6	87.8	0.6	93.1	92.3	92.0
Exeter	74	91.1	3.8	95.3	0.9	52.1	47.9	0.0	99.5	99.8	99.8
Glouc	76	93.3	4.1	93.2	2.7				100.0	99.1	0.0
Hull	78	92.3							98.2	0.6	1.2
Ipswi			12.3	87.7	0.0	13.6	86.4	0.0	0.0	99.3	96.7
Kent	72	84.9	2.1	96.3	1.6	68.9	31.1	0.0	95.9	99.5	100.0
L Barts									0.0	0.0	0.0

Table 4.5 Continued

Centre	Median URR (%)	% URR >65%	% session frequency/week			% session time			% data completeness		
			<3 sessions	3 sessions	>3 sessions	<4 hours	4–5 hours	>5 hours	URR	Session frequency	Session time
L Guys	74	88.8	7.1	92.2	0.6	22.7	77.0	0.3	99.5	99.2	99.2
L Kings	73	85.2	5.6	94.0	0.4	62.1	37.9	0.0	99.6	99.8	99.8
L Rfree			17.5	81.5	1.0	57.8	41.8	0.4	0.0	96.0	95.2
L St.G	79	92.7	0.4	99.6	0.0	8.3	91.7	0.0	71.0	97.0	94.4
L West	79	93.2	12.2	86.9	0.9	23.4	76.0	0.6	91.3	92.0	91.1
Leeds	74	85.5	8.4	91.4	0.2	20.6	79.4	0.0	99.8	98.2	100.0
Leic	76	84.9	3.6	96.0	0.4	11.2	84.4	4.5	98.1	98.8	99.5
Liv Ain			4.0	94.0	2.0	14.3	85.7	0.0	0.0	99.3	99.3
Liv Roy			0.6	88.6	10.8	8.2	91.8	0.0	0.0	97.1	99.7
M RI	76	84.9	2.8	96.7	0.5	7.0	93.0	0.0	73.9	85.1	84.7
Middlbr	73	84.1	2.9	96.8	0.3	34.4	62.3	3.3	99.3	99.7	99.7
Newc			2.9	96.4	0.6	20.5	78.1	1.3	15.8	100.0	100.0
Norwch	76	89.5	1.9	96.3	1.9	56.0	44.0	0.0	98.1	98.2	98.1
Nottm	74	92.1	0.3	94.9	4.8	9.1	90.9	0.0	91.5	100.0	100.0
Oxford	75	86.6	0.0	100.0	0.0	34.3	65.7	0.0	98.5	100.0	100.0
Plymth	75	86.8	2.6	96.6	0.9				99.1	97.5	0.0
Ports	75	90.3	8.7	90.1	1.2				98.4	97.4	0.0
Prestn	72	73.3							82.2	0.0	0.2
Redng			0.8	99.2	0.0	19.1	80.9	0.0	1.5	96.4	98.2
Salford			3.0	80.1	17.0	18.9	81.1	0.0	62.5	97.7	93.5
Sheff	74	86.4	2.4	97.6	0.0	84.5	15.5	0.0	95.2	99.8	89.7
Shrew	75	94.2	2.2	95.0	2.8	20.9	79.1	0.0	98.8	99.5	99.4
Stevng	74	85.3	9.7	87.2	3.1	68.6	31.2	0.3	98.9	98.1	97.9
Sthend	70	79.8	5.8	94.2	0.0	47.4	52.6	0.0	100.0	100.0	100.0
Stoke			5.4	91.7	2.9	14.9	85.1	0.0	64.7	100.0	100.0
Sund			1.8	89.6	8.6	30.1	69.9	0.0	1.0	96.9	79.5
Truro	74	89.9							98.0	0.0	0.0
Wirral	75	85.2	1.1	90.8	8.2	24.4	75.6	0.0	96.0	95.3	100.0
Wolve	76	93.0	2.5	97.5	0.0				96.1	97.9	63.3
York	76	87.7	4.7	89.3	6.0	12.3	87.7	0.0	100.0	87.7	89.0
N IRELAND											
Antrim	74	86.4	1.8	97.3	0.9	13.9	86.1	0.0	100.0	97.4	98.2
Belfast	74	88.3	0.6	96.8	2.5	14.9	84.4	0.6	100.0	98.7	100.0
Newry	75	90.9	21.7	76.8	1.4	59.3	40.7	0.0	80.0	97.2	98.2
Ulster	72	83.8	2.0	96.1	2.0	15.2	84.8	0.0	100.0	99.0	100.0
West NI	72	77.8	5.9	88.1	5.9	69.7	30.3	0.0	97.8	97.1	96.7
SCOTLAND											
Abrdn	72	79.5	1.0	93.2	5.8	3.6	94.3	2.1	100.0	98.6	98.5
Airdrie	71	81.5	0.0	97.7	2.3	16.0	81.1	3.0	100.0	97.2	97.7
D&Gall	71	68.3	4.5	90.9	4.5	12.5	85.0	2.5	100.0	97.8	97.6
Dundee	73	86.8	0.0	98.7	1.3	7.6	92.4	0.0	100.0	98.8	98.7
Edinb	72	84.1	0.4	98.5	1.1	32.6	67.4	0.0	100.0	100.0	98.5
Glasgw	72	81.7	0.8	98.6	0.6	7.2	88.8	4.0	99.4	94.7	99.4
Inverns	72	81.7	0.0	97.2	2.8	23.2	76.8	0.0	100.0	97.3	97.2
Klmarnk	73	81.6	0.7	99.3	0.0	4.8	90.4	4.8	100.0	94.4	88.7
Krkcldy	71	73.2	3.3	95.9	0.8	22.0	78.0	0.0	100.0	96.1	95.9
WALES											
Bangor	74	86.7	1.6	96.8	1.6				100.0	100.0	0.0
Cardff	75	90.4							99.8	0.0	0.0
Clwyd	72	87.9	1.5	98.5	0.0				100.0	100.0	0.0
Swanse	76	87.0	5.1	93.2	1.8	39.9	59.7	0.3	99.4	98.5	98.4
Wrexm	74	85.6	3.7	96.3	0.0				99.1	99.1	0.0

Table 4.5 Continued

Centre	Median URR (%)	% URR >65%	% session frequency/week			% session time			% data completeness		
			<3 sessions	3 sessions	>3 sessions	<4 hours	4–5 hours	>5 hours	URR	Session frequency	Session time
TOTALS											
England	**75**	**87.1**	**5.0**	**93.3**	**1.7**	**27.0**	**72.5**	**0.5**	**74.9**	**87.2**	**80.4**
N Ireland	**73**	**85.3**	**4.8**	**92.6**	**2.6**	**29.2**	**70.6**	**0.2**	**97.5**	**98.0**	**98.8**
Scotland	**72**	**81.3**	**0.8**	**97.4**	**1.7**	**13.5**	**84.3**	**2.2**	**99.8**	**96.9**	**97.6**
Wales	**75**	**88.5**	**4.0**	**94.8**	**1.2**	**39.9**	**59.7**	**0.3**	**99.6**	**53.5**	**30.1**
UK	**75**	**86.6**	**4.6**	**93.6**	**1.7**	**26.0**	**73.4**	**0.6**	**78.7**	**86.6**	**79.7**

Blank cells – no data returned by the centre or data completeness <70%.

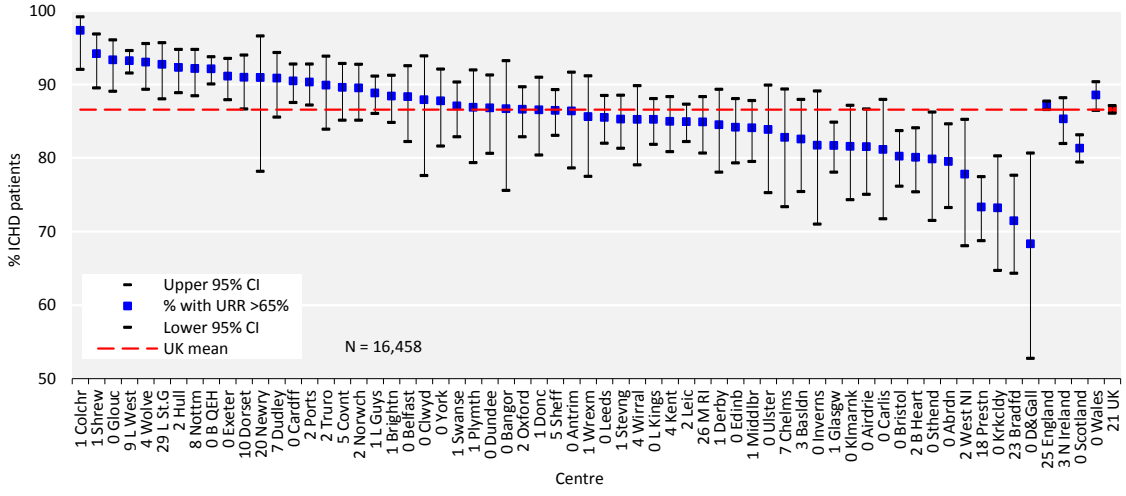

Figure 4.2 Percentage of adult patients prevalent to ICHD on 31/12/2018 with urea reduction ratio (URR) >65% by centre
CI – confidence interval

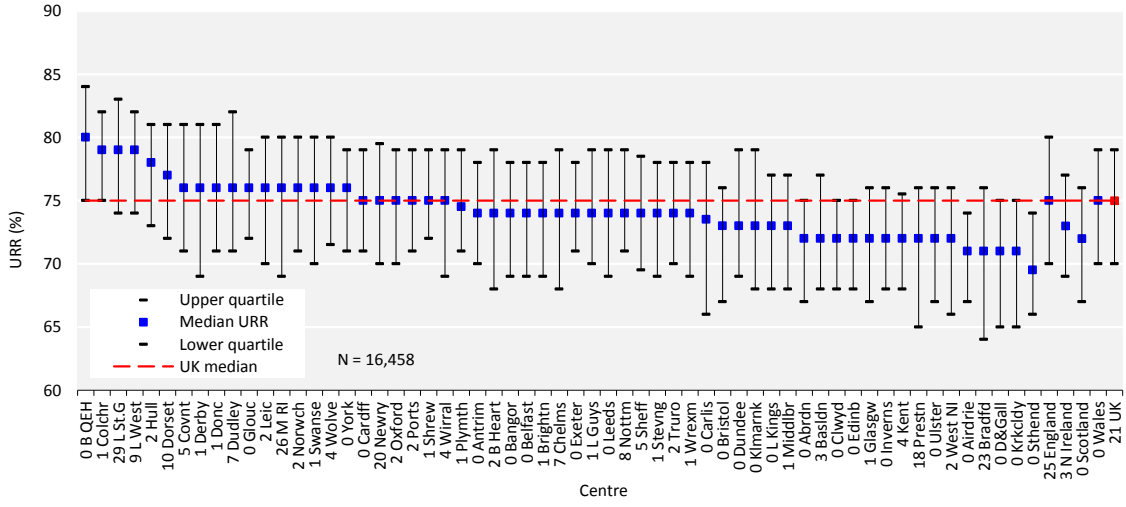

Figure 4.3 Median urea reduction ratio (URR) achieved in adult patients prevalent to ICHD on 31/12/2018 by centre

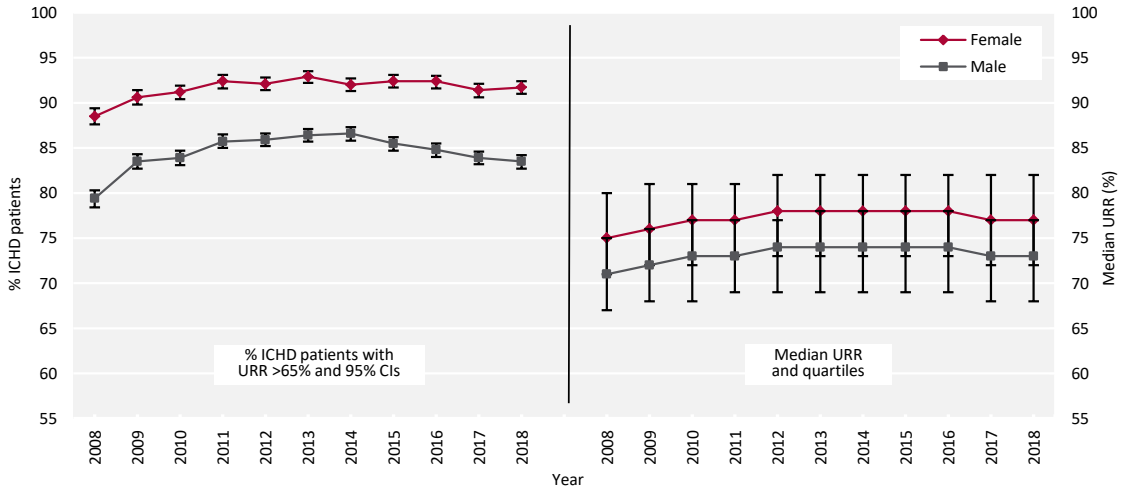

Figure 4.4 Change in the percentage of prevalent adult ICHD patients with urea reduction ratio (URR) >65% and the median URR by sex between 2008 and 2018

CI – confidence interval

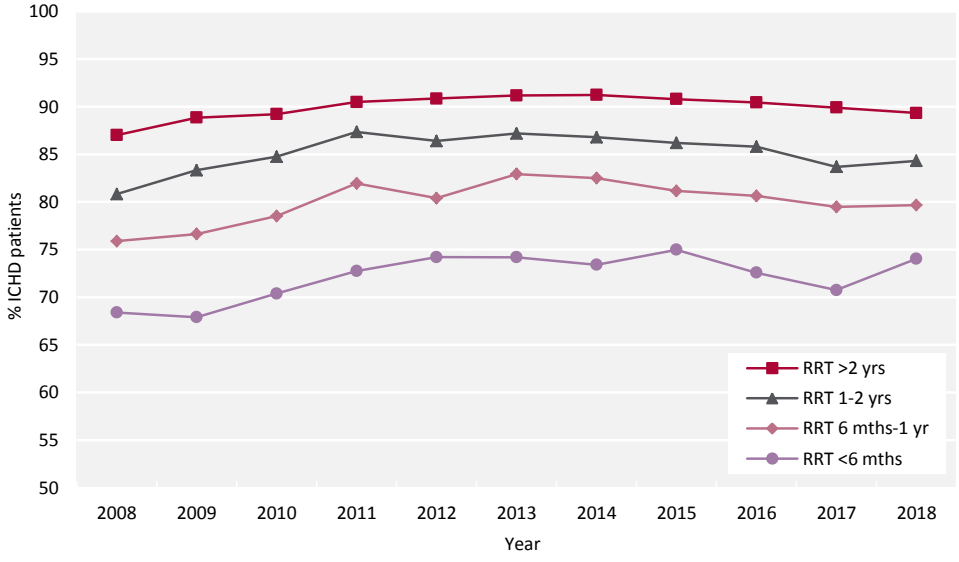

Figure 4.5 Percentage of prevalent adult ICHD patients achieving urea reduction ratio (URR) >65% by time on RRT between 2008 and 2018

Biochemistry parameters in prevalent adult ICHD patients

The Renal Association guideline on CKD mineral bone disease contains only one audit measure, which is the percentage of patients with adjusted calcium above the target range. For the first time the Scottish Renal Registry sent pre-dialysis potassium and bicarbonate data to the UKRR.

Table 4.6 Median adjusted calcium (Ca) and percentage with adjusted Ca within and above the target range (2.2–2.5 mmol/L) in adult patients prevalent to ICHD on 31/12/2018 by centre

Centre	Median adj Ca (mmol/L)	% adj Ca 2.2-2.5 mmol/L	% adj Ca >2.5 mmol/L	% data completeness
ENGLAND				
B Heart	2.4	78.5	16.2	99.1
B QEH	2.3	81.0	5.6	99.8
Basldn	2.4	74.3	21.1	100.0
Bradfd	2.4	82.0	13.9	99.6
Brightn	2.3	83.8	6.7	99.3
Bristol	2.4	82.3	14.8	99.8
Camb				
Carlis	2.3	78.4	5.2	100.0
Carsh	2.3	78.2	7.0	99.6
Chelms	2.3	83.8	4.0	98.0
Colchr	2.3	84.2	7.9	99.1
Covnt	2.3	77.5	6.2	97.2
Derby	2.4	88.7	7.3	100.0
Donc	2.4	82.4	10.3	100.0
Dorset	2.3	81.4	8.6	100.0
Dudley	2.4	79.9	11.1	100.0
Exeter	2.4	87.0	11.4	99.8
Glouc	2.4	80.7	12.0	100.0
Hull	2.4	79.3	12.8	100.0
Ipswi	2.3	77.6	9.8	100.0
Kent	2.4	75.6	20.2	99.7
L Barts	2.3	78.6	6.3	99.7
L Guys	2.3	79.7	6.6	100.0
L Kings	2.3	77.2	5.7	99.6
L Rfree	2.3	78.0	4.6	99.8
L St.G	2.4	80.2	8.2	98.5
L West	2.4	70.0	15.1	89.7
Leeds	2.4	81.9	11.9	99.8
Leic	2.3	83.7	5.7	100.0
Liv Ain	2.4	80.7	14.5	100.0
Liv Roy	2.4	84.5	7.4	98.5
M RI	2.4	74.7	16.9	93.3
Middlbr	2.3	73.6	4.1	99.7
Newc	2.3	84.2	6.3	100.0
Norwch	2.4	79.7	16.6	98.2
Nottm	2.4	83.1	11.0	100.0
Oxford	2.4	80.8	11.0	100.0
Plymth	2.3	82.9	10.3	99.2
Ports	2.4	78.5	11.0	99.2
Prestn	2.3	78.0	2.7	93.4
Redng	2.4	87.5	8.1	100.0
Salford	2.4	78.4	11.1	100.0
Sheff	2.3	76.7	5.3	99.8
Shrew	2.4	82.4	14.4	99.5
Stevng	2.3	81.3	6.4	99.8
Sthend	2.4	73.0	18.3	100.0
Stoke	2.4	84.9	10.6	98.9
Sund	2.3	76.1	13.1	99.6
Truro	2.5	66.9	32.5	100.0
Wirral	2.3	80.5	7.5	99.5
Wolve	2.4	77.4	17.8	99.0
York	2.4	87.4	7.8	100.0

Table 4.6 Continued

Centre	Median adj Ca (mmol/L)	% adj Ca 2.2-2.5 mmol/L	% adj Ca >2.5 mmol/L	% data completeness
N IRELAND				
Antrim	2.4	82.7	15.5	100.0
Belfast	2.3	82.1	8.3	100.0
Newry	2.4	87.3	11.3	100.0
Ulster	2.5	73.7	25.3	100.0
West NI	2.3	83.2	6.9	100.0
SCOTLAND				
Abrdn	2.4	78.1	17.9	100.0
Airdrie	2.4	82.2	13.9	100.0
D&Gall	2.3	76.9	7.7	100.0
Dundee	2.3	82.1	10.9	100.0
Edinb	2.4	73.9	19.6	100.0
Glasgw	2.4	84.3	10.5	99.5
Inverns	2.3	65.9	11.8	100.0
Klmarnk	2.4	82.8	14.9	100.0
Krkcldy	2.4	81.3	14.1	100.0
WALES				
Bangor	2.3	96.7	0.0	100.0
Cardff	2.4	73.8	17.3	100.0
Clwyd	2.4	80.6	13.4	100.0
Swanse	2.3	83.6	6.9	100.0
Wrexm	2.3	80.8	9.6	100.0
TOTALS				
England	**2.3**	**79.4**	**9.8**	**98.6**
N Ireland	**2.4**	**81.6**	**13.0**	**100.0**
Scotland	**2.4**	**80.1**	**13.8**	**99.8**
Wales	**2.4**	**79.3**	**12.0**	**100.0**
UK	**2.3**	**79.5**	**10.3**	**98.8**

Blank cells – no data returned by the centre.

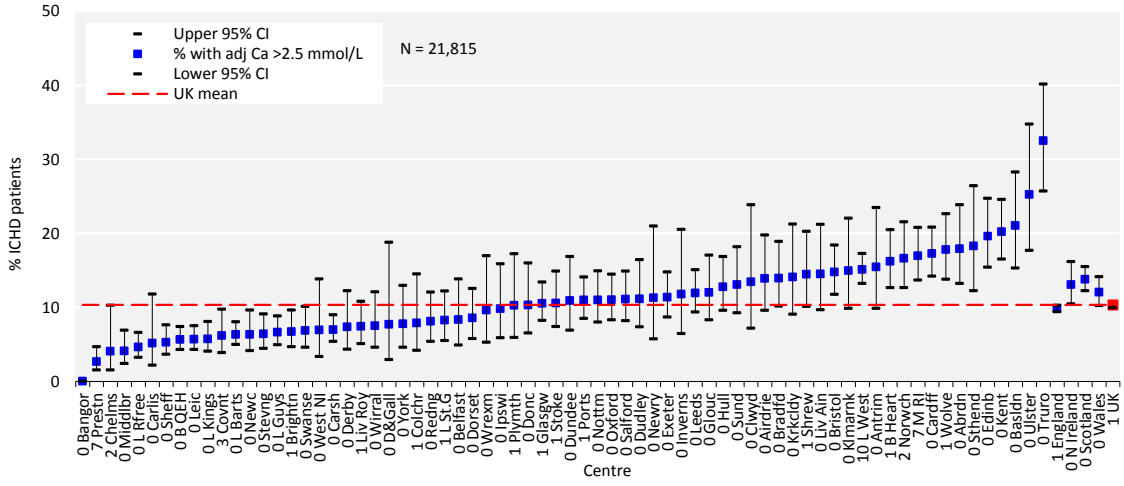

Figure 4.6 Percentage of adult patients prevalent to ICHD on 31/12/2018 with adjusted calcium (Ca) above the target range (>2.5 mmol/L) by centre
CI – confidence interval

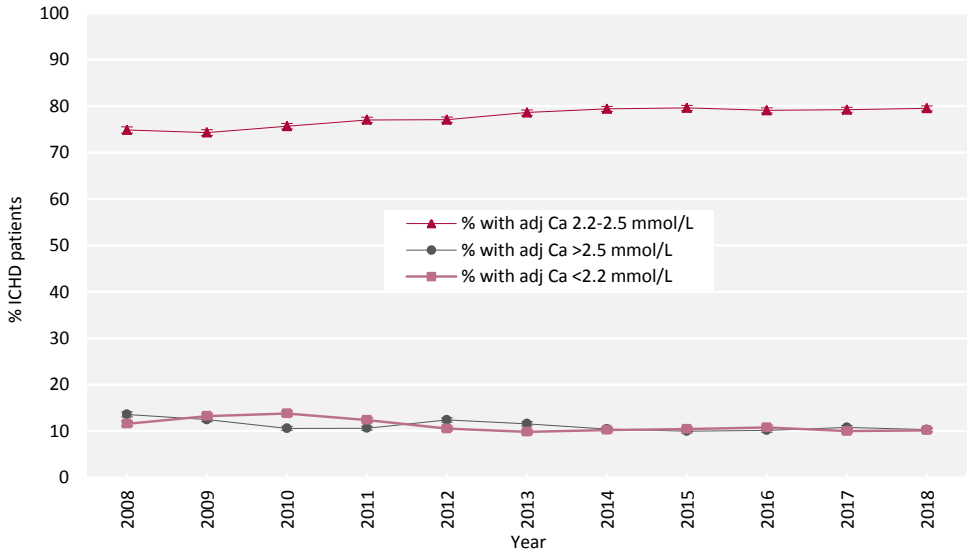

Figure 4.7 Change in percentage of prevalent adult ICHD patients within, above and below the target range for adjusted calcium (Ca 2.2–2.5 mmol/L) between 2008 and 2018

Table 4.7 Median pre-dialysis potassium and bicarbonate and percentage attaining target ranges in adult patients prevalent to ICHD on 31/12/2018 by centre

	Pre-dialysis potassium					Pre-dialysis bicarbonate				
Centre	Median (mmoI/L)	% <4.0 mmol/L	% 4.0–6.0 mmol/L	% >6.0 mmol/L	% data complete-ness	Median (mmoI/L)	% <18 mmol/L	% 18–26 mmol/L	% >26 mmol/L	% data complete-ness
ENGLAND										
B Heart	4.8	9.1	82.1	6.5	99.1	22	3.2	91.8	5.0	99.1
B QEH	4.9	10.3	81.6	8.5	99.8	23	1.3	93.0	5.8	99.8
Basldn	4.7	8.6	87.5	5.0	100.0	23	0.0	94.1	5.9	100.0
Bradfd	4.7	17.6	74.2	13.3	99.6	23	2.1	91.4	6.6	99.6
Brightn					0.0	25	1.0	73.6	25.4	99.3
Bristol	4.7	16.6	79.3	13.4	99.8	24	1.6	82.5	15.9	99.8
Camb										
Carlis					0.0	20	9.3	89.7	1.0	100.0
Carsh					0.0	25	0.2	77.6	22.2	72.1
Chelms	5.0	2.0	90.9	0.5	98.0	22	2.0	96.0	2.0	98.0
Colchr	4.7	21.1	75.4	14.5	99.1	22	0.9	96.5	2.6	99.1
Covnt					0.0	25	1.8	63.6	34.6	97.2
Derby					0.0	22	3.4	93.2	3.4	100.0
Donc	4.6	11.5	86.1	7.5	100.0	24	0.6	84.9	14.6	100.0
Dorset	4.8	8.2	86.6	5.5	100.0	22	2.2	88.9	8.9	100.0
Dudley	4.8	4.8	89.4	2.5	100.0					63.0
Exeter	4.5	20.9	77.7	17.2	99.8	23	2.8	87.9	9.2	99.8
Glouc					0.0	25	1.4	80.2	18.4	100.0
Hull	4.7	10.6	84.2	7.7	100.0	24	0.9	86.3	12.8	100.0
Ipswi					0.0	26	1.4	62.9	35.7	100.0
Kent	4.7	22.5	73.6	18.6	100.0	22	6.8	84.0	9.2	99.7
L Barts					0.0	23	7.4	83.5	9.1	99.4
L Guys	4.6	26.5	68.6	23.2	100.0	23	2.4	86.1	11.5	99.8
L Kings	5.2	6.3	80.7	4.5	99.6	22	4.3	93.5	2.2	99.6
L Rfree	5.0	13.2	78.2	10.8	99.8	22	5.4	87.6	7.0	95.2

Table 4.7 Continued

Centre	Pre-dialysis potassium					Pre-dialysis bicarbonate				
	Median (mmoI/L)	% <4.0 mmol/L	% 4.0–6.0 mmol/L	% >6.0 mmol/L	% data complete-ness	Median (mmoI/L)	% <18 mmol/L	% 18–26 mmol/L	% >26 mmol/L	% data complete-ness
L St.G					0.4	26	1.2	67.1	31.7	91.9
L West					0.0					57.0
Leeds	5.1	3.6	87.9	2.3	100.0	24	1.6	88.3	10.1	99.8
Leic	4.9	10.4	81.6	8.5	100.0	24	0.9	79.4	19.7	100.0
Liv Ain					0.0	24	1.4	81.4	17.2	100.0
Liv Roy					0.0	29	0.3	24.3	75.4	94.1
M RI					0.0	22	1.9	89.8	8.4	93.1
Middlbr	4.9	8.5	87.7	5.9	99.7	26	0.9	63.8	35.2	99.7
Newc					0.0	23	2.5	85.4	12.0	100.0
Norwch	5.0	3.3	87.5	1.7	98.2	23	4.5	89.6	6.0	97.5
Nottm	4.9	6.3	89.3	4.1	100.0	24	0.9	80.6	18.5	100.0
Oxford	5.0	7.5	86.3	5.3	100.0	23	3.0	88.0	9.0	100.0
Plymth	4.8	14.5	79.5	9.2	99.2	27	0.0	47.0	53.0	99.2
Ports	4.8	9.5	82.2	7.2	99.2	24	3.1	77.4	19.5	99.2
Prestn					0.0	23	4.0	90.2	5.8	100.0
Redng					0.0	25	1.1	80.4	18.5	100.0
Salford	4.7	14.3	81.9	11.0	100.0					0.3
Sheff	4.9	6.7	84.3	4.8	99.8	25	0.8	75.1	24.1	99.6
Shrew					0.0	25	2.1	65.8	32.1	99.5
Stevng	5.1	4.8	85.6	3.2	99.8	25	0.9	68.0	31.1	99.8
Sthend	4.7	14.8	77.4	9.4	100.0	26	0.9	54.8	44.4	100.0
Stoke					0.0	25	0.8	65.9	33.3	99.6
Sund					0.0	26	0.5	71.2	28.4	99.6
Truro	4.8	4.4	91.3	2.1	100.0	25	0.0	83.1	16.9	100.0
Wirral					0.0	24	1.0	80.1	18.9	100.0
Wolve	4.9	9.1	80.8	6.2	99.0	21	8.0	91.3	0.7	99.0
York	5.3	1.2	84.4	0.3	100.0	24	1.8	83.8	14.4	100.0
N IRELAND										
Antrim	4.9	8.2	84.6	4.3	100.0	26	0.0	55.5	44.6	100.0
Belfast	5.1	5.1	80.8	2.6	100.0	22	1.9	96.2	1.9	100.0
Newry	5.0	11.3	83.1	5.7	100.0					29.6
Ulster	4.8	9.1	87.9	4.8	100.0	23	0.0	97.0	3.0	100.0
West NI	5.1	11.9	80.2	6.9	100.0	23	0.0	90.1	9.9	100.0
SCOTLAND										
Abrdn	4.9	8.5	84.1	5.3	100.0					8.5
Airdrie	4.4	28.3	68.9	22.2	100.0	21	6.1	92.2	1.7	100.0
D&Gall	5.0	7.7	90.4	2.9	100.0	23	0.0	92.3	7.7	100.0
Dundee	4.9	7.1	84.0	4.0	100.0	26	0.7	57.6	41.7	96.8
Edinb	4.9	14.8	78.8	11.1	99.3					46.1
Glasgw	4.9	8.1	84.0	6.1	99.8	22	5.5	89.1	5.5	94.3
Inverns	5.0	7.8	87.0	3.5	90.6	25	2.8	69.0	28.2	83.5
Klmarnk	5.0	7.5	86.5	4.1	99.3	23	3.5	85.3	11.2	86.6
Krkcldy	4.9	10.2	85.2	6.0	100.0	26	0.8	67.5	31.8	98.4
WALES										
Bangor					0.0	23	1.6	91.8	6.6	100.0
Cardff					0.0	22	6.8	87.5	5.8	100.0
Clwyd					0.0	24	0.0	82.1	17.9	100.0
Swanse					0.0	24	1.5	77.7	20.8	100.0
Wrexm					0.0	27	0.0	39.4	60.6	100.0

Table 4.7 Continued

Centre	Pre-dialysis potassium					Pre-dialysis bicarbonate				
	Median (mmoI/L)	% <4.0 mmol/L	% 4.0–6.0 mmol/L	% >6.0 mmol/L	% data complete-ness	Median (mmoI/L)	% <18 mmol/L	% 18–26 mmol/L	% >26 mmol/L	% data complete-ness
TOTALS										
England	**4.9**	**11.1**	**81.9**	**10.5**	**59.2**	**24**	**2.9**	**81.3**	**15.8**	**92.7**
N Ireland	**5.0**	**8.6**	**83.1**	**6.5**	**100.0**	**23**	**0.6**	**85.4**	**14.0**	**90.7**
Scotland	**4.8**	**11.3**	**82.2**	**9.9**	**99.3**	**23**	**3.8**	**81.9**	**14.2**	**77.0**
Wales					**0.0**	**23**	**3.7**	**79.7**	**16.6**	**100.0**
UK	**4.9**	**11.0**	**82.0**	**10.5**	**60.5**	**23**	**2.9**	**81.4**	**15.7**	**91.7**

Blank cells – no data returned by the centre or data completeness <70%.

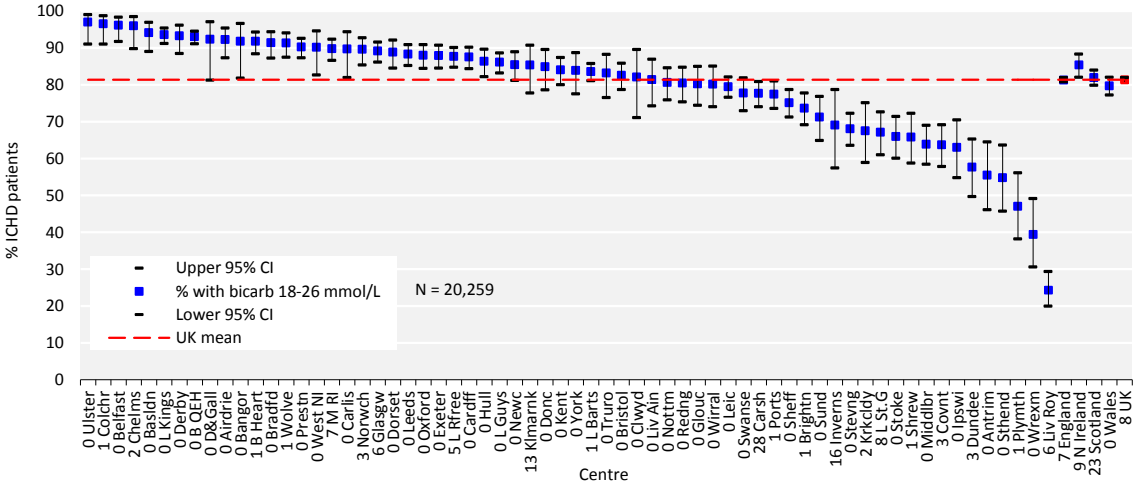

Figure 4.8 Percentage of adult patients prevalent to ICHD on 31/12/2018 with pre-dialysis bicarbonate (bicarb) within the target range (18–26 mmol/L) by centre

CI – confidence interval

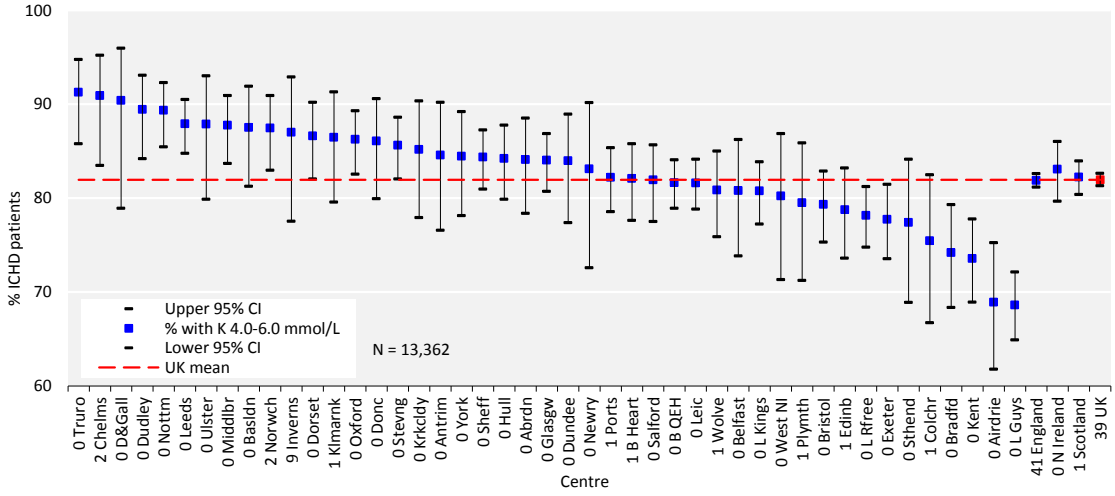

Figure 4.9 Percentage of adult patients prevalent to ICHD on 31/12/2018 with pre-dialysis potassium (K) within the target range (4.0–6.0 mmol/L) by centre

CI – confidence interval

Pre-dialysis potassium has only been included in the UKRR report in the last few years and therefore longitudinal analyses are not shown.

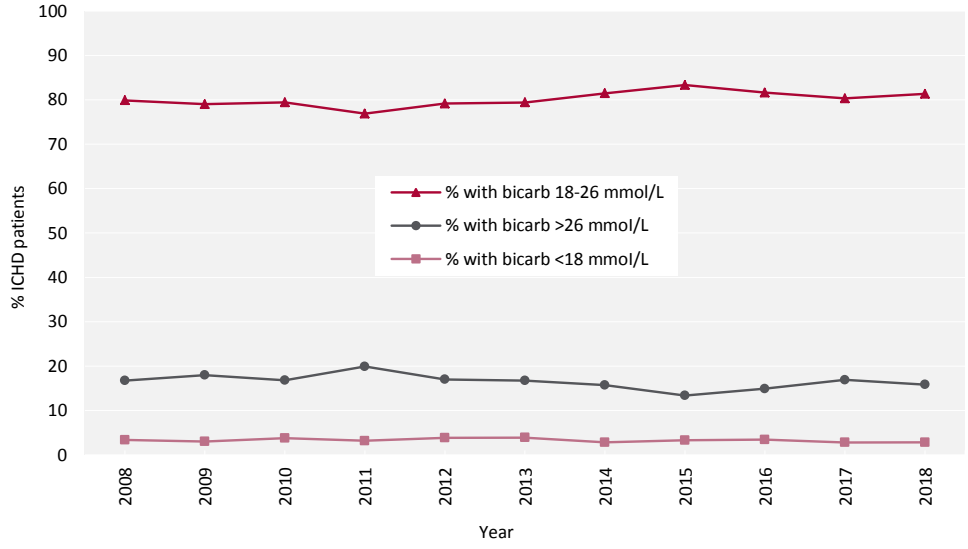

Figure 4.10 Change in percentage of prevalent adult ICHD patients within, above and below the target range for pre-dialysis bicarbonate (bicarb 18–26 mmol/L) between 2008 and 2018

Anaemia in prevalent adult ICHD patients

Inadequate data completeness in relation to ESAs makes auditing against national guidelines difficult to interpret. An important assumption is that patients for whom no ESA data have been submitted to the UKRR are not on ESA treatment, provided the centre has submitted ESA data for other patients on ICHD. The weekly ESA dose is reported, but there are some uncertainties surrounding the accuracy of this measure (see appendix A).

Table 4.8 Median haemoglobin and ferritin and percentage attaining target ranges in adult patients prevalent to ICHD on 31/12/2018 by centre

	Haemoglobin				Ferritin		
Centre	Median (g/L)	% <100 g/L	% >120 g/L	% data completeness	Median (µg/L)	% <100 µg/L	% data completeness
ENGLAND							
B Heart	112	19.4	20.9	99.1	236	23.1	97.4
B QEH	111	20.1	18.6	99.8	373	5.2	99.7
Basldn	112	19.1	23.0	100.0	397	7.2	100.0
Bradfd	112	22.0	30.2	100.0	523	2.4	100.0
Brightn	110	21.4	23.1	99.3	531	2.0	99.0
Bristol	111	8.6	23.4	99.8	654	1.8	100.0
Camb							
Carlis	111	20.6	22.7	100.0	529	7.2	100.0
Carsh	108	23.5	14.6	100.0	353	6.5	98.4
Chelms	115	13.1	29.3	98.0	400	11.1	98.0
Colchr	112	19.3	14.9	99.1	548	0.9	99.1
Covnt	106	32.0	9.1	97.2	422	5.1	96.8
Derby	121	6.8	52.0	100.0	528	3.4	99.4
Donc	107	30.3	14.5	100.0	424	1.8	100.0
Dorset	112	15.3	22.0	99.6	460	1.1	99.6
Dudley	115	13.8	25.4	100.0	241	10.1	73.0
Exeter	111	10.9	19.9	99.8	310	7.6	99.8
Glouc	113	16.6	26.3	100.0	392	8.5	98.2
Hull	111	21.6	20.1	100.0	402	4.3	100.0
Ipswi	110	18.3	9.9	99.3	541	8.4	100.0
Kent	110	18.6	18.8	100.0	507	4.0	99.2
L Barts	108	25.9	15.3	99.8	639	3.6	99.7
L Guys	109	25.9	14.8	100.0	508	3.5	99.1
L Kings	111	20.4	19.8	99.6	518	2.8	99.6
L Rfree	110	20.9	17.4	99.8	427	7.7	99.5
L St.G	104	38.6	13.5	98.5	358	7.2	97.1
L West	113	14.4	22.6	95.8	327	6.2	95.5
Leeds	107	28.0	11.9	100.0	354	7.0	99.8
Leic	112	20.6	26.2	99.9	354	8.0	100.0
Liv Ain	114	20.0	27.6	100.0	515	4.2	97.9
Liv Roy	111	20.3	22.7	98.2	377	7.2	98.0
M RI	110	24.3	23.4	93.5	394	3.2	81.2
Middlbr	113	18.2	24.5	99.7	824	5.1	99.1
Newc	110	23.1	20.9	100.0	412	4.7	100.0
Norwch	114	18.6	31.2	97.5	399	6.3	98.2
Nottm	108	18.8	11.9	100.0	405	2.8	100.0
Oxford	111	21.3	22.0	100.0	314	7.6	98.8
Plymth	111	16.2	31.6	99.2	452	6.8	99.2
Ports	112	22.2	26.7	99.2	394	5.4	98.4
Prestn	112	17.5	22.5	100.0	637	4.8	96.3

Table 4.8 Continued

Centre	Haemoglobin				Ferritin		
	Median (g/L)	% <100 g/L	% >120 g/L	% data completeness	Median (µg/L)	% <100 µg/L	% data completeness
Redng	110	18.5	17.3	100.0	589	3.7	100.0
Salford	110	28.0	21.9	100.0	347	11.0	87.2
Sheff	109	25.6	20.9	99.8	476	2.3	100.0
Shrew	116	11.8	35.3	99.5	393	3.2	99.5
Stevng	107	27.3	10.3	100.0	449	4.8	99.8
Sthend	108	27.0	13.0	100.0	343	4.3	100.0
Stoke	113	18.0	25.1	99.6	392	4.1	99.6
Sund	116	13.5	36.9	99.6	263	8.7	98.2
Truro	105	28.1	10.0	100.0	358	1.9	100.0
Wirral	111	20.9	18.9	100.0	504	5.5	99.5
Wolve	111	25.1	25.4	99.0	440	3.8	99.3
York	110	20.4	16.2	100.0	395	6.6	100.0
N IRELAND							
Antrim	109	22.9	11.0	99.1	436	1.8	100.0
Belfast	114	17.3	26.9	100.0	459	1.9	100.0
Newry	112	19.7	21.1	100.0	454	7.0	100.0
Ulster	113	18.2	23.2	100.0	675	1.0	100.0
West NI	111	17.8	24.8	100.0	719	2.0	100.0
SCOTLAND							
Abrdn	110	20.4	14.4	100.0	518	3.2	92.0
Airdrie	110	23.3	10.6	100.0	537	4.5	98.3
D&Gall	114	5.8	26.9	100.0	648	1.9	100.0
Dundee	115	16.0	34.0	100.0	365	11.0	99.4
Edinb	117	12.5	38.2	100.0	453	4.3	99.6
Glasgw	110	22.4	21.3	99.8	498	5.2	99.1
Inverns	114	9.4	17.6	100.0	364	6.8	85.9
Klmarnk	106	26.1	13.4	100.0	212	22.4	100.0
Krkcldy	114	12.5	31.3	100.0	495	7.1	99.2
WALES							
Bangor	112	23.0	24.6	100.0	378	4.9	100.0
Cardff	110	23.6	22.6	100.0	348	3.8	100.0
Clwyd	108	26.9	16.4	100.0	294	6.0	100.0
Swanse	111	14.9	19.9	100.0	412	9.3	99.1
Wrexm	114	15.4	28.8	100.0	637	1.9	100.0
TOTALS							
England	**111**	**20.9**	**20.6**	**99.2**	**417**	**5.5**	**98.0**
N Ireland	**112**	**19.0**	**21.8**	**99.8**	**549**	**2.4**	**100.0**
Scotland	**112**	**18.6**	**23.4**	**99.9**	**452**	**6.7**	**97.8**
Wales	**111**	**20.2**	**22.1**	**100.0**	**381**	**5.5**	**99.7**
UK	**111**	**20.6**	**20.9**	**99.3**	**419**	**5.5**	**98.1**

Blank cells – no data returned by the centre or data completeness <70%.

Table 4.9 Distribution of haemoglobin and erythropoiesis stimulating agent (ESA) dose values in adult patients prevalent to ICHD on 31/12/2018 by centre

	ESA		Haemoglobin and ESA	
Centre	% on ESA	Median dose (IU/week)	% <100 g/L and not on ESA	% >120 g/L and on ESA
ENGLAND				
B Heart	87.8	8,000	0.9	11.8
B QEH	0.1			
Basldn	94.1	6,000	0.7	20.4
Bradfd	91.0	6,000	2.0	26.1
Brightn	93.3	6,400	0.2	19.2
Bristol	93.9	8,000	0.0	21.4
Camb				
Carlis	84.5	6,000	0.0	18.6
Carsh	0.8			
Chelms	94.1	12,000	0.0	25.3
Colchr	0.0			
Covnt	83.0	8,000	2.5	6.5
Derby	0.0			
Donc	95.2	8,000	0.0	12.1
Dorset	92.2	6,000	0.4	18.7
Dudley	87.8	10,000	1.6	19.0
Exeter	92.7	6,000	0.2	17.1
Glouc	86.6		0.0	20.7
Hull	43.8			
Ipswi	44.1			
Kent	94.0	9,000	0.3	16.5
L Barts	0.2			
L Guys	0.0			
L Kings	92.1	8,000	0.2	15.4
L Rfree	0.2			
L St.G	0.0			
L West	0.0			
Leeds	97.2	8,000	0.0	10.1
Leic	88.4	6,000	2.3	20.7
Liv Ain	0.0			
Liv Roy	0.0			
M RI	0.0			
Middlbr	63.9			
Newc	93.4	7,400	0.6	19.6
Norwch	91.7	9,000	0.4	27.5
Nottm	94.4	6,000	0.3	8.2
Oxford	91.8	12,000	1.0	18.3
Plymth	0.0			
Ports	5.3			
Prestn	91.9		0.8	18.9
Redng	91.1	14,100	3.3	14.8
Salford	3.5			
Sheff	87.3	6,000	4.1	18.0
Shrew	1.6			
Stevng	95.2	10,000	0.5	8.4
Sthend	92.2	10,000	0.0	7.8
Stoke	0.0			
Sund	92.4	7,100	0.0	32.0
Truro	0.0			
Wirral	87.6	9,000	1.0	13.9

Table 4.9 Continued

Centre	ESA		Haemoglobin and ESA	
	% on ESA	Median dose (IU/week)	% <100 g/L and not on ESA	% >120 g/L and on ESA
Wolve	87.6	8,000	2.1	22.6
York	91.0	6,000	0.6	10.2
N IRELAND				
Antrim	94.5	6,000	0.9	5.5
Belfast	96.2	8,000	0.0	24.4
Newry	94.4	6,000	0.0	18.3
Ulster	94.9	4,000	1.0	23.2
West NI	100.0	6,000	0.0	24.8
SCOTLAND				
Abrdn	88.5		2.9	12.9
Airdrie	96.0	8,000	1.1	11.9
D&Gall	82.2	10,000	6.7	24.4
Dundee	79.5		2.5	18.0
Edinb	80.7		2.5	21.8
Glasgw	88.3	8,000	1.8	17.0
Inverns	78.1		1.4	13.7
Klmarnk	91.5	8,000	1.4	18.3
Krkcldy	83.6		3.1	20.3
WALES				
Bangor	82.0		3.3	21.3
Cardff	51.0			
Clwyd	40.3			
Swanse	94.6	9,000	0.0	15.8
Wrexm	45.2			
TOTAL[1]				
UK	**90.9**	**8,000**	**1.1**	**17.3**

Blank cells – no data returned by the centre or data completeness <70% (or <70% patients were on an ESA).
Data for Scotland refer to patients prevalent to ICHD on 31/05/2018 due to ESA data availability.
[1]This is the total of only those centres with at least 70% of ICHD patients on an ESA.

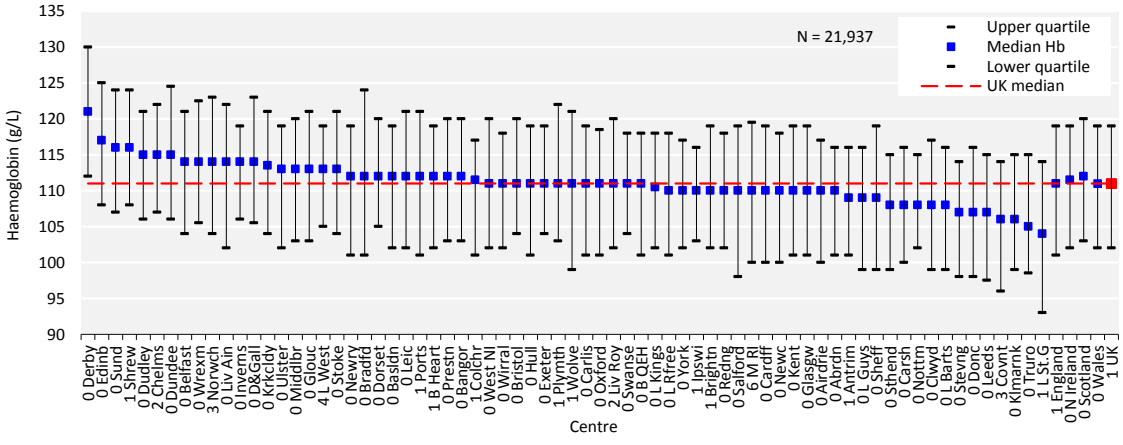

Figure 4.11 Median haemoglobin (Hb) in adult patients prevalent to ICHD on 31/12/2018 by centre

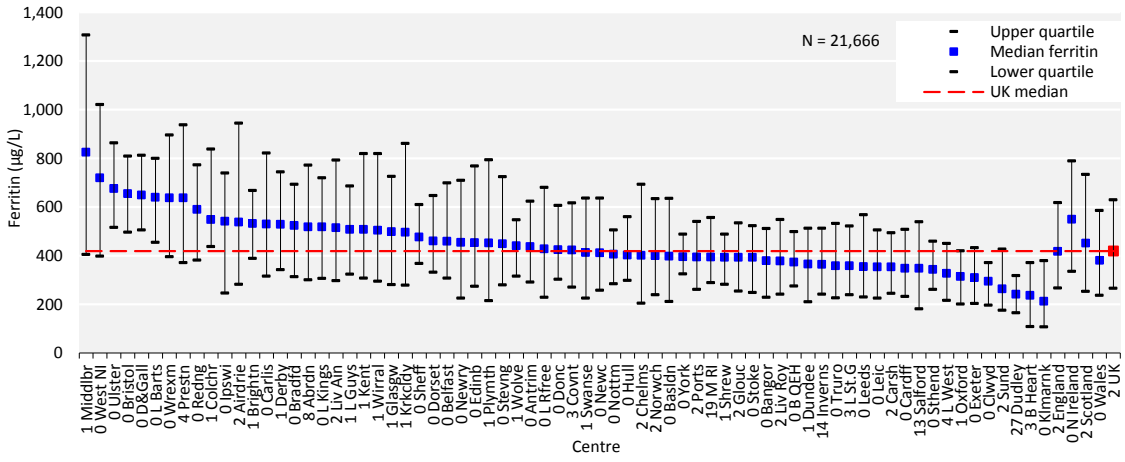

Figure 4.12 Median ferritin in adult patients prevalent to ICHD on 31/12/2018 by centre

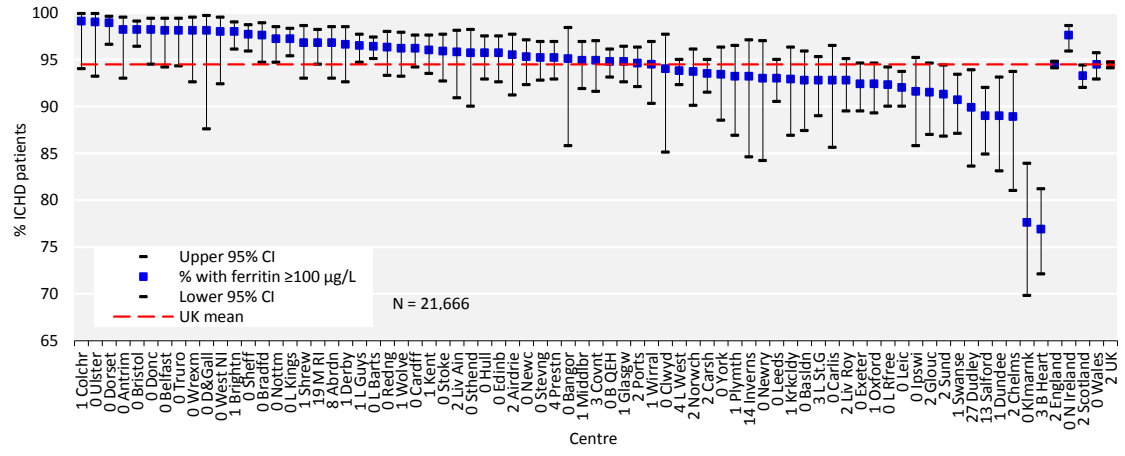

Figure 4.13 Percentage of adult patients prevalent to ICHD on 31/12/2018 with ferritin ≥100 µg/L by centre
CI – confidence interval

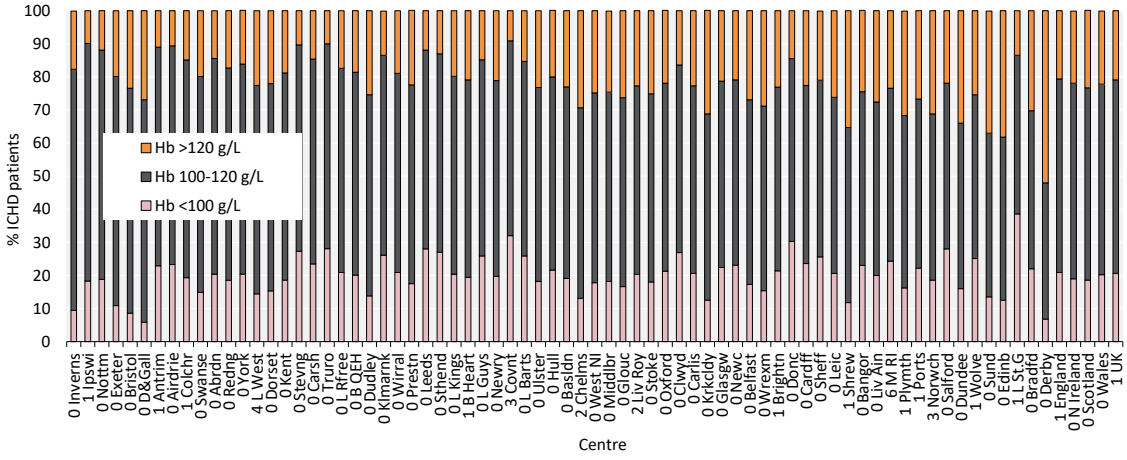

Figure 4.14 Distribution of haemoglobin (Hb) in adult patients prevalent to ICHD on 31/12/2018 by centre

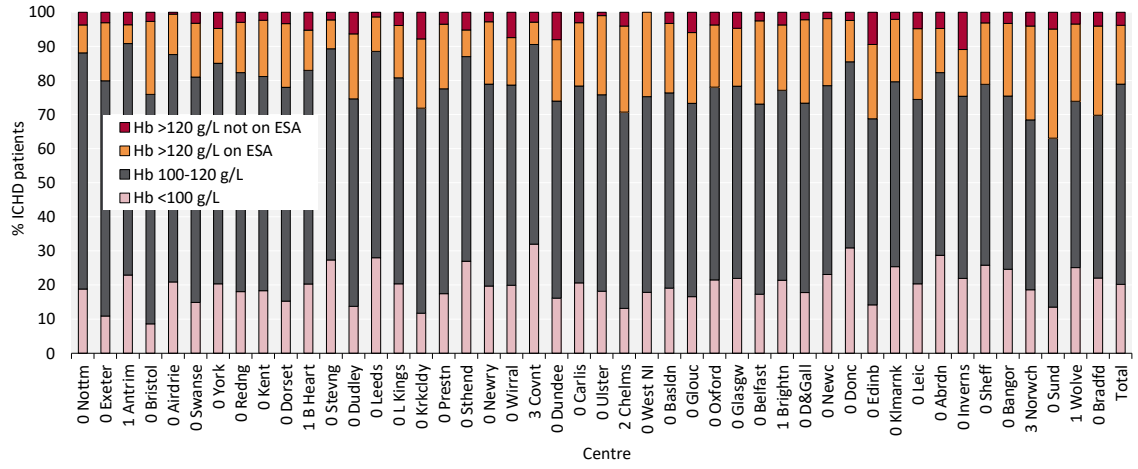

Figure 4.15 Distribution of haemoglobin (Hb) in adult patients prevalent to ICHD on 31/12/2018 and the proportion with haemoglobin >120 g/L receiving erythropoiesis stimulating agent (ESA) by centre

Figure (including total) does not include centres with <70% data completeness (or <70% ESA use).
Data for Scotland refer to patients prevalent to ICHD on 31/5/2018 due to ESA data availability.

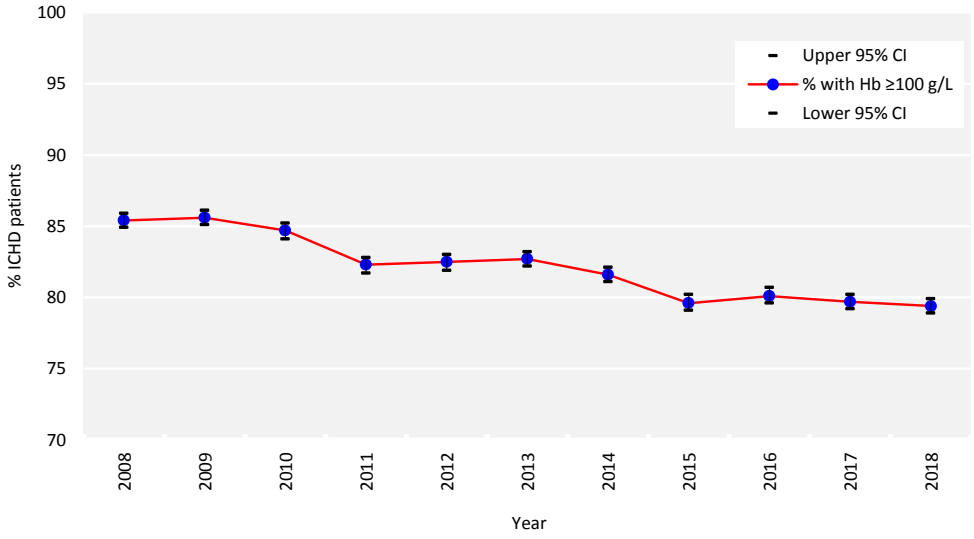

Figure 4.16 Percentage of prevalent adult ICHD patients with haemoglobin (Hb) ≥100 g/L between 2008 and 2018
CI – confidence interval

Dialysis access in prevalent adult dialysis patients

Prevalent dialysis access data were collected separately to the main UKRR quarterly data returns via the 2018 Multisite Dialysis Access Audit (see appendix A). Although Scotland do not contribute data via the audit they submit access data for incident patients separately (see chapter 1).

The type of prevalent dialysis access is presented in figure 4.17 for the 43 of 62 centres in England, Northern Ireland and Wales that returned vascular access data on ≥70% of their prevalent dialysis patients. Rates of PD may impact the types of vascular access used for ICHD and this is reflected in the combined audit measures for dialysis access.

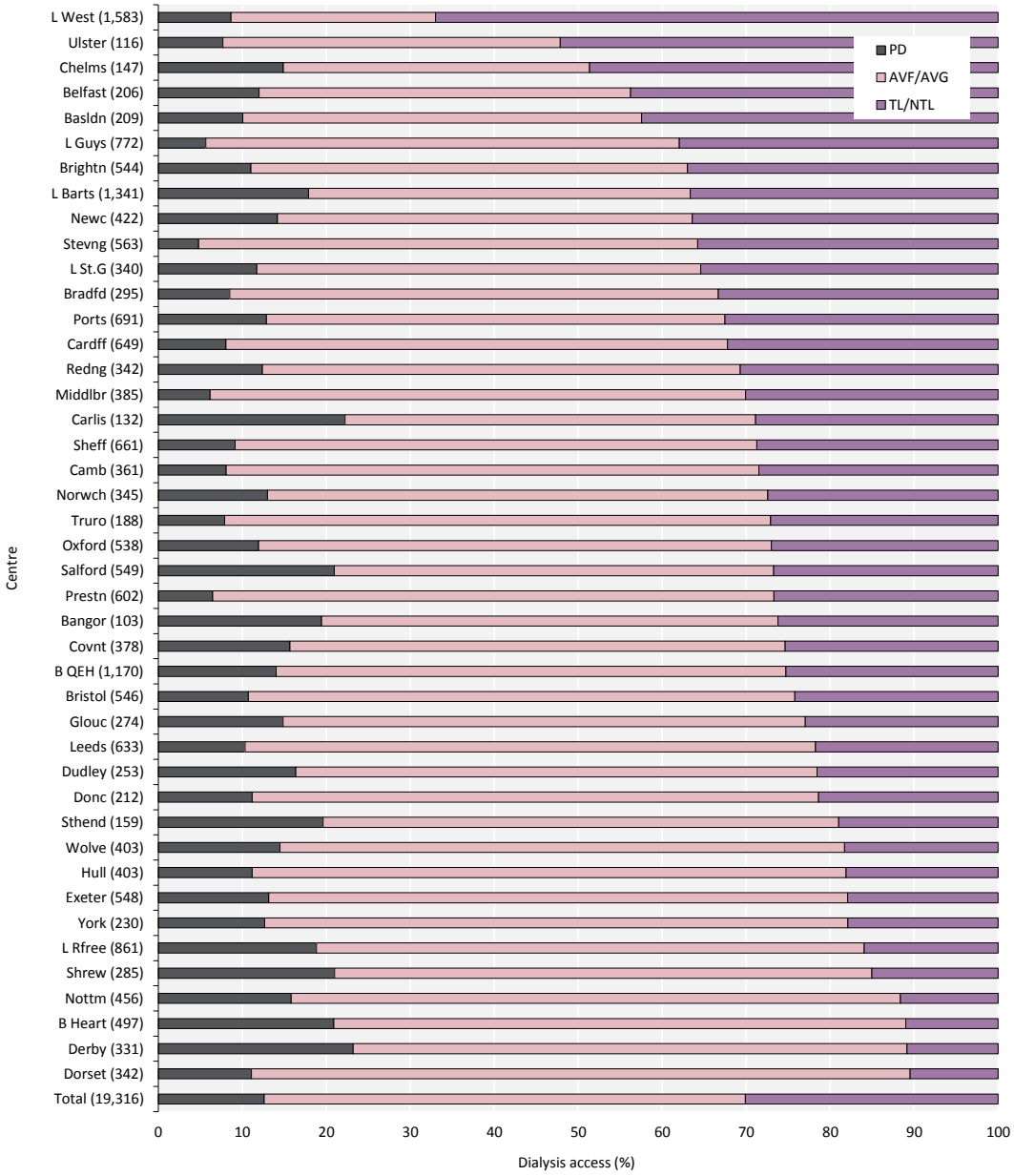

Figure 4.17 Dialysis access in adult patients prevalent to dialysis on 31/12/2018 by centre (2018 Multisite Dialysis Access Audit)

Number of patients on dialysis in a centre in brackets (centres with <70% access data for the prevalent dialysis population were excluded).
AVF – arteriovenous fistula; AVG – arteriovenous graft; NTL – non-tunnelled line; TL – tunnelled line

Infections in adult haemodialysis patients

PHE has carried out mandatory enhanced surveillance of MRSA bacteraemia since October 2005 and of MSSA bacteraemia since January 2011 for NHS acute trusts, with the subsequent addition of *E. coli* bacteraemia and *C. difficile* reporting. Patient-level infection data are reported in real time to PHE. Wales provides infection data extracted locally from the renal and hospital IT systems.

The definition of each type of infectious episode is detailed in appendix A.

A rolling two year cohort is reported in line with Renal Association guidelines. These analyses included all patients on HD, whether on HHD or ICHD.

Table 4.10 Rate of infection episodes per 100 HD patient years in prevalent adult HD patients in England and Wales from January 2017 to December 2018 by centre

		Rate per 100 HD patient years			
Centre	HD patient years	MRSA	MSSA	*C.difficile*	*E.coli*
ENGLAND					
B Heart	804	0.12	1.87	1.37	1.62
B QEH	2,103	0.14	2.57	1.09	1.71
Basldn	356	0.56	4.77	3.65	0.28
Bradfd	540	0.74	3.89	0.19	2.04
Brightn	944	0.32	3.60	2.65	2.65
Bristol	1,029	0.87	1.85	0.78	2.53
Camb					
Carlis	197	0.00	5.60	1.53	2.54
Carsh	1,754	0.17	2.17	1.03	2.05
Chelms	251	0.00	0.80	2.79	1.20
Colchr	255	0.39	2.35	0.39	0.78
Covnt	709	0.00	1.55	0.99	2.26
Derby	498	0.00	1.41	1.21	1.21
Donc	386	0.00	4.15	0.78	2.33
Dorset	603	0.17	1.49	1.49	1.99
Dudley	426	0.00	3.99	1.17	1.41
Exeter	929	0.11	2.15	1.18	1.29
Glouc	493	0.00	3.04	1.01	1.01
Hull	702	0.00	3.42	1.28	1.71
Ipswi	312	0.32	3.20	0.96	1.92
Kent	899	0.22	3.56	0.33	1.89
L Barts	2,130	0.38	2.96	0.66	2.07
L Guys	1,420	0.21	2.32	0.21	1.48
L Kings	1,185	0.25	2.19	1.10	1.01
L Rfree	1,410	0.07	1.70	1.84	2.77
L St.G	630	0.00	1.91	0.64	2.22
L West	2,969	0.24	2.16	1.11	1.85
Leeds	1,097	0.18	2.55	1.09	1.46
Leic	1,937	0.05	3.25	0.77	2.17
Liv Ain	360	0.00	3.89	1.39	2.78
Liv Roy	799	0.00	2.50	1.63	1.63
M RI	1,140	0.09	4.04	1.75	1.93
Middlbr	687	0.00	1.31	0.73	1.60
Newc	699	0.14	6.15	2.15	2.00
Norwch	639	0.16	1.25	0.94	1.72
Nottm	790	0.00	2.66	1.14	2.91

Table 4.10 Continued

Centre	HD patient years	Rate per 100 HD patient years			
		MRSA	MSSA	*C.difficile*	*E.coli*
Oxford	951	0.11	1.47	0.53	2.21
Plymth	289	0.00	3.46	1.39	2.08
Ports	1,231	0.24	3.66	0.98	1.71
Prestn	1,124	0.09	2.76	1.16	1.33
Redng	609	0.00	3.45	0.49	3.12
Salford	831	0.24	3.61	1.56	1.56
Sheff	1,208	0.00	2.73	1.08	1.32
Shrew	418	0.00	1.20	0.48	2.39
Stevng	1,051	0.29	2.00	0.95	2.09
Sthend	251	0.00	2.79	0.80	1.59
Stoke	659	0.00	1.67	0.45	3.79
Sund	530	0.76	2.64	1.13	2.45
Truro	334	0.00	3.29	1.80	0.90
Wirral	422	0.00	1.42	2.61	1.42
Wolve	664	0.00	1.51	0.30	2.41
York	391	0.51	5.88	1.53	2.56
WALES					
Bangor	161	0.00	4.96	3.72	3.10
Cardff	1,111	0.45	3.60	1.98	1.62
Clwyd	149	0.00	4.03	2.01	2.01
Swanse	790	0.13	4.05	1.52	3.93
Wrexm	240	0.83	4.17	1.67	2.08
TOTALS					
England	**40,698**	**0.18**	**2.81**	**1.17**	**2.03**
Wales	**2,341**	**0.34**	**4.10**	**2.01**	**2.65**
E & W	**43,038**	**0.19**	**2.88**	**1.21**	**2.06**

Blank cells – no data returned by the centre.
C. difficile – Clostridium difficile; E. coli – Escherichia coli; MRSA – methicillin-resistant *Staphylococcus aureus*; MSSA – methicillin-sensitive *Staphylococcus aureus*

Funnel plots show each centre's estimated infection rate per 100 HD patient years for MRSA and MSSA against the number of patient years at risk to take into account the greater variation expected as centre size decreases.

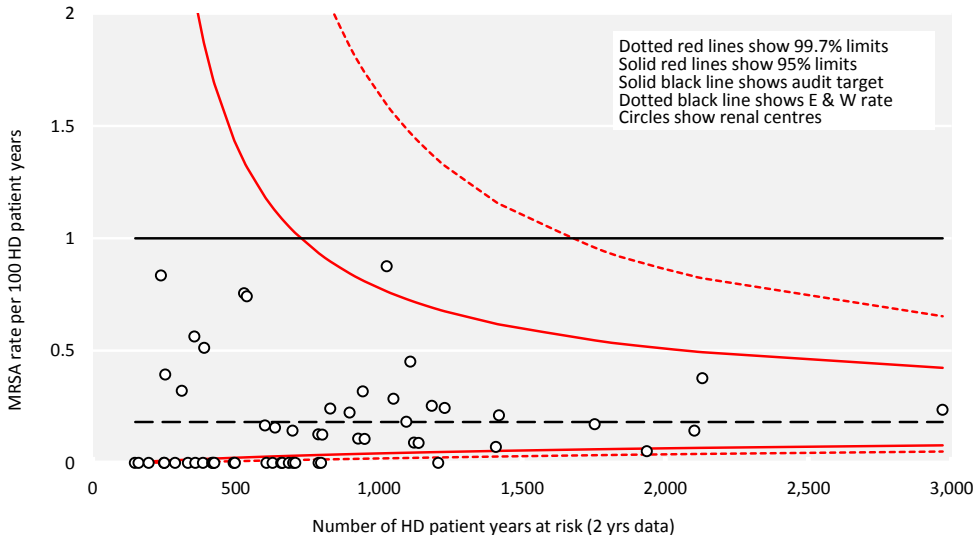

Figure 4.18 Methicillin-resistant *Staphylococcus aureus* (MRSA) rates by centre per 100 HD adult patient years (2017–2018 data) compared to audit target

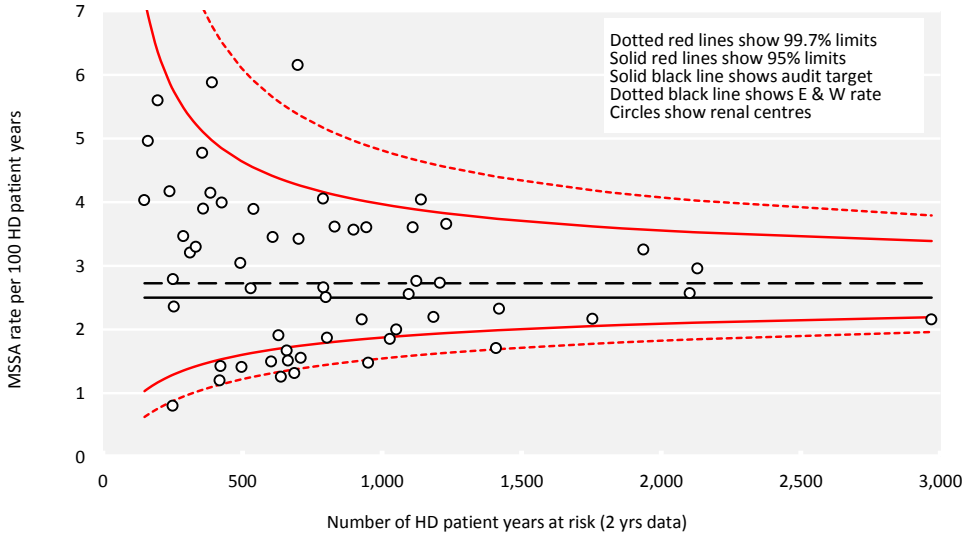

Figure 4.19 Methicillin-sensitive *Staphylococcus aureus* (MSSA) rates by centre per 100 HD adult patient years (2017–2018 data) compared to audit target

Trends in MRSA and MSSA rates are displayed using box and whisker plots, displaying the median, interquartile range and range of centre rates (more detail is available in appendix A).

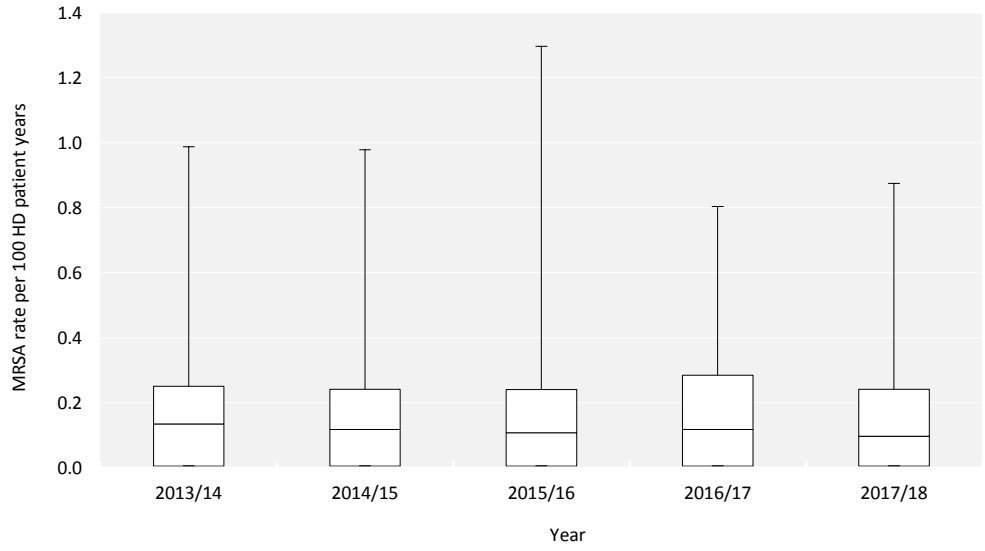

Figure 4.20 Distribution of methicillin-resistant *Staphylococcus aureus* (MRSA) centre rates per 100 HD adult patient years by rolling 2 calendar year cohort (Wales included from 2016 onwards)

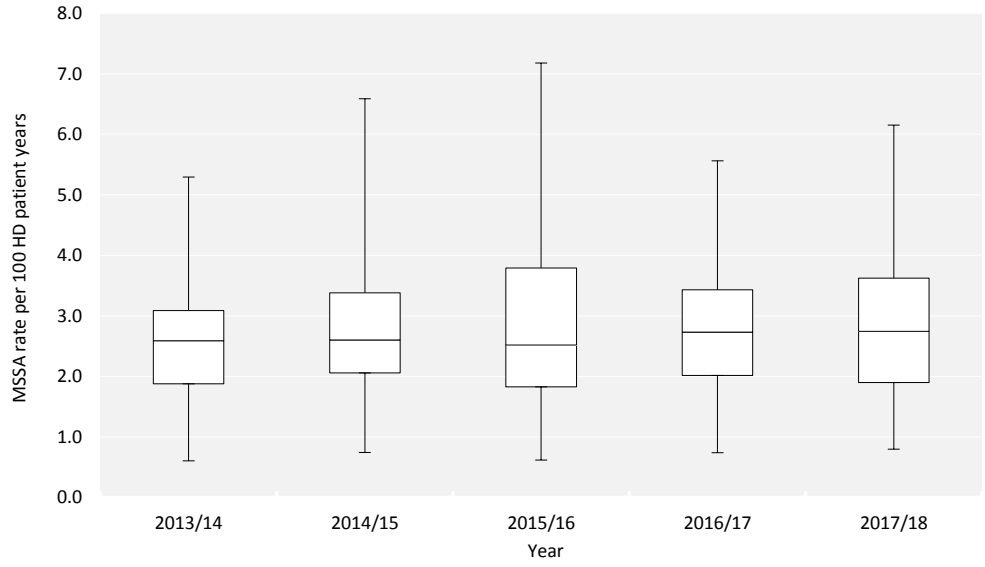

Figure 4.21 Distribution of methicillin-sensitive *Staphylococcus aureus* (MSSA) centre rates per 100 HD adult patient years by rolling 2 calendar year cohort (Wales included from 2016 onwards)

Cause of death in adult ICHD patients

Cause of death was analysed in prevalent patients receiving ICHD on 31/12/2017 and followed-up for one year in 2018. The proportion of ICHD patients with each cause of death is shown for patients with cause of death data and these total 100% of patients with data. The proportion of patients with no cause of death data is shown on a separate line. Further detail on the survival of prevalent RRT patients is in chapter 2.

Table 4.11 Cause of death in adult patients prevalent to ICHD on 31/12/2017 followed-up in 2018 by age group

	ICHD all ages		ICHD <65 years		ICHD ≥65 years	
Cause of death	N	%	N	%	N	%
Cardiac disease	567	21.3	193	28.3	374	18.8
Cerebrovascular disease	107	4.0	47	6.9	60	3.0
Infection	482	18.1	122	17.9	360	18.1
Malignancy	161	6.0	30	4.4	131	6.6
Treatment withdrawal	580	21.8	102	15.0	478	24.1
Other	522	19.6	131	19.2	391	19.7
Uncertain aetiology	247	9.3	56	8.2	191	9.6
Total (with data)	**2,666**	**100.0**	**681**	**100.0**	**1,985**	**100.0**
Missing	1,206	31.2	290	29.9	916	31.6

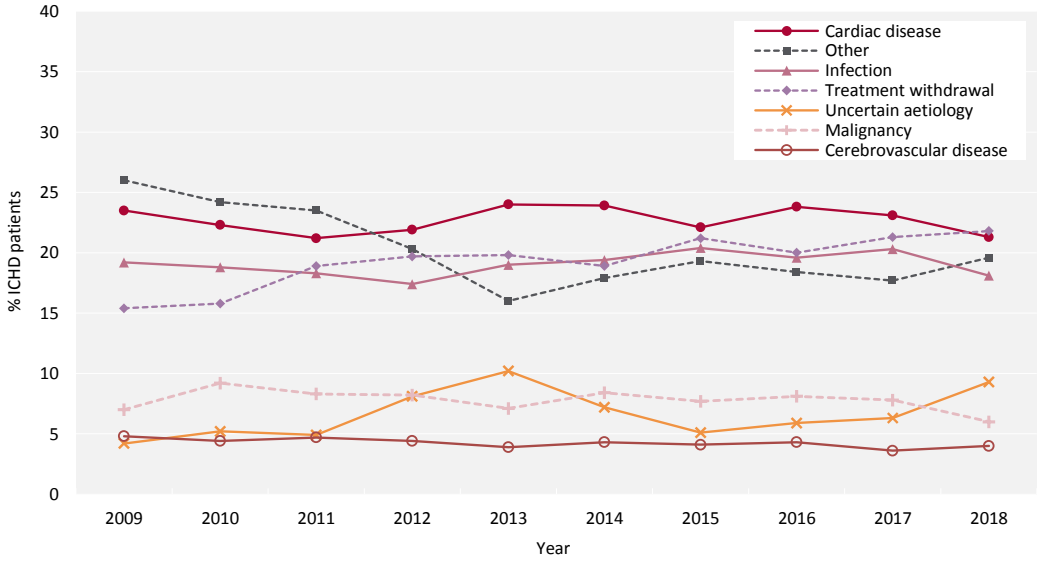

Figure 4.22 Cause of death between 2009 and 2018 for adult patients prevalent to ICHD at the beginning of the year

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Chapter 5

Adults on peritoneal dialysis (PD) in the UK at the end of 2018

Contents

Introduction

This chapter describes the population of adult patients with end-stage kidney disease (ESKD) who were receiving regular peritoneal dialysis (PD) in the UK at the end of 2018 (figure 5.1). This population comprises patients who were on PD at the end of 2017 and remained on PD throughout 2018, as well as patients who commenced/re-commenced PD in 2018. This latter group includes both incident renal replacement therapy (RRT) patients who ended 2018 on PD and prevalent RRT patients who switched to PD from in-centre haemodialysis (ICHD), home haemodialysis (HHD) or a transplant (Tx) in 2018. Consequently, the cohort of patients receiving PD in a centre not only reflects differences in underlying population case-mix, but also differences in the rates of acceptance onto RRT, survival on PD, transplantation and haemodialysis (ICHD and HHD), and the care of patients on those other modalities, as described in other chapters of this report.

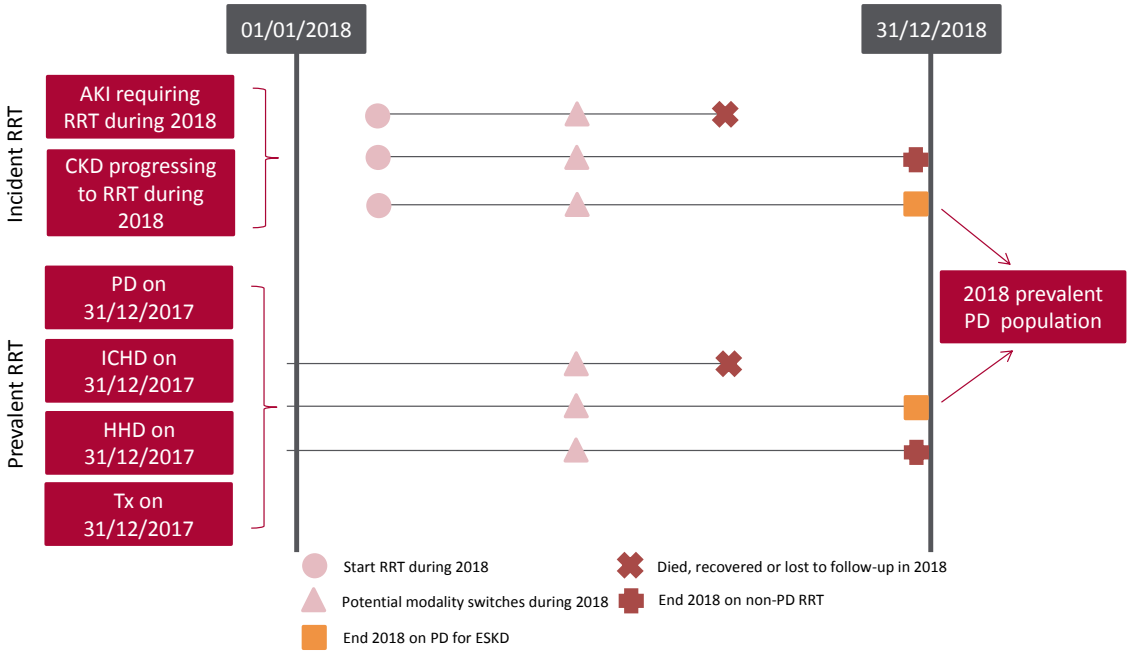

Figure 5.1 Pathways adult patients could follow to be included in the UK 2018 prevalent PD population

Note that patients receiving dialysis for acute kidney injury (AKI) are only included in this chapter if they had a timeline or RRT modality code for chronic PD at the end of 2018 or if they had been on RRT for ≥90 days and were on PD at the end of 2018.
CKD – chronic kidney disease

The infection analyses, except for peritonitis, used a rolling two year cohort to be consistent with the reporting of infections in chapter 4. The cause of death analyses were undertaken on historic prevalent cohorts to allow sufficient follow-up time.

This chapter addresses the following key aspects of the care of patients on PD for which there are Renal Association guidelines (table 5.1):

- **Complications associated with ESKD and PD:** these include anaemia, mineral bone disorders and metabolic acidosis
- **Infections associated with PD:** rates of PD peritonitis and the four infections subject to mandatory reporting to Public Health England (PHE) are reported in this chapter – methicillin-resistant *Staphylococcus aureus* (MRSA), methicillin-sensitive *Staphylococcus aureus* (MSSA), *Escherichia coli* bacteraemia and *Clostridium difficile*.

Rationale for analyses

The analyses begin with a description of the 2018 prevalent adult PD population, including the number on PD per million population (pmp).

The Renal Association guidelines (renal.org/health-professionals/guidelines/guidelines-commentaries) provide audit measures relevant to the care of patients on PD and, where data permit, their attainment by UK renal centres in 2018 is reported in this chapter (table 5.1). Audit measures in guidelines that have been archived are not included.

Some audit measures – for example, the target for glycated haemoglobin (HbA1c) in those on hypoglycaemia-inducing treatment – cannot be reported because the completeness of the required data items is too low. Detail about the completeness of data returned to the UK Renal Registry (UKRR) is available through the UKRR data completeness portal (renal.org/audit-research/data-portal/completeness) Audit measures that cannot be reported because the required data items were not collected by the UKRR are omitted.

Table 5.1 The Renal Association audit measures relevant to PD that are reported in this chapter

The Renal Association guideline	Audit criteria	Related analysis/analyses
CKD mineral bone disorder (2018)	Percentage of patients with serum calcium above the normal reference range of 2.2–2.5 mmol/L	Table 5.5, figure 5.2
PD (2017)	Plasma bicarbonate should be maintained in the normal reference range 22–30 mmol/L – 100%	Table 5.5, figure 5.4
Anaemia (2017)	Proportion of patients with serum ferritin <100 µg/L at start of treatment with erythropoiesis stimulating agent (ESA)	Table 5.6, figure 5.8 (the UKRR does not hold treatment with ESA start dates)
	Proportion of patients with haemoglobin <100 g/L not on ESA	Table 5.7
	Proportion of patients on ESA with haemoglobin >120 g/L	Table 5.7, figure 5.10
	Mean (median) ESA dose in patients maintained on ESA therapy	Table 5.7
Peritoneal access (2009)	>80% of PD catheters should be patent at 1 year (censoring for death and elective modality change)	See chapter 1
	Complications following PD catheter insertion	See chapter 1
	Peritonitis within 2 weeks of PD catheter insertion <5%	See chapter 1. For peritonitis in prevalent patients see table 5.9 and figure 5.12
Planning, initiating and withdrawing RRT (2014)	Number of patients withdrawing from PD as a proportion of all deaths on PD	Table 5.10, figure 5.13

ESA – erythropoiesis stimulating agent

For definitions and methods relating to this chapter see appendix A. Centres were exluded from caterpillar plots and cells were blanked in tables where data completeness for a biochemical variable was <70% and/or the number of patients reported was <10. The number preceding the centre name in each caterpillar plot indicates the percentage of missing data for that centre.

As Colchester renal centre did not have any PD patients they were excluded from some of the analyses, although their dialysis patients were included in the relevant dialysis population denominators.

Cambridge renal centre (Addenbrooke's Hospital) was unable to submit patient level data for 2017–2018. While data extraction issues have now been resolved, the UKRR and Cambridge are working to load and validate the backlog of data for these years, which should be completed for next year's report. Using aggregate numbers of patients on RRT by treatment modality, it was possible to report treatment rates for Cambridge, but no other quality assurance for the service provided. Coventry renal centre submitted patient level data for more than a third of their new patients only after the closing date for submission to the UKRR. In this report only the analyses on treatment rates could be corrected using the late submitted data.

Key findings

- 3,621 adult patients were receiving PD for ESKD in the UK on 31/12/2018, which represented 5.5% of the RRT population
- The median age of PD patients was 64.3 years and 60.3% were male
- The median adjusted calcium for PD patients was 2.4 mmol/L and 13.5% were above the target range of 2.2–2.5 mmol/L
- The median bicarbonate for PD patients was 25 mmol/L and 79.8% were within the target range of 22–30 mmol/L
- The median haemoglobin and ferritin for PD patients was 111 g/L and 324 µg/L, respectively, and 79.7% were on an ESA at a median dose of 5,000 IU/week
- The PD peritonitis rate in 2018 (England only) was 41.8/100 PD patient years (on average, one case in 29 months for a single patient)
- There was no cause of death data available for 26.6% of deaths. For those with data, the leading cause of death in younger patients (<65 years) was infection (23.3%) and in older patients (≥65 years) was cardiac disease (22.1%).

Analyses

Changes to the prevalent adult PD population

For the 71 adult renal centres, the number of prevalent patients on PD was calculated as both a proportion of the prevalent patients on RRT and as a proportion of the estimated centre catchment population (calculated as detailed in appendix A).

Table 5.2 Number of prevalent adult PD patients and proportion of adult RRT patients on PD by year and by centre; number of PD patients as a proportion of the catchment population

	N on PD					% on PD					Estimated catchment population (millions)	2018 crude rate (pmp)
Centre	2014	2015	2016	2017	2018	2014	2015	2016	2017	2018		
ENGLAND												
B Heart	34	51	88	87	95	5.4	7.8	13.5	13.3	14.0	0.61	155.3
B QEH	143	142	143	162	163	6.7	6.3	6.0	6.4	6.3	1.41	115.7
Basldn	28	35	34	28	28	10.1	12.8	12.4	9.3	8.9	0.34	81.4
Bradfd	21	18	25	20	26	3.8	3.1	3.9	3.0	3.8	0.54	48.1
Brightn	64	67	64	59	60	7.0	7.1	6.5	5.8	5.7	1.07	55.8
Bristol	67	57	53	58	56	4.6	3.9	3.6	3.9	3.8	1.19	46.9
Camb	31	31	22	31	44	2.5	2.4	1.7	2.2	3.1	0.96	45.8
Carlis	26	38	37	28	31	10.4	13.5	13.2	9.9	10.6	0.27	116.6
Carsh	136	113	113	96	98	8.8	7.1	6.9	5.7	5.6	1.59	61.8
Chelms	27	26	32	31	33	10.3	9.2	11.8	11.2	12.2	0.42	78.0
Colchr	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.25	0.0
Covnt	90	78	67	52	59	9.4	8.1	6.9	5.4	5.7	0.74	79.8
Derby	85	78	77	79	81	16.5	14.5	14.2	14.2	13.8	0.58	139.1
Donc	27	23	27	29	24	9.5	7.6	8.2	8.7	7.2	0.34	70.6
Dorset	51	42	36	35	38	7.7	6.2	5.2	4.8	5.0	0.71	53.2
Dudley	54	57	50	55	37	17.7	18.1	14.5	14.9	10.2	0.37	101.1
Exeter	94	82	84	75	78	9.9	8.5	8.3	7.1	7.2	0.90	86.4
Glouc	43	37	42	44	36	10.0	8.3	8.9	8.7	7.1	0.49	74.0
Hull	77	75	72	56	47	9.6	8.8	8.4	6.4	5.3	0.85	55.6
Ipswi	31	36	34	45	40	8.4	9.0	8.2	10.4	9.3	0.33	121.0
Kent	68	60	58	52	44	6.7	5.8	5.4	4.8	3.9	1.01	43.4
L Barts	223	207	202	236	237	10.1	9.1	8.5	9.5	9.1	1.52	156.2
L Guys	30	33	39	39	43	1.6	1.6	1.9	1.8	1.9	0.90	47.9
L Kings	91	90	91	97	90	8.9	8.3	8.2	8.4	7.6	0.97	92.7
L Rfree	143	154	159	145	166	7.1	7.4	7.3	6.6	7.4	1.26	131.9
L St.G	48	48	44	37	40	6.1	5.7	5.2	4.4	4.8	0.66	60.5
L West	64	70	100	120	135	2.0	2.1	2.9	3.5	3.8	1.99	67.9
Leeds	63	57	47	59	65	4.2	3.7	3.0	3.6	3.9	1.38	47.0
Leic	122	108	89	97	110	5.7	5.0	3.9	4.1	4.5	2.02	54.5
Liv Ain	39	38	27	21	26	18.0	17.1	11.9	10.0	11.9	0.40	64.8
Liv Roy	60	67	71	70	57	4.8	5.4	5.8	5.6	4.5	0.83	68.8
M RI	73	65	62	70	68	4.1	3.5	3.1	3.4	3.3	1.27	53.6
Middlbr	11	22	26	23	28	1.3	2.4	2.9	2.5	3.0	0.83	33.6
Newc	52	46	53	58	60	5.3	4.6	5.0	5.2	5.2	0.93	64.6
Norwch	35	38	48	43	36	5.1	5.3	6.2	5.5	4.6	0.65	55.2
Nottm	84	82	81	69	72	7.9	7.4	7.0	5.9	6.0	0.90	79.9
Oxford	82	95	95	67	69	5.0	5.6	5.4	3.6	3.6	1.40	49.2
Plymth	34	34	41	49	40	6.8	6.8	8.0	9.1	7.4	0.39	102.7
Ports	79	71	75	84	94	5.0	4.3	4.4	4.8	5.3	1.68	56.0
Prestn	58	53	40	34	38	5.0	4.4	3.3	2.7	2.9	1.24	30.7

Table 5.2 Continued

Centre	N on PD					% on PD					Estimated catchment population (millions)	2018 crude rate (pmp)
	2014	2015	2016	2017	2018	2014	2015	2016	2017	2018		
Redng	72	66	56	39	41	9.5	8.5	7.1	4.9	5.1	0.75	54.4
Salford	94	94	106	117	115	9.7	9.7	10.4	10.5	9.8	1.24	93.1
Sheff	62	64	55	55	61	4.6	4.6	3.9	3.8	4.1	1.14	53.7
Shrew	32	32	39	42	59	9.2	8.7	10.3	10.9	13.9	0.41	142.2
Stevng	27	15	21	23	28	3.4	1.8	2.4	2.6	2.9	1.00	28.1
Sthend	20	17	30	34	30	8.4	6.9	12.7	13.4	11.5	0.26	114.3
Stoke	83	75	79	72	81	10.7	9.5	9.6	8.9	10.0	0.74	109.8
Sund	18	18	17	16	17	4.0	3.9	3.4	3.0	3.1	0.51	33.2
Truro	21	22	18	15	17	5.5	5.3	4.2	3.5	3.9	0.34	49.7
Wirral	22	21	22	19	19	7.9	7.5	6.5	4.9	4.8	0.47	40.1
Wolve	79	79	69	54	55	13.7	13.6	12.1	9.3	9.1	0.55	99.2
York	29	29	33	35	29	6.3	5.9	6.2	6.3	5.1	0.41	71.1
N IRELAND												
Antrim	13	20	16	14	20	5.6	8.3	6.3	5.5	7.3	0.23	85.1
Belfast	15	24	24	17	23	2.0	3.1	3.0	2.0	2.6	0.51	45.3
Newry	16	22	21	23	16	7.7	9.8	8.9	9.5	6.4	0.21	76.8
Ulster	4	6	6	6	10	2.7	3.6	3.6	3.3	5.3	0.21	47.2
West NI	14	12	10	9	9	5.1	4.1	3.3	2.9	2.8	0.28	32.1
SCOTLAND												
Abrdn	27	26	21	22	26	5.4	4.9	3.8	3.9	4.5	0.50	52.1
Airdrie	9	16	24	16	21	2.3	3.8	5.5	3.4	4.3	0.46	45.7
D&Gall	15	11	10	6	6	11.5	8.5	7.6	4.4	4.1	0.12	48.6
Dundee	23	17	21	18	22	5.7	4.1	5.0	4.1	4.9	0.39	57.1
Edinb	21	26	36	33	36	2.8	3.4	4.6	4.0	4.2	0.80	44.9
Glasgw	39	55	54	48	53	2.4	3.2	3.1	2.7	2.9	1.35	39.2
Inverns	15	13	11	10	13	6.7	5.1	4.2	3.8	4.7	0.22	57.9
Klmarnk	36	37	33	24	22	12.0	11.9	10.4	7.1	6.4	0.30	73.2
Krkcldy	15	21	18	10	11	5.4	7.1	6.1	3.3	3.7	0.26	41.7
WALES												
Bangor	17	15	16	17	20	15.9	8.2	8.9	8.7	9.9	0.19	107.9
Cardff	79	79	75	72	60	5.0	4.9	4.6	4.3	3.5	1.21	49.7
Clwyd	11	20	15	12	15	6.5	10.8	8.5	6.7	7.9	0.16	93.1
Swanse	53	62	67	74	70	7.5	8.1	8.7	9.3	8.5	0.75	93.1
Wrexm	30	37	32	27	24	10.6	12.6	10.3	8.4	7.6	0.20	117.6
TOTALS												
England	**3,147**	**3,056**	**3,093**	**3,061**	**3,144**	**6.3**	**6.0**	**5.8**	**5.7**	**5.7**	**44.02**	**71.4**
N Ireland	**62**	**84**	**77**	**69**	**78**	**3.9**	**4.9**	**4.3**	**3.8**	**4.1**	**1.44**	**54.0**
Scotland	**200**	**222**	**228**	**187**	**210**	**4.4**	**4.6**	**4.6**	**3.7**	**4.0**	**4.41**	**47.6**
Wales	**190**	**213**	**205**	**202**	**189**	**6.6**	**7.0**	**6.7**	**6.4**	**5.8**	**2.51**	**75.3**
UK	**3,599**	**3,575**	**3,603**	**3,519**	**3,621**	**6.1**	**5.9**	**5.7**	**5.5**	**5.5**	**52.38**	**69.1**

Country PD populations were calculated by summing the PD patients from centres in each country. Estimated country populations were derived from Office for National Statistics figures. See appendix A for details on estimated catchment population by renal centre.
Rates appear higher than in previous reports because general population estimates now include only those aged ≥18 years (see appendix B).
Cambridge submitted only aggregate data for 2017 and 2018. Coventry submitted data for 7 prevalent PD patients after the closing date. Results shown here and in table 5.3 were corrected using the additional data.
pmp – per million population

Demographics of prevalent adult PD patients

The proportion of PD patients from each ethnic group is shown for patients with ethnicity data – the proportion of patients in each centre with no ethnicity data is shown separately.

Table 5.3 Demographics of adult patients prevalent to PD on 31/12/2018 by centre

Centre	N on RRT	N on PD	% on PD	Median age (yrs)	% male	Ethnicity				
						% White	% South Asian	% Black	% Other	% missing
ENGLAND										
B Heart	679	95	14.0	63.0	60.0	58.9	25.3	13.7	2.1	0.0
B QEH	2,569	163	6.3	58.8	60.7	59.7	22.8	13.4	4.0	8.6
Basldn	314	28	8.9	64.3	71.4	85.2	3.7	3.7	7.4	3.6
Bradfd	686	26	3.8	53.8	42.3	52.0	40.0	4.0	4.0	3.8
Brightn	1,055	60	5.7	66.8	68.3	89.7	10.3	0.0	0.0	3.3
Bristol	1,469	56	3.8	61.3	76.8	94.6	1.8	1.8	1.8	0.0
Camb										
Carlis	293	31	10.6	65.5	64.5	100.0	0.0	0.0	0.0	3.2
Carsh	1,736	98	5.6	67.1	55.1	77.9	10.5	10.5	1.1	3.1
Chelms	270	33	12.2	67.2	72.7	93.9	3.0	0.0	3.0	0.0
Colchr	121	0	0.0							
Covnt	1,042	59	5.7	64.5	59.6	84.3	11.8	3.9	0.0	1.9
Derby	589	81	13.8	64.4	54.3	88.9	8.6	2.5	0.0	0.0
Donc	332	24	7.2	57.4	41.7	100.0	0.0	0.0	0.0	0.0
Dorset	765	38	5.0	73.0	60.5	97.2	0.0	0.0	2.8	5.3
Dudley	361	37	10.2	68.4	54.1	83.8	13.5	2.7	0.0	0.0
Exeter	1,088	78	7.2	74.4	57.7	85.9	1.3	0.0	12.8	0.0
Glouc	510	36	7.1	62.5	58.3	88.6	5.7	0.0	5.7	2.8
Hull	883	47	5.3	64.4	63.8	97.9	2.1	0.0	0.0	0.0
Ipswi	428	40	9.3	70.2	70.0	74.3	0.0	8.6	17.1	12.5
Kent	1,114	44	3.9	70.1	52.3	93.2	2.3	2.3	2.3	0.0
L Barts	2,610	237	9.1	61.1	59.5	26.2	37.6	17.7	18.6	0.0
L Guys	2,225	43	1.9	61.5	53.5	48.8	14.0	30.2	7.0	0.0
L Kings	1,186	90	7.6	56.8	60.0	37.8	13.3	40.0	8.9	0.0
L Rfree	2,234	166	7.4	65.6	58.4	37.6	26.8	25.5	10.2	5.4
L St.G	837	40	4.8	62.5	60.0	52.8	25.0	16.7	5.6	10.0
L West	3,566	135	3.8	66.0	54.1	45.9	28.9	21.5	3.7	0.0
Leeds	1,687	65	3.9	56.2	50.8	81.5	12.3	4.6	1.5	0.0
Leic	2,468	110	4.5	62.6	55.5	74.8	16.8	4.7	3.7	2.7
Liv Ain	218	26	11.9	59.8	46.2	100.0	0.0	0.0	0.0	0.0
Liv Roy	1,277	57	4.5	62.1	63.2	92.7	1.8	3.6	1.8	3.5
M RI	2,073	68	3.3	62.9	58.8	74.6	14.9	10.4	0.0	1.5
Middlbr	925	28	3.0	63.3	57.1	96.4	3.6	0.0	0.0	0.0
Newc	1,155	60	5.2	64.0	68.3	96.7	1.7	0.0	1.7	0.0
Norwch	786	36	4.6	69.2	66.7	94.4	2.8	2.8	0.0	0.0
Nottm	1,196	72	6.0	68.0	58.3	77.8	11.1	5.6	5.6	0.0
Oxford	1,940	69	3.6	68.4	65.2	79.2	9.4	7.5	3.8	23.2
Plymth	539	40	7.4	72.7	82.5	97.5	0.0	0.0	2.5	0.0
Ports	1,764	94	5.3	63.1	74.5	94.5	1.1	2.2	2.2	3.2
Prestn	1,322	38	2.9	66.8	63.2	89.5	10.5	0.0	0.0	0.0
Redng	810	41	5.1	71.8	61.0	73.7	15.8	5.3	5.3	7.3
Salford	1,173	115	9.8	63.3	65.2	87.8	9.6	0.9	1.7	0.0
Sheff	1,481	61	4.1	69.7	67.2	93.2	3.4	1.7	1.7	3.3
Shrew	424	59	13.9	72.7	67.8	96.6	0.0	1.7	1.7	1.7

Table 5.3 Continued

Centre	N on RRT	N on PD	% on PD	Median age (yrs)	% male	Ethnicity				
						% White	% South Asian	% Black	% Other	% missing
Stevng	957	28	2.9	69.0	64.3	87.0	4.3	4.3	4.3	17.9
Sthend	260	30	11.5	73.2	70.0	90.0	6.7	0.0	3.3	0.0
Stoke	808	81	10.0	63.6	56.8	92.4	5.1	1.3	1.3	2.5
Sund	557	17	3.1	48.9	41.2	88.2	5.9	0.0	5.9	0.0
Truro	437	17	3.9	72.3	82.4	100.0	0.0	0.0	0.0	0.0
Wirral	395	19	4.8	66.5	63.2	94.7	0.0	5.3	0.0	0.0
Wolve	602	55	9.1	57.5	60.0	50.9	30.9	14.5	3.6	0.0
York	568	29	5.1	68.4	75.9	100.0	0.0	0.0	0.0	6.9
N IRELAND										
Antrim	274	20	7.3	71.3	65.0	100.0	0.0	0.0	0.0	0.0
Belfast	877	23	2.6	72.8	52.2					39.1
Newry	249	16	6.4	77.1	56.3	100.0	0.0	0.0	0.0	0.0
Ulster	190	10	5.3	75.7	60.0	100.0	0.0	0.0	0.0	0.0
West NI	324	9	2.8	70.4	44.4	100.0	0.0	0.0	0.0	0.0
SCOTLAND										
Abrdn	573	26	4.5	61.3	61.5					88.5
Airdrie	487	21	4.3	60.3	47.6	100.0	0.0	0.0	0.0	9.5
D&Gall	145	6	4.1	67.0	33.3					83.3
Dundee	445	22	4.9	66.1	50.0					100.0
Edinb	862	36	4.2	66.5	50.0					88.9
Glasgw	1,812	53	2.9	58.8	39.6					90.6
Inverns	279	13	4.7	70.9	53.8					92.3
Klmarnk	342	22	6.4	57.0	68.2					77.3
Krkcldy	300	11	3.7	57.5	81.8					100.0
WALES										
Bangor	202	20	9.9	67.5	60.0	100.0	0.0	0.0	0.0	0.0
Cardff	1,721	60	3.5	63.3	56.7	91.5	8.5	0.0	0.0	1.7
Clwyd	190	15	7.9	69.9	73.3	92.9	7.1	0.0	0.0	6.7
Swanse	824	70	8.5	64.3	60.0	97.1	2.9	0.0	0.0	2.9
Wrexm	315	24	7.6	63.1	62.5	91.7	0.0	8.3	0.0	0.0
TOTALS										
England	**54,784**	**3,100**	**5.7**	**64.3**	**61.0**	**72.9**	**13.6**	**8.8**	**4.7**	**2.7**
N Ireland	**1,914**	**78**	**4.1**	**73.5**	**56.4**	**100.0**	**0.0**	**0.0**	**0.0**	**11.5**
Scotland	**5,245**	**210**	**4.0**	**61.1**	**51.9**					**81.9**
Wales	**3,252**	**189**	**5.8**	**64.2**	**60.3**	**94.6**	**4.3**	**1.1**	**0.0**	**2.1**
UK	**65,195**	**3,577**	**5.5**	**64.3**	**60.3**	**74.9**	**12.7**	**8.1**	**4.2**	**7.5**

Blank cells – no data returned by the centre or data completeness <70%.
Breakdown by ethnicity is not shown for centres with <70% data completeness, but these centres were included in national averages.
Coventry submitted data for 7 prevalent PD patients after the closing date; these patients were not included in the age, sex or ethnicity breakdown.

Primary renal diseases (PRDs) were grouped into categories as shown in table 5.4, with the mapping of disease codes into groups explained in more detail in appendix A. The proportion of PD patients with each PRD is shown for patients with PRD data and these total 100% of patients with data. The proportion of patients with no PRD data is shown on a separate line.

Table 5.4 Primary renal diseases (PRDs) of adult patients prevalent to PD on 31/12/2018

PRD	N on PD	% PD population	Age <65 yrs		Age ≥65 yrs		M/F ratio
			N	%	N	%	
Diabetes	797	23.4	426	24.3	371	22.5	1.7
Glomerulonephritis	549	16.1	347	19.8	202	12.2	1.9
Hypertension	269	7.9	117	6.7	152	9.2	2.3
Polycystic kidney disease	252	7.4	168	9.6	84	5.1	1.0
Pyelonephritis	203	6.0	103	5.9	100	6.1	1.3
Renal vascular disease	197	5.8	41	2.3	156	9.5	2.1
Other	553	16.3	312	17.8	241	14.6	1.2
Uncertain aetiology	580	17.1	237	13.5	343	20.8	1.3
Total (with data)	**3,400**	**100.0**	**1,751**	**100.0**	**1,649**	**100.0**	
Missing	170	4.8	84	4.6	86	5.0	1.7

Biochemistry parameters in prevalent adult PD patients

The Renal Association guideline on CKD mineral bone disease contains only one audit measure, which is the percentage of patients with adjusted calcium above the target range. The Renal Association guideline on PD contains one biochemical audit measure, which is the proportion of patients with bicarbonate in the target range. For the first time the Scottish Renal Registry sent bicarbonate data to the UKRR.

Table 5.5 Median adjusted calcium (Ca) and percentage with adjusted Ca within and above the target range (2.2–2.5 mmol/L); and median bicarbonate and percentage with bicarbonate below, within and above the target range (22–30 mmol/L) in adult patients prevalent to PD on 31/12/2018 by centre

Centre	Adjusted calcium				Bicarbonate				
	Median (mmol/L)	% 2.2-2.5 mmol/L	% >2.5 mmol/L	% data completeness	Median (mmol/L)	% <22 mmol/L	% 22-30 mmol/L	% >30 mmol/L	% data completeness
ENGLAND									
B Heart	2.4	82.1	9.5	100.0	22	46.4	53.6	0.0	100.0
B QEH	2.3	75.7	13.5	100.0	24	26.5	71.2	2.3	89.2
Basldn	2.5	65.4	30.8	100.0	27	3.9	88.5	7.7	100.0
Bradfd	2.4	69.6	21.7	100.0	25	22.7	77.3	0.0	95.7
Brightn	2.4	77.1	16.7	98.0	26	6.3	93.8	0.0	98.0
Bristol	2.4	84.6	12.8	100.0	24	12.8	87.2	0.0	100.0
Camb									
Carlis	2.3	77.8	11.1	100.0	24	22.2	77.8	0.0	100.0
Carsh	2.4	74.7	12.7	90.8					0.0
Chelms	2.3	77.3	4.6	88.0	23	19.1	81.0	0.0	84.0
Colchr									
Covnt	2.3	79.2	6.3	100.0	25	12.8	87.2	0.0	97.9
Derby	2.4	75.7	24.3	100.0	23	25.7	72.9	1.4	100.0
Donc	2.4	79.0	15.8	95.0	25	10.5	89.5	0.0	95.0
Dorset	2.3	71.0	16.1	100.0	23	38.7	58.1	3.2	100.0
Dudley	2.5	69.4	27.8	100.0	26	8.6	85.7	5.7	97.2
Exeter	2.4	88.2	10.3	98.6	25	14.7	83.8	1.5	98.6
Glouc	2.4	73.3	23.3	96.8	24	13.8	82.8	3.5	93.6
Hull	2.4	80.0	20.0	100.0	26	17.5	75.0	7.5	100.0
Ipswi	2.3	75.7	10.8	97.4	25	10.8	86.5	2.7	97.4
Kent	2.5	63.9	36.1	92.3	25	21.6	78.4	0.0	94.9
L Barts	2.3	76.2	6.9	99.0	24	20.3	78.7	1.0	99.0
L Guys	2.4	81.3	9.4	100.0	26	9.4	90.6	0.0	100.0

Table 5.5 Continued

Centre	Adjusted calcium				Bicarbonate				
	Median (mmol/L)	% 2.2-2.5 mmol/L	% >2.5 mmol/L	% data completeness	Median (mmol/L)	% <22 mmol/L	% 22-30 mmol/L	% >30 mmol/L	% data completeness
L Kings	2.3	79.2	6.5	100.0	26	13.0	81.8	5.2	100.0
L Rfree	2.4	79.6	11.7	97.2	26	8.6	89.7	1.7	82.3
L St.G	2.5	73.5	23.5	94.4	22	35.3	64.7	0.0	94.4
L West				52.1					47.0
Leeds	2.4	82.5	14.0	98.3	26	14.0	70.2	15.8	98.3
Leic	2.4	82.1	11.6	99.0	25	14.3	83.5	2.2	94.8
Liv Ain	2.4	85.7	14.3	100.0	26	14.3	85.7	0.0	100.0
Liv Roy	2.4	86.0	10.0	100.0	25	6.0	94.0	0.0	100.0
M RI	2.4	79.3	10.3	98.3	25	15.5	84.5	0.0	98.3
Middlbr	2.2	72.2	5.6	94.7	26	11.1	88.9	0.0	94.7
Newc	2.4	86.0	8.0	100.0	24	14.0	80.0	6.0	100.0
Norwch	2.4	84.4	12.5	100.0	24	31.3	68.8	0.0	100.0
Nottm	2.3	80.4	3.6	98.3					45.6
Oxford	2.3	83.9	8.9	100.0	25	26.1	73.9	0.0	82.1
Plymth	2.4	88.2	8.8	97.1	25	11.8	88.2	0.0	97.1
Ports	2.4	75.0	13.8	100.0	26	12.0	80.0	8.0	93.8
Prestn	2.3	64.5	12.9	96.9	25	6.5	90.3	3.2	96.9
Redng	2.4	82.9	14.3	100.0	26	0.0	97.1	2.9	100.0
Salford	2.4	82.1	16.0	100.0					0.0
Sheff	2.3	86.8	5.7	98.2	24	19.6	80.4	0.0	94.4
Shrew	2.4	84.3	11.8	100.0	25	13.7	86.3	0.0	100.0
Stevng	2.3	73.1	15.4	100.0	26	11.5	80.8	7.7	100.0
Sthend	2.4	80.0	16.0	100.0	27	8.0	84.0	8.0	100.0
Stoke	2.4	81.2	11.6	97.2	26	7.0	93.0	0.0	100.0
Sund	2.3	84.6	7.7	100.0					7.7
Truro	2.5	60.0	40.0	100.0	25	7.7	92.3	0.0	86.7
Wirral	2.4	93.3	6.7	100.0	24	23.1	76.9	0.0	86.7
Wolve	2.4	75.6	19.5	91.1	23	26.8	73.2	0.0	91.1
York	2.4	82.6	17.4	100.0	28	4.4	69.6	26.1	100.0
N IRELAND									
Antrim	2.4	80.0	6.7	100.0	25	6.7	86.7	6.7	100.0
Belfast	2.4	88.9	5.6	100.0	26	22.2	77.8	0.0	100.0
Newry	2.4	86.7	13.3	100.0	26	20.0	80.0	0.0	100.0
Ulster				100.0					100.0
West NI				100.0					100.0
SCOTLAND									
Abrdn	2.4	76.5	23.5	89.5					15.8
Airdrie	2.4	76.5	17.7	100.0	26	11.8	82.4	5.9	100.0
D&Gall				100.0					100.0
Dundee	2.4	79.0	21.1	100.0	27	5.9	76.5	17.7	89.5
Edinb	2.4	89.3	7.1	96.6					58.6
Glasgw	2.4	82.1	18.0	100.0	24	22.2	77.8	0.0	92.3
Inverns	2.3	72.7	18.2	91.7	26	18.2	72.7	9.1	91.7
Klmarnk	2.5	84.2	15.8	100.0	25	29.4	52.9	17.7	89.5
Krkcldy				100.0					100.0
WALES									
Bangor	2.4	94.4	5.6	100.0	28	5.6	72.2	22.2	100.0
Cardff	2.4	75.5	18.9	98.2					68.5
Clwyd	2.5	80.0	20.0	100.0	25	13.3	86.7	0.0	100.0
Swanse	2.4	85.7	8.9	100.0	26	3.7	83.3	13.0	96.4
Wrexm	2.3	90.0	10.0	100.0	28	0.0	85.0	15.0	100.0

Table 5.5 Continued

Centre	Adjusted calcium				Bicarbonate				
	Median (mmol/L)	% 2.2-2.5 mmol/L	% >2.5 mmol/L	% data completeness	Median (mmol/L)	% <22 mmol/L	% 22-30 mmol/L	% >30 mmol/L	% data completeness
TOTALS									
England	**2.4**	**78.6**	**13.5**	**96.4**	**25**	**17.5**	**80.0**	**2.5**	**85.2**
N Ireland	**2.4**	**84.1**	**9.5**	**100.0**	**25**	**15.9**	**82.5**	**1.6**	**100.0**
Scotland	**2.4**	**82.7**	**15.4**	**97.6**	**25**	**16.2**	**77.7**	**6.2**	**78.3**
Wales	**2.4**	**83.3**	**13.0**	**99.4**	**26**	**11.8**	**78.5**	**9.7**	**88.3**
UK	**2.4**	**79.2**	**13.5**	**96.7**	**25**	**17.1**	**79.8**	**3.1**	**85.3**

Blank cells – no data returned by the centre or <10 patients in the centre or data completeness <70%.

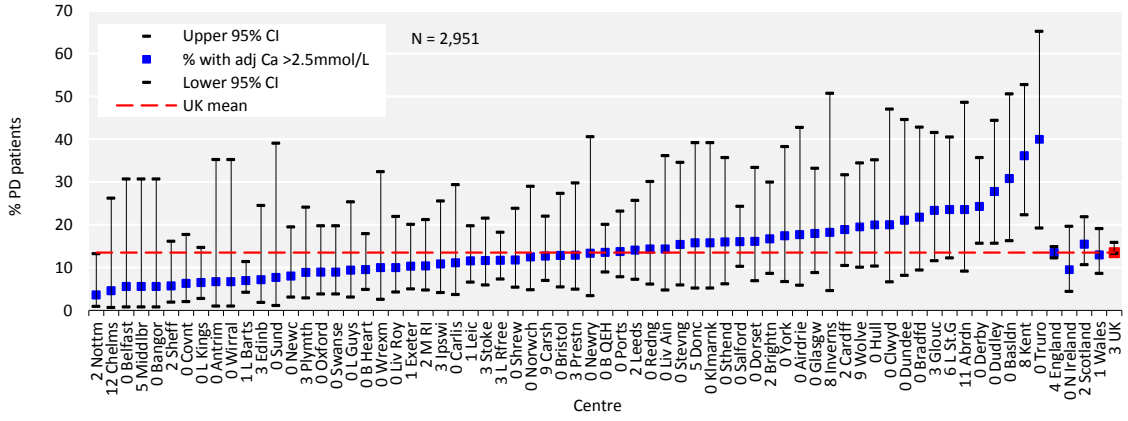

Figure 5.2 Percentage of adult patients prevalent to PD on 31/12/2018 with adjusted calcium (Ca) above the target range (>2.5 mmol/L) by centre
CI – confidence interval

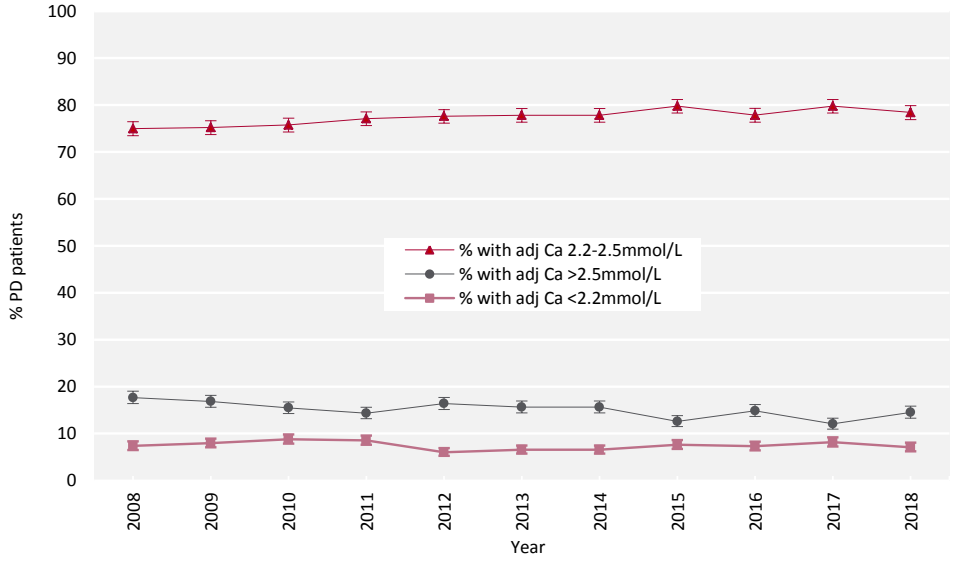

Figure 5.3 Change in percentage of prevalent adult PD patients within, above and below the target range for adjusted calcium (Ca 2.2–2.5 mmol/L) between 2008 and 2018

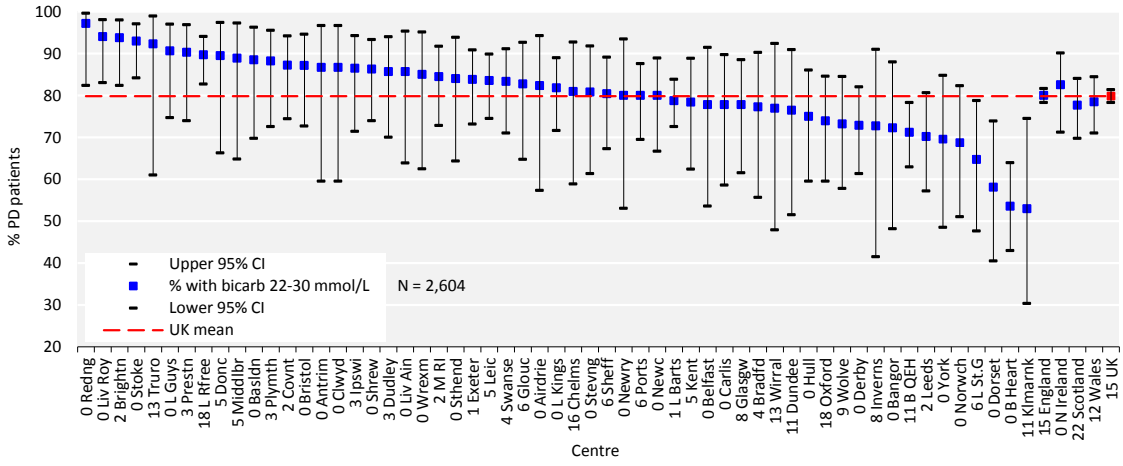

Figure 5.4 Percentage of adult patients prevalent to PD on 31/12/2018 with bicarbonate (bicarb) within the target range (22–30 mmol/L) by centre

CI – confidence interval

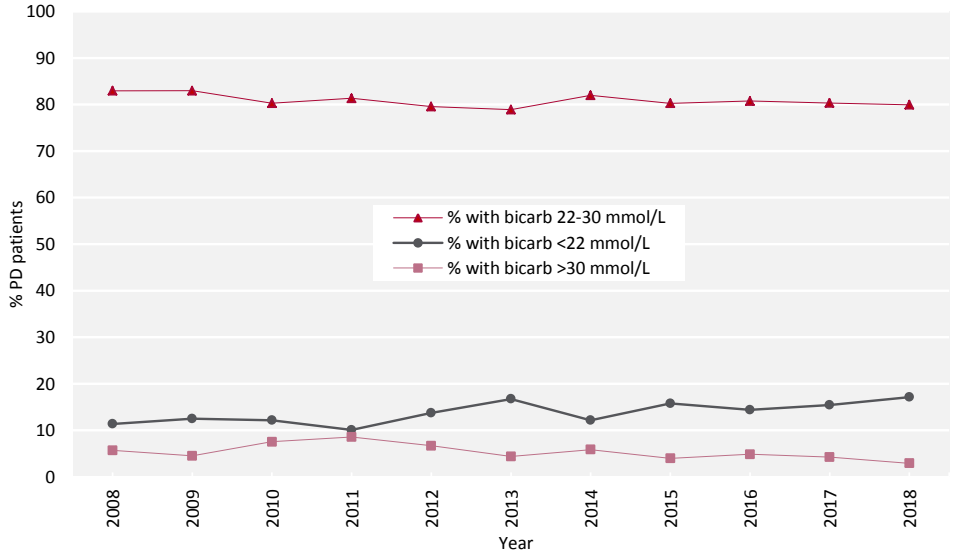

Figure 5.5 Percentage of prevalent adult PD patients within, above and below the target range for bicarbonate (bicarb 22–30 mmol/L) between 2008 and 2018

Anaemia in prevalent adult PD patients

Inadequate data completeness in relation to ESAs makes auditing against national guidelines difficult to interpret. An important assumption is that patients for whom no ESA data have been submitted to the UKRR are not on ESA treatment, provided the centre has submitted ESA data for other patients on PD. The weekly ESA dose is reported, but there are some uncertainties surrounding the accuracy of this measure (see appendix A). The Scottish Renal Registry does not submit ESA data for PD patients.

Table 5.6 Median haemoglobin and ferritin and percentage attaining target ranges in adult patients prevalent to PD on 31/12/2018 by centre

	Haemoglobin				Ferritin		
Centre	Median (g/L)	% <100 g/L	% >120 g/L	% data completeness	Median (µg/L)	% <100 µg/L	% data completeness
ENGLAND							
B Heart	108	23.8	19.0	100.0	175	29.3	97.6
B QEH	108	26.4	16.9	100.0	333	7.5	99.3
Basldn	109	23.1	19.2	100.0	124	36.0	96.2
Bradfd	110	39.1	21.7	100.0	377	0.0	87.0
Brightn	113	12.5	27.1	98.0	327	6.4	95.9
Bristol	113	17.9	30.8	100.0	346	5.4	94.9
Camb							
Carlis	116	7.4	33.3	100.0	260	18.5	100.0
Carsh	108	19.8	12.3	93.1	196	25.0	87.4
Chelms	111	9.1	27.3	88.0	219	17.4	92.0
Colchr							
Covnt	106	35.4	16.7	100.0	204	14.9	97.9
Derby	111	24.3	27.1	100.0	429	1.4	98.6
Donc	117	10.5	31.6	95.0	277	22.2	90.0
Dorset	113	16.7	23.3	96.8	305	7.1	90.3
Dudley	111	11.4	28.6	97.2			0.0
Exeter	112	7.2	23.2	100.0	284	10.4	97.1
Glouc	110	19.4	22.6	100.0	193	25.8	100.0
Hull	112	10.0	17.5	100.0	546	0.0	100.0
Ipswi	110	24.3	27.0	97.4	411	16.7	94.7
Kent	109	26.3	23.7	97.4	421	5.3	97.4
L Barts	110	20.9	23.4	98.5	284	17.6	92.2
L Guys	102	43.8	9.4	100.0	143	25.0	100.0
L Kings	110	26.0	27.3	100.0	209	12.0	97.4
L Rfree	108	32.6	24.6	97.9	576	5.8	98.6
L St.G	108	26.5	17.6	94.4	275	2.9	97.2
L West				53.9			57.3
Leeds	114	12.3	22.8	98.3	361	10.5	98.3
Leic	111	18.9	25.3	99.0	290	22.3	97.9
Liv Ain	113	14.3	23.8	100.0	589	14.3	100.0
Liv Roy	112	22.0	24.0	100.0	376	6.0	100.0
M RI	106	36.2	20.7	98.3	302	10.7	94.9
Middlbr	115	21.1	21.1	100.0	518	5.6	94.7
Newc	110	22.0	24.0	100.0	421	4.2	96.0
Norwch	117	6.3	40.6	100.0	433	0.0	100.0
Nottm	108	28.1	26.3	100.0	433	0.0	98.3
Oxford	109	17.9	23.2	100.0	319	3.6	98.2
Plymth	115	0.0	41.2	97.1	322	17.6	97.1
Ports	113	13.8	22.5	100.0	359	1.3	98.8
Prestn	113	16.1	22.6	96.9	705	6.5	96.9
Redng	106	22.9	20.0	100.0	389	5.7	100.0
Salford	112	21.7	30.2	100.0	566	3.4	84.0
Sheff	115	9.3	24.1	100.0	513	3.8	98.2
Shrew	110	23.5	17.6	100.0	274	18.8	94.1
Stevng	112	23.1	30.8	100.0	265	20.8	92.3
Sthend	116	8.0	44.0	100.0	186	12.0	100.0
Stoke	115	18.3	26.8	100.0	433	4.3	97.2
Sund	120	30.8	46.2	100.0	369	16.7	92.3
Truro	109	13.3	26.7	100.0	129	15.4	86.7
Wirral	105	35.7	0.0	93.3	411	0.0	93.3
Wolve	107	31.0	16.7	93.3	87	53.8	86.7

Table 5.6 Continued

Centre	Haemoglobin				Ferritin		
	Median (g/L)	% <100 g/L	% >120 g/L	% data completeness	Median (µg/L)	% <100 µg/L	% data completeness
York	108	17.4	26.1	100.0	187	8.7	100.0
N IRELAND							
Antrim	111	6.7	33.3	100.0	352	0.0	100.0
Belfast	119	11.1	38.9	100.0	364	0.0	100.0
Newry	108	6.7	26.7	100.0	287	26.7	100.0
Ulster				100.0			100.0
West NI				100.0			100.0
SCOTLAND							
Abrdn	115	11.1	27.8	94.7	450	5.9	89.5
Airdrie	114	17.6	11.8	100.0	344	35.3	100.0
D&Gall				100.0			100.0
Dundee	120	10.5	47.4	100.0	355	5.3	100.0
Edinb	114	17.9	28.6	96.6	317	8.0	86.2
Glasgw	114	17.9	25.6	100.0	261	26.5	87.2
Inverns	112	27.3	36.4	91.7	373	18.2	91.7
Klmarnk	108	31.6	21.1	100.0	476	5.9	89.5
Krkcldy				100.0			100.0
WALES							
Bangor	109	16.7	11.1	100.0	228	27.8	100.0
Cardff	113	16.7	24.1	100.0	169	21.6	94.4
Clwyd	113	13.3	33.3	100.0	220	6.7	100.0
Swanse	111	16.1	30.4	100.0	244	13.2	94.6
Wrexm	116	30.0	30.0	100.0	320	0.0	100.0
TOTALS							
England	**110**	**21.2**	**23.6**	**96.8**	**328**	**11.4**	**92.8**
N Ireland	**114**	**7.9**	**36.5**	**100.0**	**352**	**6.3**	**100.0**
Scotland	**114**	**17.8**	**27.6**	**98.2**	**345**	**14.5**	**91.6**
Wales	**112**	**17.8**	**26.4**	**100.0**	**223**	**15.3**	**96.3**
UK	**111**	**20.5**	**24.3**	**97.1**	**324**	**11.7**	**93.1**

Blank cells – no data returned by the centre or <10 patients in the centre or data completeness <70%.

Table 5.7 Distribution of haemoglobin and erythropoiesis stimulating agent (ESA) dose values in adult patients prevalent to PD on 31/12/2018 by centre

Centre	ESA		Haemoglobin and ESA	
	% on ESA	Median dose (IU/week)	% <100g/L and not on ESA	% >120g/L and on ESA
ENGLAND				
B Heart	64.3			
B QEH	0.0			
Basldn	61.5			
Bradfd	87.0	6,000	0.0	13.0
Brightn	10.2			
Bristol	69.2			
Camb				
Carlis	55.6			
Carsh	0.0			
Chelms	76.0	4,000	0.0	18.2
Colchr				
Covnt	70.8	8,000	6.3	6.3
Derby	0.0			
Donc	55.0			

Table 5.7 Continued

	ESA		Haemoglobin and ESA	
Centre	% on ESA	Median dose (IU/week)	% <100g/L and not on ESA	% >120g/L and on ESA
Dorset	74.2	4,000	3.3	13.3
Dudley	77.8	4,000	2.9	17.1
Exeter	76.8	3,700	0.0	8.7
Glouc	51.6			
Hull	60.0			
Ipswi	0.0			
Kent	51.3			
L Barts	0.0			
L Guys	0.0			
L Kings	83.1	6,000	1.3	23.4
L Rfree	0.0			
L St.G	0.0			
L West	0.0			
Leeds	70.7	4,000	0.0	10.5
Leic	67.7			
Liv Ain	0.0			
Liv Roy	0.0			
M RI	0.0			
Middlbr	89.5	4,000	0.0	15.8
Newc	6.0			
Norwch	59.4			
Nottm	87.7	4,000	1.8	22.8
Oxford	82.1	6,000	0.0	14.3
Plymth	0.0			
Ports	3.8			
Prestn	81.3		0.0	16.1
Redng	5.7			
Salford	84.9	6,000	0.9	24.5
Sheff	72.2	4,100	0.0	20.4
Shrew	2.0			
Stevng	65.4			
Sthend	60.0			
Stoke	0.0			
Sund	84.6	3,800	0.0	46.2
Truro	0.0			
Wirral	93.3	8,000	7.1	0.0
Wolve	68.9			
York	60.9			
N IRELAND				
Antrim	73.3	3,000	0.0	20.0
Belfast	88.9	3,000	0.0	33.3
Newry	86.7	4,000	0.0	20.0
Ulster	85.7			
West NI	87.5			
WALES				
Bangor	33.3			
Cardff	33.3			
Clwyd	46.7			
Swanse	71.4	5,000	0.0	16.1
Wrexm	65.0			
TOTAL[1]				
UK	**79.7**	**5,000**	**1.1**	**18.0**

Blank cells – no data returned by the centre or <10 patients in the centre or data completeness <70% (or <70% patients were on an ESA).
[1]This is the total of only those centres with at least 70% of PD patients on an ESA.

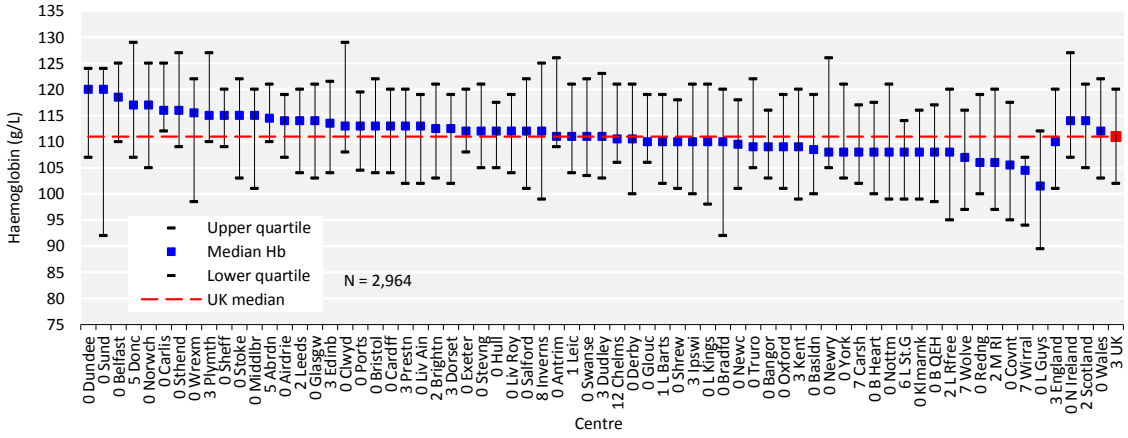

Figure 5.6 Median haemoglobin (Hb) in adult patients prevalent to PD on 31/12/2018 by centre

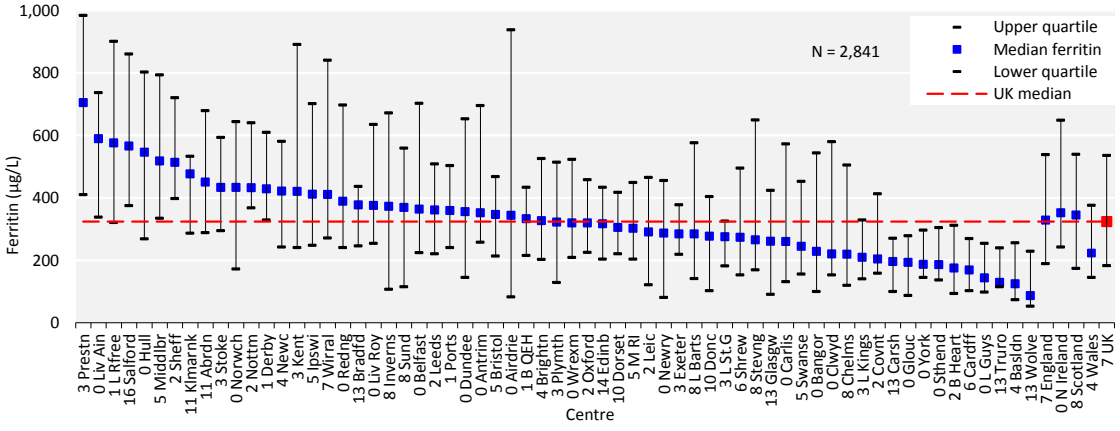

Figure 5.7 Median ferritin in adult patients prevalent to PD on 31/12/2018 by centre

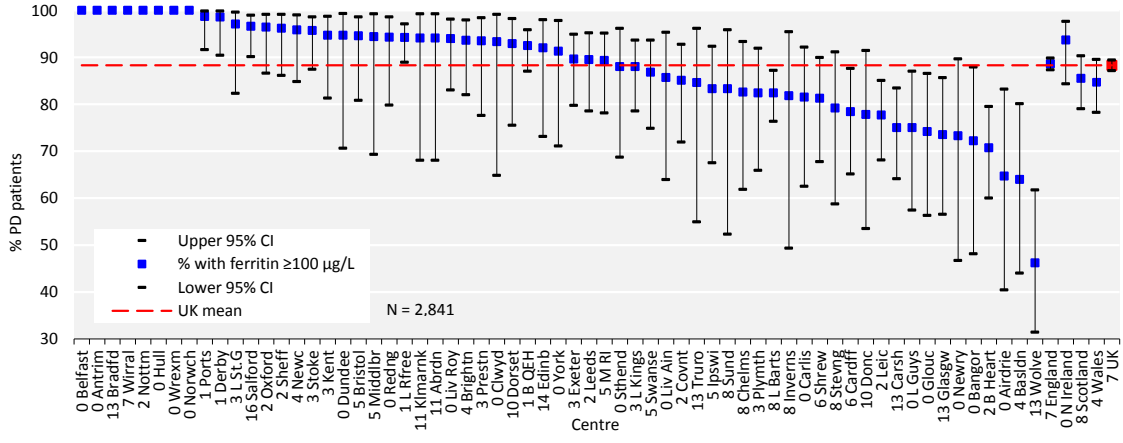

Figure 5.8 Percentage of adult patients prevalent to PD on 31/12/2018 with ferritin ≥100 µg/L by centre

CI – confidence interval

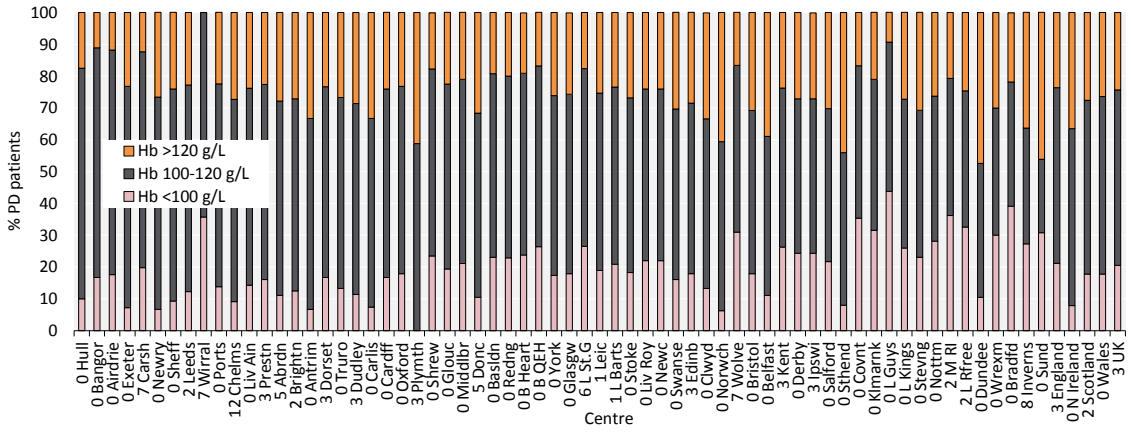

Figure 5.9 Distribution of haemoglobin (Hb) in adult patients prevalent to PD on 31/12/2018 by centre

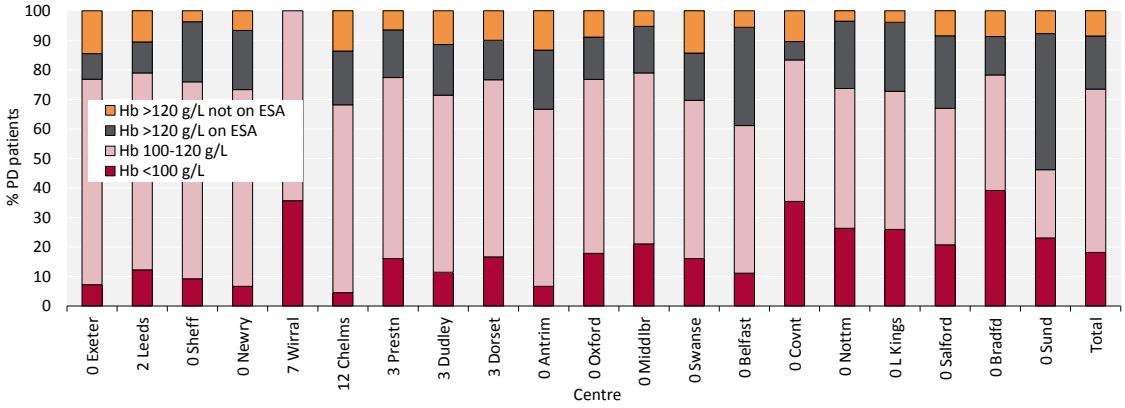

Figure 5.10 Distribution of haemoglobin (Hb) in adult patients prevalent to PD on 31/12/2018 and the proportion with haemoglobin >120 g/L receiving erythropoiesis stimulating agent (ESA) by centre
Figure (including total) does not include centres with <70% data completeness (or <70% ESA use).

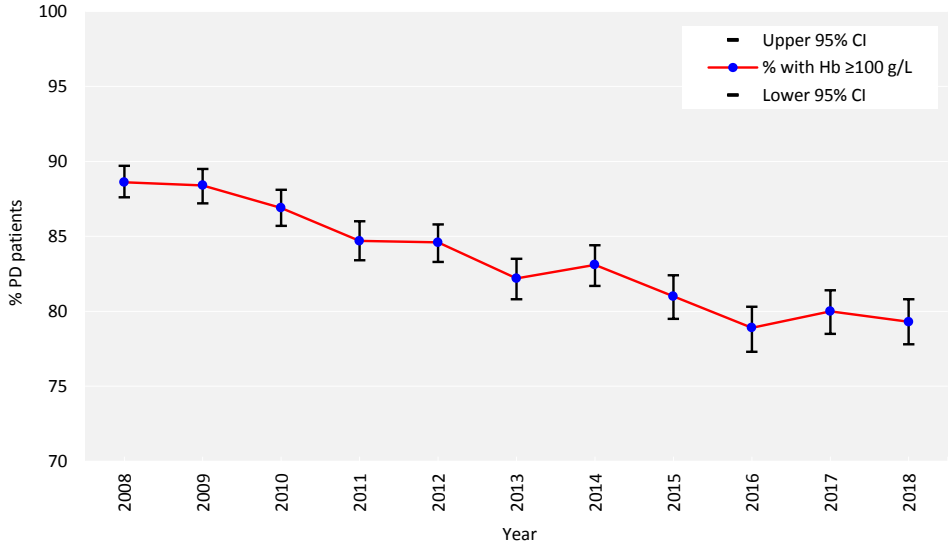

Figure 5.11 Percentage of prevalent adult PD patients with haemoglobin (Hb) ≥100 g/L between 2008 and 2018
CI – confidence interval

PD catheter insertion techniques and patency in prevalent adult PD patients

PD catheter insertion techniques and PD catheter patency at one year are presented in chapter 1.

Infections in adult PD patients

PHE has carried out mandatory enhanced surveillance of MRSA bacteraemia since October 2005 and of MSSA bacteraemia since January 2011 for NHS acute trusts, with the subsequent addition of *E. coli* bacteraemia and *C. difficile* reporting. Patient-level infection data are reported in real time to PHE. Wales provides infection data extracted locally from the renal and hospital IT systems.

Given the small numbers of infections in PD patients, data are only shown at the national level and are compared to infection rates in haemodialysis (HD) patients. The definition of each type of infectious episode is detailed in appendix A.

A rolling two year cohort is reported to be consistent with the reporting of infections in chapter 4. These analyses included all patients on HD, whether on HHD or ICHD.

Table 5.8 Number and rate of infection episodes per 100 patient years in prevalent adult PD patients in England and Wales compared to prevalent adult HD patients in England and Wales from January 2017 to December 2018

	Infection			
	MRSA	MSSA	*C. difficile*	*E.coli*
Number of episodes				
HD	83	1,240	522	888
PD	2	31	60	65
Rate per 100 patient years (with range between centres)				
HD	0.19 (0.0-0.87)	2.88 (0.80-6.15)	1.21 (0.19-3.72)	2.06 (0.28-3.93)
PD	0.03 (0.0-1.28)	0.47 (0.0-3.73)	0.90 (0.0-8.42)	0.98 (0.0-6.30)

C. difficile – Clostridium difficile; *E. coli – Escherichia coli;* MRSA – methicillin-resistant *Staphylococcus aureus*; MSSA – methicillin-sensitive *Staphylococcus aureus*

PD peritonitis infection rates are collected for English renal centres by the UKRR in collaboration with NHS England and are listed in the table below. The funnel plot (figure 5.12) shows each centre's 2018 peritonitis rate per 100 PD patient years against the number of patient years at risk to take into account the greater variation expected as centre size decreases.

Table 5.9 Number of patient years and peritonitis rate in adult patients receiving PD in 2018 by centre in England

Centre	PD patient years	Peritonitis rate per 100 PD patient years
B Heart	93	65.7
B QEH	172	35.5
Basldn	31	6.5
Bradfd	25	40.7
Brightn	52	17.3
Bristol	57	93.6
Camb	24	37.7
Carlis	22	22.3
Carsh	100	40.8
Chelms	33	30.8
Covnt	82	55.0
Derby	78	51.6
Donc	26	41.8
Dorset	36	38.5
Dudley	50	32.0
Exeter	75	51.9
Glouc	48	50.1
Hull	48	68.9
Ipswi	34	32.4
Kent	47	44.3
L Barts	236	43.2
L Guys	40	44.8
L Kings	97	45.5
L Rfree	157	55.9
L St.G	44	34.1
L West	136	39.9
Leeds	66	41.0
Leic	105	29.6
Liv Ain	27	18.6
Liv Roy	58	46.6
M RI	68	38.5
Middlbr	19	32.3
Newc	62	54.9
Norwch	39	82.1
Nottm	101	32.7
Oxford	75	37.3
Plymth	34	11.8
Ports	88	12.5
Prestn	43	49.0
Redng	45	33.6
Salford	122	40.9
Sheff	57	29.9
Shrew	65	33.7
Stevng	28	42.3
Sthend	20	5.1
Stoke	80	41.2
Sund	19	15.8
Truro	17	29.9
Wirral	17	70.6
Wolve	57	38.8
York	33	54.6
	TOTAL	
England	**3,185**	**41.8**

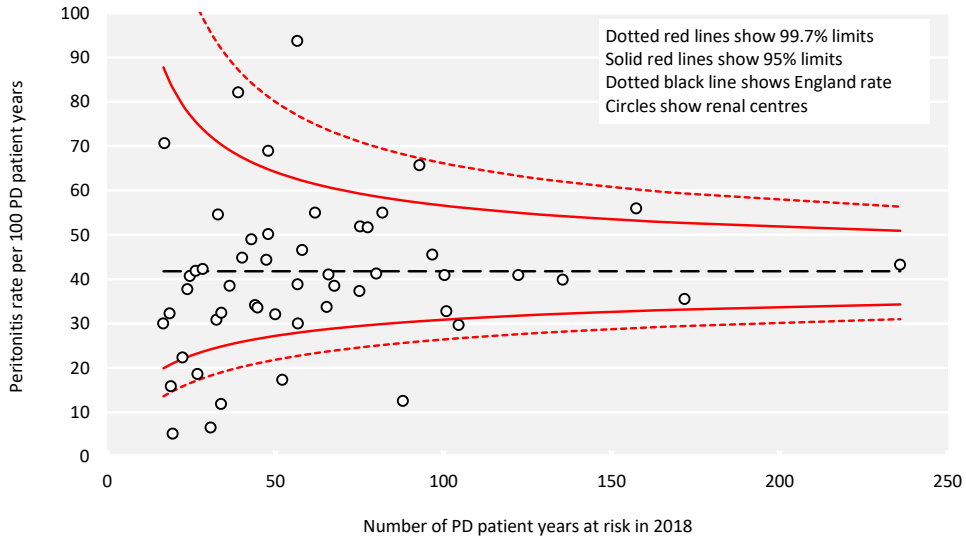

Figure 5.12 PD peritonitis rates in adult patients receiving PD in 2018 per 100 PD patient years by centre in England

Cause of death in adult PD patients

Cause of death was analysed in prevalent patients receiving PD on 31/12/2017 and followed-up for one year in 2018. The proportion of PD patients with each cause of death is shown for patients with cause of death data and these total 100% of patients with data. The proportion of patients with no cause of death data is shown on a separate line. Further detail on the survival of prevalent RRT patients is in chapter 2.

Table 5.10 Cause of death in adult patients prevalent to PD on 31/12/2017 followed-up in 2018 by age group

	PD all ages		PD <65 years		PD ≥65 years	
Cause of death	N	%	N	%	N	%
Cardiac disease	75	22.1	19	22.1	56	22.1
Cerebrovascular disease	11	3.2	5	5.8	6	2.4
Infection	55	16.2	20	23.3	35	13.8
Malignancy	22	6.5	3	3.5	19	7.5
Treatment withdrawal	60	17.7	9	10.5	51	20.1
Other	79	23.2	22	25.6	57	22.4
Uncertain aetiology	38	11.2	8	9.3	30	11.8
Total (with data)	**340**	**100.0**	**86**	**100.0**	**254**	**100.0**
Missing	123	26.6	32	27.1	91	26.4

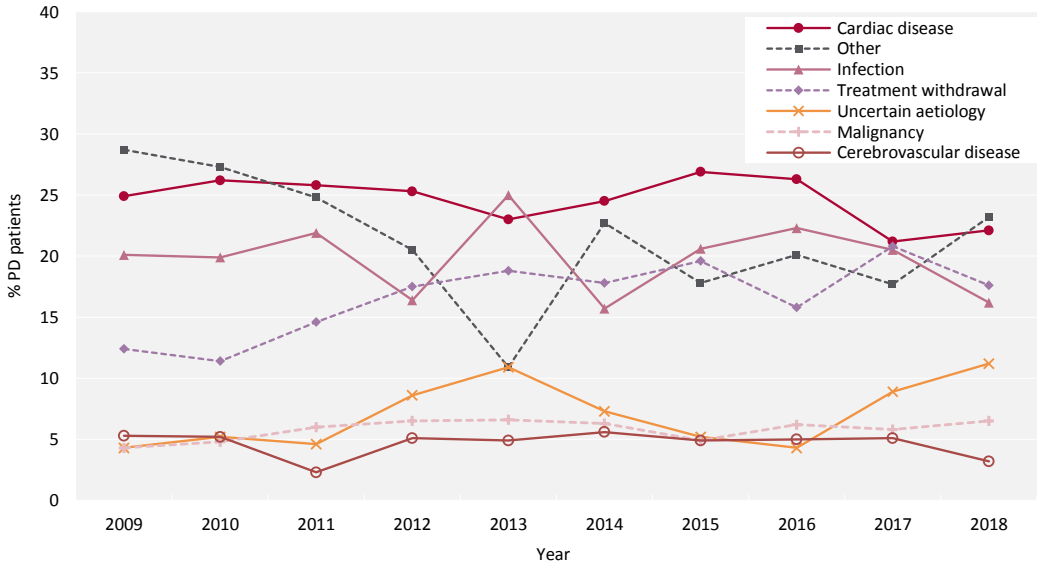

Figure 5.13 Cause of death between 2009 and 2018 for adult patients prevalent to PD at the beginning of the year

THE RENAL ASSOCIATION
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Chapter 6

Adults on home haemodialysis (HHD) in the UK at the end of 2018

Contents

Introduction

This chapter describes the population of adult patients with end-stage kidney disease (ESKD) who were receiving regular home haemodialysis (HHD) in the UK at the end of 2018 (figure 6.1). This population comprises patients who were on HHD at the end of 2017 and remained on HHD throughout 2018, as well as patients who commenced/re-commenced HHD in 2018. This latter group includes both incident renal replacement therapy (RRT) patients who ended 2018 on HHD and prevalent RRT patients who switched to HHD from in-centre haemodialysis (ICHD), peritoneal dialysis (PD), or a transplant (Tx) in 2018. Consequently, the cohort of patients receiving HHD in a centre not only reflects differences in underlying population case-mix, but also differences in the rates of acceptance onto RRT, survival on HHD, transplantation and other dialysis therapies (ICHD and PD), and the care of patients on those other modalities, as described in other chapters of this report.

In previous annual reports, HHD patients have either been described together with ICHD patients or not at all. This is the first time that a chapter dedicated to this treatment modality has been included in the annual report. Although numbers at centre level can be small, it is important to show the characteristics and attainments for these patients, because HHD is an increasingly important treatment option.

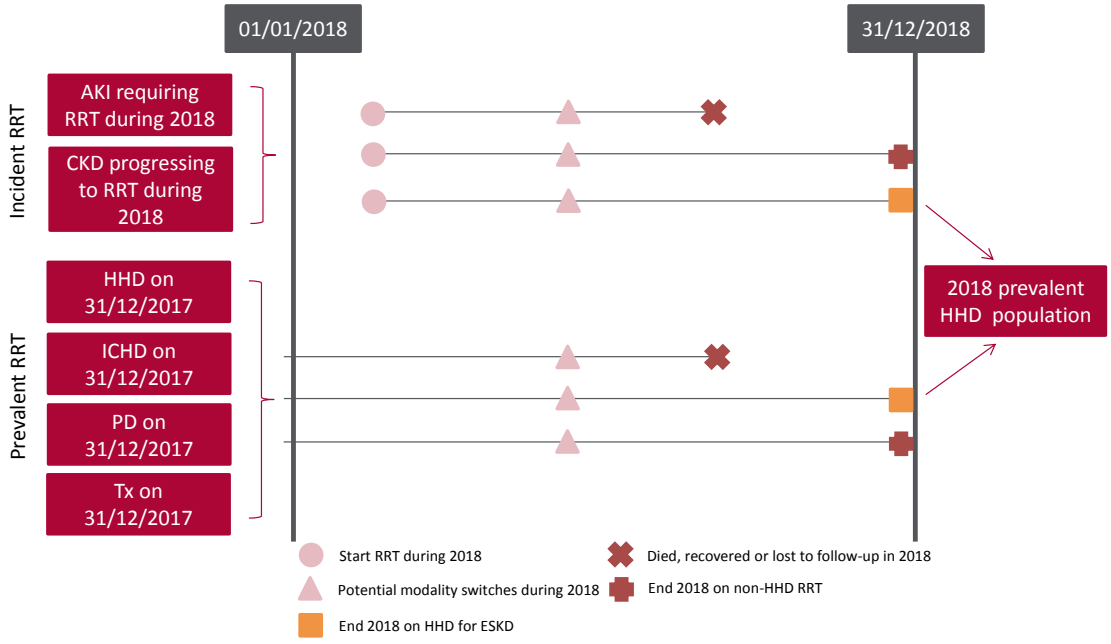

Figure 6.1 Pathways adult patients could follow to be included in the UK 2018 prevalent HHD population

Note that patients receiving dialysis for acute kidney injury (AKI) are only included in this chapter if they had a timeline or RRT modality code for chronic HHD at the end of 2018 or if they had been on RRT for ≥90 days and were on HHD at the end of 2018

CKD – chronic kidney disease

Where possible, the chapter addresses key aspects of the care of patients on HHD for which there are Renal Association guidelines (table 6.1). This includes complications associated with ESKD and HHD, for example anaemia and mineral bone disorders.

Data on infections associated with haemodialysis (HD) are described in chapter 4 on a combined ICHD and HHD population.

Rationale for analyses

The analyses begin with a description of the 2018 prevalent adult HHD population, including the number on HHD per million population (pmp).

The Renal Association guidelines (renal.org/health-professionals/guidelines/guidelines-commentaries) provide audit measures relevant to the care of patients on HHD and, where data permit, their attainment by UK renal centres in 2018 is reported in this chapter (table 6.1). Audit measures in guidelines that have been archived are not included. Some audit measures – for example, the target for glycated haemoglobin (HbA1c) in those on hypoglycaemia-inducing treatment – cannot be reported because the completeness of the required data items is too low. Further detail about the completeness of data returned to the UKRR is available through the UKRR data completeness portal (renal.org/audit-research/data-portal/completeness). Audit measures that cannot be reported because the required data items were not collected by the UKRR are omitted.

Table 6.1 The Renal Association audit measures relevant to HHD that are reported in this chapter

The Renal Association guideline	Audit criteria	Related analysis/analyses
CKD mineral bone disorder (2018)	Percentage of patients with serum calcium above the normal reference range of 2.2–2.5 mmol/L	Table 6.5, figure 6.2
HD (2019)	Proportion of patients with pre-dialysis bicarbonate 18–26 mmol/L	Table 6.6, figure 6.3
	Proportion of patients with pre-dialysis potassium 4.0–6.0 mmol/L	Table 6.6, figure 6.4
Anaemia (2017)	Proportion of patients with serum ferritin <100 µg/L at start of treatment with erythropoiesis stimulating agent (ESA)	Table 6.7, figure 6.7 (the UKRR does not hold treatment with ESA start dates)
	Proportion of patients with haemoglobin <100 g/L not on ESA	Table 6.8
	Proportion of patients on ESA with haemoglobin >120 g/L	Table 6.8, figure 6.9
	Mean (median) ESA dose in patients maintained on ESA therapy	Table 6.8
Planning, initiating and withdrawing RRT (2014)	Number of patients withdrawing from HHD as a proportion of all deaths on HHD	Table 6.9, figure 6.10

ESA – erythropoiesis stimulating agent

For definitions and methods relating to this chapter see appendix A. Centres were excluded from caterpillar plots and cells were blanked in tables where data completeness for a biochemical variable was <70% and/or the number of patients reported was <10. The number preceding the centre name in each caterpillar plot indicates the percentage of missing data for that centre.

Cambridge renal centre (Addenbrooke's Hospital) was unable to submit patient level data for 2017–2018. While data extraction issues have now been resolved, the UKRR and Cambridge are working to load and validate the backlog of data for these years, which should be completed for next year's report. Breakdown of Cambridge HD patients into ICHD and HHD was not available – therefore all HD patients were classed as ICHD (see chapter 4).

Key findings

- 1,323 adult patients were receiving HHD for ESKD in the UK on 31/12/2018, which represented 2.0% of the RRT population
- The median age of HHD patients was 56.0 years and 60.5% were male
- The median adjusted calcium for HHD patients was 2.4 mmol/L and 14.2% were above the target range 2.2–2.5 mmol/L
- The median pre-dialysis bicarbonate for HHD patients was 24 mmol/L and 72.9% were within the target range 18–26 mmol/L
- The median pre-dialysis potassium for HHD patients was 5.0 mmol/L and 79.8% were within the target range 4.0–6.0 mmol/L
- The median haemoglobin and ferritin for HHD patients was 108 g/L and 276 µg/L, respectively, and 89.6% were on an ESA at a median dose of 8,000 IU/week
- 2.6% of HHD patients had a haemoglobin <100 g/L not on an ESA and 13.9% had a haemoglobin >120 g/L on an ESA
- There was no cause of death data available for 29.3% of deaths. For those with data, the leading cause of death in younger patients (<65 years) was cardiac disease (31.8%) and in older patients (≥65 years) were cardiac disease (19.4%) and infection (19.4%).

Analyses

Changes to the prevalent adult HHD population

For the 71 adult renal centres, the number of prevalent patients on HHD was calculated as both a proportion of the prevalent patients on RRT and as a proportion of the estimated centre catchment population (calculated as detailed in appendix A).

Table 6.2 Number of prevalent adult HHD patients and proportion of adult RRT patients on HHD by year and by centre; number of HHD patients as a proportion of the catchment population

	N on HHD					% on HHD					Estimated catchment population (millions)	2018 crude rate (pmp)
Centre	2014	2015	2016	2017	2018	2014	2015	2016	2017	2018		
ENGLAND												
B Heart	18	13	19	21	21	2.8	2.0	2.9	3.2	3.1	0.61	34
B QEH	52	50	56	54	47	2.4	2.2	2.3	2.1	1.8	1.41	33
Basldn	0	5	9	9	10	0.0	1.8	3.3	3.0	3.2	0.34	29
Bradfd	6	7	7	9	9	1.1	1.2	1.1	1.3	1.3	0.54	17
Brightn	51	45	37	40	39	5.6	4.7	3.7	4.0	3.7	1.07	36
Bristol	23	22	19	17	15	1.6	1.5	1.3	1.2	1.0	1.19	13
Camb	22	21	22			1.8	1.6	1.7			0.96	
Carlis	1	0	0	0	0	0.4	0.0	0.0	0.0	0.0	0.27	0
Carsh	26	29	29	27	29	1.7	1.8	1.8	1.6	1.7	1.59	18
Chelms	2	2	3	3	2	0.8	0.7	1.1	1.1	0.7	0.42	5
Colchr	0	0	0	0	0	0	0	0	0	0	0.25	0
Covnt	12	16	12	14	22	1.3	1.7	1.2	1.5	2.3	0.74	30
Derby	35	38	42	52	53	6.8	7.1	7.7	9.4	9.0	0.58	91
Donc	8	10	9	9	9	2.8	3.3	2.7	2.7	2.7	0.34	26
Dorset	6	7	9	10	13	0.9	1.0	1.3	1.4	1.7	0.71	18
Dudley	16	13	14	13	11	5.2	4.1	4.0	3.5	3.0	0.37	30
Exeter	4	5	9	13	21	0.4	0.5	0.9	1.2	1.9	0.90	23
Glouc	4	5	9	5	3	0.9	1.1	1.9	1.0	0.6	0.49	6
Hull	10	8	4	6	5	1.2	0.9	0.5	0.7	0.6	0.85	6
Ipswi	4	1	3	8	5	1.1	0.2	0.7	1.8	1.2	0.33	15
Kent	18	16	22	21	18	1.8	1.5	2.1	1.9	1.6	1.01	18
L Barts	15	23	23	31	36	0.7	1.0	1.0	1.2	1.4	1.52	24
L Guys	54	49	48	41	38	2.8	2.4	2.3	1.9	1.7	0.90	42
L Kings	11	12	18	20	17	1.1	1.1	1.6	1.7	1.4	0.97	18
L Rfree	16	21	20	17	12	0.8	1.0	0.9	0.8	0.5	1.26	10
L St.G	5	4	4	5	6	0.6	0.5	0.5	0.6	0.7	0.66	9
L West	19	18	15	12	19	0.6	0.5	0.4	0.3	0.5	1.99	10
Leeds	19	23	17	23	23	1.3	1.5	1.1	1.4	1.4	1.38	17
Leic	68	60	73	72	64	3.2	2.8	3.2	3.0	2.6	2.02	32
Liv Ain	12	10	13	14	18	5.5	4.5	5.7	6.7	8.3	0.40	45
Liv Roy	32	37	39	39	39	2.5	3.0	3.2	3.1	3.1	0.83	47
M RI	51	49	61	77	73	2.8	2.6	3.1	3.8	3.5	1.27	58
Middlbr	13	15	11	12	13	1.5	1.7	1.2	1.3	1.4	0.83	16
Newc	22	24	24	21	22	2.3	2.4	2.3	1.9	1.9	0.93	24
Norwch	30	25	16	14	13	4.4	3.5	2.1	1.8	1.7	0.65	20
Nottm	33	29	29	34	34	3.1	2.6	2.5	2.9	2.8	0.90	38
Oxford	20	19	19	16	18	1.2	1.1	1.1	0.9	0.9	1.40	13
Plymth	8	8	8	10	10	1.6	1.6	1.6	1.9	1.9	0.39	26
Ports	45	56	75	65	70	2.8	3.4	4.4	3.7	4.0	1.68	42

Table 6.2 Continued

Centre	N on HHD					% on HHD					Estimated catchment population (millions)	2018 crude rate (pmp)
	2014	2015	2016	2017	2018	2014	2015	2016	2017	2018		
Prestn	38	41	41	49	43	3.2	3.4	3.4	3.9	3.3	1.24	35
Redng	7	5	7	6	8	0.9	0.6	0.9	0.8	1.0	0.75	11
Salford	17	15	28	41	35	1.8	1.5	2.7	3.7	3.0	1.24	28
Sheff	43	45	54	51	50	3.2	3.3	3.8	3.5	3.4	1.14	44
Shrew	15	23	19	22	20	4.3	6.2	5.0	5.7	4.7	0.41	48
Stevng	28	23	26	30	43	3.6	2.8	2.9	3.4	4.5	1.00	43
Sthend	1	2	3	2	1	0.4	0.8	1.3	0.8	0.4	0.26	4
Stoke	33	33	34	28	22	4.3	4.2	4.1	3.5	2.7	0.74	30
Sund	1	2	6	21	22	0.2	0.4	1.2	3.9	3.9	0.51	43
Truro	9	10	9	9	3	2.4	2.4	2.1	2.1	0.7	0.34	9
Wirral	8	12	10	9	8	2.9	4.3	3.0	2.3	2.0	0.47	17
Wolve	19	23	30	32	33	3.3	4.0	5.3	5.5	5.5	0.55	60
York	11	11	14	13	17	2.4	2.2	2.6	2.3	3.0	0.41	42
N IRELAND												
Antrim	1	2	1	4	4	0.4	0.8	0.4	1.6	1.5	0.23	17
Belfast	13	9	9	8	10	1.7	1.2	1.1	1.0	1.1	0.51	20
Newry	2	3	3	3	2	1.0	1.3	1.3	1.2	0.8	0.21	10
Ulster	4	2	1	1	0	2.7	1.2	0.6	0.5	0.0	0.21	0
West NI	3	4	3	3	2	1.1	1.4	1.0	1.0	0.6	0.28	7
SCOTLAND												
Abrdn	6	5	4	4	4	1.2	0.9	0.7	0.7	0.7	0.50	8
Airdrie	0	0	0	2	0	0.0	0.0	0.0	0.4	0.0	0.46	0
D&Gall	2	3	3	2	1	1.5	2.3	2.3	1.5	0.7	0.12	8
Dundee	4	2	2	2	8	1.0	0.5	0.5	0.5	1.8	0.39	21
Edinb	6	6	6	4	3	0.8	0.8	0.8	0.5	0.3	0.80	4
Glasgw	28	26	23	15	18	1.7	1.5	1.3	0.8	1.0	1.35	13
Inverns	3	3	7	5	7	1.3	1.2	2.7	1.9	2.5	0.22	31
Klmarnk	11	10	8	10	13	3.7	3.2	2.5	3.0	3.8	0.30	43
Krkcldy	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.26	0
WALES												
Bangor	13	15	10	11	13	12.1	8.2	5.6	5.6	6.4	0.19	70
Cardff	35	28	31	38	34	2.2	1.7	1.9	2.3	2.0	1.21	28
Clwyd	5	7	4	2	2	2.9	3.8	2.3	1.1	1.1	0.16	12
Swanse	40	36	39	34	35	5.7	4.7	5.0	4.3	4.2	0.75	47
Wrexm	1	5	8	5	5	0.4	1.7	2.6	1.6	1.6	0.20	25
TOTALS												
England	**1,021**	**1,040**	**1,128**	**1,167**	**1,162**	**2.1**	**2.0**	**2.1**	**2.2**	**2.1**	**44.02**	**26**
N Ireland	**23**	**20**	**17**	**19**	**18**	**1.4**	**1.2**	**1.0**	**1.0**	**0.9**	**1.44**	**12**
Scotland	**60**	**55**	**53**	**44**	**54**	**1.3**	**1.1**	**1.1**	**0.9**	**1.0**	**4.41**	**12**
Wales	**94**	**91**	**92**	**90**	**89**	**3.3**	**3.0**	**3.0**	**2.8**	**2.7**	**2.51**	**35**
UK	**1,198**	**1,206**	**1,290**	**1,320**	**1,323**	**2.0**	**2.0**	**2.1**	**2.1**	**2.0**	**52.38**	**25**

Country HHD populations were calculated by summing the HHD patients from centres in each country. Estimated country populations were derived from Office for National Statistics figures. See appendix A for details on estimated catchment population by renal centre. Rates appear higher than in previous reports because general population estimates now include only those aged ≥18 years (see appendix B).

Cambridge submitted only aggregate data for 2017 and 2018. Breakdown of HD patients into ICHD and HHD was not available for these years. Therefore all their HD patients were classed as ICHD.

pmp – per million population

Demographics of prevalent adult HHD patients

The proportion of HHD patients from each ethnic group is shown for patients with ethnicity data – the proportion of patients in each centre with no ethnicity data is shown separately.

Table 6.3 Demographics of adult patients prevalent to HHD on 31/12/2018 by centre

Centre	N on RRT	N on HHD	% on HHD	Median age (yrs)	% male	Ethnicity				
						% White	% South Asian	% Black	% Other	% missing
ENGLAND										
B Heart	679	21	3.1	52.0	85.7	66.7	14.3	19.0	0.0	0.0
B QEH	2,569	47	1.8	52.0	70.2	63.8	17.0	8.5	10.6	0.0
Basldn	314	10	3.2	60.0	30.0	100.0	0.0	0.0	0.0	0.0
Bradfd	686	9	1.3	52.4	55.6	88.9	11.1	0.0	0.0	0.0
Brightn	1,055	39	3.7	66.5	61.5	92.3	5.1	0.0	2.6	0.0
Bristol	1,469	15	1.0	57.9	46.7	100.0	0.0	0.0	0.0	0.0
Camb										
Carlis	293	0	0.0							
Carsh	1,736	29	1.7	64.5	55.2	82.8	3.4	10.3	3.4	0.0
Chelms	270	2	0.7	59.3	100.0	100.0	0.0	0.0	0.0	0.0
Colchr	121	0	0.0							
Covnt	1,042	22	2.1	51.6	68.2	81.8	9.1	9.1	0.0	0.0
Derby	589	53	9.0	60.7	71.7	84.9	13.2	0.0	1.9	0.0
Donc	332	9	2.7	59.0	55.6	88.9	0.0	0.0	11.1	0.0
Dorset	765	13	1.7	66.6	53.8	100.0	0.0	0.0	0.0	0.0
Dudley	361	11	3.0	54.5	72.7	100.0	0.0	0.0	0.0	0.0
Exeter	1,088	21	1.9	55.4	42.9	90.5	0.0	4.8	4.8	0.0
Glouc	510	3	0.6	62.2	33.3	100.0	0.0	0.0	0.0	0.0
Hull	883	5	0.6	52.0	80.0	100.0	0.0	0.0	0.0	0.0
Ipswi	428	5	1.2	66.5	60.0	80.0	0.0	20.0	0.0	0.0
Kent	1,114	18	1.6	53.3	72.2	94.4	0.0	0.0	5.6	0.0
L Barts	2,610	36	1.4	52.3	50.0	38.9	13.9	38.9	8.3	0.0
L Guys	2,225	38	1.7	48.6	44.7	68.4	5.3	23.7	2.6	0.0
L Kings	1,186	17	1.4	57.8	76.5	64.7	5.9	23.5	5.9	0.0
L Rfree	2,234	12	0.5	58.1	66.7	50.0	0.0	50.0	0.0	0.0
L St.G	837	6	0.7	45.2	33.3	83.3	0.0	16.7	0.0	0.0
L West	3,566	19	0.5	54.1	47.4	42.1	26.3	31.6	0.0	0.0
Leeds	1,687	23	1.4	47.4	56.5	87.0	4.3	8.7	0.0	0.0
Leic	2,468	64	2.6	56.2	68.8	88.9	6.3	3.2	1.6	1.6
Liv Ain	218	18	8.3	53.3	55.6	100.0	0.0	0.0	0.0	0.0
Liv Roy	1,277	39	3.1	56.4	56.4	92.3	0.0	5.1	2.6	0.0
M RI	2,073	73	3.5	53.8	61.6	66.7	8.3	20.8	4.2	1.4
Middlbr	925	13	1.4	53.3	46.2	92.3	0.0	0.0	7.7	0.0
Newc	1,155	22	1.9	50.0	54.5	100.0	0.0	0.0	0.0	0.0
Norwch	786	13	1.7	61.0	69.2	100.0	0.0	0.0	0.0	0.0
Nottm	1,196	34	2.8	53.2	47.1	79.4	2.9	11.8	5.9	0.0
Oxford	1,940	18	0.9	60.8	66.7	81.3	12.5	6.3	0.0	11.1
Plymth	539	10	1.9	62.0	40.0	100.0	0.0	0.0	0.0	0.0
Ports	1,764	70	4.0	59.7	68.6	94.3	0.0	1.4	4.3	0.0
Prestn	1,322	43	3.3	58.0	55.8	88.4	11.6	0.0	0.0	0.0
Redng	810	8	1.0	57.0	75.0	75.0	12.5	12.5	0.0	0.0
Salford	1,173	35	3.0	52.6	62.9	82.9	5.7	8.6	2.9	0.0
Sheff	1,481	50	3.4	55.7	48.0	90.0	4.0	4.0	2.0	0.0
Shrew	424	20	4.7	63.0	85.0	100.0	0.0	0.0	0.0	0.0
Stevng	957	43	4.5	54.7	51.2	82.9	9.8	4.9	2.4	4.7

Table 6.3 Continued

Centre	N on RRT	N on HHD	% on HHD	Median age (yrs)	% male	Ethnicity				
						% White	% South Asian	% Black	% Other	% missing
Sthend	260	1	0.4	63.7	100.0	0.0	100.0	0.0	0.0	0.0
Stoke	808	22	2.7	59.2	63.6	100.0	0.0	0.0	0.0	0.0
Sund	557	22	3.9	54.9	50.0	100.0	0.0	0.0	0.0	0.0
Truro	437	3	0.7	70.8	33.3	100.0	0.0	0.0	0.0	0.0
Wirral	395	8	2.0	51.0	75.0	87.5	12.5	0.0	0.0	0.0
Wolve	602	33	5.5	49.5	69.7	72.7	15.2	6.1	6.1	0.0
York	568	17	3.0	53.5	70.6	94.1	0.0	5.9	0.0	0.0
N IRELAND										
Antrim	274	4	1.5	62.3	75.0	100.0	0.0	0.0	0.0	0.0
Belfast	877	10	1.1	49.8	80.0	100.0	0.0	0.0	0.0	0.0
Newry	249	2	0.8	67.4	100.0	100.0	0.0	0.0	0.0	0.0
Ulster	190	0	0.0							
West NI	324	2	0.6	55.5	50.0	100.0	0.0	0.0	0.0	0.0
SCOTLAND										
Abrdn	573	4	0.7	48.8	25.0					50.0
Airdrie	487	0	0.0							
D&Gall	145	1	0.7	53.4	100.0					100.0
Dundee	445	8	1.8	66.0	75.0					75.0
Edinb	862	3	0.3	57.0	100.0					33.3
Glasgw	1,812	18	1.0	54.5	61.1					72.2
Inverns	279	7	2.5	49.3	42.9					42.9
Klmarnk	342	13	3.8	61.4	53.8					84.6
Krkcldy	300	0	0.0							
WALES										
Bangor	202	13	6.4	54.0	76.9	100.0	0.0	0.0	0.0	0.0
Cardff	1,721	34	2.0	55.6	58.8	97.1	2.9	0.0	0.0	0.0
Clwyd	190	2	1.1	59.5	50.0	100.0	0.0	0.0	0.0	0.0
Swanse	824	35	4.2	60.1	57.1	100.0	0.0	0.0	0.0	0.0
Wrexm	315	5	1.6	59.1	20.0	100.0	0.0	0.0	0.0	0.0
TOTALS										
England	**54,784**	**1,162**	**2.1**	**55.9**	**60.4**	**83.0**	**6.2**	**8.0**	**2.8**	**0.5**
N Ireland	**1,914**	**18**	**0.9**	**54.9**	**77.8**	**100.0**	**0.0**	**0.0**	**0.0**	**0.0**
Scotland	**5,245**	**54**	**1.0**	**57.4**	**59.3**					**68.5**
Wales	**3,252**	**89**	**2.7**	**57.5**	**58.4**	**98.9**	**1.1**	**0.0**	**0.0**	**0.0**
UK	**65,195**	**1,323**	**2.0**	**56.0**	**60.5**	**84.4**	**5.8**	**7.3**	**2.5**	**3.3**

Blank cells – no data returned by the centre or data completeness <70%.
Breakdown by ethnicity is not shown for centres with <70% data completeness, but these centres were included in national averages.

Primary renal diseases (PRDs) were grouped into categories as shown in table 6.4, with the mapping of disease codes into groups explained in more detail in appendix A. The proportion of HHD patients with each PRD is shown for patients with PRD data and these total 100% of patients with data. The proportion of patients with no PRD data is shown on a separate line.

Table 6.4 Primary renal diseases (PRDs) of adult patients prevalent to HHD on 31/12/2018

PRD	N on HHD	% HHD population	Age <65 yrs		Age ≥65 yrs		M/F ratio
			N	%	N	%	
Diabetes	190	14.8	134	14.0	56	17.2	1.5
Glomerulonephritis	326	25.4	268	28.0	58	17.8	1.8
Hypertension	65	5.1	45	4.7	20	6.2	2.6
Polycystic kidney disease	110	8.6	77	8.0	33	10.2	1.2
Pyelonephritis	136	10.6	114	11.9	22	6.8	1.1
Renal vascular disease	29	2.3	13	1.4	16	4.9	2.6
Other	251	19.6	186	19.4	65	20.0	1.3
Uncertain aetiology	175	13.7	120	12.5	55	16.9	1.8
Total (with data)	**1,282**	**100.0**	**957**	**100.0**	**325**	**100.0**	
Missing	41	3.1	28	2.8	13	3.8	1.3

Biochemistry parameters in prevalent adult HHD patients

The Renal Association guideline on CKD mineral bone disease contains only one audit measure, which is the percentage of patients with adjusted calcium above the target range. For the first time the Scottish Renal Registry sent pre-dialysis potassium and bicarbonate data to the UKRR.

Table 6.5 Median adjusted calcium (Ca) and percentage with adjusted Ca within and above the target range (2.2–2.5 mmol/L) in adult patients prevalent to HHD on 31/12/2018 by centre

Centre	Median adj Ca (mmol/L)	% adj Ca 2.2-2.5 mmoI/L	% adj Ca >2.5 mmoI/L	% data completeness
ENGLAND				
B Heart	2.4	57.9	26.3	100.0
B QEH	2.3	66.7	8.9	100.0
Basldn	2.4	80.0	10.0	100.0
Bradfd				100.0
Brightn	2.3	76.9	20.5	100.0
Bristol	2.4	93.3	6.7	100.0
Camb				
Carlis				
Carsh	2.4	78.6	10.7	100.0
Chelms				100.0
Colchr				
Covnt	2.3	81.0	4.8	95.5
Derby	2.4	71.7	20.8	100.0
Donc				100.0
Dorset	2.2	76.9	0.0	100.0
Dudley	2.5	72.7	18.2	100.0
Exeter	2.3	84.2	10.5	100.0
Glouc				100.0
Hull				100.0
Ipswi				100.0
Kent	2.4	58.8	35.3	100.0
L Barts	2.3	85.3	5.9	100.0
L Guys	2.35	71.1	13.2	100.0
L Kings	2.3	58.8	11.8	100.0
L Rfree		83.3	8.3	100.0
L St.G				100.0
L West				68.4

Table 6.5 Continued

Centre	Median adj Ca (mmol/L)	% adj Ca 2.2-2.5 mmoI/L	% adj Ca >2.5 mmoI/L	% data completeness
Leeds	2.3	78.3	8.7	100.0
Leic	2.4	79.7	10.9	100.0
Liv Ain	2.4	62.5	31.3	100.0
Liv Roy	2.4	79.0	13.2	100.0
M RI	2.5	64.3	31.4	95.9
Middlbr	2.2	53.9	0.0	100.0
Newc	2.3	68.2	9.1	100.0
Norwch	2.3	76.9	15.4	100.0
Nottm	2.4	82.4	5.9	100.0
Oxford	2.3	77.8	0.0	100.0
Plymth	2.3	50.0	30.0	100.0
Ports	2.4	78.5	16.9	98.5
Prestn	2.3	69.8	11.6	100.0
Redng				100.0
Salford	2.4	79.4	17.7	100.0
Sheff	2.3	76.0	4.0	100.0
Shrew	2.4	70.0	15.0	100.0
Stevng	2.3	70.7	17.1	100.0
Sthend				100.0
Stoke	2.4	81.8	13.6	100.0
Sund	2.4	95.5	4.6	100.0
Truro				100.0
Wirral				100.0
Wolve	2.4	72.7	21.2	100.0
York	2.4	88.2	11.8	100.0
N IRELAND				
Antrim				100.0
Belfast				100.0
Newry				100.0
Ulster				
West NI				100.0
SCOTLAND				
Abrdn				100.0
Airdrie				
D&Gall				100.0
Dundee				100.0
Edinb				100.0
Glasgw	2.4	77.8	16.7	100.0
Inverns				100.0
Klmarnk	2.4	84.6	15.4	100.0
Krkcldy				
WALES				
Bangor	2.3	69.2	15.4	100.0
Cardff	2.4	67.7	23.5	100.0
Clwyd				100.0
Swanse	2.3	80.0	2.9	100.0
Wrexm				100.0
TOTALS				
England	**2.4**	**74.8**	**14.3**	**99.0**
N Ireland	**2.3**	**82.4**	**5.9**	**100.0**
Scotland	**2.4**	**75.5**	**17.0**	**100.0**
Wales	**2.4**	**75.3**	**12.4**	**100.0**
UK	**2.4**	**75.0**	**14.2**	**99.2**

Blank cells – no data returned by the centre or <10 patients in the centre or data completeness <70%.

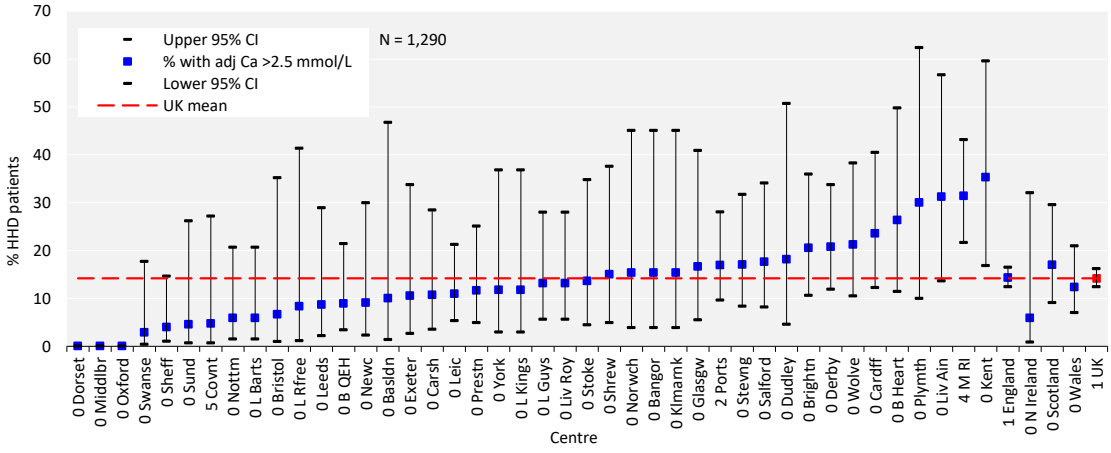

Figure 6.2 Percentage of adult patients prevalent to HHD on 31/12/2018 with adjusted calcium (Ca) above the target range (>2.5 mmol/L) by centre

CI – confidence interval

Table 6.6 Median pre-dialysis potassium and bicarbonate and percentage attaining target ranges in adult patients prevalent to HHD on 31/12/2018 by centre

	Pre-dialysis potassium					Pre-dialysis bicarbonate				
Centre	Median (mmol/L)	% <4.0 mmol/L	% 4.0–6.0 mmol/L	% >6.0 mmol/L	% data complete-ness	Median (mmol/L)	% <18 mmol/L	% 18–26 mmol/L	% >26 mmol/L	% data complete-ness
ENGLAND										
B Heart	5.0	15.8	73.7	10.5	100.0	21	5.3	89.5	5.3	100.0
B QEH	5.3	13.3	75.6	11.1	100.0					51.1
Basldn	4.6	0.0	100.0	0.0	100.0	24	0.0	80.0	20.0	100.0
Bradfd					100.0					100.0
Brightn					0.0	24	5.3	76.3	18.4	97.4
Bristol	4.9	6.7	80.0	13.3	100.0	22	0.0	86.7	13.3	100.0
Camb										
Carlis										
Carsh					0.0					3.6
Chelms					100.0					100.0
Colchr										
Covnt	4.4	33.3	61.9	4.8	95.5	24	4.8	71.4	23.8	95.5
Derby					0.0	23	0.0	94.3	5.7	100.0
Donc					100.0					100.0
Dorset	5.4	7.7	69.2	23.1	100.0	23	0.0	100.0	0.0	100.0
Dudley	5.5	0.0	81.8	18.2	100.0	26	0.0	63.6	36.4	100.0
Exeter	5.0	5.3	89.5	5.3	100.0	24	10.5	73.7	15.8	100.0
Glouc					0.0					100.0
Hull					100.0					100.0
Ipswi					0.0					100.0
Kent	4.7	11.8	88.2	0.0	100.0	24	0.0	76.5	23.5	100.0
L Barts					0.0	24	5.9	76.5	17.7	100.0
L Guys	4.7	21.1	76.3	2.6	100.0	26	0.0	54.1	46.0	97.4
L Kings	4.2	35.3	58.8	5.9	100.0	22	5.9	88.2	5.9	100.0
L Rfree		0.0	83.3	16.7	100.0		9.1	81.8	9.1	91.7

Table 6.6 Continued

Centre	Pre-dialysis potassium					Pre-dialysis bicarbonate				
	Median (mmol/L)	% <4.0 mmol/L	% 4.0–6.0 mmol/L	% >6.0 mmol/L	% data complete-ness	Median (mmol/L)	% <18 mmol/L	% 18–26 mmol/L	% >26 mmol/L	% data complete-ness
L St.G					0.0					100.0
L West					0.0					31.6
Leeds	5.4	0.0	87.0	13.0	100.0	25	0.0	73.9	26.1	100.0
Leic	5.3	4.7	81.3	14.1	100.0	25	1.6	72.6	25.8	96.9
Liv Ain					0.0	26	0.0	62.5	37.5	100.0
Liv Roy					0.0	25	2.6	57.9	39.5	100.0
M RI					0.0	24	0.0	75.7	24.3	95.9
Middlbr	5.3	0.0	84.6	15.4	100.0	25	0.0	53.9	46.2	100.0
Newc					0.0	23	0.0	100.0	0.0	100.0
Norwch	5.3	0.0	76.9	23.1	100.0	24	0.0	100.0	0.0	100.0
Nottm	5.2	2.9	94.1	2.9	100.0					41.2
Oxford	5.1	0.0	83.3	16.7	100.0	24	0.0	72.2	27.8	100.0
Plymth	5.0	10.0	70.0	20.0	100.0	27	10.0	40.0	50.0	100.0
Ports	4.9	9.1	87.9	3.0	100.0	24	6.4	73.0	20.6	95.5
Prestn					0.0	23	0.0	74.4	25.6	90.7
Redng					0.0					100.0
Salford	4.9	14.7	82.4	2.9	100.0					2.9
Sheff	5.2	4.0	84.0	12.0	100.0	25	2.0	76.0	22.0	100.0
Shrew					0.0	24	10.0	65.0	25.0	100.0
Stevng	4.9	9.8	73.2	17.1	100.0	25	0.0	62.9	37.1	85.4
Sthend					100.0					100.0
Stoke					0.0	29	0.0	31.8	68.2	100.0
Sund					0.0	24	9.1	77.3	13.6	100.0
Truro					100.0					100.0
Wirral					0.0					100.0
Wolve	4.5	18.2	75.8	6.1	100.0	21	6.1	84.9	9.1	100.0
York	5.4	0.0	64.7	35.3	100.0	25	5.9	64.7	29.4	100.0
N IRELAND										
Antrim					100.0					100.0
Belfast					100.0					100.0
Newry					100.0					100.0
Ulster										
West NI					100.0					100.0
SCOTLAND										
Abrdn					75.0					25.0
Airdrie										
D&Gall					100.0					100.0
Dundee					100.0					100.0
Edinb					100.0					0.0
Glasgw					55.6					44.4
Inverns					100.0					100.0
Klmarnk	4.5	23.1	76.9	0.0	100.0	25	0.0	80.0	20.0	76.9
Krkcldy										
WALES										
Bangor					0.0	26	0.0	61.5	38.5	100.0
Cardff					0.0	24	2.9	70.6	26.5	100.0
Clwyd					0.0					100.0
Swanse					0.0	26	0.0	57.1	42.9	100.0
Wrexm					0.0					100.0

Table 6.6 Continued

Centre	Pre-dialysis potassium					Pre-dialysis bicarbonate				
	Median (mmol/L)	% <4.0 mmol/L	% 4.0–6.0 mmol/L	% >6.0 mmol/L	% data completeness	Median (mmol/L)	% <18 mmol/L	% 18–26 mmol/L	% >26 mmol/L	% data completeness
TOTALS										
England	**5.0**	**9.5**	**79.9**	**10.6**	**59.7**	**24**	**2.9**	**73.8**	**23.3**	**88.0**
N Ireland	**5.3**	**5.9**	**70.6**	**23.5**	**100.0**	**23**	**0.0**	**82.4**	**17.7**	**100.0**
Scotland	**4.9**	**9.1**	**81.8**	**9.1**	**83.0**	**25**	**0.0**	**73.5**	**26.5**	**64.2**
Wales					**0.0**	**26**	**1.1**	**60.7**	**38.2**	**100.0**
UK	**5.0**	**9.4**	**79.8**	**10.8**	**57.1**	**24**	**2.6**	**72.9**	**24.5**	**88.0**

Blank cells – no data returned by the centre or <10 patients in the centre or data completeness <70%.

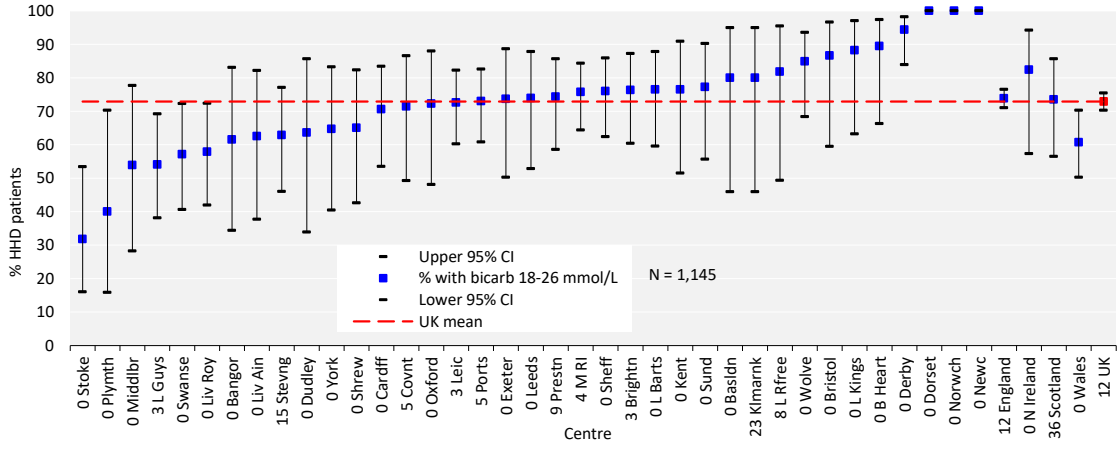

Figure 6.3 Percentage of adult patients prevalent to HHD on 31/12/2018 with pre-dialysis bicarbonate (bicarb) within the target range (18–26 mmol/L) by centre

CI – confidence interval

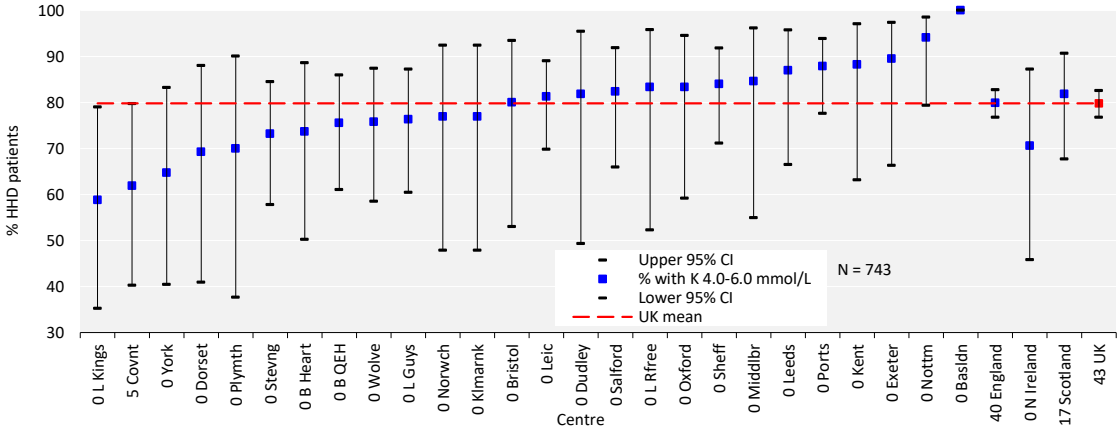

Figure 6.4 Percentage of adult patients prevalent to HHD on 31/12/2018 with pre-dialysis potassium (K) within the target range (4.0–6.0 mmol/L) by centre.

CI – confidence interval

Anaemia in prevalent adult HHD patients

Inadequate data completeness in relation to ESAs makes auditing against national guidelines difficult to interpret. An important assumption is that patients for whom no ESA data have been submitted to the UKRR are not on ESA treatment, provided the centre has submitted ESA data for other patients on HHD. The weekly ESA dose is reported, but there are some uncertainties surrounding the accuracy of this measure (see appendix A).

Table 6.7 Median haemoglobin and ferritin and percentage attaining target ranges in adult patients prevalent to HHD on 31/12/2018 by centre

	Haemoglobin				Ferritin		
Centre	Median (g/L)	% <100 g/L	% >120 g/L	% data completeness	Median (µg/L)	% <100 µg/L	% data completeness
ENGLAND							
B Heart	103	21.1	5.3	100.0	123	41.2	89.5
B QEH	109	37.8	8.9	100.0	276	8.9	100.0
Basldn	102	50.0	20.0	100.0	101	50.0	100.0
Bradfd				100.0			100.0
Brightn	109	13.2	13.2	97.4	403	10.3	100.0
Bristol	111	6.7	26.7	100.0	265	6.7	100.0
Camb							
Carlis							
Carsh	103	35.7	3.6	100.0	164	25.0	100.0
Chelms				100.0			100.0
Colchr							
Covnt	102	33.3	9.5	95.5	305	14.3	95.5
Derby	119	7.5	45.3	100.0	477	1.9	100.0
Donc				100.0			100.0
Dorset	109	15.4	7.7	100.0	413	15.4	100.0
Dudley	117	9.1	36.4	100.0			0.0
Exeter	110	5.3	26.3	100.0	184	21.1	100.0
Glouc				100.0			100.0
Hull				100.0			100.0
Ipswi				100.0			80.0
Kent	111	35.3	11.8	100.0	348	18.8	94.1
L Barts	108	20.6	8.8	100.0	596	8.8	100.0
L Guys	108	36.8	10.5	100.0	259	18.9	97.4
L Kings	112	23.5	17.6	100.0	219	17.6	100.0
L Rfree	106	33.3	16.7	100.0	442	8.3	100.0
L St.G				100.0			100.0
L West	111	28.6	21.4	73.7			68.4
Leeds	99	52.2	8.7	100.0	336	4.3	100.0
Leic	107	23.4	23.4	100.0	289	10.9	100.0
Liv Ain	101	43.8	6.3	100.0	253	12.5	100.0
Liv Roy	105	34.2	23.7	100.0	115	44.7	100.0
M RI	109	25.7	14.3	95.9	199	26.1	94.5
Middlbr	112	38.5	30.8	100.0	596	7.7	100.0
Newc	108	31.8	18.2	100.0	334	18.2	100.0
Norwch	108	23.1	23.1	100.0	213	30.8	100.0
Nottm	111	20.6	23.5	100.0	277	8.8	100.0
Oxford	112	22.2	27.8	100.0	329	5.6	100.0
Plymth	119	20.0	50.0	100.0	394	10.0	100.0
Ports	110	25.8	31.8	100.0	186	20.0	98.5
Prestn	106	34.9	9.3	100.0	361	16.3	100.0

Table 6.7 Continued

Centre	Haemoglobin				Ferritin		
	Median (g/L)	% <100 g/L	% >120 g/L	% data completeness	Median (µg/L)	% <100 µg/L	% data completeness
Redng				100.0			100.0
Salford	105	35.3	8.8	100.0	335	9.7	91.2
Sheff	103	44.0	16.0	100.0	458	8.2	98.0
Shrew	120	0.0	40.0	100.0	330	5.0	100.0
Stevng	104	36.6	12.2	100.0	441	10.3	95.1
Sthend				100.0			100.0
Stoke	116	18.2	27.3	100.0	323	4.8	95.5
Sund	110	22.7	18.2	100.0	274	0.0	100.0
Truro				100.0			100.0
Wirral				100.0			100.0
Wolve	101	45.5	15.2	100.0	243	24.2	100.0
York	108	23.5	5.9	100.0	320	11.8	100.0
N IRELAND							
Antrim				100.0			100.0
Belfast				100.0			100.0
Newry				100.0			100.0
Ulster							
West NI				50.0			100.0
SCOTLAND							
Abrdn				100.0			100.0
Airdrie							
D&Gall				100.0			100.0
Dundee				100.0			100.0
Edinb				100.0			100.0
Glasgw	107	27.8	22.2	100.0	180	44.4	100.0
Inverns				100.0			100.0
Klmarnk	104	15.4	23.1	100.0	164	30.8	100.0
Krkcldy							
WALES							
Bangor	115	23.1	30.8	100.0	66	69.2	100.0
Cardff	101	47.1	8.8	100.0	148	38.2	100.0
Clwyd				100.0			100.0
Swanse	105	31.4	8.6	100.0	173	40.0	100.0
Wrexm				100.0			80.0
TOTALS							
England	**108**	**27.3**	**19.3**	**99.1**	**284**	**15.3**	**96.9**
N Ireland	**112**	**25.0**	**25.0**	**94.1**	**310**	**11.8**	**100.0**
Scotland	**104**	**32.1**	**17.0**	**100.0**	**210**	**28.3**	**100.0**
Wales	**106**	**34.8**	**11.2**	**100.0**	**157**	**42.0**	**98.9**
UK	**108**	**28.0**	**18.7**	**99.2**	**276**	**17.6**	**97.2**

Blank cells – no data returned by the centre or <10 patients in the centre or data completeness <70%.

Table 6.8 Distribution of haemoglobin and erythropoiesis stimulating agent (ESA) dose values in adult patients prevalent to HHD on 31/12/2018 by centre

	ESA		Haemoglobin and ESA	
Centre	% on ESA	Median dose (IU/week)	% <100g/L and not on ESA	% >120g/L and on ESA
ENGLAND				
B Heart	52.6			
B QEH	0.0			
Basldn	100.0	11,000	0.0	20.0
Bradfd	100.0			
Brightn	51.3			
Bristol	93.3	9,000	0.0	26.7
Camb				
Carlis				
Carsh	7.1			
Chelms	100.0			
Colchr				
Covnt	86.4	8,000	4.8	4.8
Derby	0.0			
Donc	100.0			
Dorset	92.3	8,000	0.0	7.7
Dudley	100.0	11,000	0.0	36.4
Exeter	100.0	6,000	0.0	21.1
Glouc	100.0			
Hull	20.0			
Ipswi	0.0			
Kent	94.1	12,000	0.0	5.9
L Barts	0.0			
L Guys	0.0			
L Kings	88.2	12,000	5.9	17.6
L Rfree	0.0			
L St.G	0.0			
L West	0.0			
Leeds	100.0	8,000	0.0	8.7
Leic	89.1	6,000	3.1	15.6
Liv Ain	0.0			
Liv Roy	0.0			
M RI	0.0			
Middlbr	84.6	6,000	7.7	23.1
Newc	40.9			
Norwch	76.9	8,000	0.0	7.7
Nottm	85.3	10,000	0.0	17.6
Oxford	94.4	15,000	0.0	22.2
Plymth	0.0			
Ports	12.1			
Prestn	93.0		0.0	9.3
Redng	12.5			
Salford	76.5	8,000	14.7	8.8
Sheff	78.0	4,000	6.0	14.0
Shrew	0.0			
Stevng	92.7	11,000	2.4	12.2
Sthend	100.0			
Stoke	0.0			
Sund	63.6			
Truro	0.0			
Wirral	87.5			
Wolve	90.9	11,000	3.0	12.1
York	94.1	5,500	0.0	5.9

Table 6.8 Continued

	ESA		Haemoglobin and ESA	
Centre	% on ESA	Median dose (IU/week)	% <100g/L and not on ESA	% >120g/L and on ESA
N IRELAND				
Antrim	100.0			
Belfast	88.9			
Newry	100.0			
Ulster				
West NI	100.0			
SCOTLAND				
Abrdn	100.0			
Airdrie				
D&Gall	0.0			
Dundee	50.0			
Edinb	100.0			
Glasgw	4.8			
Inverns	100.0			
Klmarnk	9.1			
Krkcldy				
WALES				
Bangor	38.5			
Cardff	58.8			
Clwyd	50.0			
Swanse	85.7		2.9	5.7
Wrexm	80.0			
TOTAL[1]				
UK	**89.6**	**8,000**	**2.6**	**13.9**

Blank cells – no data returned by the centre or <10 patients in the centre or data completeness <70% (or <70% patients were on an ESA).
Data for Scotland refer to patients prevalent to HHD on 31/05/2018 due to ESA data availability.
[1]This is the total of only those centres with at least 70% of HHD patients on an ESA.

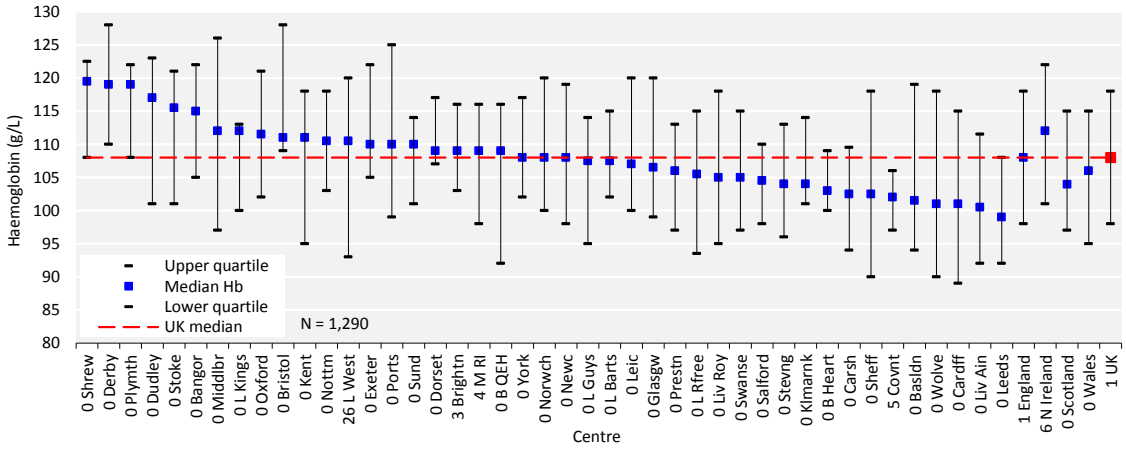

Figure 6.5 Median haemoglobin (Hb) in adult patients prevalent to HHD on 31/12/2018 by centre

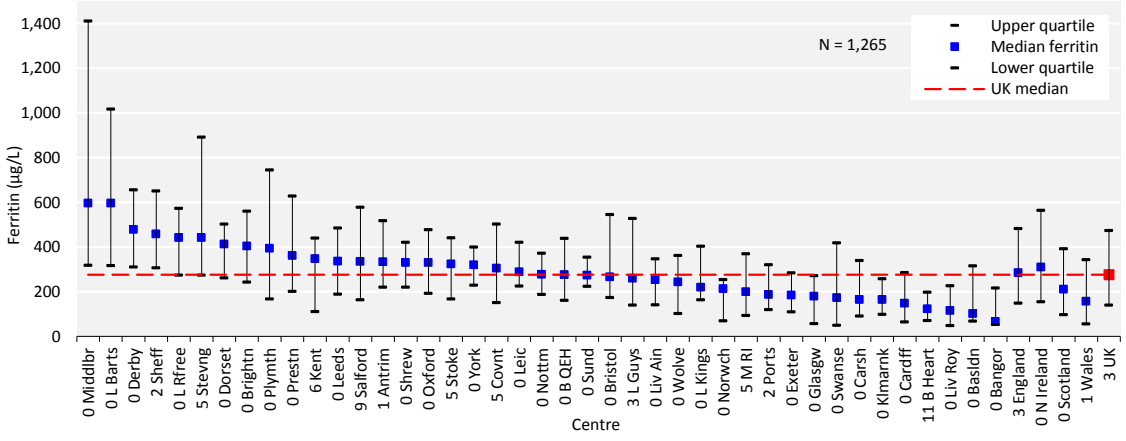

Figure 6.6 Median ferritin in adult patients prevalent to HHD on 31/12/2018 by centre

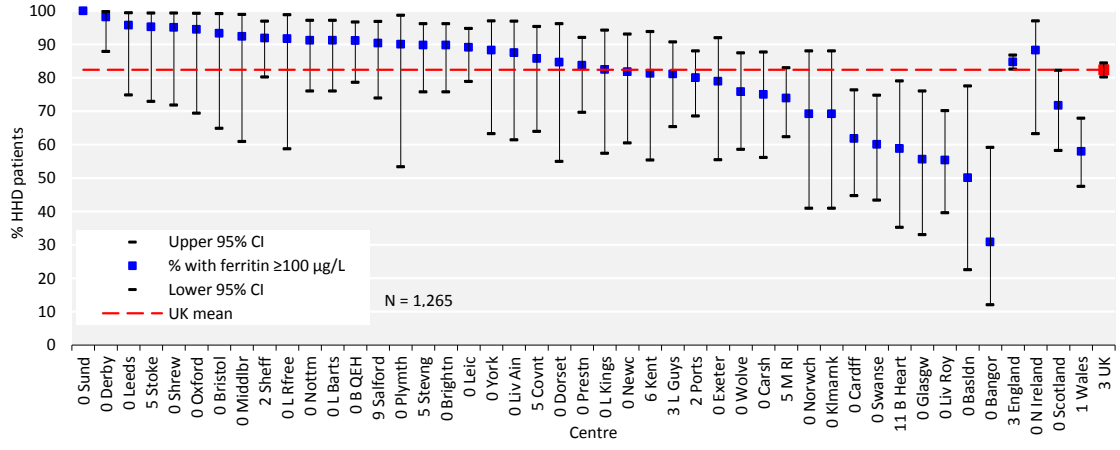

Figure 6.7 Percentage of adult patients prevalent to HHD on 31/12/2018 with ferritin ≥100 µg/L by centre
CI – confidence interval

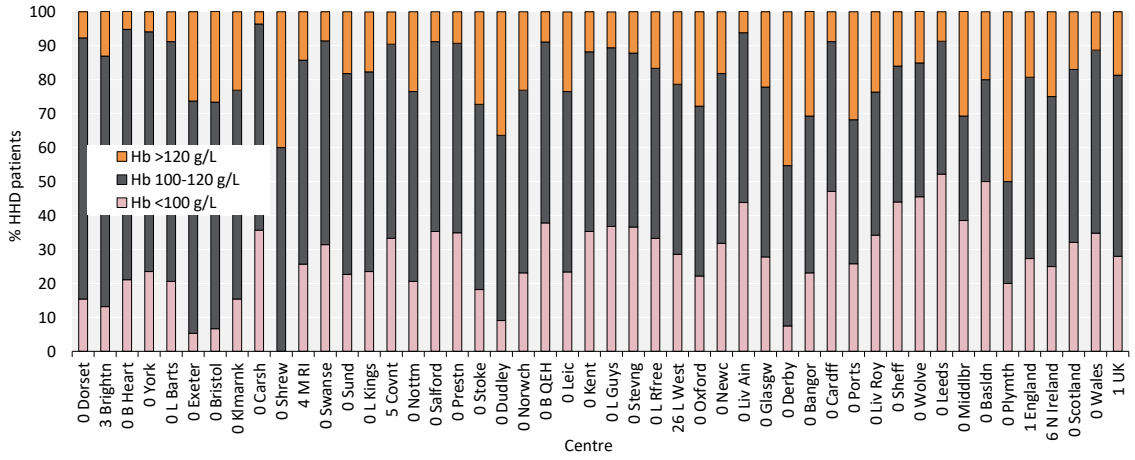

Figure 6.8 Distribution of haemoglobin (Hb) in adult patients prevalent to HHD on 31/12/2018 by centre

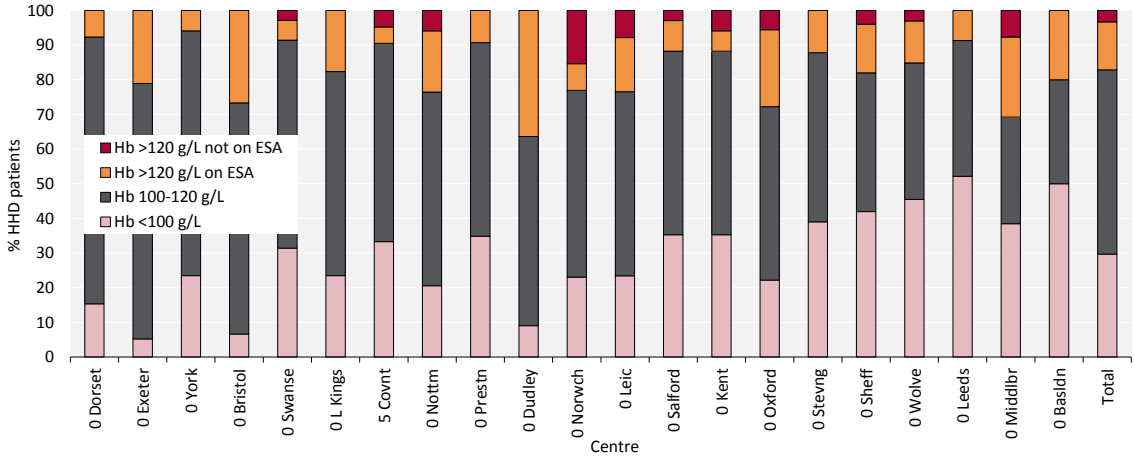

Figure 6.9 Distribution of haemoglobin (Hb) in adult patients prevalent to HHD on 31/12/2018 and the proportion with haemoglobin >120 g/L receiving erythropoiesis stimulating agent (ESA) by centre

Figure (including total) does not include centres with <70% data completeness (or <70% ESA use).

Cause of death in adult HHD patients

Cause of death was analysed in prevalent patients receiving HHD on 31/12/2017 and followed-up for one year in 2018. The proportion of HHD patients with each cause of death is shown for patients with cause of death data and these total 100% of patients with data. The proportion of patients with no cause of death data is shown on a separate line. Further detail on the survival of prevalent RRT patients is in chapter 2.

Table 6.9 Cause of death in adult patients prevalent to HHD on 31/12/2017 followed-up in 2018 by age group

	HHD all ages		HHD <65 yrs		HHD ≥65 yrs	
Cause of death	N	%	N	%	N	%
Cardiac disease	20	26.7	14	31.8	6	19.4
Cerebrovascular disease	4	5.3	2	4.6	2	6.5
Infection	11	14.7	5	11.4	6	19.4
Malignancy	3	4.0	2	4.6	1	3.2
Treatment withdrawal	7	9.3	3	6.8	4	12.9
Other	22	29.3	12	27.3	10	32.3
Uncertain aetiology	8	10.7	6	13.6	2	6.5
Total (with data)	**75**	**100.0**	**44**	**100.0**	**31**	**100.0**
Missing	31	29.3	23	34.3	8	20.5

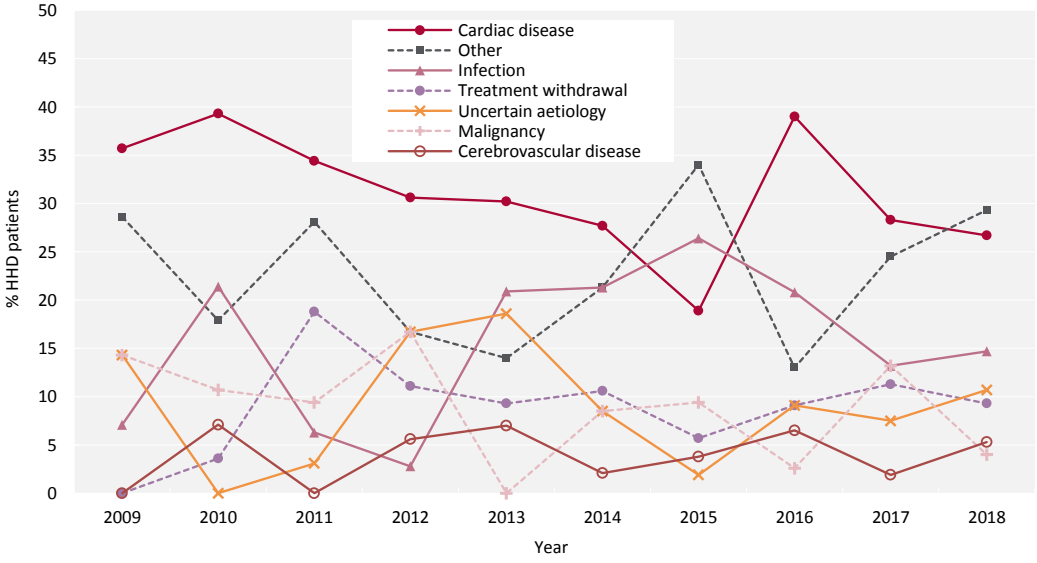

Figure 6.10 Cause of death between 2009 and 2018 for adult patients prevalent to HHD at the beginning of the year

THE RENAL ASSOCIATION
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Chapter 7

Children and young people on renal replacement therapy (RRT) for end-stage kidney disease (ESKD) in the UK in 2018

Contents

Introduction

This chapter describes the population of children and young people aged <18 years with end-stage kidney disease (ESKD) who were on renal replacement therapy (RRT) in the UK for at least 90 days in 2018 (figure 7.1). This included patients with a transplant (Tx) and patients on dialysis – in-centre haemodialysis (ICHD), home haemodialysis (HHD) and peritoneal dialysis (PD). Patients coded as acute kidney injury (AKI) or ESKD who died or recovered within the first 90 days of RRT were excluded from the analyses.

There are 13 paediatric renal centres in the UK, all of which are equipped to provide both haemodialysis (HD) and PD. Ten of these centres also perform kidney transplantation. Children aged 16 to <18 years may be managed in either paediatric or adult services. This is variable across the UK and dependent on local practices, social factors and patient/family wishes. This year, and in contrast to previous reports, children (aged <16 years) and young people (aged 16 to <18 years) are reported separately. Data about young people also includes those managed in adult centres, to provide a more complete epidemiological picture for this population.

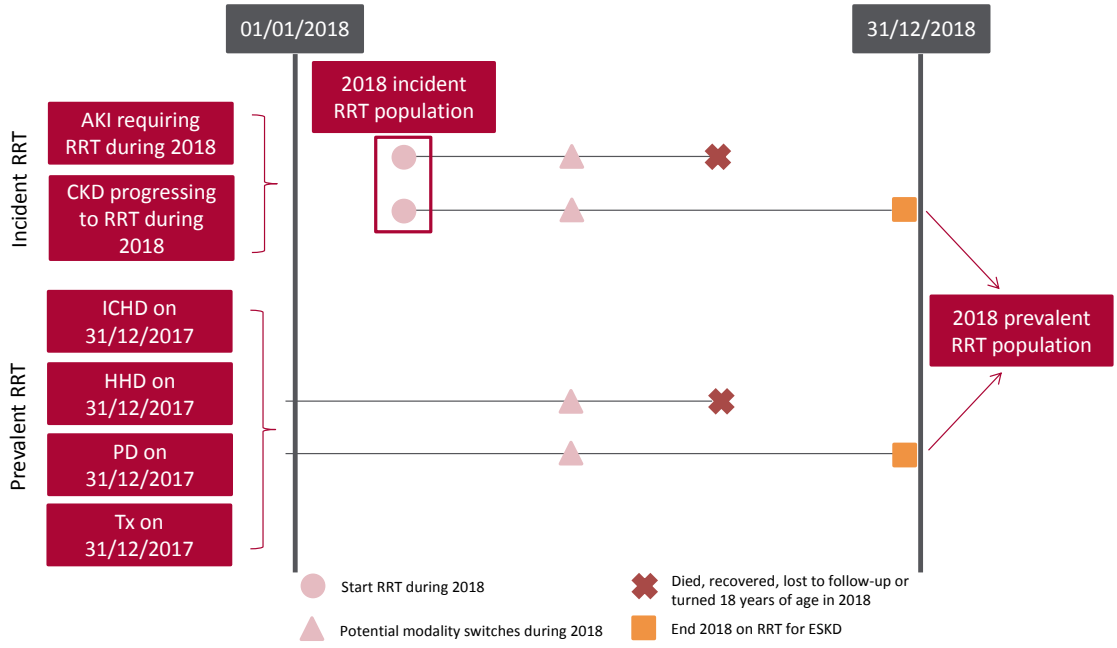

Figure 7.1 Pathways children and young people could follow to be included in the UK 2018 incident and/or prevalent RRT populations

Note that patients starting RRT in 2018 are only included in this chapter if they remained on RRT for ≥90 days.

CKD – chronic kidney disease

For children aged <16 years, the following populations included in this chapter are:

- **Incident population:** patients who started RRT during 2018 and remained on RRT for at least 90 days.
- **Prevalent population:** patients who were on RRT at the end of 2018 and still under the care of a paediatric renal centre.
- **Five-year populations:** patients who started RRT and remained on RRT for at least 90 days in the periods 2004–2008, 2009–2013 and 2014–2018.

For young people aged 16 to <18 years, the following populations included in this chapter are:

- **Incident population:** patients who started RRT during 2018 in either an adult or paediatric centre and remained on RRT for at least 90 days.
- **Prevalent population:** patients who were on RRT at the end of 2018 in either an adult or paediatric centre.

This chapter addresses the following key aspects of the care of children incident to or on RRT for which there are evidence-based guidelines (table 7.1):

- **Growth:** this includes age- and sex-adjusted heights and weights
- **Cardiovascular risk factors:** these include age-adjusted blood pressure, cholesterol and body mass index (BMI)
- **Complications associated with RRT:** these include anaemia and mineral and bone disorders.

For young people, the following aspects of care are addressed:

- **Cardiovascular risk factors:** these include blood pressure using raw systolic and diastolic values which are audited against European Society of Hypertension guidelines for the management of high blood pressure in children and adolescents (2016)
- **Complications associated with RRT:** these include anaemia and mineral and bone disorders. Paediatric reference ranges for children and young people up to 18 years are used as the standard measure.

Rationale for analyses

For both the children and young people sections, the analyses begin with a description of the 2018 incident and prevalent RRT populations, including the number on RRT per million age-related population (pmarp).

For children, height and weight are measures of healthy growth, which may be affected by kidney disease as well as its treatment. These measures are therefore presented for each centre in comparison to the UK median for this cohort.

The published guidelines listed below provide audit measures relevant to the care of children and young people on RRT and, where data permit, their attainment by UK paediatric renal centres in 2018 is reported in this chapter (table 7.1). Due to the small numbers of young people identified, we have omitted reporting by centre for this population.

For children, reporting estimated glomerular filtration rate (eGFR) is dependent on the completeness of both creatinine and height data. For young people, the Full Age Spectrum (FAS) equation was used to calculate eGFR – height data for young people managed in adult centres were incomplete and therefore a height-free calculation was used to standardise reporting and enable direct comparison within this population.

Table 7.1 Audit measures relevant to RRT incidence and prevalence that are reported in this chapter

Audit guideline	Audit criteria	Related analysis/analyses
The Renal Association: Treatment of adults and children with renal failure: standards and audit measures (2002)	Height and weight to be monitored at each clinic visit and plotted on the growth charts of healthy children and adolescents	Figures 7.6–7.13
	Blood pressure during PD or after HD to be maintained at <90th percentile for age, sex and height. Blood pressure in Tx patients to be maintained at <90th percentile for age, sex and height	Tables 7.14, 7.15, figures 7.14, 7.15
	Serum phosphate and calcium should be kept within the normal range. Parathyroid hormone (PTH) levels should be maintained within twice the upper limit of the normal range but, contrary to adult standards, may be kept within the normal range if growth is normal	Table 7.17
	Serum bicarbonate concentrations should be 20–26 mmol/L	Table 7.17
	Typically maintain the aspirational haemoglobin range 100–120 g/L for young people and children aged ≥2 years and 95–115 g/L for children <2 years, reflecting the lower normal range in that age group	Table 7.17
National Heart Lung and Blood Institute and Kidney Disease Improving Global Outcomes (KDIGO) (2013)	Screening children at risk of secondary dyslipidaemias including those with CKD is recommended	Tables 7.2, 7.3, 7.15

Detail about the completeness of data returned to the UK Renal Registry (UKRR) is available through the UKRR data completeness portal (renal.org/audit-research/data-portal/completeness). The completeness of both transferrin saturation and percentage hypochromic red cells was too low to be reported as measures of iron stores. Audit measures that cannot be reported because the required data items were not collected by the UKRR are omitted – this includes reticulocyte haemoglobin content.

For children, data for height, weight, BMI and blood pressure vary with age, sex and size and are therefore presented as z-scores. Z-scores are a way of expressing the deviation of a given measurement from the age and size-specific population mean. This relies on the completeness of height data during the period in question.

For definitions and methods relating to this chapter see appendix A. Centres were exluded from caterpillar plots and cells were blanked in tables where data completeness for a biochemical variable was <70% and/or the number of patients reported was <10. This suppression of small numbers to minimise risk of patient re-identification limits in-depth analysis of centre-level data. A patient first seen by renal services within 90 days of starting RRT for ESKD is defined as a 'late presentation'. In this report 'late presentation' is used interchangeably with 'late referral'.

Key findings

Children

- 115 patients aged <16 years started RRT for ESKD in the UK in 2018 compared to 99 patients in 2017
- RRT incidence in patients aged <16 years was 9.1 pmarp compared to 7.9 pmarp in 2017
- 826 patients aged <16 years were receiving RRT at UK paediatric renal centres on 31/12/2018, an increase from 810 patients in 2017
- RRT prevalence in patients aged <16 years was 65.4 pmarp. 77.8% had a functioning Tx (47.2% living donor and 30.6% deceased donor), 11.4% were receiving HD and 10.8% were receiving PD
- Tubulointerstitial disease accounted for >50% of all primary renal diseases (PRDs) in prevalent paediatric patients, with a high male:female ratio (3.4:1)
- Between 2004 and 2018, about a third of patients aged <16 years who were referred early received a pre-emptive Tx
- At the time of transfer to adult services, 86.4% of paediatric patients had a functioning kidney Tx
- The median height z-score for children on dialysis was −1.8 compared with -1.1 for those with a functioning Tx
- The median weight z-score for children on dialysis was -0.8 compared with −0.1 for those with a functioning Tx
- Of those with complete data, 73.1% of the prevalent paediatric RRT population had 1 or more risk factors for cardiovascular disease; 6.1% had 3 risk factors
- 50.7% and 56.5% of prevalent HD patients achieved systolic blood pressure (SBP) and diastolic blood pressure (DBP) values <90th percentile, respectively
- 55.0% and 71.2% of prevalent PD patients achieved SBP and DBP values <90th percentile, respectively
- 80.4% and 75.2% of prevalent Tx patients achieved SBP and DBP values <90th percentile, respectively.

Young people

- 18 patients aged 16 to <18 years started RRT for ESKD in the UK in 2018
- RRT incidence in young people was 12.6 pmarp
- 199 patients aged 16 to <18 years were receiving RRT on 31/12/2018, of whom the majority (79.4%) were managed in paediatric renal centres
- RRT prevalence in patients aged 16 to <18 years was 139.4 pmarp
- Tubulointerstital disease accounted for 51.3% of all PRDs in prevalent young people, followed by familial/hereditary nephropathies (18.9%) and glomerular disease (16.8%). Diabetic nephropathy was seen in 0.5%
- The overall median eGFR of young people with a kidney transplant on 31/12/2018 was 72 mL/min/1.73m^2 (IQR 57–90 mL/min/1.73m^2)
- The proportion of young people prevalent to RRT on 31/12/2018 with a blood pressure within the 'normal' range (<130/80 mmHg) was 56.0% of dialysis and 69.8% of transplanted patients.

Analyses – children

Data completeness for prevalent paediatric RRT patients

Data returns of key variables for Tx and dialysis patients <16 years old at the end of 2018 are shown in tables 7.2 and 7.3, respectively, with further detail available through the UKRR data completeness portal (renal.org/audit-research/data-portal/completeness).

Table 7.2 Data completeness for paediatric patients (<16 years old) prevalent to Tx on 31/12/2018 by centre

Centre	N with Tx	Data completeness (%)														
		Height at start	Weight at start	BMI	SBP	DBP	Hb	Creat at start	Ferr	ESA	IV iron	Chol	Bicarb	PTH	Ca	Phos
Bham_P	66	93.9	97.0	95.5	95.5	95.5	98.5	95.5	65.2	0.0	0.0	90.9	97.0	1.5	98.5	97.0
Blfst_P	26	76.9	84.6	84.6	84.6	84.6	92.3	88.5	84.6	92.3	3.9	76.9	92.3	88.5	92.3	92.3
Brstl_P	41	90.2	97.6	92.7	92.7	82.9	97.6	100.0	73.2	100.0	46.3	51.2	100.0	82.9	100.0	100.0
Cardf_P	23	95.7	95.7	82.6	78.3	26.1	87.0	95.7	65.2	8.7	0.0	65.2	87.0	73.9	87.0	87.0
Glasg_P	44	95.5	97.7	100.0	100.0	100.0	100.0	97.7	90.9	100.0	100.0	38.6	100.0	100.0	100.0	100.0
L Eve_P	65	73.9	76.9	98.5	98.5	98.5	98.5	78.5	63.1	0.0	0.0	73.9	98.5	98.5	98.5	98.5
L GOSH_P	122	86.9	94.3	98.4	97.5	2.5	99.2	93.4	79.5	93.4	0.0	74.6	99.2	95.1	99.2	99.2
Leeds_P	47	93.6	100.0	93.6	100.0	95.7	100.0	100.0	70.2	100.0	100.0	46.8	100.0	97.9	100.0	100.0
Livpl_P	31	71.0	80.7	96.8	96.8	93.6	100.0	90.3	96.8	100.0	3.2	67.7	100.0	3.2	100.0	100.0
Manch_P	63	95.2	96.8	98.4	100.0	98.4	98.4	96.8	87.3	100.0	0.0	44.4	98.4	96.8	98.4	98.4
Newc_P	25	76.0	80.0	0.0	96.0	0.0	100.0	84.0	88.0	0.0	0.0	72.0	100.0	80.0	100.0	100.0
Nottm_P	63	79.4	98.4	90.5	88.9	85.7	96.8	96.8	90.5	98.4	98.4	88.9	95.2	90.5	95.2	95.2
Soton_P	27	74.1	74.1	100.0	100.0	100.0	100.0	85.2	100.0	100.0	100.0	48.2	100.0	100.0	100.0	100.0
UK	**643**	**85.9**	**91.9**	**91.8**	**95.7**	**70.5**	**98.1**	**93.0**	**79.6**	**70.8**	**31.3**	**66.9**	**98.0**	**79.5**	**98.1**	**98.0**

Bicarb – bicarbonate; BMI – body mass index; Ca – calcium; Chol – cholesterol; Creat – creatinine; DBP – diastolic blood pressure; ESA – erythropoiesis stimulating agent; Ferr – ferritin; Hb – haemoglobin; IV – intravenous; Phos – phosphate; PTH – parathyroid hormone; SBP – systolic blood pressure

Table 7.3 Data completeness for paediatric patients (<16 years old) prevalent to dialysis on 31/12/2018 by centre

Centre	N on dialysis	Data completeness (%)													
		Height at start	Weight at start	BMI	SBP	DBP	Hb	Ferr	ESA	IV iron	Chol	Bicarb	PTH	Ca	Phos
Bham_P	33	90.9	93.9	90.9	93.9	93.9	97.0	90.9	0.0	0.0	87.9	97.0	3.0	97.0	97.0
Blfst_P	6	83.3	83.3	66.7	83.3	0.0	100.0	100.0	100.0	0.0	83.3	100.0	100.0	100.0	100.0
Brstl_P	14	50.0	85.7	85.7	100.0	50.0	100.0	100.0	100.0	64.3	71.4	100.0	92.9	100.0	100.0
Cardf_P	10	70.0	70.0	90.0	100.0	0.0	100.0	100.0	30.0	30.0	50.0	100.0	100.0	100.0	100.0
Glasg_P	13	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	69.2	100.0	100.0	100.0	100.0
L Eve_P	15	80.0	80.0	100.0	100.0	93.3	100.0	100.0	0.0	0.0	6.7	100.0	100.0	100.0	100.0
L GOSH_P	26	76.9	84.6	80.8	100.0	3.9	100.0	80.8	100.0	0.0	80.8	100.0	100.0	100.0	100.0
Leeds_P	11	81.8	90.9	81.8	90.9	90.9	100.0	100.0	100.0	100.0	72.7	100.0	90.9	90.9	90.9
Livpl_P	11	45.5	45.5	90.9	90.9	54.6	100.0	100.0	100.0	0.0	9.1	100.0	0.0	100.0	100.0
Manch_P	16	100.0	100.0	100.0	100.0	75.0	100.0	75.0	100.0	0.0	68.8	100.0	93.8	100.0	100.0
Newc_P	11	27.3	27.3	0.0	81.8	0.0	90.9	90.9	0.0	0.0	81.8	90.9	90.9	90.9	90.9
Nottm_P	14	92.9	100.0	85.7	92.9	64.3	100.0	100.0	100.0	100.0	71.4	100.0	100.0	100.0	100.0
Soton_P	3	100.0	100.0	100.0	100.0	66.7	100.0	100.0	100.0	100.0	33.3	100.0	100.0	100.0	100.0
UK	**183**	**78.1**	**83.6**	**84.2**	**95.6**	**57.4**	**98.9**	**92.9**	**63.9**	**29.0**	**65.6**	**98.9**	**74.3**	**98.4**	**98.4**

Bicarb – bicarbonate; BMI – body mass index; Ca – calcium; Chol – cholesterol; DBP – diastolic blood pressure; ESA – erythropoiesis stimulating agent; Ferr – ferritin; Hb – haemoglobin; IV – intravenous; Phos – phosphate; PTH – parathyroid hormone; SBP – systolic blood pressure

Changes to the incident paediatric RRT population

The number of incident patients on RRT <16 years old was calculated as an estimated age-related rate per million population (calculated as detailed in appendix A) and grouped by age, sex, five year time period, ethnicity, centre and PRD.

Table 7.4 Paediatric patients (<16 years old) incident to RRT in 2018 by age and sex

	All patients		Male		Female	
Age group (yrs)	N	pmarp	N	pmarp	N	pmarp
0-<2	18	11.9	10	12.9	8	10.8
2-<4	13	8.2	9	11.0	4	5.2
4-<8	22	6.6	16	9.4	6	3.7
8-<12	25	7.7	11	6.6	14	8.9
12-<16	37	12.5	23	15.1	14	9.7
<16 yrs	**115**	**9.1**	**69**	**10.7**	**46**	**7.5**

pmarp – per million age-related population

Table 7.5 Paediatric patients (<16 years old) incident to RRT by age and 5 year time period

	2004-2008		2009-2013		2014-2018	
Age group (yrs)	N	pmarp	N	pmarp	N	pmarp
0-<2	94	13.0	100	12.6	106	13.5
2-<4	44	6.4	66	8.4	70	8.7
4-<8	93	6.8	83	5.6	129	7.9
8-<12	121	8.2	122	8.8	128	8.3
12-<16	211	13.5	186	12.3	172	12.1
<16 yrs	**563**	**9.6**	**557**	**9.4**	**605**	**9.8**

pmarp – per million age-related population

Table 7.6 Paediatric patients (<16 years old) incident to RRT by ethnicity and 5 year time period

	2004-2008		2009-2013		2014-2018	
Ethnicity	N	%	N	%	N	%
White	423	75.8	392	70.9	410	69.3
South Asian	88	15.8	103	18.6	102	17.2
Black	25	4.5	20	3.6	37	6.3
Other	22	3.9	38	6.9	43	7.3
<16 yrs	**558**	**100.0**	**553**	**100.0**	**592**	**100.0**

5 children in 2004–2008, 4 in 2009–2013 and 13 in 2014–2018 with no ethnicity recorded were excluded.

Table 7.7 Paediatric patients (<16 years old) incident to RRT by centre and 5 year time period

	2004-2008		2009-2013		2014-2018	
Centre	N	%	N	%	N	%
Blfst_P	13	2.3	24	4.3	13	2.1
Bham_P	63	11.2	62	11.1	81	13.4
Brstl_P	34	6.0	34	6.1	31	5.1
Cardf_P	21	3.7	16	2.9	25	4.1
Glasg_P	46	8.2	33	5.9	50	8.3
L Eve_P	55	9.8	58	10.4	68	11.2
L GOSH_P	113	20.1	120	21.5	88	14.5
Leeds_P	60	10.7	44	7.9	46	7.6
Livpl_P	26	4.6	20	3.6	33	5.5
Manch_P	42	7.5	55	9.9	62	10.2
Newc_P	24	4.3	17	3.1	35	5.8
Nottm_P	54	9.6	54	9.7	51	8.4
Soton_P	12	2.1	20	3.6	22	3.6
<16 yrs	**563**	**100.0**	**557**	**100.0**	**605**	**100.0**

PRDs were grouped into categories as shown in table 7.8, with the mapping of disease codes into groups explained in more detail in appendix A.

Table 7.8 Paediatric patients (<16 years old) incident to RRT by primary renal disease (PRD) and 5 year time period

	2004-2008		2009-2013		2014-2018	
PRD	N	%	N	%	N	%
Tubulointerstitial disease	266	47.8	294	52.9	296	49.5
- CAKUT	245	44.1	276	49.6	287	48.0
- Non-CAKUT	21	3.8	18	3.2	9	1.5
Glomerular disease	122	21.9	98	17.6	110	18.4
Familial/hereditary nephropathies	92	16.5	92	16.5	84	14.0
Systemic diseases affecting the kidney	19	3.4	29	5.2	23	3.8
Miscellaneous renal disorders	57	10.3	43	7.7	85	14.2

7 children in 2004–2008, 1 in 2009–2013 and 7 in 2014–2018 with no PRD recorded were excluded.
CAKUT – congenital anomalies of the kidneys and urinary tract

Start modality of incident paediatric RRT patients

Start modality used by patients <16 years old starting RRT between 2004 and 2018 was grouped by five year time periods.

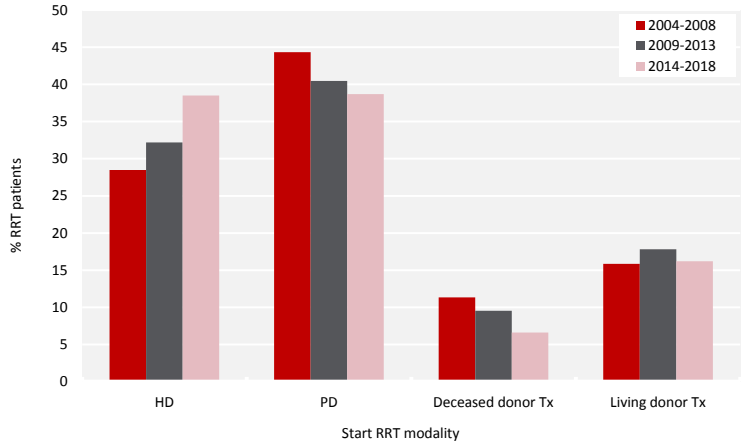

Figure 7.2 Start RRT modality for paediatric patients (<16 years old) incident to RRT by 5 year time period

Pre-emptive transplantation in incident paediatric RRT patients

The analysis of pre-emptive transplantation excluded patients starting RRT aged <3 months and patients presenting late.

Table 7.9 Pre-emptive transplantation in the incident paediatric RRT population aged 3 months to 16 years by 5 year time period, sex, ethnicity, age at start of RRT and primary renal disease (PRD)

Characteristic	N on RRT	N (%) with pre-emptive Tx
Total cohort analysed (2004-2018)	1,247	418 (33.5)
Time period		
2004-2008	398	145 (36.4)
2009-2013	400	145 (36.3)
2014-2018	449	128 (28.5)
Sex		
Male	801	290 (36.2)
Female	446	128 (28.7)
Ethnicity		
White	884	333 (37.7)
South Asian	221	50 (22.6)
Black	57	8 (14.0)
Other	70	20 (28.6)
Age at start of RRT (yrs)		
3 mths-<2	138	6 (4.4)
2-<4	155	43 (27.7)
4-<8	248	107 (43.2)
8-<12	283	104 (37.0)
12-<16	423	158 (37.4)
PRD		
Tubulointerstitial disease	679	293 (43.2)
Glomerular disease	233	15 (6.4)
Familial/hereditary nephropathies	187	64 (34.2)
Miscellaneous renal disorders	99	27 (27.3)
Systemic diseases affecting the kidney	38	16 (42.1)

100 children were excluded because they were aged <3 months; 378 children were excluded because they presented late.

Demographics of prevalent paediatric RRT patients

The number of prevalent patients on RRT <16 years old was calculated as an estimated age-related rate per million population (calculated as detailed in appendix A) and grouped by age, sex and ethnicity.

Table 7.10 Age and sex breakdown of paediatric patients (<16 years old) prevalent to RRT on 31/12/2018

	All patients		Male		Female		
Age group (yrs)	N	pmarp	N	pmarp	N	pmarp	M/F ratio
0-<2	20	13.2	13	16.7	7	9.5	1.8
2-<4	50	31.4	36	44.0	14	18.0	2.4
4-<8	173	52.2	125	73.7	48	29.7	2.5
8-<12	250	77.2	148	89.3	102	64.6	1.4
12-<16	333	112.3	212	139.6	121	83.7	1.7
<16 yrs	**826**	**65.4**	**534**	**82.5**	**292**	**47.4**	**1.7**

pmarp – per million age-related population

Table 7.11 Age and ethnicity breakdown of paediatric patients (<16 years old) prevalent to RRT on 31/12/2018

	N			
Age group (yrs)	White	South Asian	Black	Other
0-<4	53	4	3	6
4-<8	116	28	10	16
8-<12	170	47	8	21
12-<16	230	64	22	15
<16 years	**569**	**143**	**43**	**58**
pmarp <16 years	**55.9**	**132.3**	**77.9**	**72.0**

The 2011 Office for National Statistics census was used to estimate the proportion of White, South Asian, Black and Other ethnicity which was then applied to the population estimate for 2018.
13 children with no ethnicity recorded were excluded.
pmarp – per million age-related population

Treatment modality in prevalent paediatric RRT patients

The current and start RRT modalities for prevalent RRT patients aged <16 years are shown in figures 7.3 and 7.4, respectively. Table 7.12 breaks down current modality for prevalent patients by age group.

Table 7.12 RRT modality used by paediatric patients (<16 years old) prevalent to RRT on 31/12/2018 by age group

		HD		PD		Living donor Tx		Deceased donor Tx	
Age group (yrs)	Total N	N	%	N	%	N	%	N	%
0-<2	20	6	30.0	14	70.0	0	0.0	0	0.0
2-<4	50	11	22.0	17	34.0	20	40.0	2	4.0
4-<8	173	28	16.2	17	9.8	81	46.8	47	27.2
8-<12	250	17	6.8	13	5.2	140	56.0	80	32.0
12-<16	333	32	9.6	28	8.4	149	44.7	124	37.2
<16 years	**826**	**94**	**11.4**	**89**	**10.8**	**390**	**47.2**	**253**	**30.6**

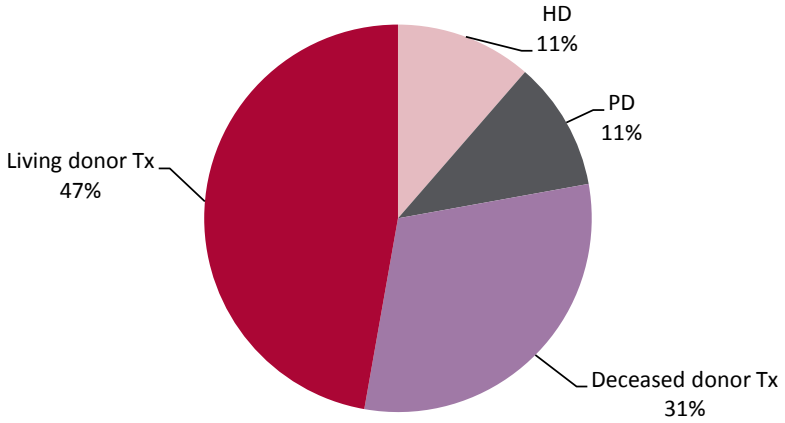

Figure 7.3 RRT modality used by paediatric patients (<16 years old) prevalent to RRT on 31/12/2018

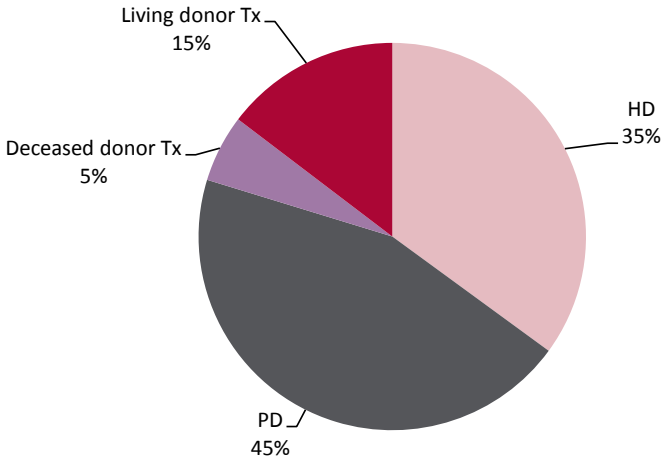

Figure 7.4 RRT modality used at the start of RRT by paediatric patients (<16 years old) prevalent to RRT on 31/12/2018

Causes of ESKD in prevalent paediatric RRT patients

PRDs were grouped into categories as shown in table 7.13.

Table 7.13 Primary renal diseases (PRDs) of paediatric patients (<16 years old) prevalent to RRT on 31/12/2018 by sex and ethnicity

PRD	N	%	N male	N female	% non-White
Tubulointerstitial disease	437	53.4	338	99	28.2
- CAKUT	426	52.0	330	96	28.0
- Non-CAKUT	11	1.3	8	3	40.0
Glomerular disease	156	19.0	82	74	32.5
Familial/hereditary nephropathies	106	12.9	45	61	41.3
Systemic diseases affecting the kidney	36	4.4	16	20	13.9
Miscellaneous renal disorders	84	10.3	49	35	28.4
Total (with data)	**826**	**100.0**	**534**	**292**	**30.0**
Missing	7	0.9	4	3	16.7

CAKUT – congenital anomalies of the kidneys and urinary tract

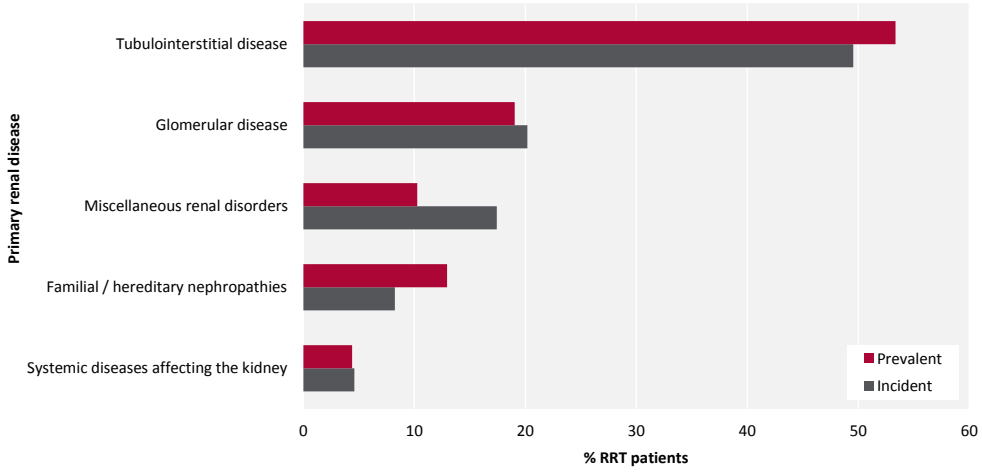

Figure 7.5 Comparison of primary renal diseases for paediatric patients (<16 years old) incident and prevalent to RRT in 2018 with no missing data

Growth of prevalent paediatric RRT patients

The height and weight of children receiving RRT were compared to the age- and sex-matched general childhood population. The UK median score for each measure is represented by a red dotted line.

Height of paediatric RRT patients

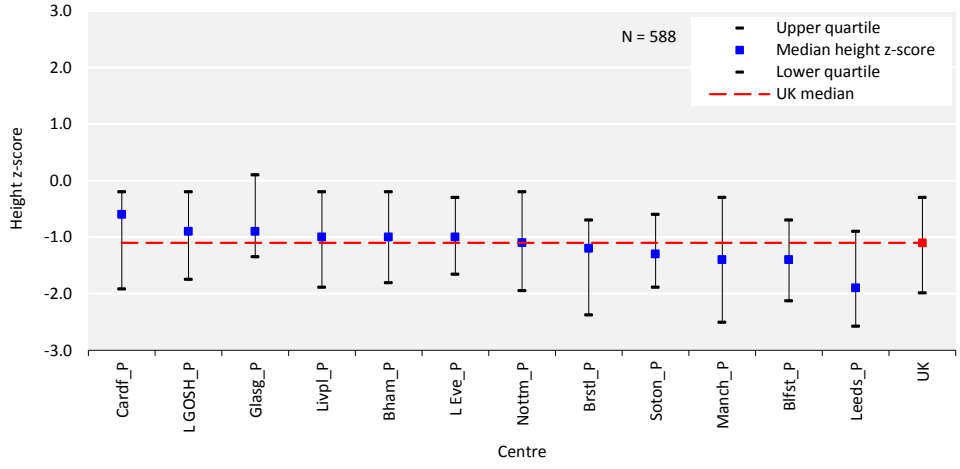

Figure 7.6 Median height z-scores for paediatric patients (<16 years old) prevalent to Tx on 31/12/2018 by centre

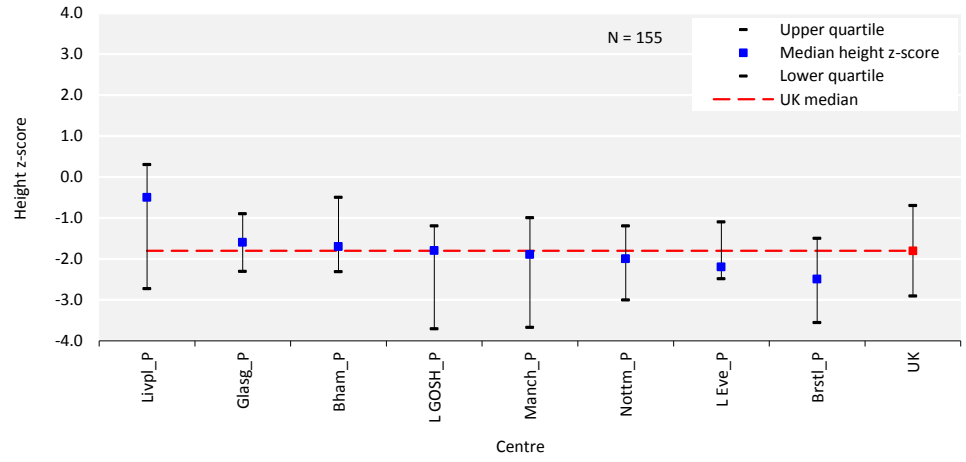

Figure 7.7 Median height z-scores for paediatric patients (<16 years old) prevalent to dialysis on 31/12/2018 by centre

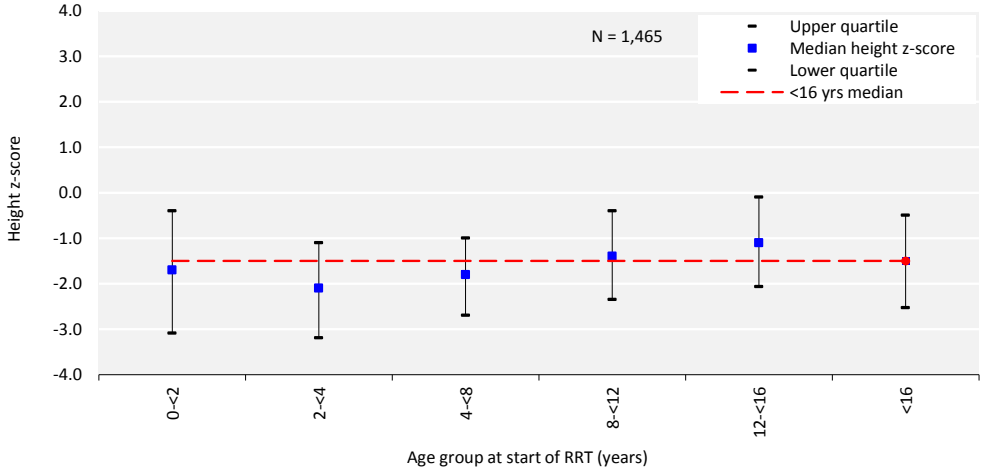

Figure 7.8 Median height z-scores at start of RRT for incident paediatric RRT patients (<16 years old) between 2004 and 2018 by age group at start of RRT

Weight of paediatric RRT patients

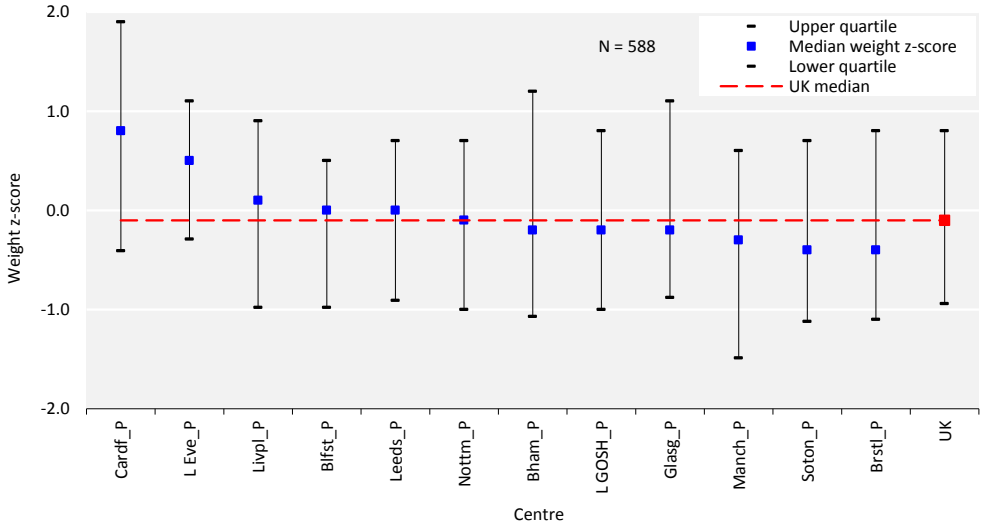

Figure 7.9 Median weight z-scores for paediatric patients (<16 years old) prevalent to Tx on 31/12/2018 by centre

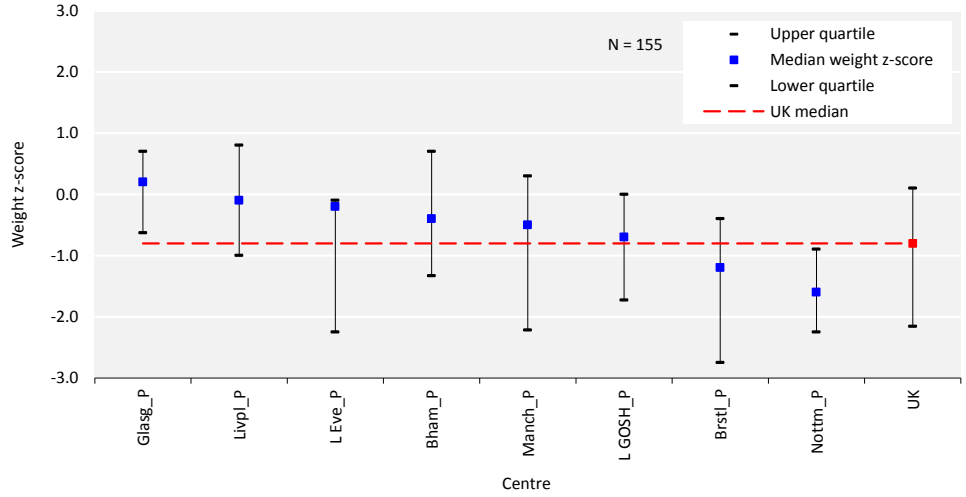

Figure 7.10 Median weight z-scores for paediatric patients (<16 years old) prevalent to dialysis on 31/12/2018 by centre

Cardiovascular risk factor evaluation in prevalent paediatric RRT patients

Obesity in paediatric RRT patients

BMI was calculated using the formula BMI = weight (kg)/height^2 (m). Height and weight were adjusted for age. To account for discrepancies in linear growth secondary to renal disease, BMI was expressed according to height age, rather than chronological age. Height age corresponds to the age when a child's height is plotted at the 50th percentile on a UK growth chart.

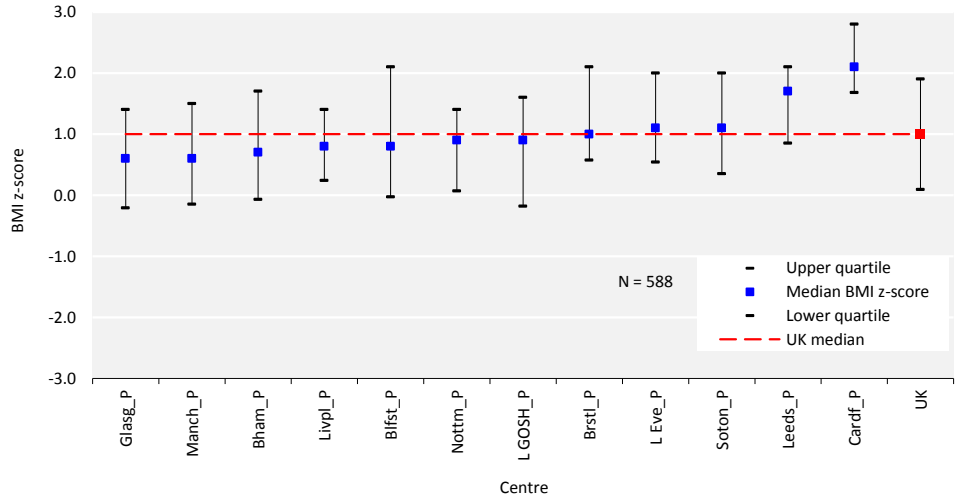

Figure 7.11 Median body mass index (BMI) z-scores for paediatric patients (<16 years old) prevalent to Tx on 31/12/2018 by centre

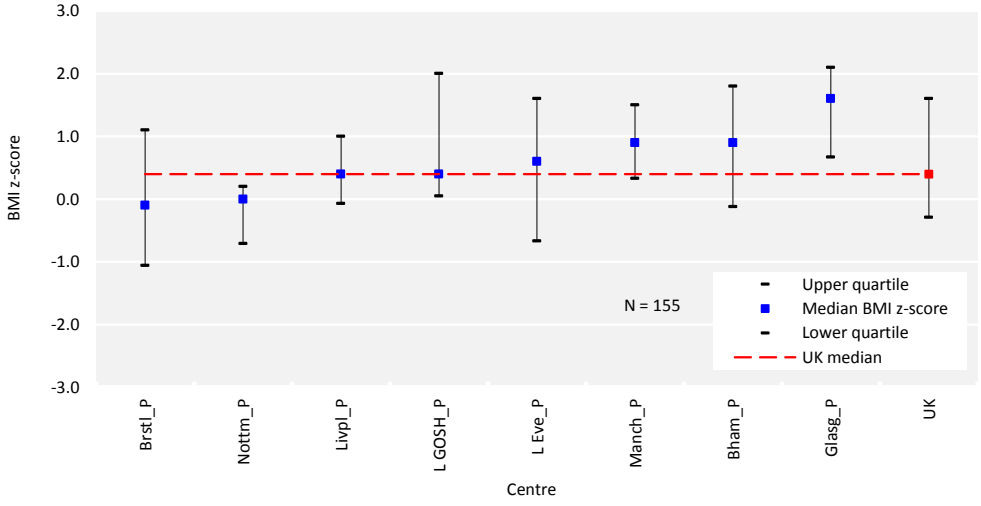

Figure 7.12 Median body mass index (BMI) z-scores for paediatric patients (<16 years old) prevalent to dialysis on 31/12/2018 by centre

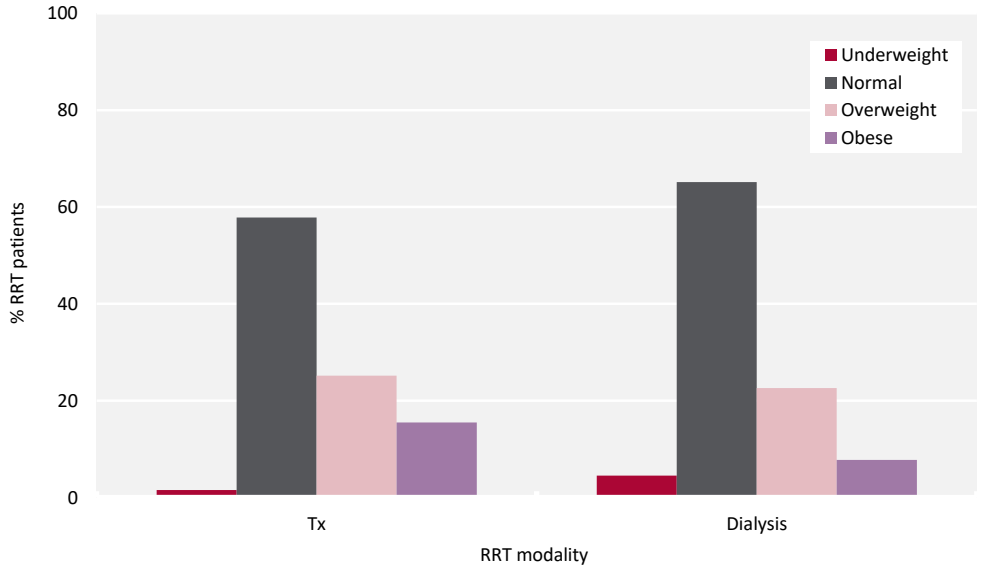

Figure 7.13 Body mass index categorisation of paediatric patients (<16 years old) prevalent to RRT on 31/12/2018 by RRT modality

Hypertension in paediatric RRT patients

In paediatric RRT patients, the systolic blood pressure should be maintained at <90th percentile for age, sex and height.

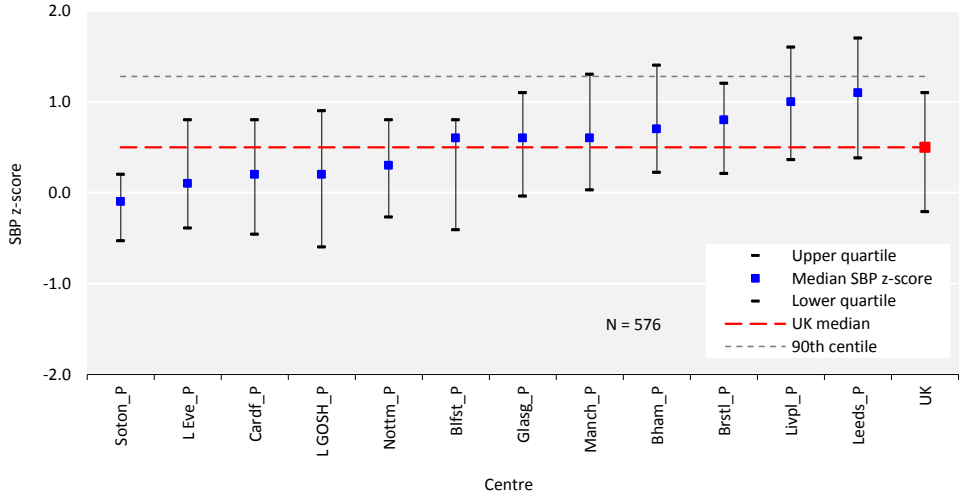

Figure 7.14 Median systolic blood pressure (SBP) z-scores for paediatric patients (<16 years old) prevalent to Tx on 31/12/2018 by centre

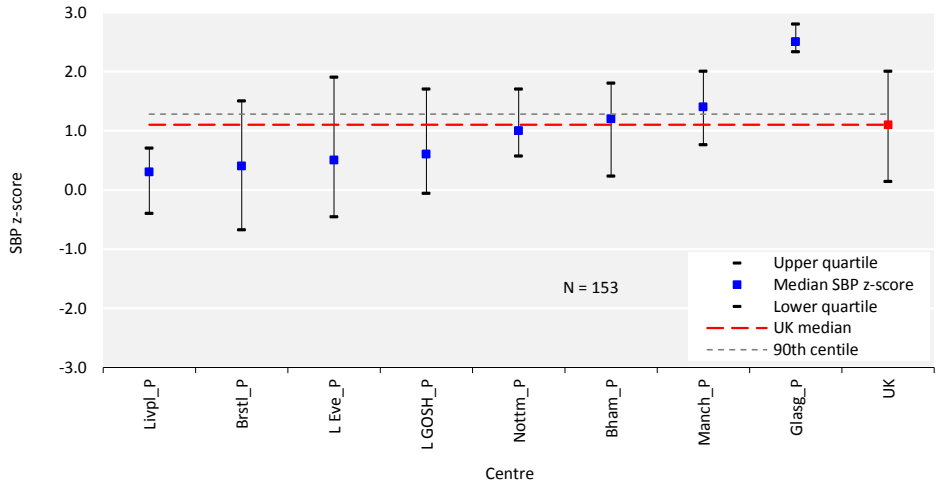

Figure 7.15 Median systolic blood pressure (SBP) z-scores for paediatric patients (<16 years old) prevalent to dialysis on 31/12/2018 by centre

Table 7.14 Percentage of paediatric patients (<16 years old) prevalent to RRT on 31/12/2018 achieving the standards for blood pressures

	SBP		DBP	
Characteristic	N	% <90th percentile	N	% <90th percentile
Total	729	74.6	530	73.2
Age group (yrs)				
0-<5	92	57.6	56	66.1
5-<12	342	72.8	248	74.6
12-<16	295	82.0	226	73.5
Sex				
Male	479	76.4	346	74.3
Female	250	71.2	184	71.2
Ethnicity				
White	498	75.9	380	73.7
South Asian	131	71.0	93	67.7
Black	39	74.4	23	73.9
Other	54	75.9	33	81.2
Modality				
HD	73	50.7	46	56.5
PD	80	55.0	52	71.2
Tx	576	80.4	432	75.2

DBP – diastolic blood pressure; SBP – systolic blood pressure

Cardiovascular risk factors in paediatric RRT patients

The analysis of the percentage of prevalent RRT patients with identified cardiovascular risk factors was restricted to the 490 of the 826 patients (59.3%) with data for all three risk factors.

Table 7.15 Frequency of number of cardiovascular risk factors in paediatric patients (<16 years old) prevalent to RRT on 31/12/2018

N cardiovascular risk factors	Hypertensive	Overweight/Obese	Hypercholesterolaemic	N	%	Total %
0	No	No	No	132	26.9	26.9
1	Yes	No	No	59	12.0	
	No	Yes	No	69	14.1	37.3
	No	No	Yes	55	11.2	
2	Yes	Yes	No	55	11.2	
	Yes	No	Yes	45	9.2	29.6
	No	Yes	Yes	45	9.2	
3	Yes	Yes	Yes	30	6.1	6.1
Total N	**189**	**199**	**175**	**490**		
Total %	**38.6**	**40.6**	**35.7**			**100.0**

Biochemistry parameters in prevalent paediatric RRT patients

The median values and the percentage with eGFR <30 mL/min/1.73m^2 for prevalent 2018 paediatric Tx patients are presented in table 7.16.

Table 7.16 Median estimated glomerular filtration rate (eGFR) and percentage with eGFR <30 mL/min/1.73m^2 in paediatric patients (<16 years old) prevalent to Tx on 31/12/2018 by centre

Centre	N with Tx	Median eGFR (mL/min/1.73m^2)	% eGFR <30 mL/min/1.73m^2	% data completeness
Bham_P	66	54	6.4	95.5
Blfst_P	26	79	9.1	84.6
Brstl_P	41	66	0.0	92.7
Cardf_P	23	75	0.0	78.3
Glasg_P	44	80	2.3	100.0
L Eve_P	65	55	4.7	98.5
L GOSH_P	122	58	8.5	96.7
Leeds_P	47	74	2.3	93.6
Livpl_P	31	76	0.0	96.8
Manch_P	63	65	1.6	96.8
Newc_P[1]	25			
Nottm_P	63	56	9.1	87.3
Soton_P	27	70	3.7	100.0
UK	**643**	**63**	**4.8**	**90.8**

Blank cells – centres with <70% data completeness or <10 patients.
[1]Although completeness of creatinine data was good, no height data were returned – heights are needed to calculate eGFRs from creatinine.

Table 7.17 Attainment of targets for haemoglobin, calcium, phosphate, parathyroid hormone and bicarbonate in paediatric patients (<16 years old) (a) prevalent to dialysis on 31/12/2018 by centre and (b) prevalent to Tx on 31/12/2018 with estimated glomerular filtration rate (eGFR) <30 mL/min/1.73 m^2 in the UK

Centre	N	% Hb below target	% Hb within target	% Ca below target	% Ca within target	% phos below target	% phos within target	% PTH within target	% bicarb below target	% bicarb within target
DIALYSIS PATIENTS										
Bham_P	33	18.8	50.0	6.3	65.6	9.4	59.4		0.0	78.1
Blfst_P	6									
Brstl_P	14	7.1	71.4	0.0	78.6	35.7	42.9	38.5	0.0	57.1
Cardf_P	10	0.0	60.0	0.0	60.0	10.0	70.0	10.0	40.0	60.0
Glasg_P	13	15.4	46.2	7.7	76.9	46.2	30.8	38.5	7.7	84.6
L Eve_P	15	20.0	66.7	0.0	80.0	6.7	40.0	46.7	20.0	80.0
L GOSH_P	26	19.2	38.5	3.9	61.5	0.0	53.9	53.9	3.9	92.3
Leeds_P	11	27.3	63.6	20.0	60.0	0.0	40.0	40.0	0.0	72.7
Livpl_P	11	18.2	63.6	0.0	90.9	18.2	45.5		9.1	72.7
Manch_P	16	37.5	31.3	12.5	50.0	25.0	37.5	66.7	6.3	75.0
Newc_P	11	10.0	50.0	0.0	90.0	40.0	40.0	70.0	0.0	90.0
Nottm_P	14	21.4	64.3	0.0	50.0	7.1	50.0	50.0	0.0	57.1
Soton_P	3									
UK	**183**	**18.8**	**50.8**	**4.4**	**67.8**	**16.1**	**47.8**	**51.5**	**6.1**	**75.7**
TX PATIENTS WITH eGFR <30 mL/min/1.73 m^2										
UK	**28**	**32.1**	**46.4**	**14.3**	**78.6**	**14.3**	**75.0**	**60.0**	**17.9**	**82.1**

Blank cells – centres with <70% data completeness or <10 patients.
See appendix A for biochemical target ranges.
Bicarb – bicarbonate; Ca – calcium; Hb – haemoglobin; Phos – phosphate; PTH – parathyroid hormone

Table 7.18 Median estimated glomerular filtration rate (eGFR) in paediatric patients (<16 years old) prevalent to Tx on 31/12/2018 by time since transplantation and age group

	Age group (years)					
	0-<5		5-<12		12-<16	
Time since transplantation	N	Median eGFR (mL/min/1.73 m^2)	N	Median eGFR (mL/min/1.73 m^2)	N	Median eGFR (mL/min/1.73 m^2)
3 mths	17	76	28	82	19	64
1 yr	16	88	37	70	25	64
3 yrs	5	90	83	64	49	63
5 yrs	0	0	107	59	62	60
≥7 yrs	0	0	41	53	95	56
Total (IQR)	**38**	**84 (69-109)**	**296**	**64 (50-80)**	**250**	**61 (46-75)**

IQR – interquartile range

The percentage of patients with haemoglobin above target range on ESA is shown by renal centre.

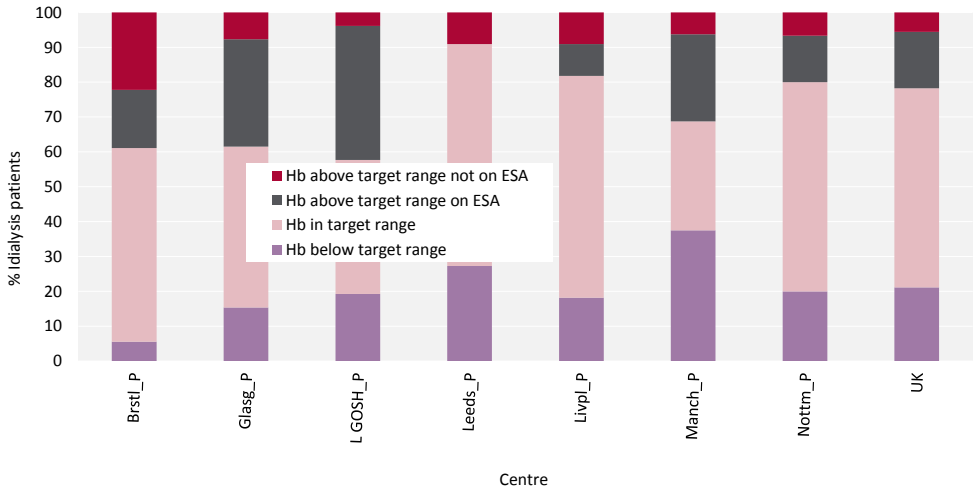

Figure 7.16 Proportion of paediatric patients (<16 years old) prevalent to dialysis on 31/12/2018 with haemoglobin (Hb) below, within and above target by centre; for those above target the proportion on erythropoiesis stimulating agent (ESA) therapy is shown

Transfer to adult renal services for prevalent paediatric RRT patients

Ninety-five paediatric patients transitioned to adult renal centres in 2018. The median age of patients at transfer was 18.0 years with an IQR of 17.5–18.4 years. Overall, the demographics of this population reflected those of the prevalent paediatric RRT population, but with a higher proportion having a functioning Tx (86.4% versus 76.3%).

Survival in paediatric RRT patients

Of patients aged <16 years, 1,583 started RRT between 2004 and 2017 at paediatric renal centres and were included in survival analyses, to allow at least one year follow-up. At the end of 2018, 88 deaths had been reported in these children before they reached 16 years of age and when still under the care of a paediatric renal centre. Patients included in the analysis must have been alive on RRT for 90 days. The median follow-up time (beyond day 90) was 3.6 years (range three days to 14.7 years).

Table 7.19 Survival of incident paediatric RRT patients (<16 years old) at 1 year intervals of RRT by age at start of RRT

	Age group (yrs)				
Survival	0-<2	2-<4	4-<8	8-<12	12-<16
Survival at 1 year (%)	93.6	98.2	98.6	99.7	99.0
95% CI	90.0-95.9	94.5-99.4	96.3-99.5	98.0-100	97.2-99.6
Survival at 2 years (%)	92.5	96.2	95.2	98.8	97.4
95% CI	88.7-95.0	91.8-98.3	91.9-97.2	96.8-99.5	94.8-98.7
Survival at 3 years (%)	90.0	94.8	94.8	98.1	97.4
95% CI	85.7-93.0	89.9-97.4	91.4-96.9	95.9-99.2	94.8-98.7
Survival at 4 years (%)	88.6	94.0	94.8	97.4	
95% CI	84.1-91.9	88.8-96.9	91.4-96.9	94.8-98.7	
Survival at 5 years (%)	87.1	93.1	93.7	96.9	
95% CI	82.2-90.7	87.5-96.3	89.9-96.1	94.1-98.4	

CI – confidence interval

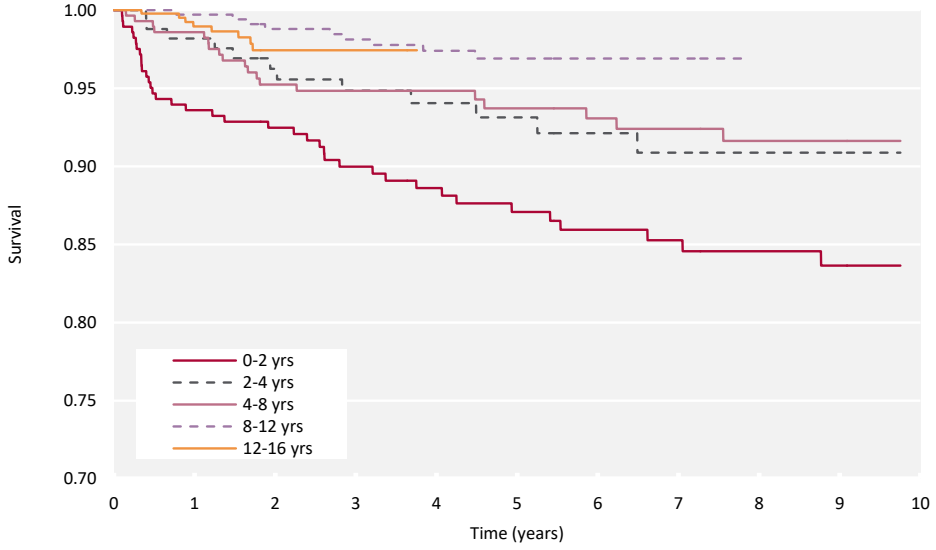

Figure 7.17 Unadjusted Kaplan-Meier survival (from day 90) of incident paediatric RRT patients (<16 years old) between 2004 and 2017 by age group at start of RRT

Analyses – young people

RRT incidence and prevalence in young people

Table 7.20 reports the numbers of young people who started RRT in 2018 (incidence) as well as those on RRT as of 31/12/2018 (prevalence) in both paediatric and adult centres, as an estimated total pmarp and grouped by sex, ethnicity and PRD. Diabetes is reported as a separate disease entity. For incident young people, start modality is reported; current treatment modality is reported for prevalent patients.

Table 7.20 Demographics of young people (16–<18 years) incident to RRT in 2018 and/or prevalent to RRT on 31/12/2018, by care setting

	Incident			Prevalent		
Characteristic	Paediatric centres	Adult centres	All	Paediatric centres	Adult centres	All
N	6	12	18	158	41	199
pmarp			12.6			139.4
Median age (yrs)	17.0	17.4	17.3	16.8	17.8	17.0
% male	16.7	50.0	38.9	57.6	75.6	61.3
Ethnicity[1] (%)						
White	33.3	50.0	43.8	74.5	55.3	70.8
South Asian	0.0	40.0	25.0	15.3	29.0	18.0
Black	33.3	0.0	12.5	5.1	7.9	5.6
Other	33.3	10.0	18.8	5.1	7.9	5.6
Missing	0.0	16.7	11.1	0.6	7.3	2.0
PRD[1] (%)						
Tubulointerstitial disease	33.3	25.0	27.8	53.5	41.2	51.3
Glomerular disease	16.7	50.0	38.9	17.2	14.7	16.8
Familial/hereditary nephropathies	33.3	8.3	16.7	19.1	17.7	18.9
Systemic diseases affecting the kidney	0.0	8.3	5.6	2.6	5.9	3.1
Diabetes	0.0	0.0	0.0	0.0	2.9	0.5
Miscellaneous renal disorders	16.7	8.3	11.1	7.6	17.7	9.4
Missing	0.0	0.0	0.0	0.6	17.1	4.0
Modality (%)						
HD	50.0	41.7	44.4	9.5	17.1	11.1
PD	33.3	50.0	44.4	7.6	17.1	9.5
Tx	16.7	8.3	11.1	82.9	65.9	79.4

[1]Percentages by ethnicity and PRD were calculated for those with data (excluding patients with missing data).
pmarp – per million age-related population; PRD – primary renal disease

Table 7.21 details the number and type of centres (adult or paediatric) that have contributed to the incident and prevalent numbers reported. The small proportion of adult centres identified may reflect that young people are often directed to centres with an established transition programme for early adult care; however, under-reporting of young people may also account for this finding.

Table 7.21 Number of centres that submitted data for young people (16–<18 years) incident to RRT in 2018 and/or prevalent to RRT on 31/12/2018, by care setting

	Incident	Prevalent
Paediatric centres	5 out of 13	13 out of 13
Adult centres	11 out of 70*	21 out of 70*

*Cambridge did not submit patient-level data for 2018.

Transplant parameters in young people

The median values for age, creatinine and eGFR, and the proportion with an eGFR <30 mL/min/1.73 m^2 for young people prevalent to Tx on 31/12/2018 are presented by care setting (adult or paediatric centre).

Table 7.22 Measures of graft function in young people (16–<18 years) prevalent to Tx on 31/12/2018, by care setting

	N on Tx	Median age (yrs)	N with creatinine data	Creatinine (µmol/L)	Median FAS-eGFR (mL/min/1.73m²)	% FAS-eGFR <30 mL/min/1.73m²	% creatinine completeness
Paediatric centres	131	16.8	130	102	73	5.4	99.2
Adult centres	27	17.9	26	120	68	15.4	96.3

eGFR – estimated glomerular filtration rate; FAS – Full Age Spectrum

Table 7.23 reports the median eGFR for all young people prevalent to Tx on 31/12/2018 by time since transplantation. Small numbers preclude further analysis by care setting (adult or paediatric centre).

Table 7.23 Estimated glomerular filtration rate (eGFR) in young people (16–<18 years) prevalent to Tx on 31/12/2018 by time since transplantation

Time since transplantation	N	Median FAS-eGFR (mL/min/1.73m²)
3 months	11	90
1 year	20	66
3 years	26	80
5 years	31	78
≥7 years	68	71
Total (IQR)	**156**	**72 (57-90)**

FAS – Full Age Spectrum; IQR – interquartile range

Biochemical and blood pressure measures in young people

Table 7.24 shows attainment of biochemical and blood pressure measures for young people prevalent to dialysis and transplant on 31/12/2018 for the total population and by care setting (adult or paediatric). Attainment of targets including haemoglobin, calcium, phosphate and bicarbonate are shown; median systolic and diastolic blood pressure values and the percentage of young people with blood pressure values within 'normal' range or that are 'high' are also reported. Data completeness was satisfactory (>70%) for all biochemical parameters, although a higher proportion of incomplete blood pressure data was noted among young people managed in adult centres. As a result, we advise caution when making inferences from the unadjusted data.

Table 7.24 Attainment of biochemical and blood pressure measures in young people (16–<18 years) prevalent to RRT on 31/12/2018, by modality and care setting

	Dialysis			Tx		
Characteristic	Paediatric centres	Adult centres	All	Paediatric centres	Adult centres	All
N	27	14	41	131	27	158
Median (IQR) Hb (g/L)	114 (101-124)	101 (99-121)	111 (100-124)	126 (116-137)	130 (116-147)	126 (116-138)
% Hb <100g/L	11.5	33.3	17.1	3.1	4.6	3.3
Median (IQR) Ca (mmol/L)	2.5 (2.4-2.6)	2.4 (2.3-2.5)	2.5 (2.4-2.6)	2.4 (2.3-2.5)	2.4 (2.3-2.5)	2.4 (2.3-2.5)
% Ca in range	53.9	90.9	64.9	92.3	84.6	91
Median (IQR) Phos (mmol/L)	1.7 (1.4-1.9)	2.1 (1.3-2.3)	1.7 (1.4-2.1)	1.1 (1.0-1.3)	1.1 (1.0-1.3)	1.1 (1.0-1.3)
% phos in range	53.9	36.4	48.7	59.7	61.5	60.0
Median (IQR) bicarb (mmol/L)	25 (23-27)	26 (21-26)	25 (22-27)	24 (22-26)	25 (23-26)	24 (22-26)
% bicarb in range	57.7	72.7	62.2	79.8	72	78.6
Median (IQR) SBP (mmHg)	114 (108-118)	142 (118-158)	116 (110-132)	117 (110-124)	123 (112-134)	118 (110-126)
Median (IQR) DBP (mmHg)	69 (63-80)	81 (56-82)	70 (63-81)	70 (64-77)	77 (70-81)	70 (65-78)
% 'normal' BP range (<130/80 mmHg)	66.7	28.6	56.0	73.8	47.4	69.8
% high BP (≥140/90 mmHg)	11.1	57.1	24.0	4.7	10.5	5.6

bicarb – bicarbonate; BP – blood pressure; Ca – calcium; DBP – diastolic blood pressure; Hb – haemoglobin; IQR – inter-quartile range; phos – phosphate; SBP – systolic blood pressure

THE RENAL ASSOCIATION
founded 1950

Abbreviations

UK renal centre abbreviations and other shortened forms used in the 22nd Annual Report

UK renal centre abbreviations

Adult renal centres

Abbreviation	City	Hospital
	ENGLAND	
B Heart	Birmingham	Heartlands Hospital
B QEH	Birmingham	Queen Elizabeth Hospital
Basldn	Basildon	Basildon Hospital
Bradfd	Bradford	St Luke's Hospital
Brightn	Brighton	Royal Sussex County Hospital
Bristol	Bristol	Southmead Hospital
Camb	Cambridge	Addenbrooke's Hospital
Carlis	Carlisle	Cumberland Infirmary
Carsh	Carshalton	St Helier Hospital
Chelms	Chelmsford	Broomfield Hospital
Colchr	Colchester	Colchester General Hospital
Covnt	Coventry	University Hospital Coventry and Warwick
Derby	Derby	Royal Derby Hospital
Donc	Doncaster	Doncaster Royal Infirmary
Dorset	Dorchester	Dorset County Hospital
Dudley	Dudley	Russells Hall Hospital
Exeter	Exeter	Royal Devon and Exeter Hospital
Glouc	Gloucester	Gloucestershire Royal Hospital
Hull	Hull	Hull Royal Infirmary
Ipswi	Ipswich	Ipswich Hospital
Kent	Kent	Kent and Canterbury Hospital
L Barts	London	St Bartholomew's Hospital and The Royal London Hospital
L Guys	London	Guy's Hospital and St Thomas' Hospital
L Kings	London	King's College Hospital
L Rfree	London	Royal Free, Middlesex and UCL Hospitals
L St.G	London	St George's Hospital and Queen Mary's Hospital
L West	London	Hammersmith, Charing Cross and St Mary's Hospitals
Leeds	Leeds	St James's University Hospital and Leeds General Infirmary
Leic	Leicester	Leicester General Hospital
Liv Ain	Liverpool	Aintree University Hospital
Liv Roy	Liverpool	Royal Liverpool University Hospital
M RI	Manchester	Manchester Royal Infirmary
Middlbr	Middlesbrough	The James Cook University Hospital
Newc	Newcastle	Freeman Hospital and Royal Victoria Infirmary
Norwch	Norwich	Norfolk and Norwich University Hospital
Nottm	Nottingham	Nottingham City Hospital
Oxford	Oxford	Oxford Radcliffe Hospital
Plymth	Plymouth	Derriford Hospital
Ports	Portsmouth	Queen Alexandra Hospital
Prestn	Preston	Royal Preston Hospital
Redng	Reading	Royal Berkshire Hospital
Salford	Salford	Salford Royal Hospital
Sheff	Sheffield	Northern General Hospital
Shrew	Shrewsbury	Royal Shrewsbury Hospital
Stevng	Stevenage	Lister Hospital
Sthend	Southend	Southend Hospital
Stoke	Stoke	University Hospital of North Staffordshire
Sund	Sunderland	Sunderland Royal Hospital
Truro	Truro	Royal Cornwall Hospital

Adult renal centres Continued

Abbreviation	City	Hospital
Wirral	Birkenhead	Arrowe Park Hospital
Wolve	Wolverhampton	New Cross Hospital
York	York	York District General Hospital
	NORTHERN IRELAND	
Antrim	Antrim	Antrim Hospital (Northern Trust)
Belfast	Belfast	Belfast City Hospital
Newry	Newry	Daisy Hill Hospital (Southern Trust)
Ulster	Belfast	Ulster Hospital
West NI	Londonderry and Omagh	Tyrone County Hospital (Western Trust)
	SCOTLAND	
Abrdn	Aberdeen	Aberdeen Royal Infirmary
Airdrie	Airdrie	Monklands Hospital
D&Gall	Dumfries	Dumfries and Galloway Royal Infirmary
Dundee	Dundee	Ninewells Hospital
Edinb	Edinburgh	Royal Infirmary of Edinburgh
Glasgw	Glasgow	Queen Elizabeth University, Glasgow Royal Infirmary and Stobhill Hospitals
Inverns	Inverness	Raigmore Hospital
Klmarnk	Kilmarnock	University Hospital Crosshouse
Krkcldy	Kirkcaldy	Victoria Hospital
	WALES	
Bangor	Bangor	Ysbyty Gwynedd
Cardff	Cardiff	University Hospital of Wales
Clwyd	Clwyd	Ysbyty Glan Clwyd Hospital
Swanse	Swansea	Morriston Hospital
Wrexm	Wrexham	Wrexham Maelor Hospital

Paediatric renal centres

Abbreviation	City	Hospital
	ENGLAND	
Bham_P	Birmingham	Birmingham Children's Hospital
Brstl_P	Bristol	Bristol Royal Hospital for Children
L Eve_P	London	Evelina London Children's Hospital
L GOSH_P	London	Great Ormond Street Hospital for Children
Leeds_P	Leeds	Leeds Children's Hospital
Livpl_P	Liverpool	Alder Hey Children's Hospital
Manch_P	Manchester	Royal Manchester Children's Hospital
Newc_P	Newcastle	Great North Children's Hospital
Nottm_P	Nottingham	Nottingham Children's Hospital
Soton_P	Southampton	Southampton Children's Hospital
	NORTHERN IRELAND	
Blfst_P	Belfast	Royal Belfast Hospital for Sick Children
	SCOTLAND	
Glasg_P	Glasgow	Royal Hospital for Children Glasgow
	WALES	
Cardf_P	Cardiff	Children's Kidney Centre University Hospital Wales

Other shortened forms

AKI	acute kidney injury
APD	automated peritoneal dialysis
AVF	arteriovenous fistula
AVG	arteriovenous graft
Bicarb	bicarbonate
BMI	body mass index
Ca	calcium
CAKUT	congenital abnormalities of the kidneys and urinary tract
CAPD	continuous ambulatory peritoneal dialysis
C. difficile	*Clostridium difficile*
Chol	cholesterol
CI	confidence interval
CKD	chronic kidney disease
Creat	creatinine
CVC	central venous catheter
DBD	donor after brain death
DBP	diastolic blood pressure
DCD	donor after circulatory death
E	England
E. coli	*Escherichia coli*
eGFR	estimated glomerular filtration rate
ESA	erythropoiesis stimulating agent
ESKD	end-stage kidney disease
FAS	Full Age Spectrum
Ferr	ferritin
Hb	haemoglobin
HbA1c	glycated haemoglobin
HD	haemodialysis
HES	Hospital Episode Statistics
HHD	home haemodialysis
ICHD	in-centre haemodialysis
IQR	interquartile range
IV	intravenous
K	potassium
KDIGO	Kidney Disease: Improving Global Outcomes
LKD	living kidney donor
MRSA	methicillin-resistant *Staphylococcus aureus*
MSSA	methicillin-sensitive *Staphylococcus aureus*
NHSBT	NHS Blood and Transplant
NI	Northern Ireland

NTL	non-tunnelled line
PD	peritoneal dialysis
PEDW	Patient Episode Database for Wales
PHE	Public Health England
Phos	phosphate
pmarp	per million age-related population
pmp	per million population
PRD	primary renal disease
PTH	parathyroid hormone
RRT	renal replacement therapy
SBP	systolic blood pressure
SD	standard deviation
TL	tunnelled line
Tx	transplant
UKRDC	UK Renal Data Collaboration
UKRR	UK Renal Registry
URR	urea reduction ratio
W	Wales

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UK Renal Registry 22nd Annual Report

Data to 31/12/2018

25 years of the UK Renal Registry

The UKRR was established by the Renal Association in 1995 to collate data centrally from all adult UK renal centres to improve the care of patients with end-stage kidney disease. Although originally limited to patients on renal replacement therapies (RRT) – dialysis treatments and kidney transplant recipients – the UKRR now collects cases of acute kidney injury in primary and secondary care and cases of advanced chronic kidney disease in secondary care not on dialysis. Data on children on RRT have been collated by the UKRR since 2009. The UKRR team manages data collection, analysis and reporting on approximately 8,000 new patients and 67,000 existing patients on RRT each year. The Renal Association has an active and involved patient council. Each year the UKRR publishes an annual report comprising centre comparisons, attainment of the Renal Association audit standards, national averages and long term trends.

The UK Renal Registry is part of the Renal Association, a registered charity (company registration 2229663, charity number 800733)