ISSN 2632-4326 (Online)

THE RENAL ASSOCIATION
founded 1950

UK Renal Registry
23rd Annual Report

Data to 31/12/2019

Chronic kidney disease

Incidence of RRT

Prevalence of RRT

Transplant

In-centre haemodialysis

Peritoneal dialysis

Home haemodialysis

Paediatrics

UK Renal Registry 23rd Annual Report

Data to 31/12/2019

Suggested citation

UK Renal Registry (2021) UK Renal Registry 23rd Annual Report – data to 31/12/2019, Bristol, UK.
Available from renal.org/audit-research/annual-report

Publications based on UK Renal Registry (UKRR) data presented in this report must include the citation detailed above and the following disclaimer:

The data reported here have been supplied by the UKRR of the Renal Association. The interpretation and reporting of these data are the responsibility of the authors and in no way should be seen as an official policy or interpretation of the UKRR or the Renal Association

Summary of the UKRR 23rd Annual Report – adults

UK Renal Registry (2021) UK Renal Registry Summary of Annual Report – analyses of adult data to the end of 2019, Bristol, UK.
Available from renal.org/audit-research/annual-report

Summary of the UKRR 23rd Annual Report – children and young people

UK Renal Registry (2021) UK Renal Registry Summary of Annual report – analyses of paediatric data to the end of 2019, Bristol, UK.
Available from renal.org/audit-research/annual-report

Contact information

For more information about this report or the UKRR, please contact us:


renal@renal.org


www.renalreg.org


@UKKidney

Foreword



Professor James Medcalf
Medical director, The Renal Association

It is a pleasure to again write a foreword for the UK Renal Registry (UKRR) Annual Report. It has been a difficult year with COVID-19, but it is a great credit to the renal centres and the staff at the UKRR that this year's report is ready at about the same time as last year.

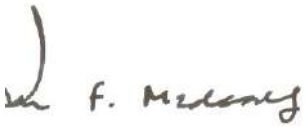
Report highlights include the inclusion of many of the measures developed in collaboration with Getting It Right First Time (GIRFT) and made possible by the now routine linkage of UKRR data with Hospital Episode Statistics (HES) and Patient Episode Database for Wales (PEDW). Analyses include hospitalisation rates amongst people who are receiving renal replacement therapy (RRT) and the now routine comorbidity-adjusted patient survival. Many more analyses are possible and it is only the cost of HES that precludes more frequent linkage than once a year.

As promised, we have put together a chapter that reports a basic analysis of the chronic kidney disease (CKD) stage 4–5 data from those renal centres that submit usable data. A significant amount of the activity stimulated by GIRFT and the Renal Services Transformation Programme (RSTP) is likely to be in the pre-RRT part of the patient journey. We encourage other centres to start providing these data, because they will be essential to future analyses of the 'conservative management' of people with advanced CKD, in particular.

Over the next few months we will publish an updated dataset that will significantly reduce the number of items that renal centres are asked to send to the UKRR. This reduction is possible because we now routinely link with HES, PEDW and the Public Health England infections databases for some key information. We have also looked critically at what is still routinely required and have consequently removed several items.

The trade-off is that we are again encouraging centres to submit data via the UK Renal Data Collaboration (UKRDC) feed. This is the only practical means to fulfil the frequently voiced phrase 'we want to see timely comparisons of our data'. Two centres are using this routinely and we are currently working with several other system suppliers to design feeds. This change, along with routinely receiving data on any patient with CKD stage 4 or lower under renal centre follow-up, and at the UKRR a commitment to visualise the initial analysis in a slick and largely automated process, will stimulate continued quality improvement.

The annual report of the UKRR provides the opportunity to thank all the renal centres again this year. This is likely to be an important year for us to work together to change our data collection processes to get even more value from the information they share.



Professor James Medcalf
Medical director, The Renal Association, July 2021

Contents

Introduction	The UK Renal Registry's 23rd Annual Report	iii
Chapter 1	Adults with chronic kidney disease (CKD) and estimated glomerular filtration rate (eGFR) <30mL/min/1.73m^2 in the UK at the end of 2019	1
Chapter 2	Adults starting renal replacement therapy (RRT) for end-stage kidney disease (ESKD) in the UK in 2019	10
Chapter 3	Adults on renal replacement therapy (RRT) in the UK at the end of 2019	52
Chapter 4	Adults with a kidney transplant (Tx) in the UK at the end of 2019	76
Chapter 5	Adults on in-centre haemodialysis (ICHD) in the UK at the end of 2019	102
Chapter 6	Adults on peritoneal dialysis (PD) in the UK at the end of 2019	136
Chapter 7	Adults on home haemodialysis (HHD) in the UK at the end of 2019	160
Chapter 8	Children and young people on renal replacement therapy (RRT) for end-stage kidney disease (ESKD) in the UK in 2019	182
Abbreviations	UK renal centre abbreviations and other shortened forms used in the 23rd annual report	208

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

Appendix A	Definitions and methodologies used in the 23rd Annual Report – data to the end of 2019
Appendix B	Clinical commissioning group (CCG) and health board (HB) adult incidence and prevalence numbers, rates and standardised ratios – data to the end of 2019

Introduction: The UK Renal Registry's 23rd 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 70 adult and 13 paediatric centres against national standards, in particular, the Renal Association's guidelines – renal.org/health-professionals/guidelines/guidelines-commentaries.

The 23rd Annual Report includes the 8,000 patients who started RRT in 2019, as well as all 68,000 patients who were on RRT at the end of 2019. 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 and all graphs used in the report are available for use in presentations – renal.org/audit-research/annual-report.

What's new?

The UKRR Annual Report now routinely describes the demographic and clinical features of patients with CKD treated at renal centres who are not on RRT, either because they do not yet require RRT or because they receive conservative care.

Metrics for renal services that were developed by the UKRR in collaboration with the Getting It Right First Time (GIRFT) programme are presented to investigate equity of access to services, outcomes and pathways in nephrology, dialysis and transplantation, and measures of resource use and costs.

This year two renal centres submitted their data via the UK Renal Data Collaboration (UKRDC) daily feed – St Bartholomew's Hospital and The Royal London Hospital, and King's College Hospital. The UKRR is in discussion with one of the big renal IT suppliers to develop a data feed that could be used by other renal IT systems too, which will accelerate the adoption of the UKRDC.

Increasing amounts of data are now available via the data portal – renal.org/audit-research/data-portal. This year 15 measures, including three patient measures, are reported by renal centres grouped by region.

How to interpret centre analyses and outlying centres

The UKRR advises caution when comparing centre-specific attainment of clinical audit measures, because 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 highlight outlying centres. Centre comparisons will become more meaningful when more comorbidity data (via linkages) and advanced CKD data are included to understand differences in the transition of patients onto both RRT and conservative non-dialysis pathways. Despite these shortcomings, identifiable centre-specific analyses on the survival of RRT patients are published in the annual report. Although the UKRR has no statutory powers, the UKRR senior management team communicates survival outlier status with 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.

THE RENAL ASSOCIATION
founded 1950

Chapter 1

Adults with chronic kidney disease (CKD) and estimated glomerular filtration rate (eGFR) <30mL/min/1.73m^2 in the UK at the end of 2019

Contents

Introduction 2

Rationale for analyses 3

Key findings 4

Analyses 5

- Stage and demographics of adult CKD patients 5
- Blood pressure in adult CKD patients 7
- Biochemistry parameters in adult CKD patients 7
- Anaemia in adult CKD patients 8

Introduction

From this year onwards, the UKRR will routinely publish data in the annual report about patients with chronic kidney disease (CKD) outside the context of renal replacement therapy (RRT) or acute kidney injury (AKI). The primary aim of this chapter is to present the demographic and clinical features of patients receiving treatment for CKD stages G4 and 5 at UK renal centres at the end of 2019 (figure 1.1). A '2019 prevalent CKD population' is described, comprising individuals who:

- were reported by an adult renal centre as receiving treatment for CKD at the end of 2019, and
- had an eGFR of <30mL/min/1.73m^2 on their last recorded creatinine measurement.

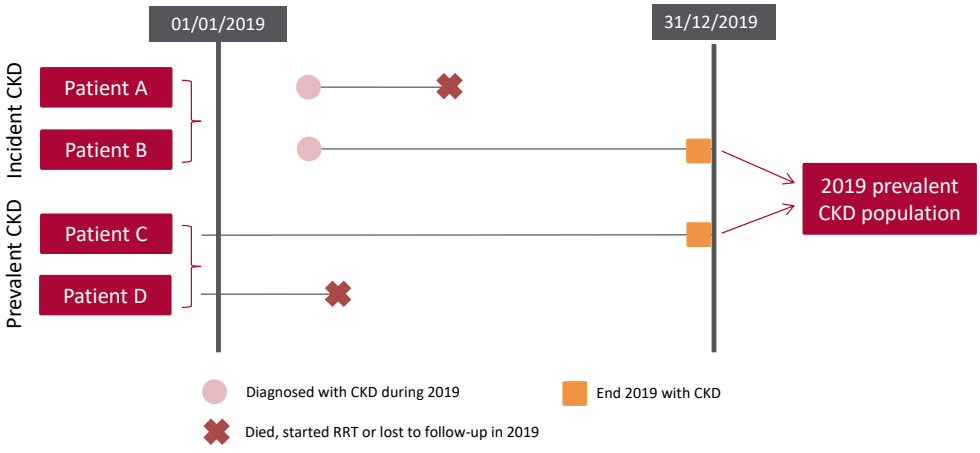


Figure 1.1 Pathways adult patients could follow to be included in the UK 2019 prevalent CKD population

Auditable aspects of care for this population are highlighted and described. For the purpose of this chapter, individuals are categorised as having CKD stage G5 (estimated glomerular filtration rate [eGFR] <15 mL/min/1.73m^2) or CKD stage G4 (eGFR 15–30mL/min/1.73m^2) using their last recorded creatinine measurement. Patients whose last measurement was over two years old are included, but are reported as 'CKD stage unknown'. Further categorisation, e.g. by eGFR trend or albuminuria is not possible using UKRR data.

Information about completeness of primary renal disease (PRD) data are presented. Whilst PRD data are known to be incomplete, no triangulation was performed using other datasets available to the UKRR, e.g. Hospital Episode Statistics (HES). The UKRR is developing approaches to combine CKD and AKI reporting systems with HES and will publish these elsewhere. Data relating to survival and initiation of RRT/conservative care (CC) are also being prepared separately.

It is important to highlight that the individuals described in this chapter represent a sub-population of those with CKD in the UK. Many individuals with diagnosed CKD receive care without referral to a renal centre, particularly those with earlier stages. Furthermore, not all renal centres are yet submitting CKD data to the UKRR. For this reason, it is not appropriate to generalise findings from this chapter to the wider CKD population, even to those cared for in renal centres.

Consequently, this first-ever CKD chapter asks simple questions:

- Which individuals with CKD are currently reported to the UKRR?
- What data are captured and which aspects of CKD care can be audited using them?

Rationale for analyses

Since 2016, renal centres in England and Wales have been asked by the National Clinical Reference Group to report individuals with CKD under their care to the UKRR. Data collection has increased from almost 17,000 patients with CKD stages G4 and 5 at the end of 2016, to more than 34,000 patients at the end of 2019. These numbers will continue to rise – in 2019 the UKRR received data from only 17 of the UK's 70 adult renal centres.

Reliable estimates of CKD prevalence in secondary care are required to inform CKD management and policy planning. The presented analyses will be performed annually to help clinicians and policy makers in this task and will be expanded as data quality and quantity improve. The Renal Association guidelines (renal.org/health-professionals/guidelines/guidelines-commentaries) provide audit measures relevant to the care of patients with CKD, and where data permit, their attainment by UK renal centres in 2019 is reported in this chapter (table 1.1). Some audit measures cannot be reported because the completeness of the required data items is too low. Audit measures in guidelines that have been archived are not included. For consistency with other chapters, table 1.1 is provided to outline the addressed Renal Association audit measures. However, data completeness is poor even for the analyses presented, necessitating caution in interpretation. Further detail about the completeness of data returned to the UKRR is available through the UKRR data portal (renal.org/audit-research/data-portal).

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

The Renal Association guideline	Audit criteria	Related analysis/analyses
Commentary on the Kidney Disease Improving Global Outcomes (KDIGO) guideline on the diagnosis, evaluation, prevention and treatment of CKD mineral bone disorder (2018)	Percentage of adult CKD G5 patients with serum calcium above the normal reference range 2.2–2.5 mmol/L	Figure 1.3
Cardiovascular disease in CKD (2008)	Blood pressure in CKD stages G1–4 should be managed according to National Institute for Health and Care Excellence (NICE) guidance: <140/90 mmHg in patients without significant proteinuria and <130/80 mmHg in those with proteinuria or with diabetes	Table 1.4 (partly addressed)
Anaemia of CKD (updated 2020)	Proportion of CKD patients with eGFR <30mL/min/1.73m^2 (using CKD-EPI equation) and an annual haemoglobin level measurement	Figure 1.4
	Proportion of CKD stage G4–5 patients with haemoglobin 100–120 g/L	Figures 1.5–1.6
Commentary on the National Institute for Health and Care Excellence (NICE) guideline on RRT and conservative management (2020)	The number of patients with stage G5 CKD who were reported as being under conservative care	Table 1.2

For definitions and methods relating to this chapter see appendix A. The number preceding the centre name in each caterpillar plot indicates the percentage of missing data for that centre.

Key findings

- Data about patients with CKD stages G4 and 5 who were not on RRT were reported by just 17 of the UK's 70 adult renal centres
- The 2019 prevalent CKD population comprised 21,368 patients, with a median age of 78.0 years, compared to a median age of 59.6 years for those on RRT
- CKD prevalence was 1,301 per million population (pmp) overall, but ranged from 149 to 2,793 pmp between centres. There were also substantial differences in the ages and distribution of disease stages between centres. Such large variation suggests discrepancies in the definitions used for processes of care or reporting of people with CKD between centres
- The data reported in this chapter highlight the need for improved capture and reporting of CKD data to enable national quality assurance. Concordance with audit measures for the CKD not on RRT population cannot be addressed until this is achieved.

Analyses

Stage and demographics of adult CKD patients

For the 17 adult renal centres, the number of prevalent patients with CKD and eGFR ≤30 mL/min/1.73m^2 was calculated as a proportion of the estimated centre catchment population (details in appendix A). Only a few centres reported patients with kidney failure as undergoing conservative care (CC). It is not clear whether a CC code means the same thing at all centres and for each patient. In particular, it is unclear which CC codes represent planned RRT for the eventuality of kidney failure, and which represent active treatment for an individual who might otherwise have started RRT. As such, people coded as receiving CC are included throughout this chapter.

Table 1.2 Number of adult patients prevalent to CKD stages G4 and 5 on 31/12/2019, including those on conservative care (CC) by stage and centre; number of CKD and RRT patients as a proportion of the adult catchment population

Centre	N with CKD	N on CC	Total	% stage G4	% stage G5	% stage unknown	Estimated catchment population (millions)	CKD 2019 crude rate (pmp)	RRT 2019 crude rate (pmp)
Bham[1]	805	69	874	70.9	28.7	0.3	2.03	430	1,627
Camb	189	1	190	65.3	28.9	5.8	0.93	205	1,584
Carlis	513	77	590	75.1	15.8	9.2	0.25	2,334	1,199
Covnt	1,588	0	1,588	87.0	12.4	0.6	0.79	2,016	1,366
Derby	1,085	1	1,086	82.1	16.2	1.7	0.56	1,954	1,173
Glouc	1,099	1	1,100	85.5	13.2	1.3	0.51	2,178	1,039
L Rfree	1,961	0	1,961	68.7	27.1	4.2	1.32	1,491	1,782
Leic	3,966	1	3,967	80.5	17.3	2.2	2.07	1,920	1,252
Middlbr	585	0	585	64.3	32.1	3.6	0.80	732	1,188
Oxford	2,166	3	2,169	73.2	22.4	4.4	1.43	1,515	1,375
Plymth	1,076	1	1,077	85.4	13.6	1.0	0.40	2,710	1,336
Ports	2,082	1	2,083	76.6	23.2	0.2	1.73	1,202	1,087
Salford	168	2	170	92.9	7.1	0.0	1.14	149	1,084
Stevng	416	103	519	69.4	28.5	2.1	1.10	472	878
Sthend	491	0	491	81.7	17.5	0.8	0.27	1,812	974
Swanse	2,065	32	2,097	87.2	12.8	0.0	0.75	2,793	1,156
Truro	764	57	821	85.9	14.1	0.0	0.35	2,316	1,266
Total	**21,019**	**349**	**21,368**	**79.0**	**19.0**	**2.0**	**16.42**	**1,301**	**1,302**

[1]The catchment population and 2019 crude rate for RRT reflect the combined Bham population (QEH and Heartlands renal centres), but CKD patients were only reported for QEH.

The proportion of patients with CKD and eGFR ≤30 mL/min/1.73m^2 from each ethnic group is shown for patients with ethnicity data – the proportion of centre patients with no ethnicity is shown separately. The completeness of PRD data varies greatly between centres, making interpretation difficult. PRD completeness is shown for each centre overall and by CKD stage.

Table 1.3 Demographics and completeness of primary renal disease (PRD) data of adult patients prevalent to CKD stages G4 and 5 on 31/12/2019 by centre

				Ethnicity					PRD completeness		
Centre	N with CKD	Median age (yrs)	% male	% White	% Asian	% Black	% Other	% missing	% all stages	% stage G4	% stage G5
Bham	874	69.0	57.2	61.5	24.9	10.1	3.6	10.3	16.6	6.9	39.4
Camb	190	77.1	54.2	95.5	2.2	1.1	1.1	6.3	47.9	31.5	92.7
Carlis	590	78.8	51.2	99.6	0.4	0.0	0.0	20.7	11.2	11.3	14.0
Covnt	1,588	80.0	54.5	90.9	7.9	1.2	0.0	8.0	84.3	83.6	89.8
Derby	1,086	78.3	55.7	92.2	5.3	1.1	1.3	9.9	89.0	88.6	92.6
Glouc	1,100	80.1	59.0	95.5	2.1	1.4	0.9	2.4	55.4	53.8	67.6
L Rfree	1,961	76.0	54.7	57.5	19.9	12.7	10.0	21.7	52.5	51.0	59.8
Leic	3,967	78.8	53.5	82.5	14.5	1.8	1.2	26.4	56.6	54.7	67.2
Middlbr	585	73.3	58.1	93.9	6.1	0.0	0.0	46.5	15.7	12.2	23.9
Oxford	2,169	76.8	57.4	87.2	5.3	3.5	4.0	71.1	15.9	12.0	30.2
Plymth	1,077	80.8	49.9	98.7	0.3	0.1	0.9	4.3	19.8	18.7	26.7
Ports	2,083	76.0	59.3	97.0	2.0	0.4	0.6	34.9	27.4	20.0	52.2
Salford	170	75.6	57.6	82.8	14.1	1.2	1.8	4.1	2.9	1.9	16.7
Stevng	519	81.2	56.1	85.3	9.7	2.5	2.5	46.2	42.8	29.4	77.0
Sthend	491	79.8	56.6	94.1	1.9	1.3	2.7	2.9	39.3	34.2	64.0
Swanse	2,097	79.4	53.3	99.7	0.0	0.3	0.0	81.0	21.9	19.5	38.4
Truro	821	80.2	56.2	99.3	0.4	0.1	0.2	0.1	12.3	8.7	34.5
Total	**21,368**	**78.0**	**55.3**	**86.6**	**8.5**	**2.8**	**2.1**	**30.4**	**40.7**	**38.0**	**53.5**

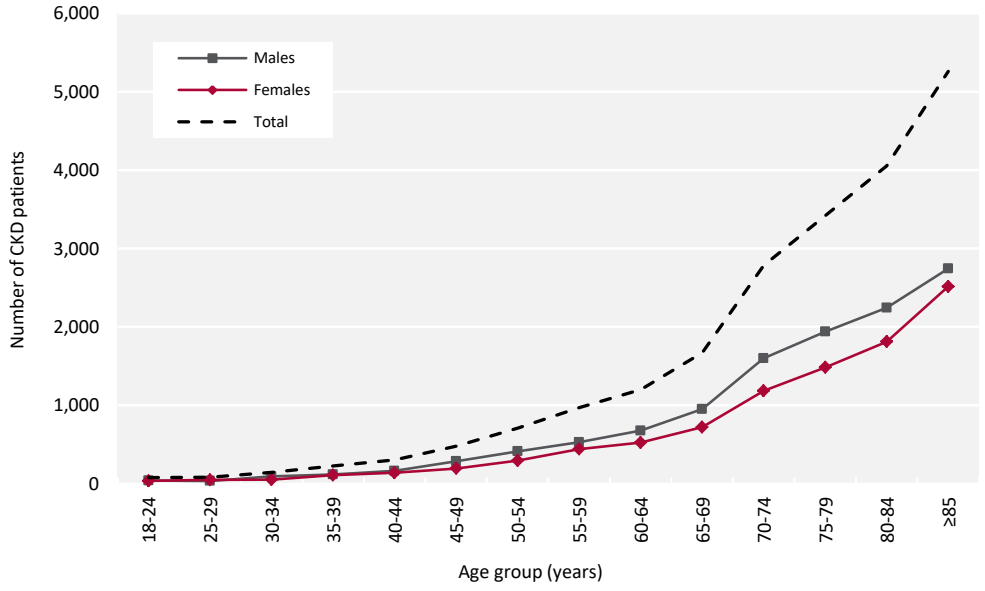


Figure 1.2 Number of adult patients prevalent to CKD stages G4 and 5 on 31/12/2019 by age group and sex

Blood pressure in adult CKD patients

Only 7 centres submitted sufficient blood pressure data for analysis (Bham, Derby, Glouc, L Rfree, Plymth, Ports, Swanse).

Table 1.4 Blood pressures in adult patients prevalent to CKD stages G4 and 5 on 31/12/2019 by stage

	All stages				Stage G4				Stage G5			
	N (% complete)	Median SBP	Median DBP	N (%) <140/90[1]	N (% complete)	Median SBP	Median DBP	N (%) <140/90[1]	N (% complete)	Median SBP	Median DBP	N (%) <140/90[1]
All	3866 (37.6)	141	75	1706 (44.1)	2749 (33.8)	140	75	1276 (46.4)	1115 (55.7)	145	75	429 (38.5)
Age group (yrs)												
18-29	56 (62.9)	136	82	32 (57.1)	37 (58.7)	130	81	25 (67.6)	19 (73.1)	141	87	7 (36.8)
30-39	92 (50.0)	137	86	44 (47.8)	72 (49.3)	135	85	37 (51.4)	20 (57.1)	142	86	7 (35.0)
40-49	236 (57.7)	137	84	111 (47.0)	177 (56.2)	136	83	89 (50.3)	59 (67.0)	140	86	22 (37.3)
50-59	397 (47.9)	141	81	172 (43.3)	280 (44.8)	139	80.5	131 (46.8)	117 (60.3)	145	81	41 (35.0)
60-64	287 (48.6)	142	78	130 (45.3)	199 (44.9)	139	77	96 (48.2)	88 (65.2)	146	80	34 (38.6)
65-69	348 (43.0)	140	74	166 (47.7)	246 (39.3)	138	74.5	124 (50.4)	102 (58.3)	143.5	73	42 (41.2)
70-74	548 (39.7)	141	74	240 (43.8)	387 (35.2)	140	75	173 (44.7)	161 (58.8)	145	72	67 (41.6)
75-79	652 (38.7)	144	73	268 (41.1)	484 (35.5)	144	73	204 (42.1)	167 (56.0)	146	73	63 (37.7)
80-84	662 (34.8)	140	71	303 (45.8)	473 (30.8)	140	71	230 (48.6)	189 (55.3)	146	72	73 (38.6)
≥85	588 (24.5)	144	70	240 (40.8)	394 (20.5)	142	70	167 (42.4)	193 (44.5)	147	70	73 (37.8)
Sex												
Male	2187 (38.3)	140	75	997 (45.6)	1543 (34.3)	140	75	723 (46.9)	642 (55.5)	142	75	273 (42.5)
Female	1679 (36.8)	142	75	709 (42.2)	1206 (33.0)	140	75	553 (45.9)	473 (56.0)	148	76	156 (33.0)

[1]% <140/90 mmHg of patients with complete blood pressure data.
The total includes the patients with old eGFR measurements who were classed as 'unknown stage'.
DBP – diastolic blood pressure; SBP – systolic blood pressure (both measured in mmHg)

Biochemistry parameters in adult CKD 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.

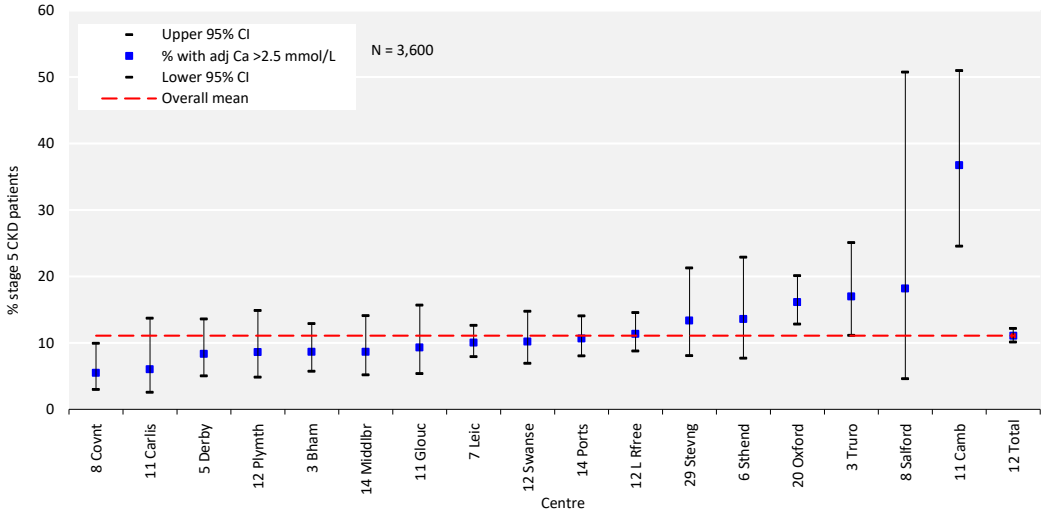


Figure 1.3 Percentage of adult patients prevalent to CKD stage G5 on 31/12/2019 with adjusted serum calcium (Ca) >2.5 mmol/L by centre

Anaemia in adult CKD patients

The percentage of patients with haemoglobin (Hb) 100–120 g/L is presented overall and by CKD stage. Inadequate data completeness in relation to erythropoiesis stimulating agents (ESAs) makes auditing against national guidelines difficult. Completeness of ESA data in the prevalent CKD population with eGFR ≤30 mL/min/1.73m^2 is shown in table 1.5.

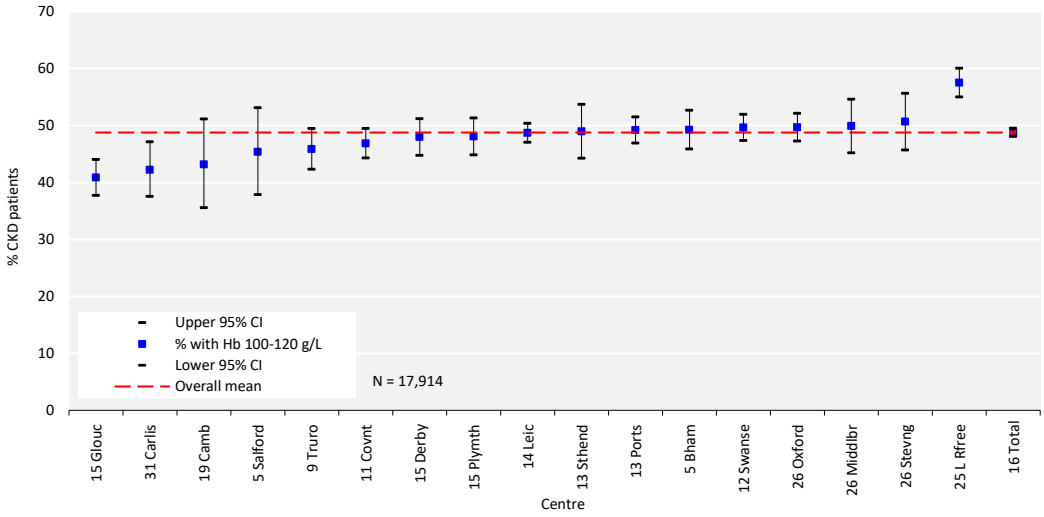


Figure 1.4 Percentage of adult patients prevalent to CKD stages G4 and 5 on 31/12/2019 with haemoglobin (Hb) 100–120 g/L by centre

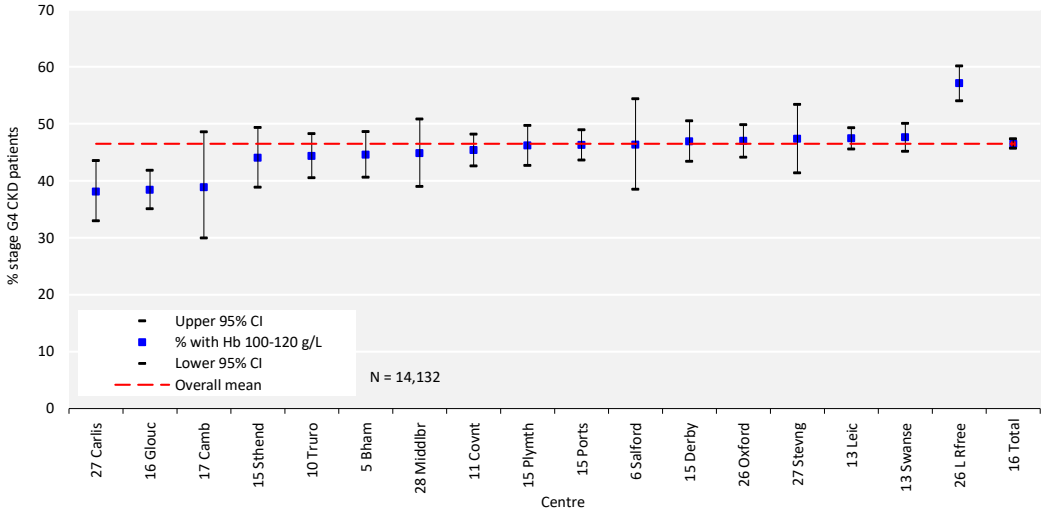


Figure 1.5 Percentage of adult patients prevalent to CKD stage G4 on 31/12/2019 with haemoglobin (Hb) 100–120 g/L by centre

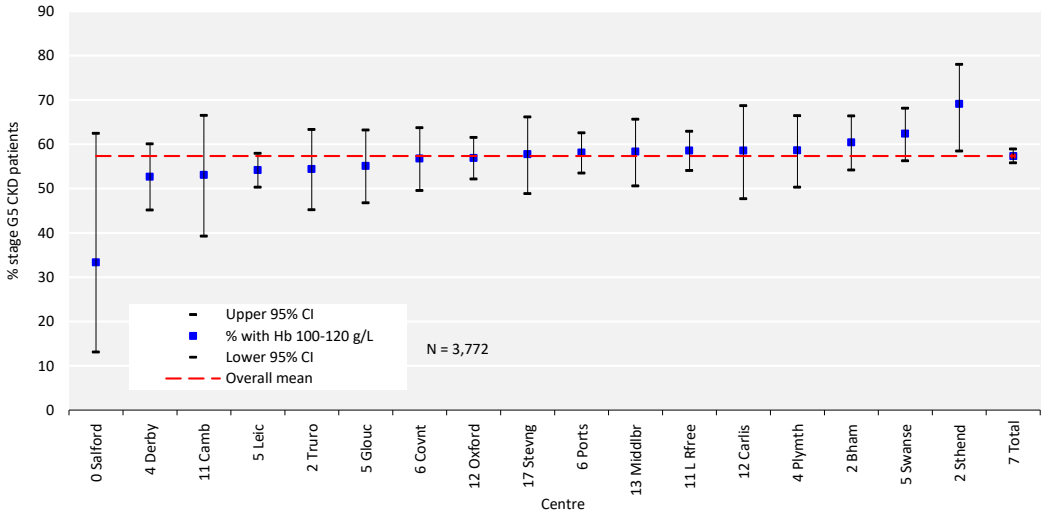


Figure 1.6 Percentage of adult patients prevalent to CKD stage G5 on 31/12/2019 with haemoglobin (Hb) 100-120 g/L by centre

Table 1.5 Completeness of erythropoiesis stimulating agent (ESA) data for adult patients prevalent to CKD stages G4 and 5 on 31/12/2019

	All stages	Stage G4	Stage G5
Number of centres	7	7	7
N on ESA	986	570	412
% on ESA	14.7	10.8	34.1
Range of % on ESA	8.2–21.2	7–15.8	23.4–42.4

The total includes the patients with old eGFR measurements who were classed as 'unknown stage'.

THE RENAL ASSOCIATION
founded 1950

Chapter 2

Adults starting renal replacement therapy (RRT) for end-stage kidney disease (ESKD) in the UK in 2019

Contents

Introduction 12

Rationale for analyses 14

Key findings 16

Analyses 17

- Changes to the incident adult RRT population 17
- Demographics and start modality of incident adult RRT patients 20
- Modality changes of incident adult RRT patients 25
- Late presentation to nephrology services of incident adult RRT patients 29
- Start estimated glomerular filtration rate in incident adult RRT patients 32
- Anaemia in incident adult RRT patients 33
- Biochemistry parameters in incident adult RRT patients 36
- Dialysis access in incident adult dialysis patients 38
- Survival in incident adult RRT patients 44
- Cause of death in incident adult RRT patients 51

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 2019 (figure 2.1). 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 2.1). 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.

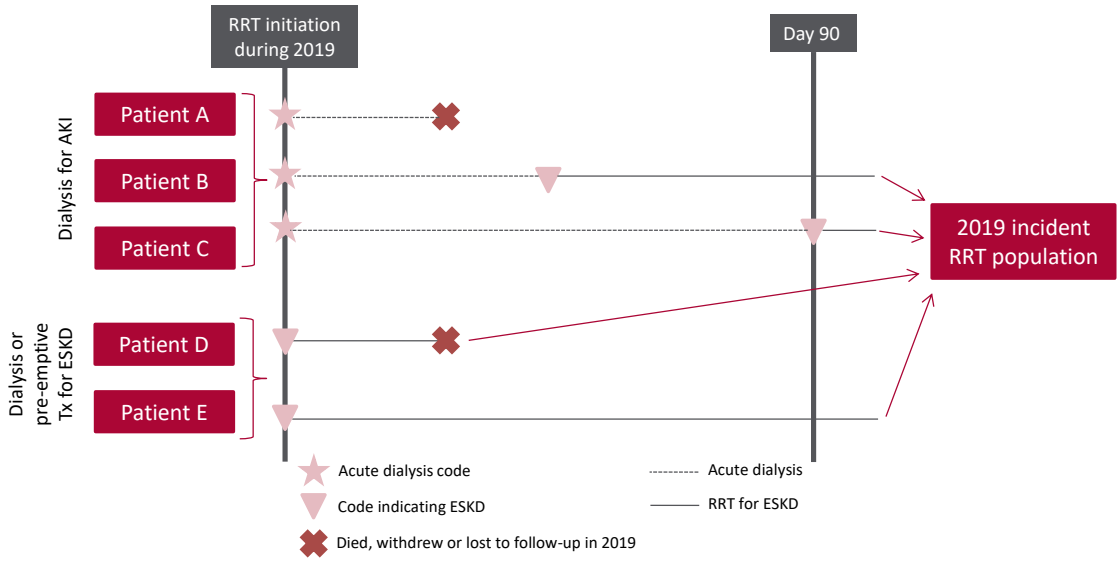


Figure 2.1 Example histories for patients starting RRT, illustrating the use of timeline codes to define dialysis as being 'acute' or for ESKD

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 2019 Multisite Dialysis Access Audit. This year, fewer data items were collected to reduce the burden on centres and, in future years, the audit will be stopped entirely in centres that provide the data in their regular data returns to the UKRR.

This chapter addresses the following key aspects of the care of patients incident to RRT for which there are Renal Association guidelines (table 2.1):

- **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 – either a tunnelled line (TL) or a non-tunnelled line (NTL).

Rationale for analyses

The analyses begin with a description of the 2019 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 2019 is reported in this chapter (table 2.1). 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 portal (renal.org/audit-research/data-portal). 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, unless specified to the contrary.

Table 2.1 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 2.3
	Proportion of patients remaining on initial treatment modality 3 and 12 months post initiation of RRT	Tables 2.6–2.8, figures 2.6–2.7
	Percentage of patients commencing RRT referred <3 months and <12 months before date of starting RRT	Tables 2.9–2.12, figure 2.8
	Proportion of patients on UK Tx waiting list at RRT initiation	Table 2.3
	Proportion of RRT patients transplanted pre-emptively from living and deceased donors	Table 2.3, figure 2.6 (partly addressed)
	Estimated glomerular filtration rate (eGFR) at start of RRT and at time of pre-emptive Tx	Figure 2.9
	Proportion of planned initiations with established access or pre-emptive Tx	Table 2.16, figure 2.16
	Number of patients withdrawing from dialysis as a proportion of all deaths on dialysis	Table 2.21
Anaemia (2017)	Proportion of patients initiating RRT with haemoglobin <100 g/L not on erythropoiesis stimulating agent (ESA)	Table 2.13, figure 2.11 (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 2.14, figure 2.12
Vascular access (2015)	>60% of all patients with established ESKD commencing planned HD should receive dialysis via a functioning AVF or AVG	Table 2.16, figure 2.17
Peritoneal access (2009)	>80% of catheters should be patent at 1 year (censoring for death and elective modality change)	Figure 2.7 shows the RRT modality of PD patients at 1 year

AVF – arteriovenous fistula; AVG – arteriovenous graft

Key findings

- 7,945 adult patients started RRT for ESKD in the UK in 2019, a decrease of 1.6% from 2018
- RRT incidence in adults was 151 pmp, comparable to the rate of 152 pmp in 2018
- The median age of incident RRT patients was 64.2 years, but this was dependent on ethnicity (White 66.3 years, Asian 62.3 years and Black 56.3 years)
- 63.5% of incident RRT patients were male
- Diabetes remained the most common identifiable primary renal disease (PRD) for patients starting RRT (30.4%)
- By 90 days, 66.2% of patients were on HD (including HHD), 19.6% on PD, 9.3% had a functioning Tx and 5.0% had died or stopped treatment
- The mean eGFR at the start of RRT was 7.3 mL/min/1.73m^2 (HD 7.1 mL/min/1.73m^2, PD 7.4 mL/min/1.73m^2 and pre-emptive Tx 10.0 mL/min/1.73m^2)
- Late presentation was 16.2%
- Of the 5,890 incident dialysis patients with dialysis access data, 54.4% started dialysis with definitive access (23.1% PD and 31.3% HD with an AVF or AVG), 29.4% with a TL and 16.2% with an NTL
- Short-term (90 day) age-adjusted survival of incident RRT patients in a combined 2 year cohort (2017–2018) was 96.7%, which was the same as in the analysis of the 2016–2017 cohort
- 1 year after 90 day age-adjusted survival for incident RRT patients in a combined 2 year cohort (2017–2018) was 91.0% (compared to 90.9% in the previous analysis of the 2016–2017 cohort)
- There were 8 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 (2015–2018): 4 centres below the lower 95% limit and 4 centres above the upper 95% limit. After further adjustment for sex and comorbidities, only 1 centre (Preston) remained below the lower 95% limit and 2 centres (London King's and London Barts) above the upper 95% limit. It is expected that 3 centres would be outside the limits by chance
- There was no cause of death data available for 42.5% 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 (24.0%) and infection (20.3%).

Analyses

Changes to the incident adult RRT population

For the 70 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 2.2 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)	2019 crude rate (pmp)
	2015	2016	2017	2018	2019		
ENGLAND							
Basldn	53	49	48	50	53	0.34	155
Bham	365	376	386	371	369	2.03	181
Bradfd	91	88	82	71	104	0.49	214
Brightn	142	149	155	177	149	1.07	140
Bristol	145	154	157	167	159	1.21	131
Camb	102	102	86	115	118	0.93	127
Carlis	47	36	42	33	41	0.25	162
Carsh[1]	260	246	231	244	200	1.61	124
Chelms	50	55	43	33	48	0.37	129
Colchr	28	29	45	38	40	0.29	138
Covnt	108	136	119	129	140	0.79	178
Derby	61	87	89	84	89	0.56	160
Donc	39	64	57	52	53	0.37	143
Dorset	75	71	102	106	90	0.72	125
Dudley	51	53	59	53	53	0.34	156
Exeter	138	144	140	134	152	0.94	161
Glouc	72	70	82	72	61	0.51	121
Hull	123	92	106	104	106	0.79	134
Ipswi	67	43	53	58	57	0.31	184
Kent	144	144	140	137	150	1.06	142
L Barts	308	290	343	345	278	1.57	177
L Guys	177	166	167	183	210	1.00	211
L Kings	181	153	170	149	183	0.92	198
L Rfree	238	237	236	244	264	1.32	201
L St.G	115	91	92	84	102	0.66	155
L West	333	386	408	392	391	1.95	201
Leeds	144	166	176	180	161	1.36	118
Leic	269	321	292	312	368	2.07	178
Liv Ain	61	51	55	65	37	0.43	86
Liv Roy	141	111	137	99	68	0.80	85
M RI	197	212	225	187	206	1.32	156
Middlbr	133	100	117	118	109	0.80	136
Newc	124	132	145	136	114	0.94	121
Norwch	118	103	80	82	103	0.68	151
Nottm	124	122	134	125	125	0.92	136
Oxford	192	213	216	217	206	1.43	144
Plymth	53	61	91	64	62	0.40	156
Ports	201	215	220	222	219	1.73	126
Prestn	163	141	167	180	154	1.22	126
Redng	87	95	105	104	117	0.69	169
Salford	173	192	173	162	171	1.14	150

Table 2.2 Continued

Centre	N on RRT 2015	2016	2017	2018	2019	Estimated catchment population (millions)	2019 crude rate (pmp)
Sheff	147	150	159	185	154	1.12	137
Shrew	62	58	64	78	64	0.41	157
Stevng	134	163	141	175	193	1.10	176
Sthend	35	48	50	43	44	0.27	162
Stoke	118	114	98	101	94	0.72	130
Sund	63	94	95	89	86	0.54	159
Truro	70	48	58	61	58	0.35	164
Wirral	63	66	61	62	63	0.47	135
Wolve	87	70	84	94	86	0.54	158
York	60	73	59	52	58	0.48	121
N IRELAND							
Antrim	36	40	47	56	42	0.24	173
Belfast	89	95	77	71	76	0.53	144
Newry	31	28	28	32	25	0.23	107
Ulster	33	31	31	31	25	0.20	124
West NI	41	36	34	41	37	0.25	149
SCOTLAND							
Abrdn	66	52	54	58	29	0.50	58
Airdrie	64	62	66	64	70	0.46	153
D&Gall	12	12	16	18	17	0.12	139
Dundee	46	44	55	36	27	0.37	74
Edinb	96	86	126	106	109	0.84	130
Glasgw	221	198	202	210	203	1.37	148
Inverns	34	20	25	37	17	0.22	76
Klmarnk	39	53	49	38	44	0.29	151
Krkcldy	44	32	41	38	46	0.27	169
WALES							
Bangor	29	23	27	26	19	0.16	117
Cardff	160	165	180	190	166	1.15	145
Clwyd	28	18	24	32	29	0.18	162
Swanse	135	129	132	142	156	0.75	208
Wrexm	45	47	25	29	28	0.21	136
TOTALS							
England	**6,532**	**6,630**	**6,840**	**6,818**	**6,780**	**44.33**	**153**
N Ireland	**230**	**230**	**217**	**231**	**205**	**1.45**	**141**
Scotland	**622**	**559**	**634**	**605**	**562**	**4.43**	**127**
Wales	**397**	**382**	**388**	**419**	**398**	**2.45**	**163**
UK	**7,781**	**7,801**	**8,079**	**8,073**	**7,945**	**52.67**	**151**

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.

Carshalton discovered a problem related to the submission of PD patients after the closing date. As a consequence, 26 incident PD patients are not included in this report. No adjustment has been made this year, but the problem has been resolved and numbers will be correct next year.

pmp – per million population

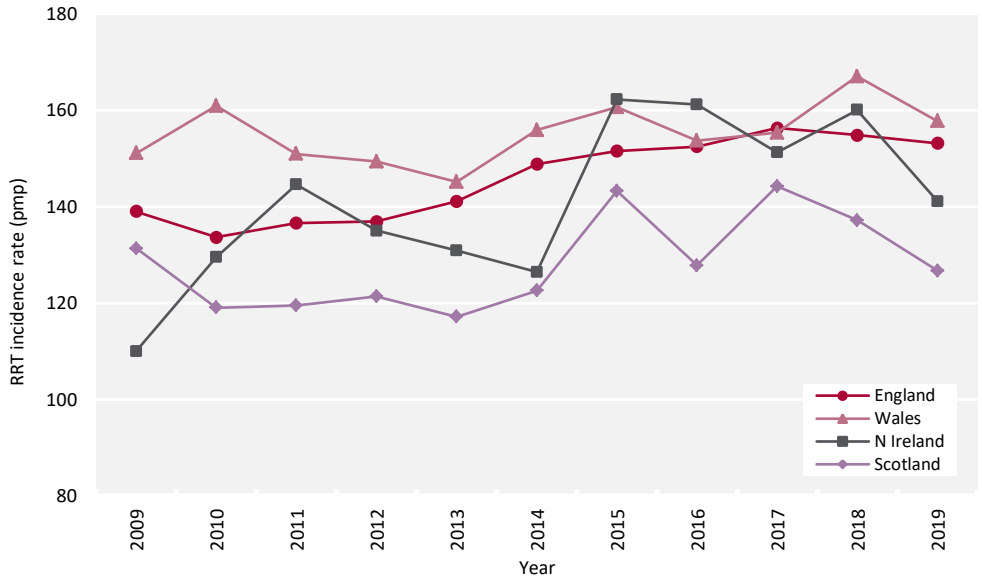


Figure 2.2 Adult RRT incidence rates by country between 2009 and 2019
pmp – per million population

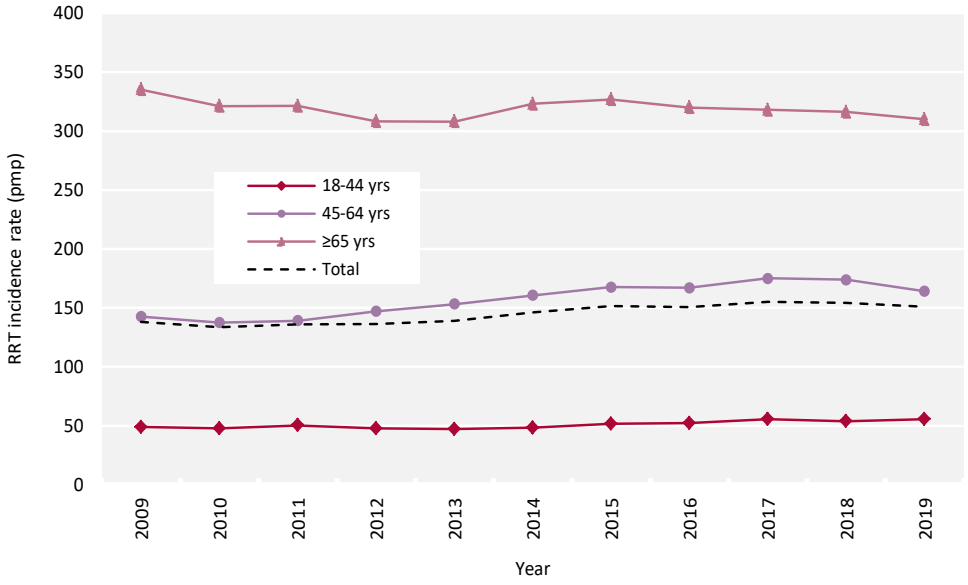


Figure 2.3 Adult RRT incidence rates by age group between 2009 and 2019
pmp – per million population

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 2.3 Demographics and start modality of adult patients incident to RRT in 2019 by centre

Centre	N on RRT	% on ICHD	% on PD	% on HHD	% with Tx	% pre-emptive listing/ Tx	Median age (yrs)	% male	Ethnicity				
									% White	% Asian	% Black	% Other	% missing
ENGLAND													
Basldn	53	79.3	17.0	0.0	3.8	9.4	61.7	56.6	86.0	6.0	8.0	0.0	5.7
Bham	369	67.8	26.8	0.0	5.4	18.7	63.0	56.4	58.3	27.5	11.8	2.5	3.3
Bradfd	104	82.7	17.3	0.0	0.0	9.6	62.4	64.4	54.8	41.3	1.0	2.9	0.0
Brightn	149	79.2	14.8	0.0	6.0	14.8	67.2	63.1	91.1	4.0	1.6	3.2	16.8
Bristol	159	75.5	16.4	0.0	8.2	16.4	64.8	69.2	88.9	2.8	6.3	2.1	9.4
Camb	118	60.2	10.2	0.0	29.7	37.3	64.9	66.1	95.2	2.9	1.0	1.0	11.0
Carlis	41	65.9	34.2	0.0	0.0	7.3	67.6	56.1	100.0	0.0	0.0	0.0	0.0
Carsh[1]	200	89.5	5.5	0.5	4.5	10.0	66.9	65.0	69.4	16.7	8.9	5.0	10.0
Chelms	48	70.8	25.0	0.0	4.2	12.5	69.4	70.8	89.5	5.3	2.6	2.6	20.8
Colchr	40	100.0	0.0	0.0	0.0	7.5	72.2	57.5	89.7	2.6	0.0	7.7	2.5
Covnt	140	61.4	30.0	0.7	7.9	23.6	66.1	65.0	75.0	21.4	3.6	0.0	0.0
Derby	89	66.3	24.7	5.6	3.4	14.6	68.5	59.6	80.5	14.9	4.6	0.0	2.2
Donc	53	77.4	22.6	0.0	0.0	11.3	66.6	67.9	94.3	1.9	1.9	1.9	0.0
Dorset	90	80.0	14.4	0.0	5.6	13.3	70.0	72.2	96.5	2.4	0.0	1.2	5.6
Dudley	53	71.7	20.8	0.0	7.6	15.1	71.7	77.4	81.1	13.2	5.7	0.0	0.0
Exeter	152	78.3	17.8	0.7	3.3	10.5	70.4	67.1	98.0	0.0	1.3	0.7	1.3
Glouc	61	82.0	14.8	0.0	3.3	16.4	73.5	77.0	90.2	1.6	4.9	3.3	0.0
Hull	106	73.6	18.9	0.0	7.6	17.9	64.7	71.7	93.4	1.9	2.8	1.9	0.0
Ipswi	57	66.7	28.1	0.0	5.3	12.3	71.3	68.4	75.0	0.0	4.2	20.8	15.8
Kent	150	71.3	20.7	0.7	7.3	14.7	65.5	62.0	95.7	2.9	0.0	1.4	7.3
L Barts	278	57.9	33.8	0.0	8.3	22.3	60.0	60.8	29.8	37.5	21.8	10.9	10.8
L Guys	210	74.8	12.9	0.0	12.4	22.4	60.5	60.5	50.0	10.5	36.3	3.2	9.5
L Kings	183	72.1	24.6	0.0	3.3	8.7	56.4	67.8	43.6	12.7	35.2	8.5	9.8
L Rfree	264	62.5	29.6	0.0	8.0	20.5	60.7	64.8	48.9	20.4	18.6	12.2	16.3
L St.G	102	68.6	24.5	0.0	6.9	13.7	66.9	65.7	29.0	28.0	23.7	19.4	8.8
L West	391	73.7	18.7	0.0	7.7	18.7	63.8	60.6	40.7	41.2	16.4	1.8	0.0
Leeds	161	75.2	17.4	0.0	7.5	26.1	61.0	68.9	74.5	19.9	3.7	1.9	0.0
Leic	368	68.8	20.9	0.0	10.3	26.1	64.8	64.1	73.3	19.8	5.2	1.8	10.6
Liv Ain	37	78.4	16.2	2.7	2.7	18.9	67.4	62.2	100.0	0.0	0.0	0.0	2.7
Liv Roy	68	64.7	14.7	4.4	16.2	22.1	65.3	66.2	93.2	3.4	1.7	1.7	13.2
M RI	206	71.8	20.9	0.5	6.8	15.0	63.0	64.1	62.0	19.8	15.1	3.1	6.8
Middlbr	109	77.1	12.8	0.0	10.1	19.3	60.9	66.1	92.7	7.3	0.0	0.0	0.0
Newc	114	67.5	19.3	0.0	13.2	26.3	62.4	58.8	96.5	1.8	0.9	0.9	0.9
Norwch	103	75.7	20.4	0.0	3.9	9.7	67.6	67.0	97.0	0.0	1.0	2.0	2.9
Nottm	125	60.8	28.8	0.0	10.4	16.8	63.5	63.2	88.8	7.2	2.4	1.6	0.0
Oxford	206	61.2	18.0	0.0	20.9	33.0	63.4	59.7	81.0	10.2	2.7	6.1	28.6
Plymth	62	72.6	17.7	0.0	9.7	21.0	70.7	67.7	98.4	0.0	0.0	1.6	0.0
Ports	219	73.1	17.8	0.9	8.2	21.9	65.4	61.6	92.0	4.0	1.7	2.3	19.6
Prestn	154	69.5	18.2	0.7	11.7	25.3	64.4	57.1	80.4	18.3	1.3	0.0	0.6
Redng	117	59.8	30.8	0.0	9.4	14.5	63.7	68.4	70.3	22.0	5.5	2.2	22.2
Salford	171	62.0	23.4	0.0	14.6	32.2	61.0	70.2	81.2	14.1	3.5	1.2	0.6
Sheff	154	79.9	12.3	3.3	4.6	14.3	62.7	63.6	85.7	7.5	2.7	4.1	4.5
Shrew	64	62.5	29.7	3.1	4.7	14.1	70.4	64.1	88.9	4.8	1.6	4.8	1.6
Stevng	193	80.3	13.0	2.6	4.2	21.2	62.7	67.9	75.2	12.1	8.3	4.5	18.7

Table 2.3 Continued

Centre	N on RRT	% on ICHD	% on PD	% on HHD	% with Tx	% pre-emptive listing/ Tx	Median age (yrs)	% male	Ethnicity				
									% White	% Asian	% Black	% Other	% missing
Sthend	44	59.1	34.1	0.0	6.8	13.6	68.0	68.2	93.2	2.3	0.0	4.5	0.0
Stoke	94	62.8	33.0	0.0	4.3	20.2	67.7	64.9	92.4	5.4	2.2	0.0	2.1
Sund	86	76.7	16.3	0.0	7.0	22.1	62.2	51.2	95.3	4.7	0.0	0.0	1.2
Truro	58	79.3	19.0	0.0	1.7	10.3	70.5	63.8	98.3	1.7	0.0	0.0	0.0
Wirral	63	76.2	20.6	0.0	3.2	14.3	66.9	69.8	96.8	1.6	0.0	1.6	0.0
Wolve	86	75.6	17.4	5.8	1.2	8.1	67.5	59.3	62.8	27.9	5.8	3.5	0.0
York	58	65.5	24.1	0.0	10.3	19.0	70.1	62.1	98.3	0.0	0.0	1.7	0.0
N IRELAND													
Antrim	42	69.1	16.7	0.0	14.3	23.8	69.2	61.9	100.0	0.0	0.0	0.0	2.4
Belfast	76	54.0	15.8	0.0	30.3	47.4	62.7	61.8					34.2
Newry	25	80.0	4.0	0.0	16.0	24.0	60.4	72.0	100.0	0.0	0.0	0.0	12.0
Ulster	25	80.0	8.0	0.0	12.0	12.0	70.8	72.0	92.0	0.0	4.0	4.0	0.0
West NI	37	70.3	21.6	0.0	8.1	24.3	56.3	67.6	100.0	0.0	0.0	0.0	0.0
SCOTLAND													
Abrdn	29	75.9	24.1	0.0	0.0	20.7	61.1	65.5					100.0
Airdrie	70	85.7	14.3	0.0	0.0	15.7	62.6	61.4	94.9	5.1	0.0	0.0	15.7
D&Gall	17	76.5	23.5	0.0	0.0	35.3	66.2	52.9					82.4
Dundee	27	81.5	18.5	0.0	0.0	22.2	59.0	63.0					100.0
Edinb	109	58.7	15.6	0.0	25.7	43.1	58.5	60.6					96.3
Glasgw	203	71.4	13.3	0.0	15.3	35.5	59.4	56.7					70.9
Inverns	17	82.4	17.7	0.0	0.0	29.4	55.0	58.8					100.0
Klmarnk	44	75.0	25.0	0.0	0.0	13.6	72.0	59.1					77.3
Krkcldy	46	78.3	19.6	2.2	0.0	15.2	60.8	65.2					100.0
WALES													
Bangor	19	63.2	36.8	0.0	0.0	5.3	71.5	57.9					47.4
Cardff	166	67.5	22.9	0.0	9.6	18.7	64.5	58.4	89.0	8.4	1.3	1.3	6.6
Clwyd	29	82.8	17.2	0.0	0.0	3.4	66.6	58.6					37.9
Swanse	156	75.0	16.0	0.6	8.3	17.3	67.0	65.4	97.4	1.9	0.6	0.0	0.0
Wrexm	28	75.0	25.0	0.0	0.0	3.6	64.5	67.9	96.2	3.8	0.0	0.0	7.1
TOTALS													
England	**6,780**	**71.1**	**20.5**	**0.5**	**7.9**	**18.9**	**64.5**	**63.9**	**73.6**	**14.9**	**8.1**	**3.4**	**7.3**
N Ireland	**205**	**66.3**	**14.6**	**0.0**	**19.0**	**31.2**	**63.4**	**65.4**	**98.3**	**0.6**	**0.6**	**0.6**	**14.6**
Scotland	**562**	**72.8**	**16.6**	**0.2**	**10.5**	**29.5**	**61.0**	**59.6**					**76.0**
Wales	**398**	**71.9**	**20.6**	**0.3**	**7.3**	**15.3**	**65.5**	**61.8**	**93.4**	**4.9**	**1.1**	**0.5**	**8.3**
UK	**7,945**	**71.1**	**20.1**	**0.5**	**8.3**	**19.8**	**64.2**	**63.5**	**75.6**	**13.8**	**7.4**	**3.1**	**12.4**

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.
Carshalton discovered a problem related to the submission of PD patients after the closing date. As a consequence, 26 incident PD patients are not included in this report. No adjustment has been made this year, but the problem has been resolved and numbers will be correct next year.

PRDs were grouped into categories as shown in table 2.4, 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 2.5.

Table 2.4 Demographics, primary renal diseases (PRDs), referral time and start modality of adult patients incident to RRT in 2019 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	636	646	1,161	1,665	2,025	1,566	246	7,945	64.2
%	8.0	8.1	14.6	21.0	25.5	19.7	3.1		
Sex (%)									
Male	56.0	61.9	60.8	62.2	63.8	68.6	74.0	63.5	65.2
Female	44.0	38.1	39.2	37.8	36.2	31.4	26.0	36.5	62.7
Ethnicity (%)									
White	71.5	65.6	68.7	70.4	80.8	81.8	86.8	75.3	66.3
Asian	14.5	16.3	15.3	16.8	13.0	11.1	8.2	14.0	62.3
Black	9.2	12.8	12.1	9.1	3.9	5.3	3.2	7.5	56.3
Other	4.8	5.4	3.9	3.8	2.3	1.8	1.8	3.2	57.7
Missing	7.3	6.9	7.7	7.7	7.0	8.1	7.6	7.5	64.5
PRD (%)									
Diabetes	21.3	26.2	33.3	38.0	31.8	25.5	17.1	30.4	62.9
Glomerulonephritis	24.1	21.4	15.4	12.9	9.1	9.1	7.6	13.0	57.1
Hypertension	5.2	7.4	8.0	6.8	7.1	8.0	7.6	7.2	64.5
Polycystic kidney disease	3.3	10.3	12.6	9.7	4.5	3.6	0.5	6.9	56.7
Pyelonephritis	7.6	4.1	4.0	4.7	5.7	6.5	6.6	5.4	66.8
Renal vascular disease	0.3	1.9	0.7	2.9	6.8	11.5	18.5	5.4	75.7
Other	24.3	16.4	16.1	13.7	18.9	15.4	16.1	16.8	64.5
Uncertain aetiology	13.9	12.5	9.9	11.3	16.0	20.5	26.1	14.8	69.5
Missing	9.3	9.4	9.0	9.5	10.3	11.0	14.2	10.0	65.8
Referral time (%)									
<90 days	23.0	21.3	15.0	15.1	16.4	13.9	17.3	16.4	63.0
≥90 days	77.0	78.7	85.0	84.9	83.6	86.1	82.7	83.6	64.9
Missing	6.1	10.0	6.8	6.3	5.9	6.3	5.5	6.5	62.4
Start modality (%)									
ICHD	56.6	59.1	61.0	71.2	76.3	80.7	82.5	71.1	66.5
HHD	0.2	0.3	0.8	0.5	0.5	0.2	0.4	0.5	61.0
PD	27.7	26.5	23.7	18.6	17.1	17.7	17.1	20.1	60.6
Tx	15.6	14.1	14.6	9.6	6.0	1.4	0.0	8.3	53.6

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.

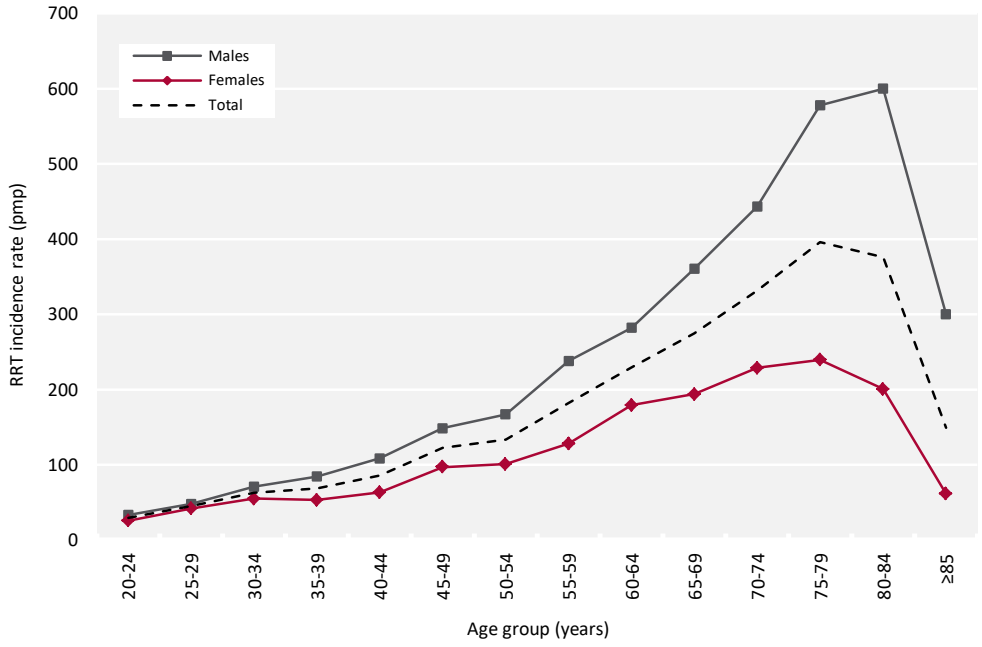


Figure 2.4 Incidence rates for adult patients starting RRT in 2019 by age group and sex
pmp – per million population

Table 2.5 Change in primary renal disease (PRD) of adult patients incident to RRT from 2010 to 2019

	Year of RRT start									
PRD	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Diabetes	23.7	23.9	25.3	25.2	26.2	26.9	27.5	28.5	29.6	30.4
Glomerulonephritis	13.4	12.9	13.7	14.2	13.0	13.4	13.3	13.6	13.0	13.0
Hypertension	6.7	6.9	7.3	7.6	6.3	6.7	6.1	6.3	6.6	7.2
Polycystic kidney disease	6.9	7.4	6.8	7.6	6.5	7.2	6.7	6.8	7.0	6.9
Pyelonephritis	7.2	6.7	6.7	6.6	5.7	6.3	6.2	5.6	5.1	5.4
Renal vascular disease	7.2	6.6	6.2	5.3	6.0	5.9	6.1	5.7	5.6	5.4
Other	15.9	16.7	17.5	18.1	19.8	18.6	18.6	18.9	18.8	16.8
Uncertain aetiology	19.0	18.8	16.5	15.4	16.5	15.1	15.5	14.7	14.4	14.8
Missing	2.9	4.0	2.1	3.7	1.9	2.8	3.5	6.7	5.3	10.0

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

The audit of pre-emptive listing for transplant and transplant was merged as a single metric. Figure 2.5 shows the percentage of patients at each centre who were either pre-emptively listed or pre-emptively transplanted on day one of their RRT treatment in 2019. Please visit the UKRR data portal (renal.org/audit-research/data-portal) to identify individual renal centres.

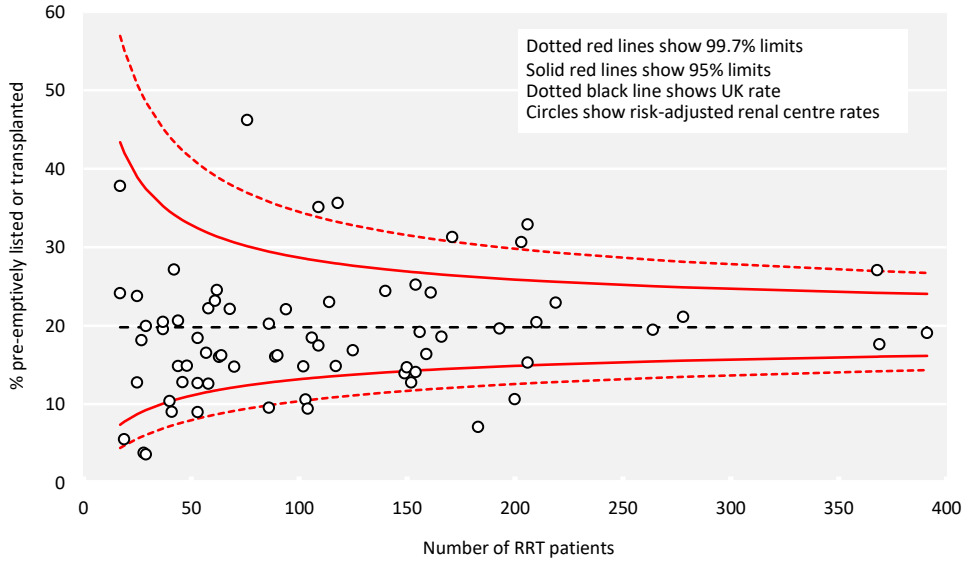


Figure 2.5 Transplant-status (listed or transplanted) at the start of RRT for adult patients incident to RRT in 2019 by centre
Analysis is adjusted for age, sex and PRD (diabetes versus non-diabetes).

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 2.6) and by UK country (table 2.7). Changes from start modality and deaths during the first five years are shown by start modality (table 2.8). 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 2.6), but all HD patients are combined for other analyses.

Table 2.6 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				
2014	71.4	0.4	19.9	8.3
2015	72.7	0.2	19.2	7.9
2016	71.9	0.4	20.0	7.7
2017	71.6	0.4	19.1	8.9
2018	71.8	0.4	19.6	8.3
2019	71.1	0.5	20.1	8.3
Day 90 modality				
Oct 2013 - Sept 2014	68.7	0.9	20.1	10.3
Oct 2014 - Sept 2015	70.6	0.6	19.2	9.6
Oct 2015 - Sept 2016	68.7	0.9	20.3	10.1
Oct 2016 - Sept 2017	68.6	0.8	20.0	10.6
Oct 2017 - Sept 2018	69.2	0.9	19.8	10.1
Oct 2018 - Sept 2019	68.7	1.0	20.6	9.7

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 2.7 RRT modality at 90 days for adult patients incident to RRT between 01/10/2018 and 30/09/2019 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	6,510	66.2	19.8	8.8	1.1	4.1	69.8	20.9	9.3
N Ireland	225	58.1	17.5	20.5	1.7	2.1	60.4	18.2	21.3
Scotland	516	65.8	18.7	12.0	0.6	3.0	68.2	19.4	12.4
Wales	398	72.6	18.1	6.9	0.3	2.2	74.4	18.6	7.0
UK	7,649	66.2	19.6	9.3	1.1	3.9	69.7	20.6	9.7

[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 2.8 Start and subsequent RRT modalities for adult patients incident to RRT in 2014 by time after start

			Time after start (%)			
Start modality	N	Later modality[1]	90 days	1 yr	3 yrs	5 yrs
HD	5,349	HD	91.0	72.5	44.4	25.5
		PD	2.1	2.9	1.3	0.4
		Tx	1.2	5.2	13.9	17.9
		Other[2]	0.5	2.0	2.1	2.2
		Died	5.2	17.5	38.3	54.0
PD	1,481	HD	7.2	18.1	23.2	16.5
		PD	88.0	60.4	20.7	8.0
		Tx	3.0	13.3	30.9	37.2
		Other[2]	0.6	1.1	1.1	1.1
		Died	1.3	7.1	24.1	37.3
Tx	619	HD	0.8	1.3	2.1	4.2
		PD	0.0	0.3	0.3	0.6
		Tx	98.7	95.3	91.0	85.9
		Other[2]	0.2	1.3	1.8	2.1
		Died	0.3	1.8	4.8	7.1

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

The modality at one year after RRT initiation is shown in figure 2.6 for all RRT starters and in figure 2.7 for those starting on PD by centre, using incident patients starting RRT in 2018 to allow one year follow-up time.

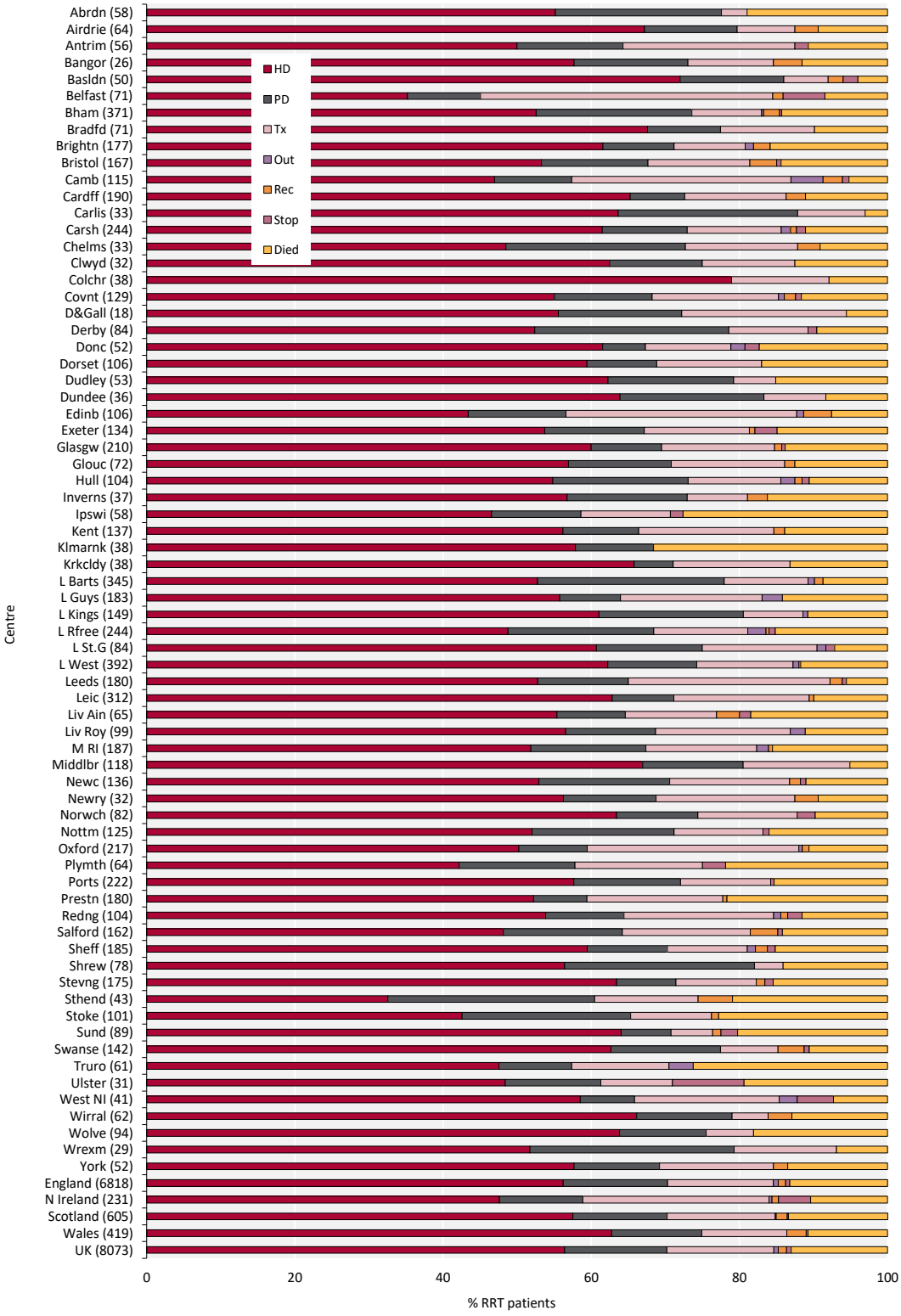


Figure 2.6 RRT modality at 1 year for incident adult RRT patients who started RRT in 2018 by centre

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

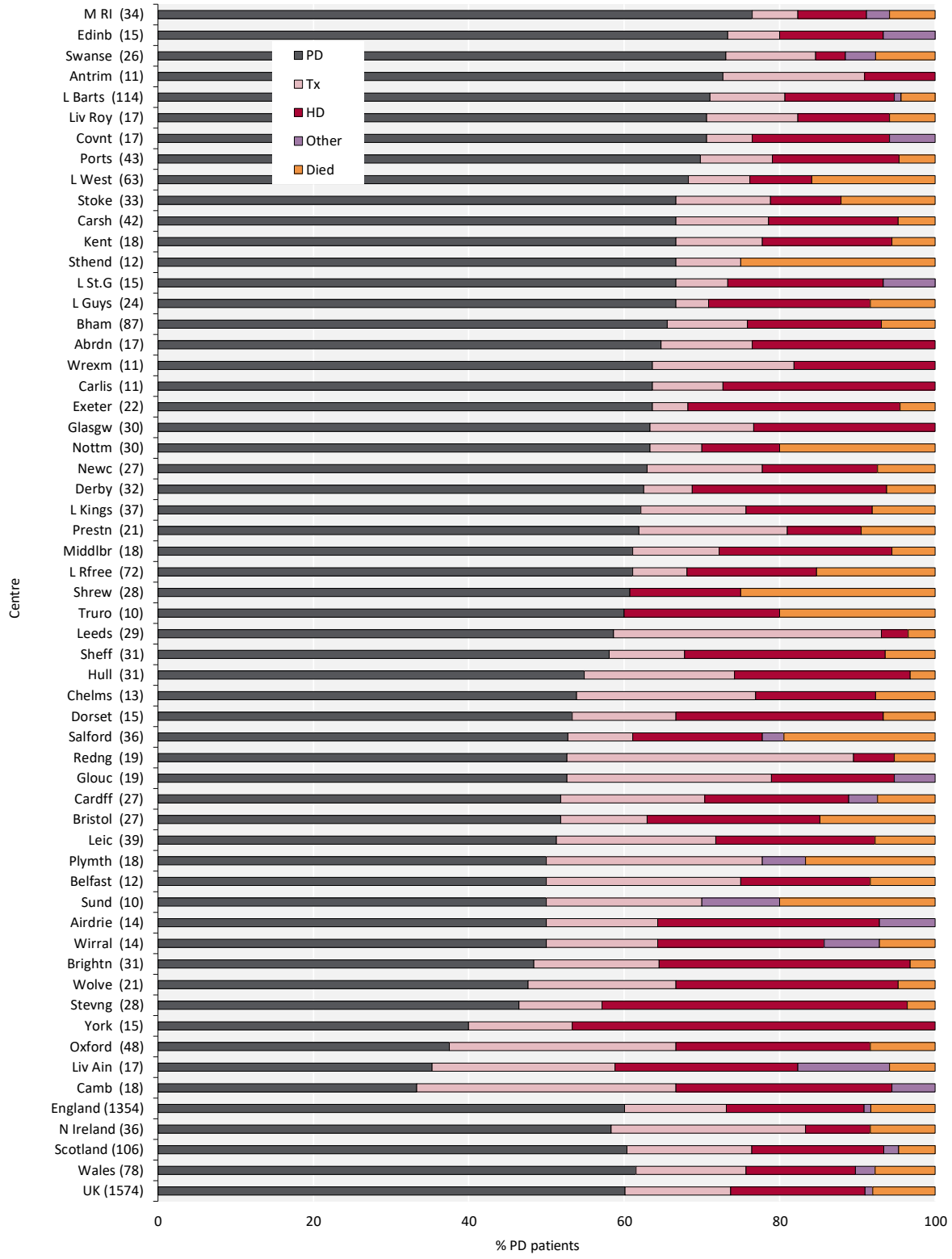


Figure 2.7 RRT modality at 1 year for incident adult PD patients who started RRT in 2018 by centre

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 the totals. Due to small numbers, a two year cohort (2018–2019) was used at a centre level to estimate late referral to a nephrologist and centres with a completeness of <70% were excluded. Scottish referral data are submitted mid-year to mid-year and so the two year cohort is July 2017 to June 2019 – there are therefore descrepencies between tables 2.3 and table 2.9. A seven year cohort was used to show national longitudinal trends (table 2.12).

Table 2.9 Referral times of incident adult RRT patients by centre (2018–2019 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	2018	2019		2018	2019	All PRDs	Non-diabetes PRDs	All PRDs
ENGLAND								
Basldn	50	53	103	100.0	100.0	18.4	18.8	41.7
Bham	371	369	739	99.7	100.0	18.5	22.6	30.2
Bradfd	71	104	175	100.0	100.0	14.3	20.2	24.6
Brightn	177	149	326	100.0	100.0	21.5	23.4	34.4
Bristol	167	159	166	99.4	63.5	21.1	25.2	30.7
Camb	115	118	233	100.0	100.0	20.2	21.2	33.5
Carlis	33	41	74	100.0	100.0	8.1	12.0	16.2
Carsh	244	200	442	100.0	99.0	20.6	20.4	34.6
Chelms	33	48	81	100.0	100.0	14.8	16.0	38.3
Colchr	38	40	31	81.6	7.5	12.9	11.1	48.4
Covnt	129	140	245	87.6	94.3	14.7	14.3	26.5
Derby	84	89	173	100.0	100.0	19.1	23.0	29.5
Donc	52	53	96	98.1	84.9	9.4	11.9	18.8
Dorset	106	90	194	100.0	97.8	11.9	11.1	22.2
Dudley	53	53	106	100.0	100.0	9.4	11.1	19.8
Exeter	134	152	286	100.0	100.0	18.5	20.8	29.0
Glouc	72	61	133	100.0	100.0	11.3	11.2	21.8
Hull	104	106	210	100.0	100.0	22.9	28.5	34.3
Ipswi	58	57	45	17.2	78.9	20.0		26.7
Kent	137	150	285	99.3	99.3	14.0	15.8	20.4
L Barts	345	278		4.6	1.8			
L Guys	183	210	387	98.4	98.6	17.8	22.6	32.6
L Kings	149	183	330	100.0	98.9	15.8	18.8	24.5
L Rfree	244	264	497	98.0	97.7	14.3	16.9	26.0
L St.G	84	102	167	81.0	97.1	31.7	35.6	50.3
L West	392	391	780	99.5	99.7	16.2	19.1	33.2
Leeds	180	161	341	100.0	100.0	16.4	18.9	31.7
Leic	312	368	679	99.7	100.0	14.7	10.8	23.7
Liv Ain	65	37	101	98.5	100.0	15.8	18.9	27.7
Liv Roy	99	68	159	98.0	91.2	21.4	21.0	32.7
M RI	187	206	386	97.9	98.5	17.9	16.5	31.9
Middlbr	118	109	226	100.0	99.1	15.0	18.1	33.2
Newc	136	114	250	100.0	100.0	16.8	20.6	27.2
Norwch	82	103	167	96.3	85.4	32.9	31.8	46.7
Nottm	125	125	249	99.2	100.0	14.1	17.8	23.7
Oxford	217	206	423	100.0	100.0	14.4	16.5	24.3

Table 2.9 Continued

Centre	N on RRT 2018	N on RRT 2019	N with referral data	% data completeness 2018	% data completeness 2019	% 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	64	62	123	98.4	96.8	19.5	19.6	28.5
Ports	222	219	436	99.1	98.6	8.9		25.5
Prestn	180	154	334	100.0	100.0	17.7	21.4	32.0
Redng	104	117	221	100.0	100.0	13.1	16.7	18.6
Salford	162	171	331	99.4	99.4	16.6	20.4	29.0
Sheff	185	154	339	100.0	100.0	19.5	24.5	28.0
Shrew	78	64	142	100.0	100.0	16.2	17.5	31.0
Stevng	175	193	368	100.0	100.0	9.0	10.1	14.1
Sthend	43	44	83	95.3	95.5	25.3	31.6	38.6
Stoke	101	94	177	99.0	81.9	17.5	19.4	33.3
Sund	89	86	175	100.0	100.0	17.1	21.1	32.6
Truro	61	58	118	98.4	100.0	16.9	20.0	34.7
Wirral	62	63	125	100.0	100.0	12.0	15.1	24.8
Wolve	94	86	180	100.0	100.0	12.8	17.5	26.7
York	52	58	110	100.0	100.0	10.0	10.3	26.4
N IRELAND								
Antrim	56	42	93	96.4	92.9	16.1	17.4	25.8
Belfast	71	76	128	88.7	85.5	10.9	15.1	13.3
Newry	32	25	57	100.0	100.0	26.3	28.9	38.6
Ulster	31	25	56	100.0	100.0	16.1	21.4	26.8
West NI	41	37	78	100.0	100.0	19.2	22.0	24.4
SCOTLAND								
Abrdn	54	50	87	90.7	76.0	13.8	16.9	23.0
Airdrie	78	58	131	100.0	91.4	11.5	14.9	22.9
D&Gall	14	20	13	92.9	65.0	15.4	28.6	30.8
Dundee	42	29	60	81.0	89.7	16.7	22.5	38.3
Edinb	114	109	184	85.1	79.8	10.9	13.0	21.2
Glasgw	202	200	356	92.6	84.5	11.2	16.8	17.7
Inverns	31	24	49	96.8	79.2	20.4	30.0	30.6
Klmarnk	45	35	77	97.8	94.3	16.9	21.8	22.1
Krkcldy	41	36	70	92.7	88.9	15.7	19.6	25.7
WALES								
Bangor	26	19	45	100.0	100.0	11.1	14.3	20.0
Cardff	190	166	356	100.0	100.0	9.6	12.4	17.4
Clwyd	32	29	61	100.0	100.0	16.4	21.4	41.0
Swanse	142	156	298	100.0	100.0	9.7	14.0	18.8
Wrexm	29	28	56	100.0	96.4	8.9	8.3	26.8
TOTALS								
England	**6,818**	**6,780**	**12,682**	**93.4**	**93.1**	**16.5**	**18.8**	**28.9**
N Ireland	**231**	**205**	**412**	**95.7**	**93.2**	**16.5**	**20.1**	**23.5**
Scotland	**621**	**561**	**1,040**	**91.8**	**83.8**	**13.1**	**17.6**	**22.4**
Wales	**419**	**398**	**816**	**100.0**	**99.7**	**10.2**	**13.5**	**20.5**
E, W & NI	**7,468**	**7,383**	**13,910**	**93.8**	**93.5**	**16.2**	**18.5**	**28.2**

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 people without diabetes, patients with missing PRD were excluded from the analysis and the results not shown if the completeness of PRD was <70%.

PRD – primary renal disease

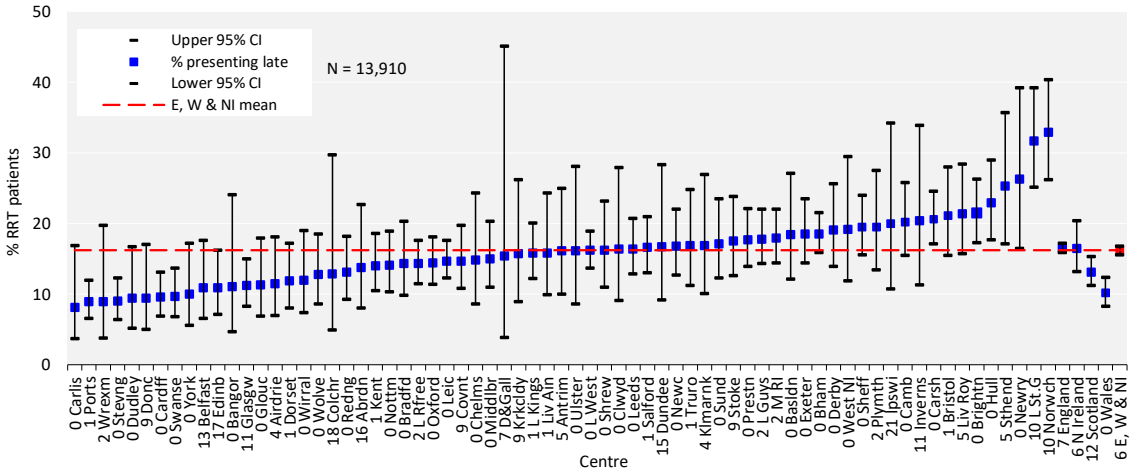


Figure 2.8 Percentage of incident adult RRT patients presenting late (<90 days) to a nephrologist (2018–2019 2 year cohort)
CI – confidence interval

Table 2.10 Characteristics of incident adult RRT patients by referral time (2018–2019 2 year cohort)

	Referral time	
Characteristic	<90 days	≥90 days
Median age (yrs)	63.4	64.5
% male	64.7	63.2
% starting on PD	7.0	21.2
% on PD at 90 days	9.8	21.2
Mean haemoglobin at RRT start (g/L)	92	100
Mean eGFR at RRT start (mL/min/1.73m^2)[1]	6.6	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 2.11, 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 2.11 Referral time of incident adult RRT patients by primary renal disease (PRD) (2018–2019 2 year cohort)

		Referral time			
		<90 days		≥90 days	
PRD	N with data	N	%	N	%
Diabetes	4,151	320	7.7	3,831	92.3
Glomerulonephritis	1,823	220	12.1	1,603	87.9
Hypertension	960	135	14.1	825	85.9
Polycystic kidney disease	970	43	4.4	927	95.6
Pyelonephritis	753	111	14.7	642	85.3
Renal vascular disease	771	91	11.8	680	88.2
Other	2,499	859	34.4	1,640	65.6
Uncertain aetiology	2,023	348	17.2	1,675	82.8
Total (with data)	13,950	2,127	15.2	11,823	84.8
Missing	1,000	258	25.8	742	74.2

Table 2.12 Referral time of incident adult RRT patients by year of start (restricted to centres reporting continuous data for 2013–2019)

	RRT start year (%)						
Referral time	2013	2014	2015	2016	2017	2018	2019
<90 days	17.6	16.5	16.0	15.2	15.8	15.6	16.2
3-6 mths	5.0	5.4	4.6	4.6	4.8	4.6	4.2
6-12 mths	7.2	8.2	8.1	8.2	7.0	7.4	7.7
≥12 mths	70.3	69.9	71.3	71.9	72.4	72.4	71.8

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 (50% overall), (ii) if the date of RRT start is incorrect, the documented start eGFR may have been taken after the patient had started RRT.

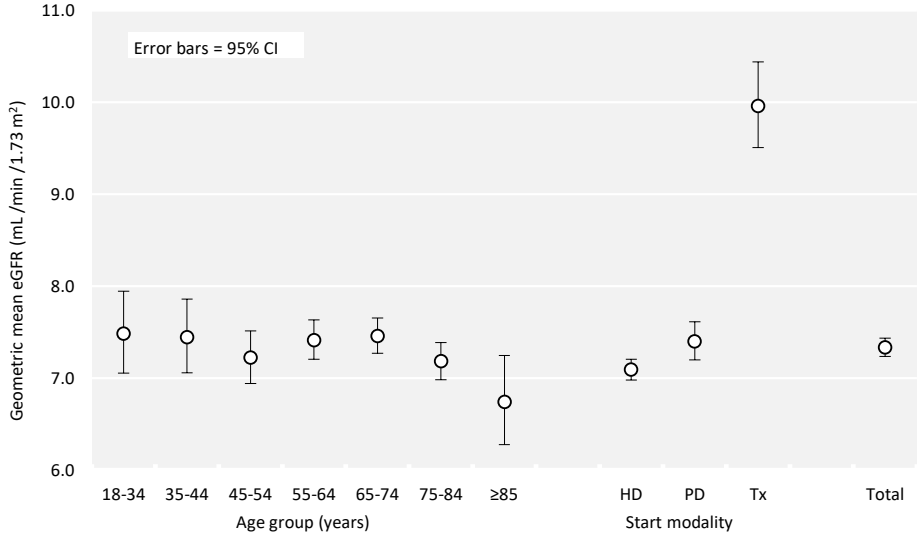


Figure 2.9 Geometric mean estimated glomerular filtration rates (eGFR) for adult patients incident to RRT in 2019 by age group and start modality

CI – confidence interval

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 2.13 Haemoglobin (Hb) data for adult patients incident to RRT in 2019 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								
Basldn	95	34.0			94	95	88	94.3
Bham	98	44.8	113	108	94	100	89	96.8
Bradfd	100	51.6		104	99	101	91	93.3
Brightn	102	54.4	113	112	98	102	96	91.3
Bristol	104	74.7	121	106	103			96.9
Camb	104	58.1	109	104	99	104	100	78.8
Carlis	105	68.3		114	100	105		100.0
Carsh	95	39.1		102	95	96	93	98.5
Chelms	102	57.8		110	98	104		93.8
Colchr								65.0
Covnt	98	45.6	105	108	93	99	88	97.1
Derby	98	45.4		100	96	99	93	96.6
Donc	93	35.4		98	90	96		90.6
Dorset	103	57.8		110	100	104	91	92.2
Dudley	102	56.9		114	98	102		96.2
Exeter	105	78.4		111	103	105	102	97.4
Glouc	103	57.6		112	101	104		96.7
Hull	100	50.0		107	96	101	89	83.0
Ipswi	98	45.6		104	94	96		100.0
Kent	98	46.3	94	108	95	99	90	99.3
L Barts	101	54.0	104	106	95			99.3
L Guys	95	40.0	104	106	92	97	87	97.6
L Kings	98	46.1		104	95	99	95	91.3
L Rfree	99	49.1	109	106	95	100	96	99.6
L St.G	95	41.2		106	89	96	87	95.1
L West	102	58.0	113	104	101	103	100	82.9
Leeds	92	29.3	106	106	88	94	86	93.2
Leic	97	44.6	107	104	94	98	92	92.7
Liv Ain	105	54.3			99	105		94.6
Liv Roy	103	59.1	114		100	106	99	97.1
M RI	92	27.6	102	96	90	94	87	98.5
Middlbr	96	38.3	112	110	93	97	88	98.2
Newc	95	41.8	114	105	88	97	88	96.5
Norwch	98	44.3		113	90	104	89	85.4
Nottm	99	49.1		111	94	101	84	84.8
Oxford	95	39.7	101	104	92	96	85	99.0
Plymth	98	45.0		109	98	98	94	96.8
Ports	102	56.5	119	112	99	102	95	97.7
Prestn	98	46.0	105	112	94	99	93	97.4
Redng	96	42.1	106	108	91	97	86	97.4
Salford	96	40.6	104	104	92	96	95	93.6
Sheff	94	33.6	111	95	91	95	84	96.8
Shrew	101	54.8		109	99	101		96.9

Table 2.13 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	
Stevng	92	29.6		103	90	92	87	97.9
Sthend	100	50.0		108	89	102		95.5
Stoke	105	63.3		113	100	105		95.7
Sund	101	51.2		110	98	103	92	95.4
Truro	99	45.6		111	95	100		98.3
Wirral	94	40.4			91	96		82.5
Wolve	99	48.0		110	97	102	82	84.9
York	100	52.9		113	93	102		87.9
N IRELAND								
Antrim	98	42.9			93	98		100.0
Belfast	107	62.0	109	114	95	108		93.4
Newry	94	47.8			94	94		92.0
Ulster	99	47.8			99	99		92.0
West NI	109	66.7			106	110		89.2
SCOTLAND								
Abrdn	97	40.7			91	94		93.1
Airdrie	94	35.7			93	96		80.0
D&Gall	109	75.0			108			94.1
Dundee	100	50.0			99	98		74.1
Edinb	106	67.8	112	112	103	102	88	82.6
Glasgw	97	44.1	101	107	94	94	92	91.6
Inverns	100	53.9			98	103		76.5
Klmarnk	96	29.7		100	96	95		84.1
Krkcldy	102	57.6			99	105		71.7
WALES								
Bangor	110	68.4			99	113		100.0
Cardff	101	55.8	105	106	99	102	92	99.4
Clwyd	96	25.9			96	96		93.1
Swanse	101	55.5	105	116	98	102	91	99.4
Wrexm	98	38.5			93	98		92.9
TOTALS								
England	**98**	**47.4**	**108**	**106**	**95**	**99**	**91**	**94.2**
N Ireland	**104**	**55.2**	**110**	**111**	**97**	**104**	**97**	**93.7**
Scotland	**99**	**48.7**	**104**	**107**	**96**	**98**	**92**	**85.1**
Wales	**100**	**53.1**	**105**	**114**	**98**	**101**	**91**	**98.5**
UK[1]	**99**	**48.0**	**108**	**107**	**95**	**100**	**91**	**93.8**

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

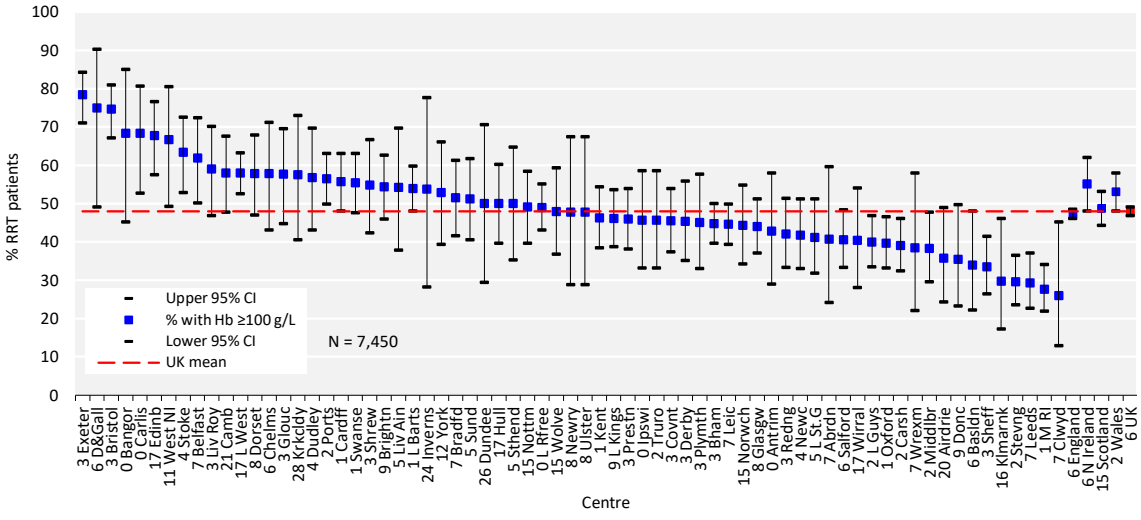


Figure 2.10 Percentage of adult patients incident to RRT in 2019 with haemoglobin (Hb) ≥100 g/L at start of RRT treatment by centre
CI – confidence interval

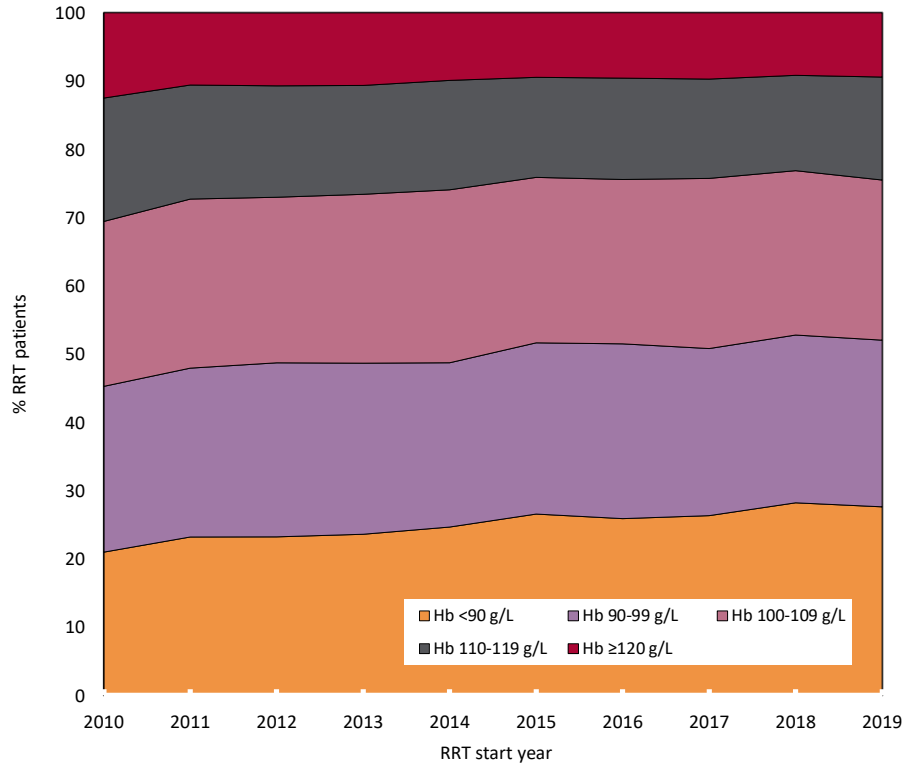


Figure 2.11 Distribution of haemoglobin (Hb) in incident adult RRT patients by year of start between 2010 and 2019

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 2.14 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 2019 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				
Basldn	2.4	84.0	12.0	94.3
Bham	2.3	83.2	7.1	99.7
Bradfd	2.4	79.4	6.2	93.3
Brightn	2.3	77.6	6.8	98.7
Bristol	2.3	89.3	8.8	100.0
Camb	2.4	81.2	12.8	99.2
Carlis	2.2	75.6	2.4	100.0
Carsh	2.3	76.2	4.7	96.5
Chelms	2.3	83.0	4.3	97.9
Colchr	2.3	80.0	5.7	87.5
Covnt	2.3	82.6	3.6	98.6
Derby	2.4	86.5	9.0	100.0
Donc	2.3	86.5	7.7	98.1
Dorset	2.3	83.3	5.6	100.0
Dudley	2.4	88.5	5.8	98.1
Exeter	2.3	86.8	6.0	99.3
Glouc	2.3	83.6	3.3	100.0
Hull	2.4	83.3	10.8	96.2
Ipswi	2.3	84.2	8.8	100.0
Kent	2.3	75.3	12.0	100.0
L Barts	2.3	82.0	3.6	99.6
L Guys	2.4	78.5	12.4	99.5
L Kings	2.2	76.7	5.0	98.4
L Rfree	2.3	84.5	5.7	100.0
L St.G	2.4	82.8	9.1	97.1
L West	2.4	75.3	11.6	81.8
Leeds	2.3	82.6	9.3	100.0
Leic	2.3	82.2	6.7	97.6
Liv Ain	2.3	75.7	10.8	100.0
Liv Roy	2.4	85.3	10.3	100.0
M RI	2.4	74.8	13.6	100.0
Middlbr	2.2	56.9	3.7	100.0
Newc	2.4	83.3	8.8	100.0
Norwch	2.4	78.3	9.8	89.3
Nottm	2.3	73.6	8.0	100.0
Oxford	2.4	78.9	12.8	99.0
Plymth	2.3	85.3	3.3	98.4
Ports	2.3	83.0	7.8	99.1
Prestn	2.3	73.8	2.8	91.6
Redng	2.3	88.9	4.3	100.0
Salford	2.4	84.9	6.0	97.1
Sheff	2.2	74.7	3.9	100.0
Shrew	2.3	92.2	6.3	100.0
Stevng	2.3	82.9	6.7	100.0
Sthend	2.4	86.4	2.3	100.0

Table 2.14 Continued

Centre	Median adj Ca (mmol/L)	% adj Ca 2.2–2.5 mmol/L	% adj Ca >2.5 mmol/L	% data completeness
Stoke	2.4	82.9	9.8	87.2
Sund	2.3	80.0	4.7	98.8
Truro	2.3	87.9	10.3	100.0
Wirral	2.3	79.0	5.3	90.5
Wolve	2.3	75.6	8.5	95.4
York	2.3	89.7	6.9	100.0
N IRELAND				
Antrim	2.3	90.5	2.4	100.0
Belfast	2.3	78.1	6.9	96.1
Newry	2.3	96.0	0.0	100.0
Ulster	2.4	84.0	12.0	100.0
West NI	2.2	75.7	2.7	100.0
SCOTLAND				
Abrdn	2.4	85.2	0.0	93.1
Airdrie	2.3	86.2	10.8	92.9
D&Gall	2.2	76.5	0.0	100.0
Dundee	2.3	87.0	4.4	85.2
Edinb	2.4	76.9	11.5	95.4
Glasgw	2.3	76.4	7.2	96.1
Inverns	2.2	70.6	0.0	100.0
Klmarnk	2.3	77.5	12.5	90.9
Krkcldy	2.3	85.7	7.1	91.3
WALES				
Bangor	2.3	79.0	15.8	100.0
Cardff	2.4	84.2	10.9	99.4
Clwyd	2.5	75.9	24.1	100.0
Swanse	2.3	80.0	8.4	99.4
Wrexm	2.3	81.5	7.4	96.4
TOTALS				
England	**2.3**	**80.8**	**7.6**	**97.3**
N Ireland	**2.3**	**83.2**	**5.0**	**98.5**
Scotland	**2.3**	**79.3**	**7.9**	**94.3**
Wales	**2.4**	**81.5**	**10.9**	**99.3**
UK	**2.3**	**80.8**	**7.7**	**97.2**

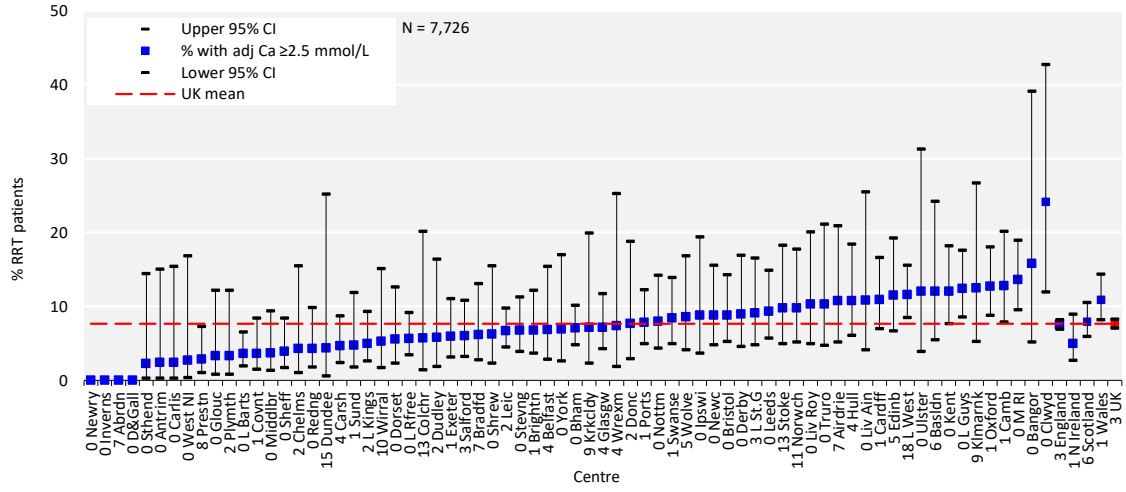


Figure 2.12 Percentage of adult patients incident to RRT in 2019 with adjusted calcium (Ca) above the normal range (>2.5 mmol/L) by centre
CI – confidence interval

Dialysis access in incident adult dialysis patients

Incident dialysis access data were collected separately to the main UKRR quarterly data returns via the 2019 Multisite Dialysis Access Audit (see appendix A). Patients who did not start dialysis for the first time in 2019 based on UKRR quarterly data submissions were excluded.

Table 2.15 Demographics and characteristics of patients in the 2019 Multisite Dialysis Access Audit by first dialysis access type

		HD – first dialysis access type				PD	
Characteristic		N	AVF/AVG	TL	NTL	N	Total
Total							
N		4,530	1,842	1,733	955	1,360	5,890
%			40.7	38.3	21.1		
Age (%)	Median (yrs)	66	68	64	67	61	65
	IQR (yrs)	55,75	58,76	51,74	53,75	47,73	53,75
	<45 yrs	571	22.6	53.8	23.6	297	868
	45–54 yrs	583	36.4	40.8	22.8	237	820
	55–64 yrs	965	44.8	37.4	17.8	258	1,223
	65–74 yrs	1,252	42.7	35.3	22.0	293	1,545
	≥75 yrs	1,159	46.1	33.2	20.7	275	1,434
PRD (%)	Diabetes	1,278	43.7	37.9	18.5	335	1,613
	Glomerulonephritis	438	39.7	42.9	17.4	218	656
	Hypertension	293	44.4	37.2	18.4	76	369
	Polycystic kidney disease	200	66.0	27.5	6.5	92	292
	Pyelonephritis	208	43.3	38.5	18.3	46	254
	Renal vascular disease	243	48.6	35.8	15.6	66	309
	Other	684	23.4	42.1	34.5	157	841
	Uncertain aetiology	550	40.0	40.4	19.6	190	740
	Missing	171	36.3	37.4	26.3	38	209
Referral time (%)	<90 days	827	4.0	49.6	46.4	79	906
	90–179 days	194	22.2	54.1	23.7	62	256
	180–364 days	344	37.8	43.6	18.6	116	460
	≥365 days	2,727	53.6	32.6	13.8	992	3,719
	Missing	35	20.0	42.9	37.1	18	53
Sex (%)	Male	2,911	41.6	37.5	20.9	853	3,764
	Female	1,619	39.0	39.7	21.4	507	2,126
Ethnicity (%)	White	2,835	41.8	36.4	21.8	895	3,730
	Asian	525	41.1	39.2	19.6	152	677
	Black	265	34.3	41.9	23.8	73	338
	Other	94	31.9	53.2	14.9	30	124
	Missing	279	31.5	44.4	24.0	66	345
eGFR at start[1]	Median	7	7	7	7	7	7
	IQR (yrs)	6,9	6,9	6,9	5,9	6,9	6,9
Diabetes[2] **(%)**	Yes	635	44.4	34.3	21.3	143	778
	No	771	39.0	35.0	25.9	268	1,039
	Missing	127	28.3	46.5	25.2	21	148

[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.
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 and timing of presentation. Delayed presentation/ referral to renal services is defined as being within 90 days (3 months) prior to the start of RRT.

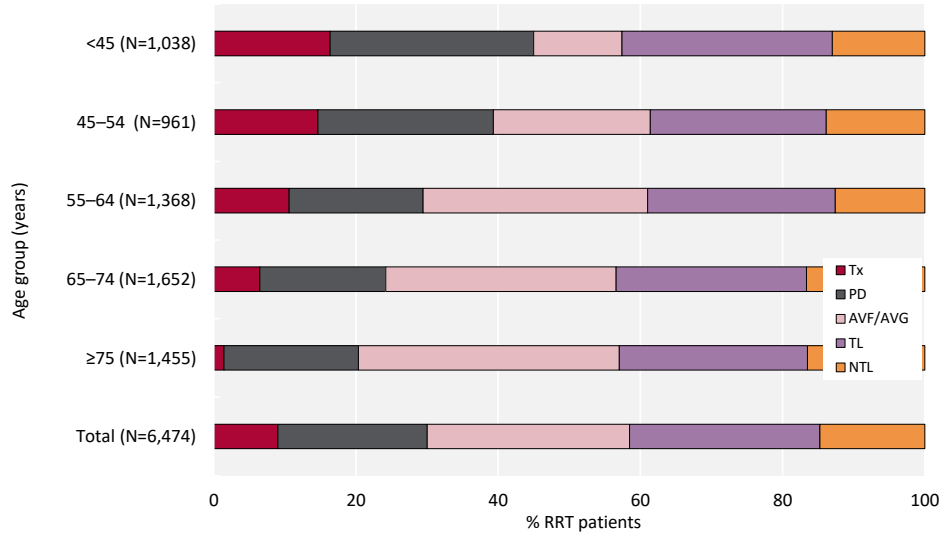


Figure 2.13 Dialysis access used for adult patients incident to RRT in 2019 by age group (2019 Multisite Dialysis Access Audit)
AVF – arteriovenous fistula; AVG – arteriovenous graft; NTL – non-tunnelled line; TL – tunnelled line

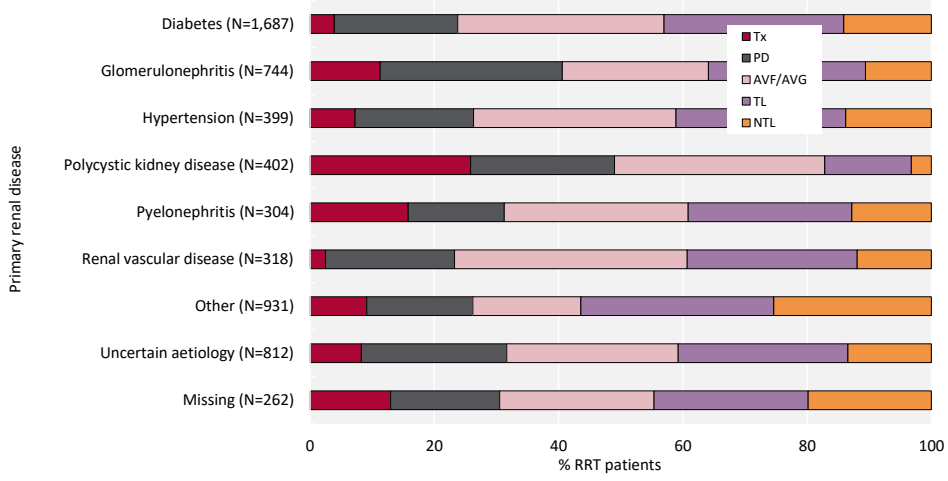


Figure 2.14 Dialysis access used for adult patients incident to RRT in 2019 by primary renal disease (2019 Multisite Dialysis Access Audit)
AVF – arteriovenous fistula; AVG – arteriovenous graft; NTL – non-tunnelled line; TL – tunnelled line

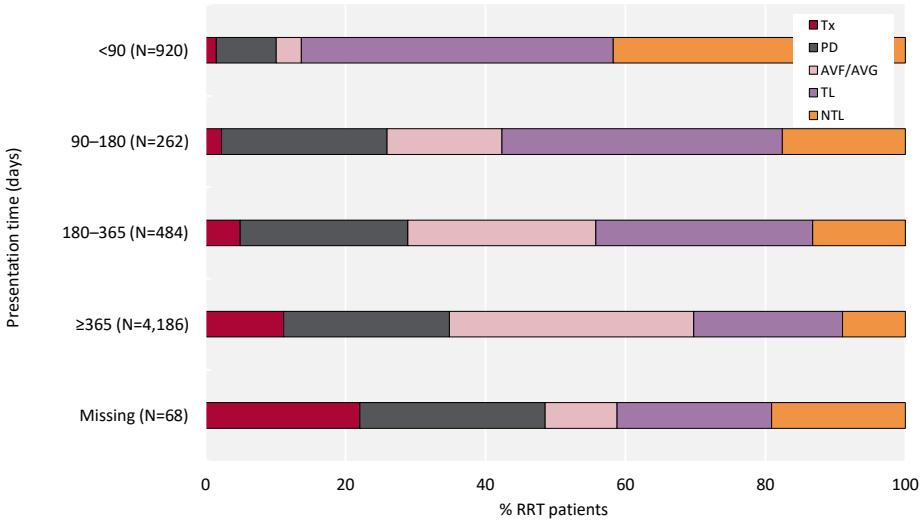


Figure 2.15 Dialysis access used for adult patients incident to RRT in 2019 by presentation time (2019 Multisite Dialysis Access Audit)
AVF – arteriovenous fistula; AVG – arteriovenous graft; NTL – non-tunnelled line; TL – tunnelled line

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. West NI is two centres combined, but only one submitted vascular access data. The number of patients on dialyis at West NI is therefore lower than presented elsewhere in the report.

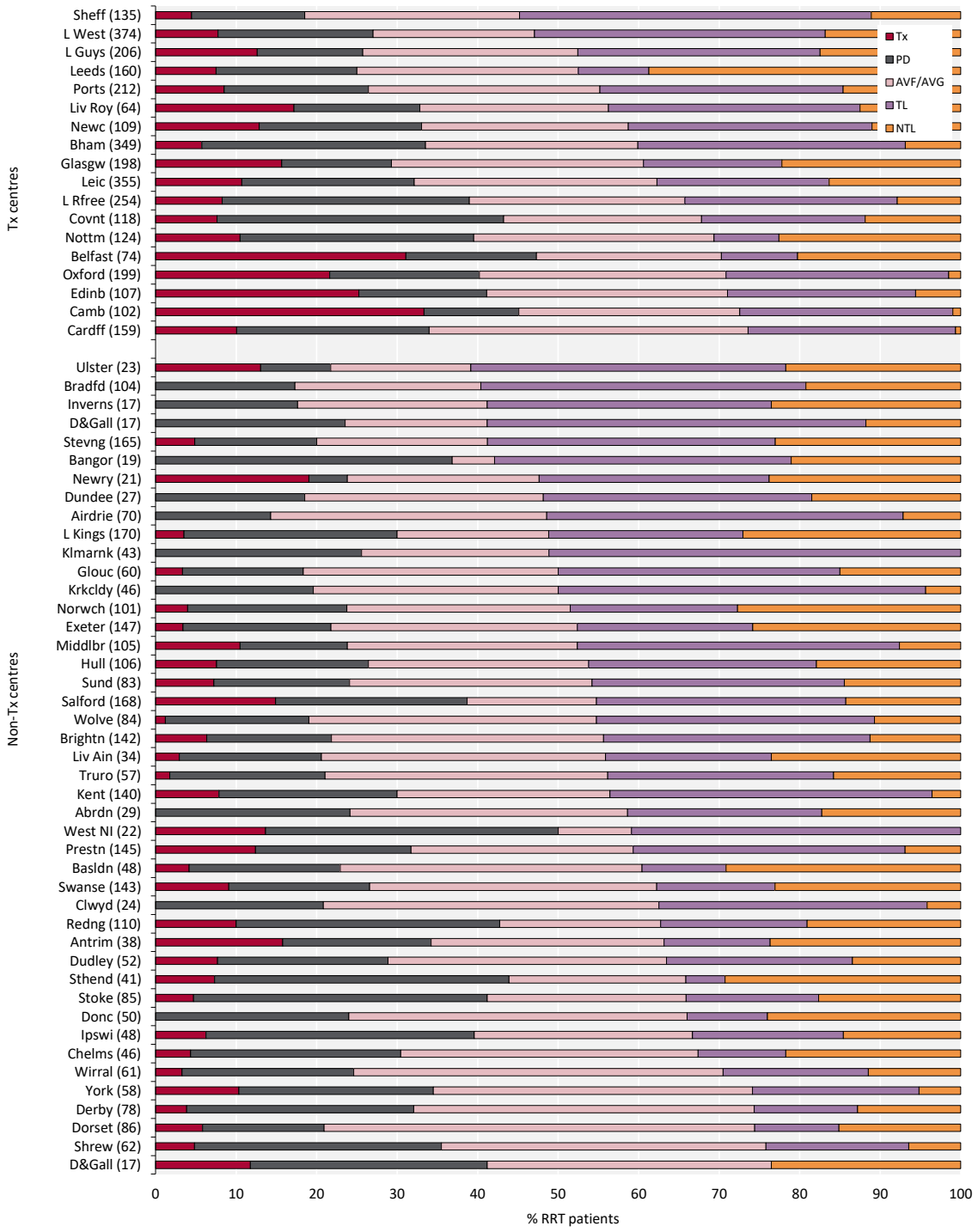


Figure 2.16 First dialysis access used for adult patients incident to RRT in 2019 by centre (2019 Multisite Dialysis Access Audit)

Number of incident patients on RRT in a centre in brackets.
Centres are ordered by decreasing use of lines.
AVF – arteriovenous fistula; AVG – arteriovenous graft; NTL – non-tunnelled line; TL – tunnelled line

Table 2.16 Start modality and dialysis access used for adult patients incident to dialysis in 2019 by presentation time before start of dialysis by centre (2019 Multisite Dialysis Access Audit)

	Early presenters (≥90 days)(%)					Late presenters (<90 days) (%)					Start modality (%)		
Centre	N	PD	AVF/AVG	TL	NTL	N	PD	AVF/AVG	TL	NTL	HD	PD	Tx
Antrim	27	25.9	40.7	14.8	18.5	5	0.0	0.0	20.0	80.0	65.8	18.4	15.8
Bangor	16	37.5	6.3	43.8	12.5	3	33.3	0.0	0.0	66.7	63.2	36.8	0.0
Basldn	36	25.0	50.0	8.3	16.7	10	0.0	0.0	20.0	80.0	77.1	18.8	4.2
Belfast	39	28.2	38.5	17.9	15.4	6	0.0	0.0	0.0	100.0	52.7	16.2	31.1
Bham	263	35.7	34.2	24.0	6.1	66	4.5	3.0	80.3	12.1	66.5	27.8	5.7
Bradfd	89	20.2	27.0	39.3	13.5	15	0.0	0.0	46.7	53.3	82.7	17.3	0.0
Brightn	108	20.4	44.4	28.7	6.5	25	0.0	0.0	64.0	36.0	78.2	15.5	6.3
Camb	54	16.7	50.0	33.3	0.0	14	21.4	7.1	64.3	7.1	54.9	11.8	33.3
Cardff	130	28.5	48.5	22.3	0.8	13	7.7	0.0	92.3	0.0	66.0	23.9	10.1
Chelms	36	30.6	47.2	8.3	13.9	8	12.5	0.0	25.0	62.5	69.6	26.1	4.3
Clwyd	23	21.7	43.5	30.4	4.3	1	0.0	0.0	100.0	0.0	79.2	20.8	0.0
Covnt	88	42.0	30.7	15.9	11.4	15	13.3	13.3	53.3	20.0	56.8	35.6	7.6
Derby	62	32.3	53.2	11.3	3.2	13	15.4	0.0	23.1	61.5	67.9	28.2	3.8
Donc	42	28.6	47.6	9.5	14.3	8	0.0	12.5	12.5	75.0	76.0	24.0	0.0
Dorset	65	13.8	69.2	6.2	10.8	15	20.0	6.7	33.3	40.0	79.1	15.1	5.8
Dudley	44	25.0	40.9	22.7	11.4	4	0.0	0.0	50.0	50.0	71.2	21.2	7.7
Exeter	116	21.6	37.9	19.0	21.6	26	7.7	3.8	38.5	50.0	78.2	18.4	3.4
Glouc	49	18.4	36.7	32.7	12.2	9	0.0	11.1	55.6	33.3	81.7	15.0	3.3
Hull	77	24.7	37.7	28.6	9.1	21	4.8	0.0	38.1	57.1	73.6	18.9	7.5
Ipswi	33	33.3	36.4	18.2	12.1	8	12.5	12.5	37.5	37.5	60.4	33.3	6.3
Kent	102	26.5	34.3	37.3	2.0	27	14.8	7.4	66.7	11.1	70.0	22.1	7.9
L Guys	143	18.2	38.5	30.1	13.3	37	2.7	0.0	51.4	45.9	74.3	13.1	12.6
L Kings	136	28.7	23.5	22.8	25.0	27	22.2	0.0	33.3	44.4	70.0	26.5	3.5
L Rfree	192	33.9	34.4	28.1	3.6	37	29.7	2.7	35.1	32.4	61.0	30.7	8.3
L West	286	24.1	25.9	39.5	10.5	59	5.1	1.7	37.3	55.9	73.0	19.3	7.8
Leeds	117	21.4	37.6	9.4	31.6	31	9.7	0.0	9.7	80.6	75.0	17.5	7.5
Leic	261	27.2	39.5	19.5	13.8	56	8.9	7.1	44.6	39.3	67.9	21.4	10.7
Liv Ain	24	25.0	50.0	20.8	4.2	9	0.0	0.0	22.2	77.8	79.4	17.6	2.9
Liv Roy	36	27.8	36.1	27.8	8.3	14	0.0	14.3	50.0	35.7	67.2	15.6	17.2
Middlbr	78	17.9	37.2	39.7	5.1	15	0.0	6.7	73.3	20.0	76.2	13.3	10.5
Newc	71	31.0	39.4	19.7	9.9	24	0.0	0.0	79.2	20.8	67.0	20.2	12.8
Newry	10	10.0	50.0	30.0	10.0	7	0.0	0.0	42.9	57.1	76.2	4.8	19.0
Norwch	56	33.9	39.3	17.9	8.9	27	0.0	7.4	25.9	66.7	76.2	19.8	4.0
Nottm	90	36.7	41.1	6.7	15.6	21	14.3	0.0	19.0	66.7	60.5	29.0	10.5
Oxford	134	24.6	45.5	28.4	1.5	22	18.2	0.0	77.3	4.5	59.8	18.6	21.6
Ports	177	20.9	33.9	32.2	13.0	16	6.3	6.3	37.5	50.0	73.6	17.9	8.5
Prestn	98	24.5	39.8	30.6	5.1	29	13.8	3.4	65.5	17.2	68.3	19.3	12.4
Redng	86	40.7	25.6	22.1	11.6	13	7.7	0.0	7.7	84.6	57.3	32.7	10.0
Salford	126	31.0	20.6	35.7	12.7	17	5.9	5.9	41.2	47.1	61.3	23.8	14.9
Sheff	98	19.4	35.7	38.8	6.1	31	0.0	3.2	67.7	29.0	81.5	14.1	4.4
Shrew	57	31.6	43.9	19.3	5.3	2	50.0	0.0	0.0	50.0	64.5	30.6	4.8
Stevng	140	17.9	24.3	39.3	18.6	17	0.0	5.9	23.5	70.6	80.0	15.2	4.8
Sthend	31	48.4	29.0	6.5	16.1	7	0.0	0.0	0.0	100.0	56.1	36.6	7.3
Stoke	65	36.9	30.8	13.8	18.5	4	25.0	25.0	25.0	25.0	58.8	36.5	4.7
Sund	63	20.6	36.5	31.7	11.1	14	7.1	14.3	42.9	35.7	75.9	16.9	7.2
Swanse	114	21.9	43.9	14.9	19.3	16	0.0	6.3	25.0	68.8	73.4	17.5	9.1
Truro	47	21.3	42.6	31.9	4.3	9	11.1	0.0	11.1	77.8	78.9	19.3	1.8
Ulster	17	11.8	23.5	47.1	17.6	3	0.0	0.0	33.3	66.7	78.3	8.7	13.0
West NI	17	41.2	11.8	47.1	0.0	2	50.0	0.0	50.0	0.0	50.0	36.4	13.6
Wirral	55	21.8	50.9	20.0	7.3	4	25.0	0.0	0.0	75.0	75.4	21.3	3.3
Wolve	68	16.2	42.6	33.8	7.4	15	26.7	6.7	40.0	26.7	81.0	17.9	1.2
York	43	27.9	53.5	16.3	2.3	9	22.2	0.0	55.6	22.2	65.5	24.1	10.3
Total	**4,435**	**26.4**	**36.9**	**25.8**	**10.9**	**906**	**8.7**	**3.6**	**45.3**	**42.4**	**69.7**	**21.4**	**8.9**

Centres with <70% access or time of referral data were excluded. Start modality breakdown includes patients with missing referral time.
AVF – arteriovenous fistula; AVG – arteriovenous graft; NTL – non-tunnelled line; TL – tunnelled line

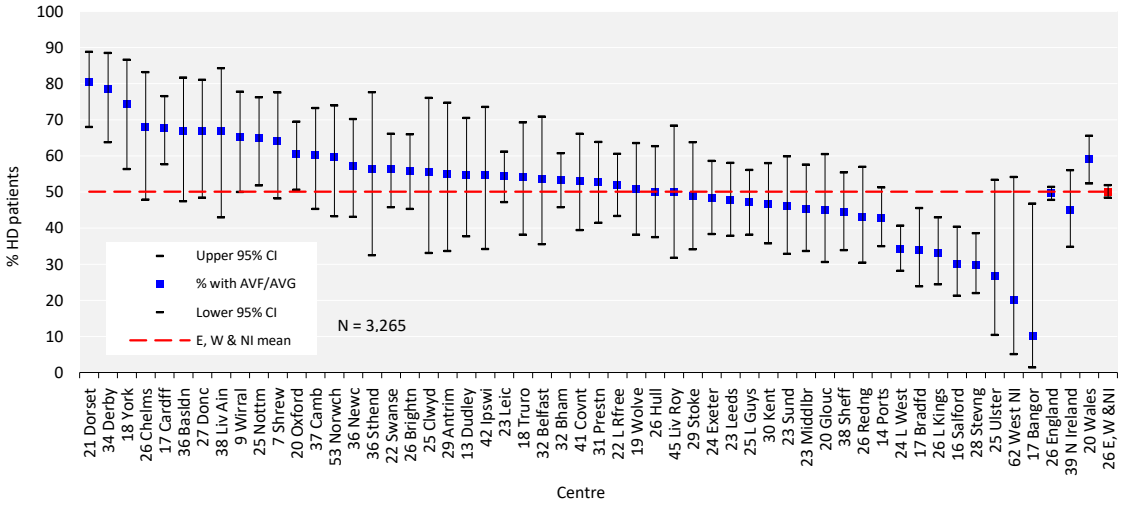


Figure 2.17 Percentage of adult patients incident to HD in 2019 who started dialysis using either an arteriovenous fistula (AVF) or an arteriovenous graft (AVG) by centre, excluding late presenters (2019 Multisite Dialysis Access Audit)

Centres with <70% completeness of access data for all dialysis patients were excluded. No further exclusion for completeness in HD patients was applied. Therefore, data completeness for some centres is less than in other caterpillar plots in this report.
CI – confidence interval

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 2018 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 2.17 90 days and 1 year after 90 days survival (adjusted to age 60 years) of incident adult RRT patients (2017–2018 2 year cohort) by country

Interval	England	N Ireland	Scotland	Wales	UK
Survival at 90 days (%)	96.6	98.2	96.6	98.0	96.7
95% CI	96.2-96.9	97.2-99.2	95.7-97.5	97.2-98.8	96.4-97.0
Survival 1 year after 90 days (%)	91.1	93.2	90.5	89.2	91.0
95% CI	90.5-91.6	91.1-95.3	89.0-92.1	87.3-91.2	90.5-91.5

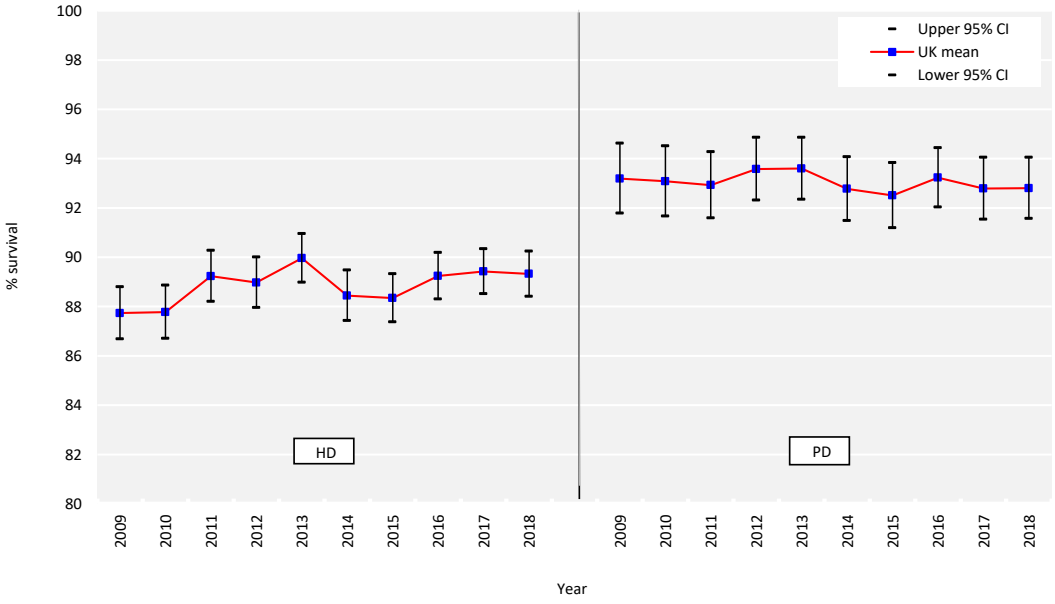


Figure 2.18 1 year after 90 days survival (adjusted to age 60 years) of incident adult RRT patients by start modality between 2009 and 2018
CI – confidence interval

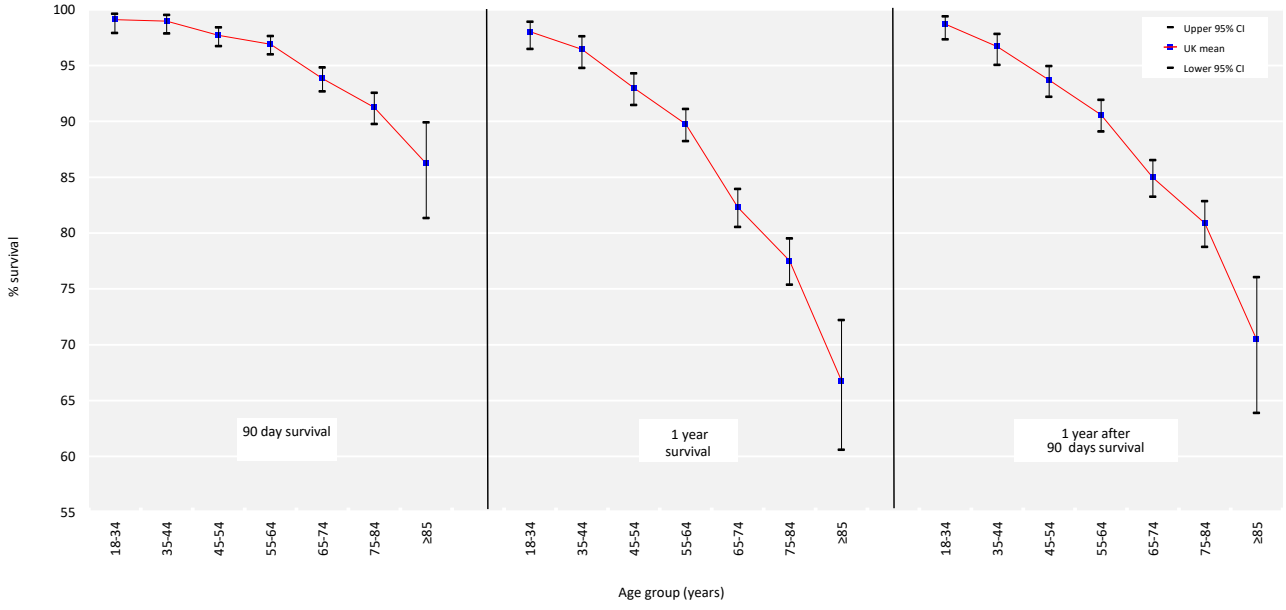


Figure 2.19 90 days, 1 year and 1 year after 90 days survival of incident adult RRT patients by age group (2018 cohort)
CI – confidence interval

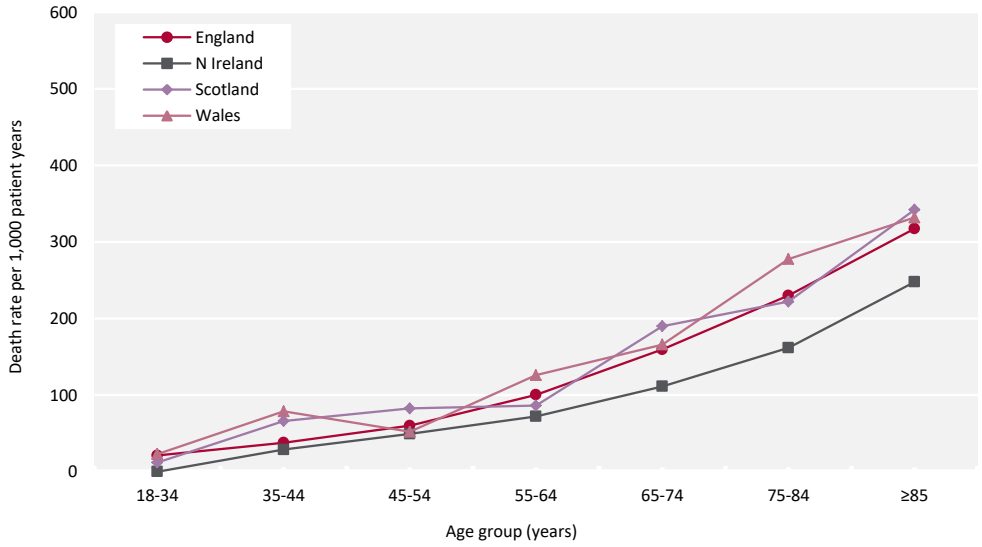


Figure 2.20 1 year after 90 days death rate per 1,000 incident RRT adult patient years by age group and country (2015–2018 4 year cohort)

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 2.21), 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 2.22 and 2.23).

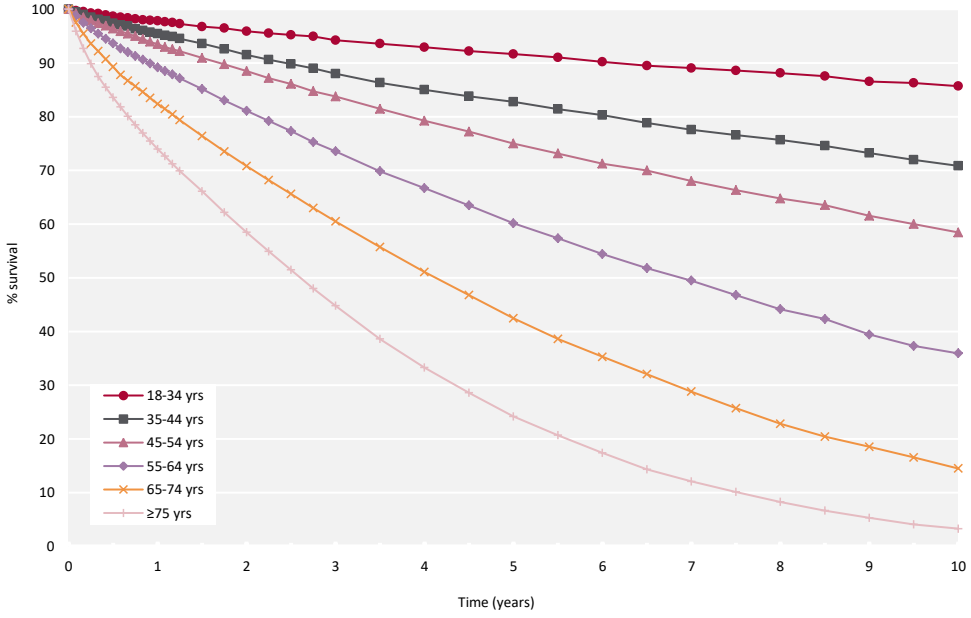


Figure 2.21 Survival (unadjusted) of incident adult RRT patients from day 0 by age group (2009–2018 10 year cohort)

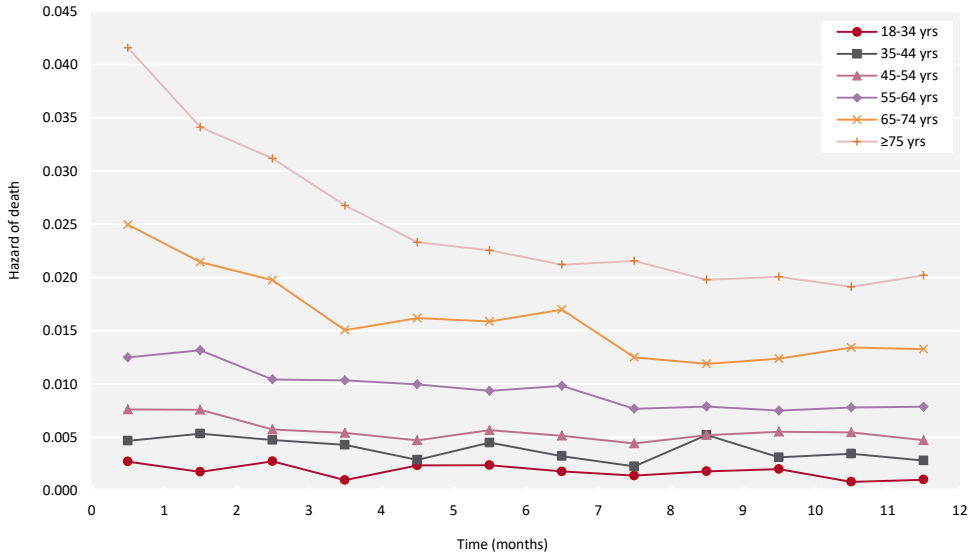


Figure 2.22 Monthly hazard of death (unadjusted) of incident adult RRT patients from day 0 to 1 year by age group (2009–2018 10 year cohort)

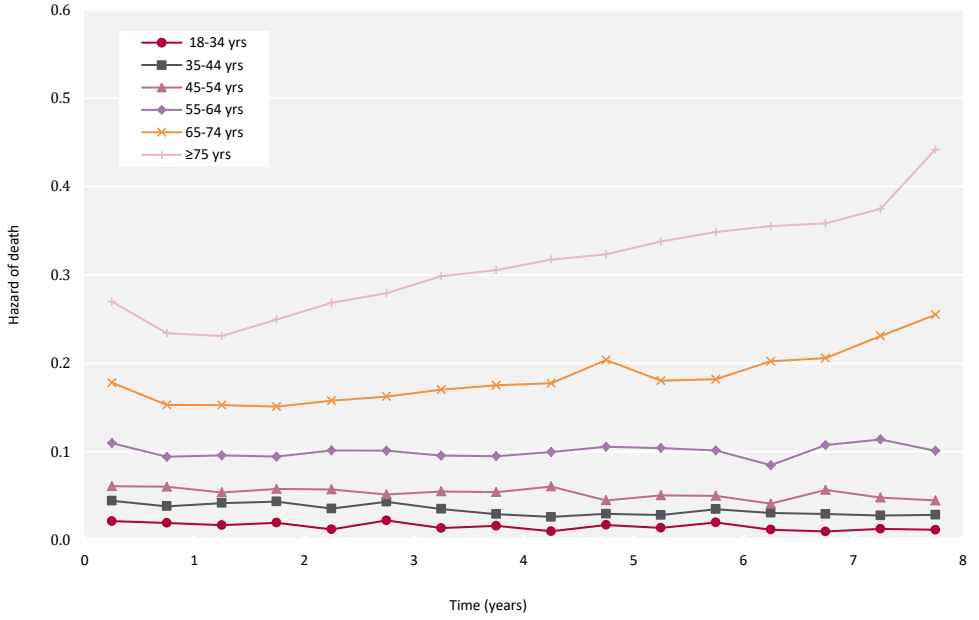


Figure 2.23 6 monthly hazard of death (unadjusted) of incident adult RRT patients from day 0 to 8 years by age group (2008–2017 10 year cohort)

Table 2.18 Survival (unadjusted) of incident adult RRT patients aged <65 years (1999–2018)

Cohort	Unadjusted survival (%)										95% CI for latest year	N
	1 yr	2 yr	3 yr	4 yr	5 yr	6 yr	7 yr	8 yr	9 yr	10 yr		
2018	**92.9**										**92.1-93.6**	**4,253**
2017	93.0	87.2									86.1-88.2	4,230
2016	92.9	87.5	82.1								80.8-83.2	4,007
2015	92.3	86.5	81.4	76.9							75.5-78.2	3,927
2014	92.8	86.8	81.4	76.9	73.3						71.8-74.7	3,673
2013	93.7	88.2	83.1	77.7	73.2	68.6					67.0-70.1	3,573
2012	93.1	87.4	82.0	76.9	72.6	68.6	64.9				63.3-66.4	3,522
2011	93.2	88.6	83.6	79.0	74.5	70.9	67.7	64.7			63.0-66.3	3,341
2010	92.2	86.6	81.7	77.3	72.8	69.6	66.4	62.5	59.5		57.8-61.2	3,362
2009	91.3	85.1	80.4	76.3	71.1	67.0	63.8	60.4	57.4	54.6	52.8-56.3	3,388
2008	91.5	86.0	81.2	76.8	73.2	69.5	65.6	62.3	59.4	56.4	54.7-58.1	3,447
2007	92.5	87.0	81.8	76.8	73.1	69.3	66.0	62.6	59.3	56.3	54.6-58.0	3,327
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	3,156
2005	89.6	83.5	78.5	73.8	69.1	65.6	62.5	59.5	56.5	53.9	52.0-55.7	2,829
2004	89.6	83.4	78.0	72.5	67.9	64.1	61.0	57.1	54.6	53.0	51.0-55.0	2,548
2003	89.4	82.6	77.2	72.3	67.1	62.9	59.2	56.4	53.8	51.4	49.2-53.5	2,225
2002	88.7	80.9	75.0	69.4	65.3	61.3	57.8	54.8	51.7	49.6	47.4-51.8	1,991
2001	88.0	81.1	75.4	69.9	65.0	60.2	56.3	52.9	50.0	47.8	45.4-50.2	1,694
2000	89.0	80.9	74.0	68.8	63.4	58.6	55.1	52.0	49.6	47.1	44.5-49.6	1,492
1999	87.0	80.8	73.2	67.7	62.1	58.1	53.9	50.9	48.5	46.8	44.1-49.5	1,312

CI – confidence interval

Table 2.19 Survival (unadjusted) of incident adult RRT patients aged ≥65 years (1999–2018)

Cohort	Unadjusted survival (%)										95% CI for latest year	N
	1 yr	2 yr	3 yr	4 yr	5 yr	6 yr	7 yr	8 yr	9 yr	10 yr		
2018	79.3										78.0-80.5	3,816
2017	79.3	67.4									65.9-68.8	3,824
2016	80.0	65.1	52.7								51.1-54.3	3,760
2015	78.2	64.8	52.2	41.9							40.4-43.5	3,809
2014	78.5	64.2	52.2	41.3	32.9						31.3-34.4	3,589
2013	78.5	64.6	53.2	43.0	34.6	27.7					26.2-29.2	3,438
2012	77.2	65.1	54.2	44.0	35.4	27.6	21.8				20.4-23.3	3,326
2011	77.1	62.7	51.2	41.1	32.3	24.7	18.9	14.4			13.2-15.7	3,350
2010	76.0	63.1	51.2	41.8	32.2	25.4	19.7	14.5	11.3		10.2-12.4	3,280
2009	76.4	63.1	52.4	41.4	32.8	26.1	20.0	15.3	11.2	8.2	7.3-9.2	3,374
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	23.0	17.5	13.4	10.6	8.5	7.5-9.5	3,113
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	68.9	53.9	42.3	33.9	26.7	20.8	16.2	12.8	9.8	7.5	6.5-8.6	2,613
2003	68.3	53.5	41.5	31.6	24.1	18.0	13.9	10.8	8.1	6.4	5.5-7.5	2,260
2002	65.8	50.8	40.4	31.9	24.0	18.4	13.7	10.9	8.1	6.4	5.4-7.5	2,059
2001	66.1	51.6	38.3	28.7	21.5	15.9	11.9	8.7	7.0	5.4	4.4-6.6	1,660
2000	66.2	52.0	39.6	28.8	22.2	17.0	12.9	9.4	7.3	5.4	4.3-6.7	1,441
1999	67.9	51.3	38.8	29.2	21.7	15.6	11.3	8.2	5.9	4.6	3.5-6.0	1,168

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 2.20). Centre-specific one year survival rates were adjusted for not only age (figure 2.24), but also sex and comorbidities for centres with at least 85% completeness (figure 2.25). 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 2.20. 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 2.20 1 year after 90 days adjusted survival (60 years, male and median comorbidity score) of incident adult RRT patients by centre (2015–2018 4 year cohort)

Centre	Age-adjusted survival				Case-mix adjusted survival[11]			
	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	56	89.2	79.9	96.0				
Clwyd	88	87.3	82.7	95.3	88	87.3	81.5	94.6
Bangor	96	89.4	83.1	95.1	96	89.9	82.0	94.5
Inverns	107	89.6	83.6	95.0				
Newry	108	92.7	83.7	95.0	108	89.4	82.5	94.3
Ulster	124	92.9	84.2	94.7	124	90.6	83.1	94.0
Colchr	133	89.7	84.5	94.6	133	88.5	83.4	93.9
West NI	148	95.6	84.9	94.5	148	93.6	83.8	93.8
Wrexm	150	92.6	85.0	94.5	150	91.2	83.9	93.7
Krkcldy	152	90.6	85.0	94.4				
Sthend	154	93.2	85.1	94.4	154	91.6	83.9	93.7
Carlis	159	92.4	85.2	94.4	156	91.7	84.0	93.7
Antrim	167	92.3	85.3	94.3	159	89.5	84.1	93.6
Klmarnk	167	88.9	85.3	94.3				
Chelms	180	94.5	85.6	94.2	179	93.2	84.5	93.5
Dundee	184	90.2	85.6	94.2				
Basldn	193	91.1	85.8	94.1	192	90.7	84.7	93.4
Ipswi	193	93.1	85.8	94.1	184	92.6	84.5	93.4
Dudley	202	92.4	85.9	94.0	202	92.2	84.8	93.3
Donc	206	90.7	86.0	94.0	204	89.3	84.8	93.3
Abrdn	217	91.0	86.1	94.0				
Liv Ain	218	85.8	86.1	93.9	218	86.0	85.0	93.2
Truro	225	91.0	86.2	93.9	225	90.0	85.1	93.1
Wirral	226	89.2	86.2	93.9	225	89.4	85.1	93.1
York	239	89.7	86.4	93.8	239	89.0	85.3	93.1
Plymth	243	87.5	86.4	93.8	239	86.1	85.3	93.1
Airdrie	247	88.3	86.5	93.8				
Shrew	253	87.7	86.5	93.8	252	86.7	85.4	93.0
Glouc	289	92.4	86.8	93.6	286	91.3	85.7	92.8
Belfast	314	93.4	87.0	93.5				
Derby	317	90.9	87.0	93.5	317	90.1	86.0	92.7
Bradfd	318	89.6	87.0	93.5	318	89.4	86.0	92.7
Wolve	318	86.5	87.0	93.5	318	86.0	86.0	92.7
Sund	322	88.4	87.1	93.5	320	87.6	86.0	92.7
Dorset	333	89.7	87.1	93.4	332	88.2	86.1	92.6
L St.G	352	91.8	87.3	93.4	338	90.9	86.1	92.6
Norwch	356	91.8	87.3	93.4	356	90.4	86.2	92.6
Camb	375	92.8	87.4	93.3	375	91.2	86.3	92.5
Redng	377	91.8	87.4	93.3	377	91.1	86.3	92.5
Hull	388	90.9	87.4	93.3	388	90.0	86.4	92.5
Edinb	400	92.5	87.5	93.2				
Stoke	424	87.5	87.6	93.2	422	86.9	86.5	92.4
Covnt	438	89.8	87.7	93.1	425	87.6	86.6	92.3
Middlbr	453	90.6	87.7	93.1	453	91.2	86.7	92.3

Table 2.20 Continued

Centre	Age-adjusted survival				Case-mix adjusted survival[11]			
	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
Liv Roy	458	90.8	87.7	93.1	446	90.9	86.6	92.3
Nottm	488	90.0	87.8	93.0	488	89.1	86.8	92.2
Swanse	506	88.9	87.9	93.0	506	88.5	86.9	92.2
Newc	509	89.7	87.9	93.0	508	90.0	86.9	92.2
Kent	526	89.4	88.0	93.0	526	87.7	86.9	92.1
Exeter	538	92.0	88.0	92.9	535	91.1	86.9	92.1
Stevng	555	91.7	88.0	92.9	555	90.3	87.0	92.1
Brightn	560	89.6	88.1	92.9	547	88.0	87.0	92.1
Bristol	589	89.5	88.1	92.8	585	88.4	87.1	92.0
Sheff	611	91.3	88.2	92.8	609	90.6	87.1	92.0
L Kings	622	92.9	88.2	92.8	619	92.5	87.2	92.0
Prestn	624	87.5	88.2	92.8	596	86.8	87.1	92.0
Leeds	646	92.4	88.3	92.8	645	91.9	87.2	91.9
L Guys	652	92.4	88.3	92.8	652	91.3	87.2	91.9
Cardff	658	89.7	88.3	92.7	658	88.7	87.3	91.9
Salford	664	90.1	88.3	92.7	659	89.3	87.3	91.9
M RI	756	90.4	88.5	92.6	735	89.7	87.4	91.8
Glasgw	778	89.4	88.5	92.6				
Oxford	780	91.9	88.5	92.6	771	90.7	87.5	91.8
Ports	819	91.1	88.6	92.6	807	89.6	87.5	91.7
L Rfree	906	91.0	88.7	92.5	886	90.2	87.6	91.6
Carsh	920	91.4	88.7	92.5	891	89.8	87.6	91.6
Leic	1,095	91.3	88.9	92.3	1,077	90.4	87.9	91.5
L Barts	1,221	92.8	89.0	92.3	1,183	92.1	88.0	91.4
Bham	1,425	89.7	89.1	92.2	1,420	88.4	88.1	91.3
L West	1,464	91.7	89.2	92.1	1,429	90.5	88.1	91.3

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

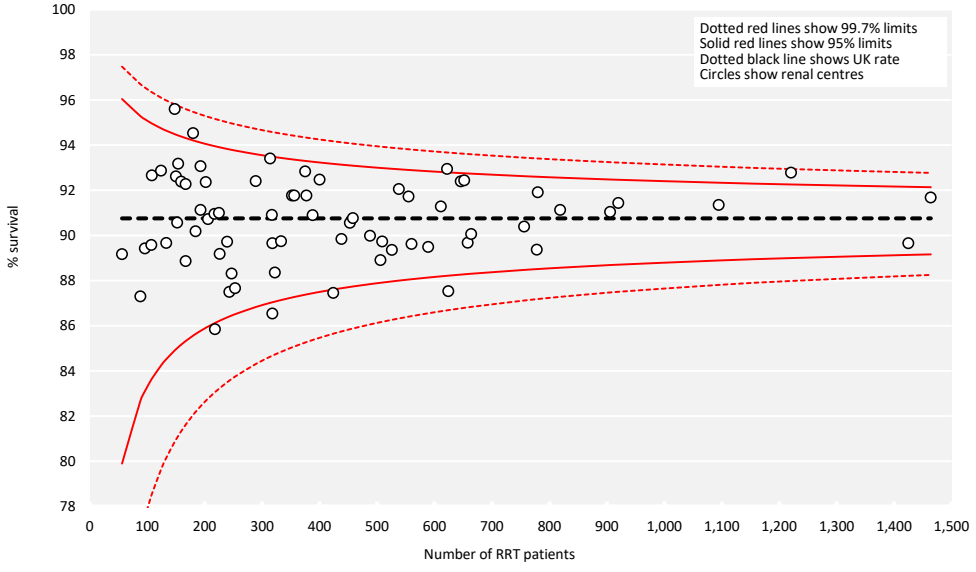


Figure 2.24 1 year after 90 days survival (adjusted to age 60 years) of incident adult RRT patients by centre (2015–2018 4 year cohort)

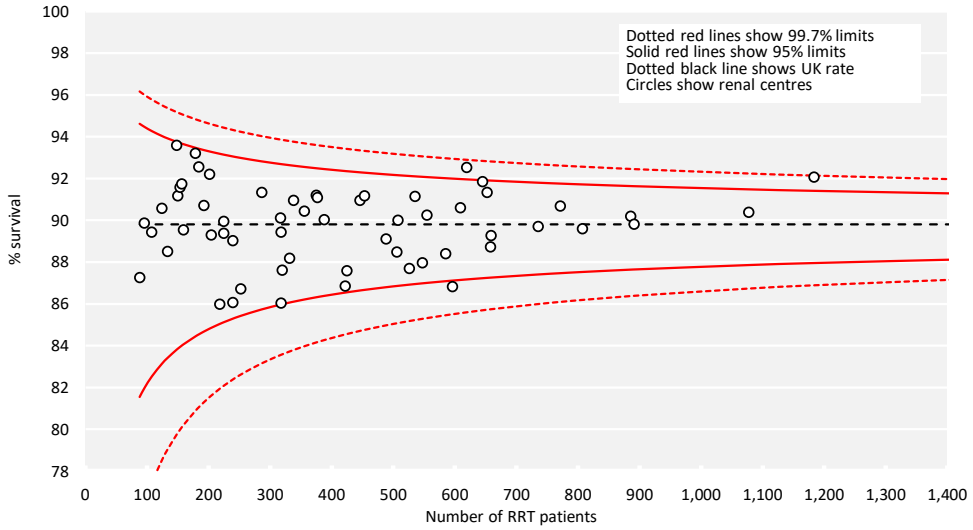


Figure 2.25 1 year after 90 days survival (adjusted to age 60 years, male and median comorbidity score) of incident adult RRT patients by centre (2015–2018 4 year cohort)

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 2.21 Cause of death in the first 90 days and one year after 90 days in incident adult RRT patients by age group (2015–2018 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	211	24.0	25.2	23.7	502	21.5	27.0	19.2
Cerebrovascular disease	27	3.1	4.8	2.5	105	4.5	5.6	4.1
Infection	178	20.3	21.0	20.1	445	19.1	18.9	19.1
Malignancy	74	8.4	11.0	7.6	251	10.7	10.4	10.9
Treatment withdrawal	155	17.7	8.6	20.5	446	19.1	12.6	21.8
Other	180	20.5	23.8	19.5	423	18.1	19.1	17.7
Uncertain aetiology	53	6.0	5.7	6.1	163	7.0	6.5	7.2
Total (with data)	**878**	**100.0**	**100.0**	**100.0**	**2,335**	**100.0**	**100.0**	**100.0**
Missing	649	42.5	42.9	42.9	1,169	33.4	33.3	33.4

THE RENAL ASSOCIATION
founded 1950

Chapter 3

Adults on renal replacement therapy (RRT) in the UK at the end of 2019

Contents

Introduction 54

Rationale for analyses 55

Key findings 56

Analyses 57

- Changes to the prevalent adult RRT population 57
- Demographics and treatment modality of prevalent adult RRT patients 60
- Dialysis access in prevalent adult dialysis patients 69
- Survival in adult dialysis patients 69
- Cause of death in adult RRT patients 74

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 2019 (figure 3.1). Patients may have started RRT prior to 2019 or during 2019. 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 2); 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.

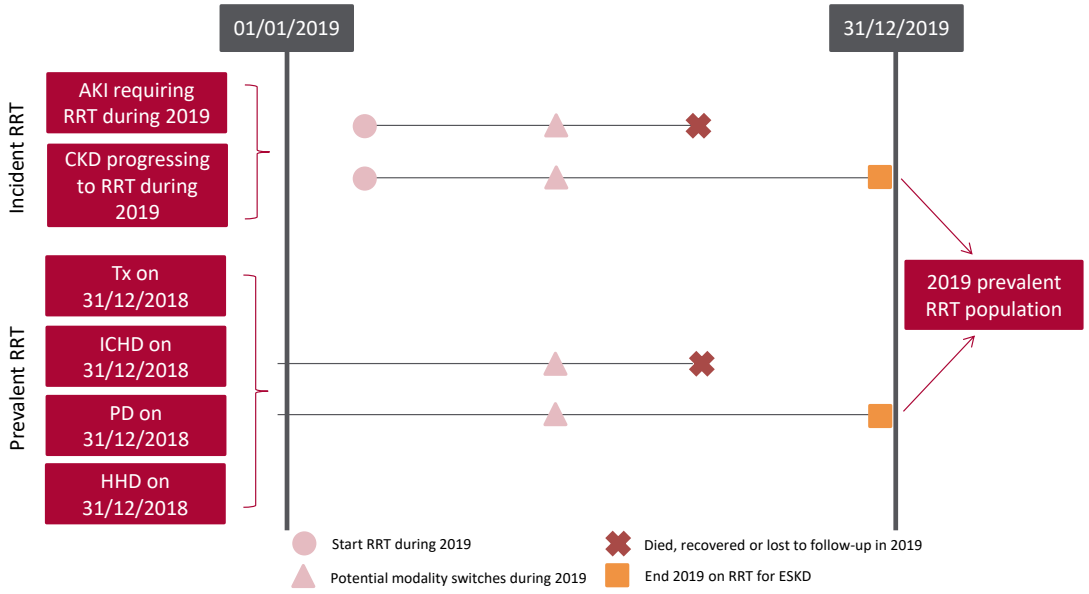


Figure 3.1 Pathways adult patients could follow to be included in the UK 2019 prevalent RRT population

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 2019 or if they had been on RRT for ≥90 days and were on RRT at the end of 2019.

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 2019 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/health-professionals/guidelines/guidelines-commentaries) 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.

Key findings

- 68,111 adult patients were receiving RRT for ESKD in the UK on 31/12/2019, an increase of 2.5% from 2018
- RRT prevalence was 1,293 pmp for adults, in trend with a 2.0% increase in recent years
- The median age of RRT patients was 59.6 years (ICHD 67.5 years, HHD 55.2 years, PD 64.4 years and Tx 55.6 years). In 2000 the median age was 54.8 years (HD 63.3 years, PD 58.5 years and Tx 48.6 years)
- 61.2% of RRT patients were male
- Tx continued as the most common treatment modality (56.8%) – ICHD comprised 35.8%, PD 5.4% and HHD 2.0% of the RRT population
- The most common identifiable primary renal disease was glomerulonephritis (19.5%), followed by diabetes (18.3%)
- There were 3 centres above the upper 95% limit in the funnel plots showing 1 year age-, sex- and comorbidity-adjusted survival for patients prevalent to dialysis on 31/12/2018. It is expected that 3 centres would be outside the limits by chance
- There was no cause of death data available for 30.6% of deaths. For those with data, the leading cause of death in younger patients (<65 years) was cardiac disease (22.2%) and in older patients (≥65 years) was treatment withdrawal (20.9%).

Analyses

Changes to the prevalent adult RRT population

For the 70 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 3.1 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)	2019 crude rate (pmp)
	2015	2016	2017	2018	2019		
ENGLAND							
Basldn	275	273	301	317	322	0.34	944
Bham	2,896	3,038	3,154	3,234	3,308	2.03	1,627
Bradfd	583	636	673	688	733	0.49	1,507
Brightn	950	992	1,010	1,056	1,059	1.07	992
Bristol	1,477	1,468	1,472	1,469	1,486	1.21	1,228
Camb	1,303	1,322	1,329	1,385	1,469	0.93	1,584
Carlis	281	279	281	293	303	0.25	1,199
Carsh[1]	1,587	1,654	1,692	1,763	1,771	1.61	1,098
Chelms	282	271	276	262	261	0.37	702
Colchr	120	123	129	124	145	0.29	502
Covnt	959	973	964	957	1,076	0.79	1,366
Derby	538	542	555	587	652	0.56	1,173
Donc	302	331	333	332	342	0.37	920
Dorset	681	686	734	764	772	0.72	1,069
Dudley	315	346	369	365	366	0.34	1,075
Exeter	968	1,013	1,058	1,090	1,091	0.94	1,156
Glouc	444	472	508	520	525	0.51	1,039
Hull	856	854	872	881	904	0.79	1,141
Ipswi	401	416	435	428	424	0.31	1,370
Kent	1,041	1,073	1,091	1,113	1,140	1.06	1,077
L Barts	2,279	2,368	2,492	2,599	2,660	1.57	1,689
L Guys	2,012	2,098	2,160	2,228	2,310	1.00	2,319
L Kings	1,084	1,110	1,149	1,185	1,244	0.92	1,345
L Rfree	2,093	2,175	2,192	2,237	2,344	1.32	1,782
L St.G	837	836	829	827	852	0.66	1,294
L West	3,294	3,391	3,472	3,554	3,613	1.95	1,857
Leeds	1,525	1,550	1,618	1,681	1,723	1.36	1,268
Leic	2,172	2,292	2,355	2,452	2,587	2.07	1,252
Liv Ain	222	227	209	216	210	0.43	491
Liv Roy	1,241	1,213	1,249	1,264	1,227	0.80	1,526
M RI	1,880	1,971	2,042	2,065	2,060	1.32	1,559
Middlbr	901	890	905	929	949	0.80	1,188
Newc	1,009	1,050	1,114	1,153	1,175	0.94	1,245
Norwch	720	770	777	785	809	0.68	1,185
Nottm	1,113	1,153	1,177	1,193	1,218	0.92	1,324
Oxford	1,690	1,766	1,874	1,935	1,969	1.43	1,375
Plymth	503	513	540	538	531	0.40	1,336
Ports	1,669	1,691	1,749	1,763	1,883	1.73	1,087
Prestn	1,215	1,204	1,270	1,319	1,341	1.22	1,097
Redng	775	789	795	814	860	0.69	1,245
Salford	974	1,019	1,113	1,174	1,237	1.14	1,084

Table 3.1 Continued

Centre	N on RRT 2015	2016	2017	2018	2019	Estimated catchment population (millions)	2019 crude rate (pmp)
Sheff	1,383	1,421	1,439	1,480	1,491	1.12	1,328
Shrew	369	377	384	428	428	0.41	1,053
Stevng	813	885	883	937	966	1.10	878
Sthend	246	236	254	263	264	0.27	974
Stoke	788	826	810	805	803	0.72	1,108
Sund	459	507	542	557	568	0.54	1,048
Truro	414	426	424	437	449	0.35	1,266
Wirral	281	337	386	395	411	0.47	884
Wolve	582	570	583	608	598	0.54	1,100
York	490	535	555	567	581	0.48	1,208
N IRELAND							
Antrim	241	252	255	274	280	0.24	1,152
Belfast	769	811	836	871	890	0.53	1,686
Newry	225	236	241	250	251	0.23	1,079
Ulster	169	166	182	191	182	0.20	906
West NI	293	307	313	326	328	0.25	1,321
SCOTLAND							
Abrdn	531	555	563	573	558	0.50	1,120
Airdrie	425	439	467	487	524	0.46	1,147
D&Gall	130	131	135	145	149	0.12	1,221
Dundee	419	418	435	445	449	0.37	1,225
Edinb	769	777	824	861	885	0.84	1,057
Glasgw	1,709	1,753	1,773	1,815	1,854	1.37	1,356
Inverns	252	258	262	279	282	0.22	1,267
Klmarnk	310	317	337	339	359	0.29	1,234
Krkcldy	295	294	304	298	295	0.27	1,083
WALES							
Bangor	182	179	195	202	201	0.16	1,238
Cardff	1,613	1,626	1,684	1,720	1,730	1.15	1,511
Clwyd	185	177	180	190	205	0.18	1,143
Swanse	765	774	795	828	868	0.75	1,156
Wrexm	293	310	322	313	311	0.21	1,511
TOTALS							
England	**51,292**	**52,958**	**54,577**	**56,016**	**57,510**	**44.33**	**1,297**
N Ireland	**1,697**	**1,772**	**1,827**	**1,912**	**1,931**	**1.45**	**1,329**
Scotland	**4,840**	**4,942**	**5,100**	**5,242**	**5,355**	**4.43**	**1,209**
Wales	**3,038**	**3,066**	**3,176**	**3,253**	**3,315**	**2.45**	**1,354**
UK	**60,867**	**62,738**	**64,680**	**66,423**	**68,111**	**52.67**	**1,293**

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.
[1]Carshalton discovered a problem related to the submission of PD patients after the closing date. As a consequence, 26 PD patients are not included in this report. No adjustment has been made this year, but the problem has been resolved and numbers will be correct next year.
pmp – per million population

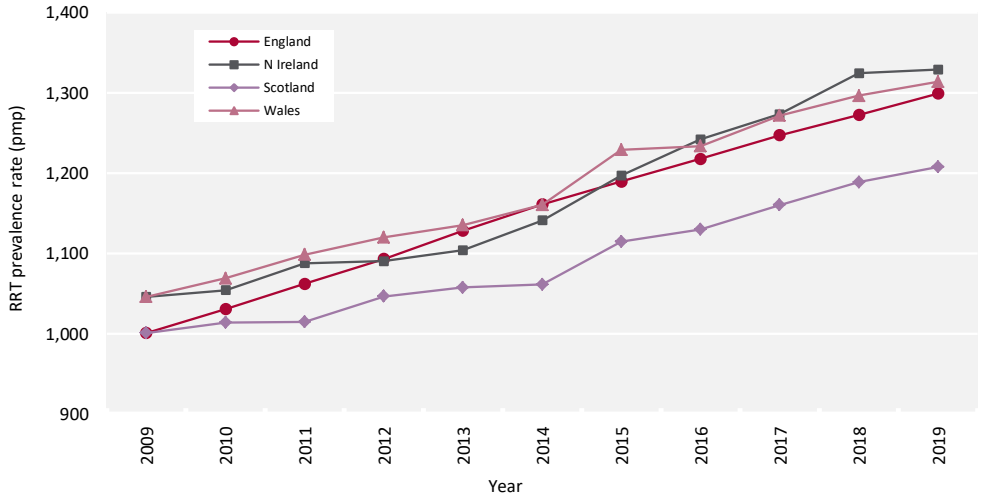


Figure 3.2 Adult RRT prevalence rates by country between 2009 and 2019

pmp – per million population

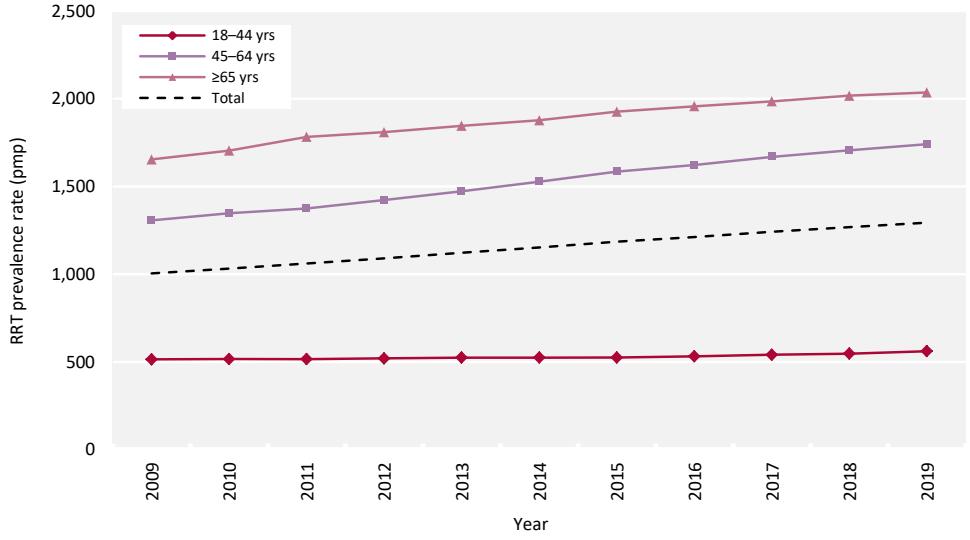


Figure 3.3 Adult RRT prevalence rates by age group between 2009 and 2019

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.

Variation between centres in the proportion of dialysis patients on home therapies (PD and HHD combined) is shown in figure 3.4.

Table 3.2 Demographics and treatment modality of adult patients prevalent to RRT on 31/12/2019 by centre

								Ethnicity				
Centre	N on RRT	% on ICHD	% on PD	% on HHD	% with Tx	Median age (yrs)	% male	% White	% Asian	% Black	% Other	% missing
ENGLAND												
Basldn	322	58.4	6.2	3.1	32.3	61.3	65.5	85.6	6.6	5.0	2.8	0.9
Bham	3,308	40.5	7.8	2.3	49.5	58.7	58.4	57.2	29.3	10.7	2.8	1.5
Bradfd	733	38.2	4.6	0.8	56.3	57.6	60.6	50.9	45.4	2.6	1.1	0.8
Brightn	1,059	40.6	5.2	3.0	51.2	61.5	62.3	89.8	6.4	2.1	1.8	3.4
Bristol	1,486	31.5	4.3	1.1	63.1	59.0	61.7	88.6	4.1	5.6	1.8	0.9
Camb	1,469	19.6	1.9	2.0	76.4	57.7	62.7	90.9	5.9	2.0	1.2	2.0
Carlis	303	36.6	11.9	0.0	51.5	61.5	62.4	99.0	1.0	0.0	0.0	0.0
Carsh[1]	1,771	47.3	3.9	2.0	46.9	62.1	62.9	67.0	17.0	11.3	4.7	2.9
Chelms	261	43.7	11.9	0.0	44.4	65.4	69.3	90.8	3.2	2.8	3.2	3.8
Colchr	145	100.0	0.0	0.0	0.0	72.5	61.4	95.1	1.4	0.7	2.8	0.7
Covnt	1,076	32.9	7.6	1.9	57.6	59.2	61.7	78.6	16.4	5.0	0.0	0.1
Derby	652	36.5	9.5	8.9	45.1	60.8	61.5	83.1	10.9	3.4	2.6	0.3
Donc	342	52.9	7.3	1.5	38.3	65.3	63.5	93.9	2.9	1.2	2.0	0.0
Dorset	772	37.4	4.3	1.9	56.3	65.0	60.5	96.7	1.3	0.1	1.8	1.0
Dudley	366	56.6	9.8	3.3	30.3	64.1	63.1	81.4	12.3	5.5	0.8	0.0
Exeter	1,091	40.6	7.7	1.9	49.8	63.7	62.1	97.0	0.6	0.9	1.5	0.3
Glouc	525	43.0	5.5	0.6	50.9	64.7	63.2	92.6	3.0	2.3	2.1	0.0
Hull	904	38.7	5.4	0.8	55.1	59.1	64.0	96.4	1.9	0.7	1.0	0.4
Ipswi	424	33.3	9.9	0.9	55.9	62.8	64.2	82.9	2.0	3.7	11.5	3.5
Kent	1,140	36.8	4.5	1.7	57.0	61.3	59.8	93.9	3.5	1.1	1.6	1.5
L Barts	2,660	39.0	8.6	0.7	51.7	57.8	60.0	32.6	33.3	22.7	11.5	1.1
L Guys	2,310	28.8	2.3	1.9	67.0	55.5	58.9	58.7	9.9	27.0	4.4	1.9
L Kings	1,244	48.8	7.6	1.4	42.1	59.3	62.0	44.1	13.6	37.6	4.7	1.5
L Rfree	2,344	31.7	7.2	0.5	60.7	58.5	59.8	44.3	22.6	22.7	10.3	4.8
L St.G	852	35.2	5.2	0.7	58.9	60.5	58.7	38.4	25.5	25.1	10.9	3.5
L West	3,613	38.2	4.3	0.8	56.7	60.9	60.9	39.3	35.1	18.8	6.8	0.0
Leeds	1,723	32.0	3.9	1.5	62.6	57.4	61.8	77.1	16.7	4.9	1.3	0.1
Leic	2,587	37.3	4.9	2.1	55.7	60.2	60.6	73.3	20.1	4.8	1.8	3.9
Liv Ain	210	71.9	8.6	6.2	13.3	64.6	62.4	97.6	0.5	1.0	1.0	1.0
Liv Roy	1,227	28.9	2.6	2.9	65.5	57.6	61.7	91.2	2.9	3.3	2.6	1.2
M RI	2,060	24.2	3.7	3.7	68.3	57.0	60.0	68.4	14.9	14.7	2.0	1.5
Middlbr	949	36.2	3.4	2.0	58.4	59.5	64.0	94.0	5.2	0.6	0.2	0.0
Newc	1,175	27.8	5.1	1.6	65.4	59.0	60.3	93.4	4.3	1.0	1.3	0.0
Norwch	809	36.7	5.8	1.7	55.7	62.7	61.6	96.8	1.5	0.9	0.9	0.4
Nottm	1,218	29.6	6.2	2.5	61.7	58.1	60.5	80.9	9.4	6.7	3.0	0.0
Oxford	1,969	23.1	2.9	1.3	72.7	57.8	62.3	80.3	11.6	4.3	3.8	10.8
Plymth	531	23.7	7.9	1.3	67.0	62.0	67.8	96.6	0.8	0.4	2.3	0.0
Ports	1,883	31.4	4.7	3.7	60.2	60.4	61.7	92.2	3.9	1.3	2.5	5.7
Prestn	1,341	37.8	3.1	3.7	55.4	60.5	60.9	83.8	14.9	0.8	0.4	0.0
Redng	860	36.3	6.5	0.9	56.3	62.0	63.1	66.6	24.7	6.5	2.2	8.8
Salford	1,237	31.7	9.7	3.3	55.3	58.7	61.4	79.8	15.8	2.7	1.7	0.0

Table 3.2. Continued

Centre	N on RRT	% on ICHD	% on PD	% on HHD	% with Tx	Median age (yrs)	% male	Ethnicity				
								% White	% Asian	% Black	% Other	% missing
Sheff	1,491	36.2	4.0	3.8	56.1	59.4	62.4	88.0	6.7	2.6	2.7	1.5
Shrew	428	47.7	12.9	6.3	33.2	63.3	65.0	93.0	3.5	1.4	2.1	0.5
Stevng	966	52.5	3.8	3.8	39.9	61.1	63.3	71.1	15.1	8.9	4.9	8.4
Sthend	264	44.7	12.9	2.3	40.2	63.6	60.6	87.1	6.8	3.8	2.3	0.0
Stoke	803	33.3	8.8	3.5	54.4	59.8	63.3	90.6	5.9	1.3	2.3	2.2
Sund	568	44.4	4.6	2.1	48.9	60.8	59.7	95.9	3.2	0.7	0.2	0.2
Truro	449	37.0	4.5	0.9	57.7	62.7	58.6	98.7	0.4	0.0	0.9	0.0
Wirral	411	50.4	4.1	1.9	43.6	62.0	60.8	95.6	2.4	1.0	1.0	0.0
Wolve	598	50.5	8.2	5.4	36.0	60.9	60.4	64.4	24.8	9.4	1.3	0.8
York	581	31.7	5.7	2.8	59.9	61.9	62.5	97.2	1.2	0.3	1.2	1.4
N IRELAND												
Antrim	280	42.1	6.8	1.4	49.6	64.2	64.6	100.0	0.0	0.0	0.0	0.0
Belfast	890	17.6	2.1	1.5	78.8	57.1	59.4	97.4	1.7	0.6	0.4	6.0
Newry	251	31.1	4.4	0.8	63.7	61.1	57.0	98.4	0.8	0.4	0.4	1.2
Ulster	182	53.3	4.4	0.0	42.3	68.6	55.5	95.1	2.7	1.6	0.5	0.0
West NI	328	32.3	4.3	0.3	63.1	57.7	60.7	98.5	1.2	0.3	0.0	0.0
SCOTLAND												
Abrdn	558	34.1	3.9	0.5	61.5	57.6	57.9					66.5
Airdrie	524	39.5	4.0	0.0	56.5	58.5	58.8	96.7	2.2	0.2	0.8	6.7
D&Gall	149	34.9	5.4	1.3	58.4	59.8	61.7					36.9
Dundee	449	36.1	4.7	1.6	57.7	59.0	60.6					66.8
Edinb	885	33.4	4.6	0.2	61.7	58.9	62.4					75.5
Glasgw	1,854	31.0	2.4	1.0	65.6	58.5	59.2					48.8
Inverns	282	32.6	4.3	2.5	60.6	58.8	56.7					47.9
Klmarnk	359	38.7	6.7	3.9	50.7	60.4	59.1					56.5
Krkcldy	295	46.8	4.1	0.7	48.5	61.6	60.3					80.3
WALES												
Bangor	201	32.8	7.0	7.5	52.7	62.5	64.2	98.5	0.0	0.5	1.0	3.5
Cardff	1,730	31.9	3.7	1.9	62.5	58.8	62.2	91.4	6.0	0.8	1.8	0.8
Clwyd	205	42.0	6.3	1.0	50.7	64.7	64.4	97.4	2.1	0.0	0.5	6.3
Swanse	868	44.8	9.0	5.2	41.0	63.8	63.6	97.3	1.6	0.3	0.7	0.8
Wrexm	311	34.1	7.4	2.3	56.3	59.6	64.6	96.4	1.3	1.0	1.3	1.0
TOTALS												
England	**57,510**	**36.1**	**5.5**	**2.1**	**56.3**	**59.6**	**61.3**	**73.2**	**14.5**	**8.9**	**3.4**	**2.0**
N Ireland	**1,931**	**28.8**	**3.7**	**1.0**	**66.5**	**59.2**	**59.7**	**97.9**	**1.3**	**0.5**	**0.3**	**2.9**
Scotland	**5,355**	**34.6**	**3.8**	**1.0**	**60.6**	**58.8**	**59.7**					**54.3**
Wales	**3,315**	**36.2**	**5.8**	**3.1**	**55.0**	**60.7**	**63.0**	**94.2**	**3.8**	**0.6**	**1.3**	**1.3**
UK	**68,111**	**35.8**	**5.4**	**2.0**	**56.8**	**59.6**	**61.2**	**75.6**	**13.3**	**8.0**	**3.1**	**6.1**

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.
[1]Carshalton discovered a problem related to the submission of PD patients after the closing date. As a consequence, 26 PD patients are not included in this report. No adjustment has been made this year, but the problem has been resolved and numbers will be correct next year.

PRDs were grouped into categories as shown in table 3.3, 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 3.3 Demographics, primary renal diseases (PRDs) and prevalent treatment modality of adult patients prevalent to RRT on 31/12/2019 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	5,389	7,552	13,284	16,696	14,496	8,905	1,789	68,111	59.6
% on RRT	7.9	11.1	19.5	24.5	21.3	13.1	2.6		
Sex (%)									
Male	7.7	10.9	19.1	24.7	21.2	13.5	2.8	61.2	59.9
Female	8.3	11.3	20.1	24.2	21.5	12.4	2.3	38.8	59.2
Ethnicity (%)									
White	7.8	10.5	19.3	23.9	21.9	13.7	2.9	75.6	60.0
Asian	9.0	13.5	18.3	24.7	22.3	10.4	1.7	13.3	59.3
Black	6.0	12.3	25.3	29.4	13.7	11.1	2.3	8.0	57.0
Other	11.2	15.7	20.8	23.4	17.7	9.9	1.3	3.1	56.0
Missing	7.3	9.2	16.6	25.9	23.5	14.8	2.7	6.1	61.7
PRD (%)									
Diabetes	2.7	8.8	19.4	28.3	24.8	13.8	2.2	18.3	61.8
Glomerulonephritis	9.3	13.8	22.3	25.9	18.8	8.7	1.2	19.5	56.8
Hypertension	3.2	8.6	19.1	24.6	21.3	18.9	4.4	6.3	62.4
Polycystic kidney disease	1.7	5.7	20.9	34.2	26.6	10.2	0.8	10.4	61.3
Pyelonephritis	10.4	14.5	24.1	22.1	16.3	10.3	2.3	9.6	55.4
Renal vascular disease	1.6	3.1	5.1	13.2	29.6	36.9	10.5	2.8	74.3
Other	15.8	13.8	18.1	20.3	19.0	10.9	2.1	18.2	56.1
Uncertain aetiology	7.7	11.4	17.5	20.8	21.0	16.9	4.6	14.9	61.5
Missing	15.0	9.6	14.5	20.2	20.6	16.0	4.0	2.5	60.7
Modality (%)									
ICHD	4.4	6.3	13.0	20.9	24.7	24.5	6.3	35.8	67.5
HHD	9.2	13.5	26.8	26.6	16.0	7.5	0.4	2.0	55.2
PD	7.8	8.4	14.1	21.0	24.0	20.7	3.8	5.4	64.4
Tx	10.1	14.3	23.9	27.0	19.1	5.4	0.3	56.8	55.6

Variation between centres in the proportion of patients prevalent to dialysis on 31/12/2019 and on home therapies is shown in figure 3.4 . Please visit the UKRR data portal (renal.org/audit-research/data-portal) to identify individual renal centres.

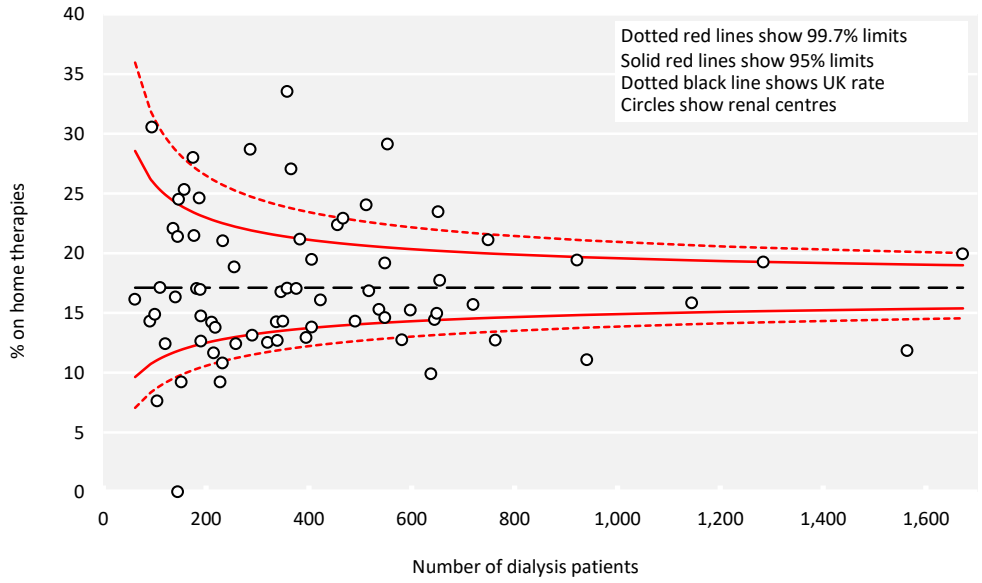


Figure 3.4 Percentage of adult patients prevalent to dialysis on 31/12/2019 on home therapies (PD and HHD) by centre

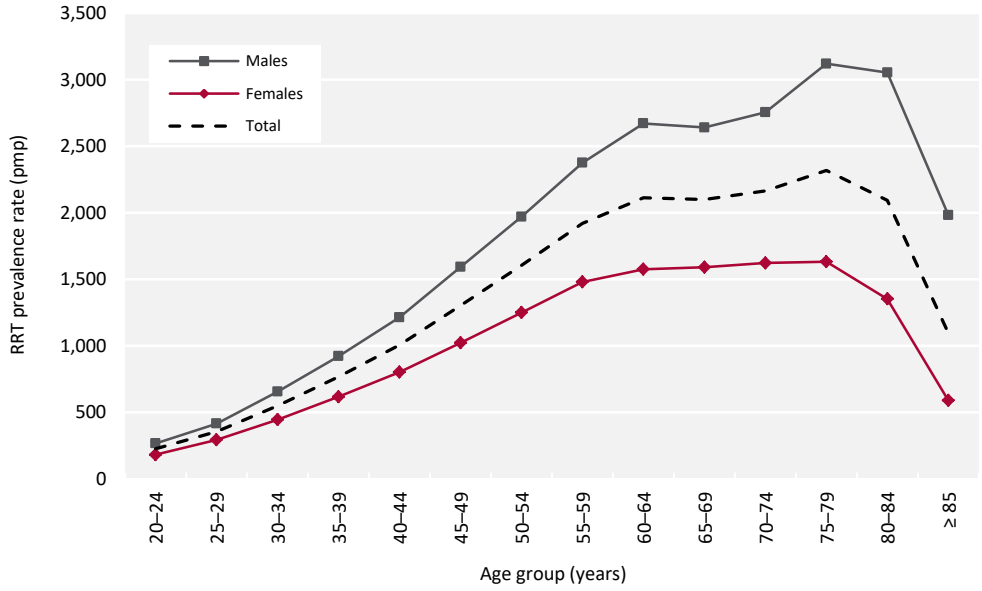


Figure 3.5 Prevalence rates for adult patients on RRT on 31/12/2019 by age group and sex

For each modality, the percentage of patients of each year of age is shown in figure 3.6, with the totals of each modality adding to 100%.



Figure 3.6 Age profile of adult patients prevalent to RRT on 31/12/2019 by RRT modality

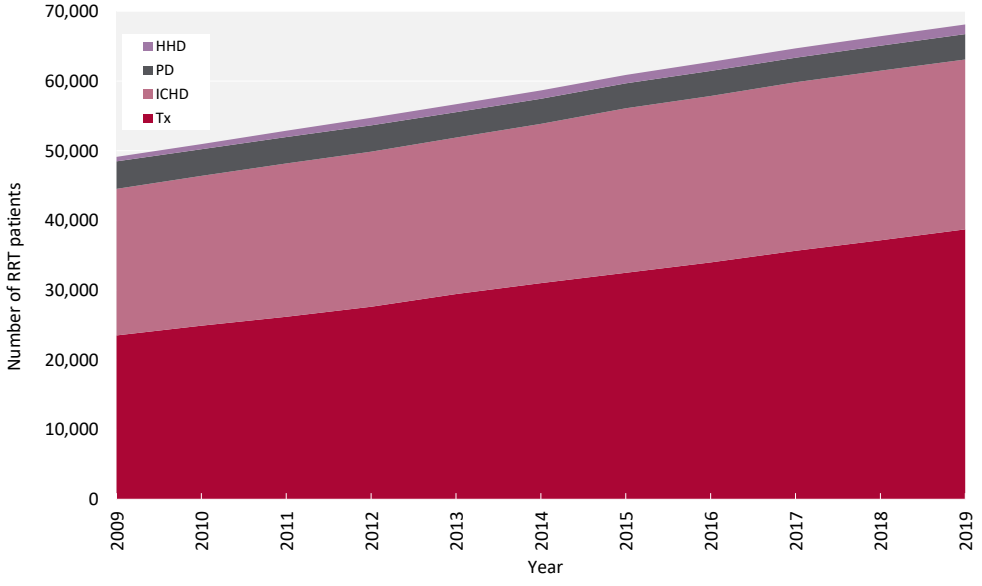


Figure 3.7 Growth in numbers of prevalent adult RRT patients by treatment modality between 2009 and 2019

Table 3.4 Change in adult RRT prevalence rates by modality between 2015 and 2019

	Prevalence (pmp)					% growth in prevalence				
Year	HD	PD	Dialysis	Tx	RRT	HD	PD	Dialysis	Tx	RRT
2015	483	70	553	633	1,186					
2016	486	70	556	656	1,212	0.6	-0.1	0.5	3.7	2.2
2017	490	68	558	684	1,242	0.8	-2.9	0.4	4.3	2.5
2018	491	68	559	709	1,268	0.1	1.3	0.2	3.6	2.1
2019	489	69	558	735	1,293	-0.3	1.1	-0.2	3.7	2.0
Average annual growth 2015-2019						**0.3**	**-0.1**	**0.2**	**3.8**	**2.2**

pmp – per million population

In table 3.5, 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 3.6 shows changes in PRDs between 2010 and 2019, in particular the increase in diabetes.

Table 3.5 Treatment modality of adult patients prevalent to RRT on 31/12/2019 by primary renal disease (PRD)

PRD	N on RRT	% RRT population	Modality (%)		
			HD	PD	Tx
Diabetes	12,140	18.3	55.5	7.1	37.4
Glomerulonephritis	12,968	19.5	27.4	4.3	68.3
Hypertension	4,200	6.3	44.7	6.5	48.8
Polycystic kidney disease	6,927	10.4	20.5	3.5	76.0
Pyelonephritis	6,355	9.6	29.1	3.4	67.5
Renal vascular disease	1,860	2.8	65.8	10.7	23.5
Other	12,079	18.2	36.0	4.5	59.5
Uncertain aetiology	9,910	14.9	38.6	5.9	55.5
Total (with data)	**66,439**	**100.0**	**37.4**	**5.2**	**57.4**
Missing	1,672	2.5	54.8	9.5	35.6

Table 3.6 Change in primary renal disease (PRD) of adult patients prevalent to RRT between 2010 and 2019

PRD	Year									
	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Diabetes	15.4	15.8	16.2	16.5	16.7	17.1	17.4	17.7	18.0	18.3
Glomerulonephritis	19.4	19.3	19.4	19.5	19.5	19.4	19.4	19.5	19.4	19.5
Hypertension	6.1	6.1	6.3	6.3	6.3	6.3	6.2	6.2	6.2	6.3
Polycystic kidney disease	9.9	10.0	10.0	10.2	10.2	10.3	10.2	10.3	10.4	10.4
Pyelonephritis	11.8	11.6	11.4	11.2	10.9	10.6	10.4	10.1	9.8	9.6
Renal vascular disease	3.6	3.5	3.3	3.1	3.1	3.0	3.0	3.0	2.9	2.8
Other	16.3	16.4	16.6	16.8	17.2	17.4	17.7	18.0	18.2	18.2
Uncertain aetiology	17.5	17.4	16.8	16.3	16.2	15.9	15.6	15.3	15.0	14.9
Missing	0.4	0.6	0.6	0.9	0.8	0.9	1.0	1.4	1.7	2.5

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).

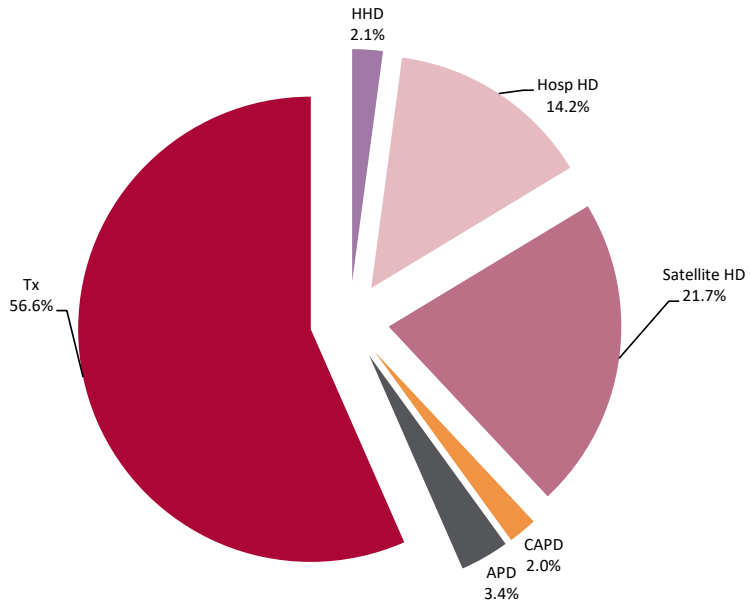


Figure 3.8 Detailed treatment modality of adult patients prevalent to RRT on 31/12/2019

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

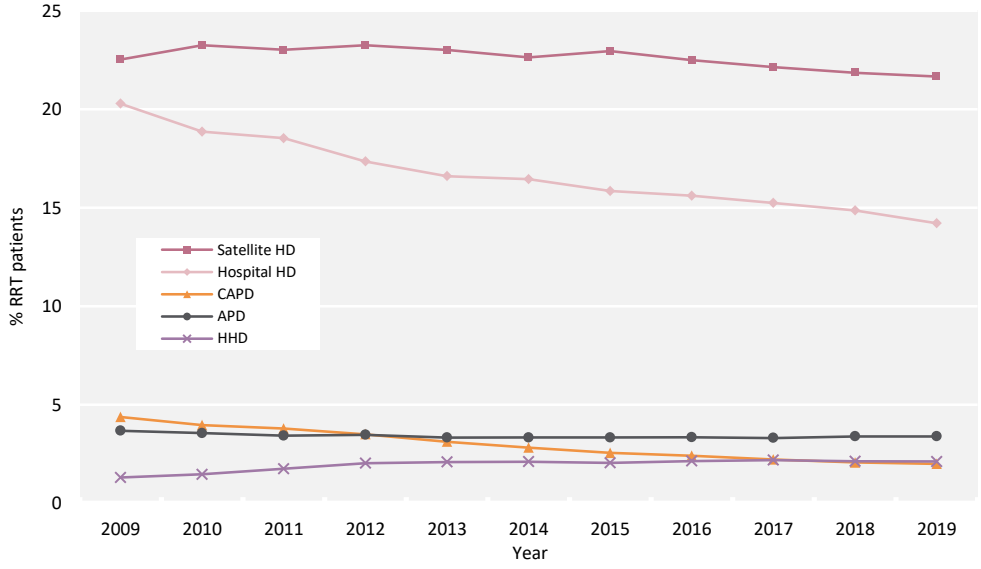


Figure 3.9 Detailed dialysis modality changes in prevalent adult RRT patients between 2009 and 2019

No Scottish centres were included because data on satellite HD were not available.
The denominator includes patients with a Tx.
APD – automated PD; CAPD – continuous ambulatory PD

Table 3.7 Adult patients prevalent to dialysis on 31/12/2019 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										
Basldn	218	39.0	6.8	90.8	4.6	70.6	15.6	9.2	2.8	6.4
Bham	1,672	30.4	3.0	84.6	4.6	28.3	51.8	15.4	2.3	13.1
Bradfd	320	30.9	4.2	89.4	1.9	74.7	12.8	10.6	6.9	3.8
Brightn	517	28.0	4.4	89.4	6.2	36.8	46.4	10.6	6.6	4.1
Bristol	548	30.1	5.0	88.3	2.9	15.5	69.9	11.7	6.9	4.7
Camb	346	31.7	4.9	91.9	8.7	35.0	48.3	8.1	5.5	2.6
Carlis	147	25.8	5.9	75.5	0.0	47.6	27.9	24.5	3.4	21.1
Carsh	941	32.6	3.9	92.7	3.7	20.2	68.8	7.3	2.1	4.5
Chelms	145	25.5	2.1	78.6	0.0	78.6	0.0	21.4	5.5	15.9
Colchr	145	26.1	2.0	100.0	0.0	78.6	21.4	0.0	0.0	0.0
Covnt	456	36.6	3.6	82.0	4.4	77.6	0.0	18.0	18.0	0.0
Derby	358	28.0	4.1	82.7	16.2	58.9	7.5	17.3	9.2	8.1
Donc	211	35.5	6.7	88.2	2.4	45.5	40.3	11.9	4.3	7.6
Dorset	337	37.2	8.5	90.2	4.5	18.7	67.1	9.8	1.2	8.6
Dudley	255	31.2	4.1	85.9	4.7	32.2	49.0	14.1	7.5	6.7
Exeter	548	30.9	3.8	84.7	3.8	9.9	71.0	15.3	6.6	8.8
Glouc	258	31.3	6.2	88.8	1.2	63.6	24.0	11.2	1.6	9.7
Hull	406	31.4	7.1	87.9	1.7	42.1	44.1	12.1	6.7	5.4
Ipswi	187	24.6	3.4	77.5	2.1	66.8	8.6	22.5	12.8	8.6
Kent	490	23.7	4.9	89.6	3.9	28.6	57.1	10.4	9.6	0.8
L Barts	1,284	37.1	5.7	82.2	1.4	33.8	47.0	17.8	2.4	15.4
L Guys	763	32.6	8.5	93.1	5.8	15.1	72.2	7.0	0.3	6.7
L Kings	720	22.9	6.2	86.8	2.5	19.3	65.0	13.2	4.3	8.9
L Rfree	922	38.8	8.7	81.8	1.2	2.7	77.9	18.2	5.6	12.6
L St.G	350	32.5	9.6	87.4	1.7	25.7	60.0	12.6	2.3	8.6
L West	1,564	51.0	13.3	90.0	1.9	16.1	72.1	10.0	5.8	4.2
Leeds	645	39.5	13.9	89.6	4.0	17.4	68.2	10.4	2.8	7.6
Leic	1,145	35.2	6.9	88.9	4.7	16.9	67.3	11.1	2.4	8.7
Liv Ain	182	31.3	5.1	90.1	7.1	9.3	73.6	9.9	1.7	8.2
Liv Roy	423	24.6	14.7	92.4	8.5	35.0	48.9	7.6	2.4	5.2
M RI	652	40.0	13.9	88.2	11.7	12.7	63.8	11.8	2.5	9.4
Middlbr	395	40.9	8.4	91.9	4.8	23.3	63.8	8.1	8.1	0.0
Newc	406	35.3	11.9	85.2	4.7	60.1	20.4	14.8	1.2	13.6
Norwch	358	22.0	2.6	86.9	3.9	51.7	31.3	13.1	9.8	3.4
Nottm	467	28.6	2.9	83.7	6.6	34.3	42.8	16.3	5.1	11.1
Oxford	537	41.5	6.0	89.4	4.7	30.9	53.8	10.6	3.7	6.7
Plymth	175	31.7	14.8	76.0	4.0	68.0	4.0	24.0	6.3	17.7
Ports	749	32.1	10.3	88.3	9.4	16.4	62.5	11.8	4.4	7.3
Prestn	598	36.4	10.2	93.0	8.2	19.7	65.1	7.0	2.3	4.7
Redng	376	30.4	4.6	85.1	2.1	35.9	47.1	14.9	8.8	6.1
Salford	553	44.6	21.4	78.3	7.4	20.1	50.8	21.7	7.6	14.1
Sheff	655	32.2	7.0	90.8	8.6	46.4	35.9	9.2	2.8	6.3
Shrew	286	26.8	4.0	80.8	9.4	40.6	30.8	19.2	3.5	15.7
Stevng	581	37.7	9.4	93.6	6.4	41.1	46.1	6.4	6.4	0.0
Sthend	158	26.2	2.2	78.5	3.8	74.7	0.0	21.5	21.5	0.0
Stoke	366	34.4	1.9	80.6	7.7	47.5	25.4	19.4	2.5	11.8
Sund	290	31.4	11.1	91.0	4.1	46.9	40.0	9.0	2.8	6.2
Truro	190	30.2	3.9	89.5	2.1	54.7	32.6	10.5	4.2	6.3
Wirral	232	30.4	9.2	92.7	3.5	42.7	46.6	7.3	0.4	6.9
Wolve	383	21.3	5.4	87.2	8.4	66.6	12.3	12.8	2.4	7.3
York	233	34.9	8.7	85.8	6.9	30.0	48.9	14.2	11.6	2.6

Table 3.7 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
N IRELAND[1]										
Antrim	141	29.7	4.8	86.5	2.8	83.7	0.0	13.5	2.8	9.9
Belfast	189	35.6	14.1	90.0	6.9	83.1	0.0	10.1	0.0	9.0
Newry	91	19.4	8.3	87.9	2.2	85.7	0.0	12.1	0.0	12.1
Ulster	105	16.0	3.8	92.4	0.0	92.4	0.0	7.6	1.0	3.8
West NI	121	30.2	7.4	88.4	0.8	87.6	0.0	11.6	1.7	9.9
SCOTLAND[2]										
Abrdn	215	37.4	10.3	89.8	1.4	88.4	0.0	10.2	10.2	0.0
Airdrie	228	40.0	16.3	90.8	0.0	90.8	0.0	9.2	4.0	5.3
D&Gall	62	51.9	14.3	87.1	3.2	83.9	0.0	12.9	1.6	11.3
Dundee	190	36.7	1.0	89.0	3.7	85.3	0.0	11.1	0.0	11.1
Edinb	339	33.5	11.3	87.9	0.6	87.3	0.0	12.1	4.1	8.0
Glasgw	638	51.3	12.7	93.0	2.8	90.1	0.0	7.1	1.6	5.5
Inverns	111	46.9	3.2	89.2	6.3	82.9	0.0	10.8	10.8	0.0
Klmarnk	177	36.0	15.4	86.4	7.9	78.5	0.0	13.6	0.0	13.6
Krkcldy	152	27.1	11.0	92.1	1.3	90.8	0.0	7.9	0.7	7.2
WALES										
Bangor	95	32.5	7.3	85.3	15.8	52.6	16.8	14.7	3.2	11.6
Cardff	649	30.6	7.8	90.1	5.1	3.9	81.2	9.9	5.1	4.8
Clwyd	101	27.3	2.9	87.1	2.0	85.2	0.0	12.9	6.9	5.9
Swanse	512	29.1	5.5	84.8	8.8	44.5	31.5	15.2	6.5	8.8
Wrexm	136	23.4	5.6	83.1	5.2	64.0	14.0	16.9	0.7	16.2
TOTALS										
England	**25,143**	**34.1**	**7.3**	**87.4**	**4.8**	**31.4**	**51.2**	**12.6**	**4.7**	**7.8**
N Ireland	**647**	**29.2**	**7.8**	**89.0**	**3.1**	**85.9**	**0.0**	**11.0**	**1.1**	**9.0**
Scotland	**2,112**	**41.1**	**11.1**	**90.3**	**2.6**	**87.6**	**0.0**	**9.8**	**3.3**	**6.5**
Wales	**1,493**	**29.4**	**6.3**	**87.1**	**6.8**	**31.9**	**48.4**	**12.9**	**5.2**	**7.7**
UK	**29,395**	**34.3**	**7.5**	**87.6**	**4.7**	**36.6**	**46.3**	**12.4**	**4.5**	**7.7**

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 3.10, with the remaining patients on hospital HD.

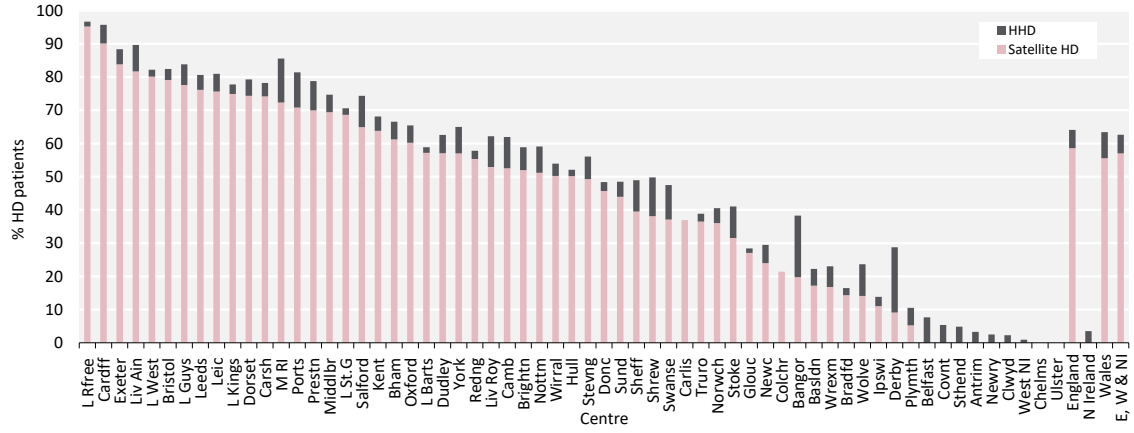


Figure 3.10 Adult patients prevalent to HD on 31/12/2019 treated with satellite HD or HHD by centre

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 5.

Survival in adult dialysis patients

Survival was analysed in prevalent patients receiving dialysis on 31/12/2018 and followed-up for one year in 2019. Survival in patients with a Tx is presented in chapter 4.

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 3.11), but also sex and comorbidities for centres with at least 85% completeness (figure 3.12). 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 3.8.

Table 3.8 1 year adjusted survival (age and case-mix) of adult patients prevalent to dialysis on 31/12/2018 by centre

	Age-adjusted survival				Case-mix adjusted survival1			
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	57	86.1	76.4	94.0				
Clwyd	84	92.5	78.8	93.2	84	94.1	81.6	94.9
Newry	89	83.9	79.1	93.0	88	82.4	81.9	94.8
Bangor	95	85.6	79.4	92.9	95	89.0	82.3	94.7
Inverns	104	90.7	79.9	92.7				
Colchr	119	86.9	80.5	92.5	119	89.9	83.3	94.3
Ulster	124	88.4	80.6	92.4	122	86.4	83.4	94.3
Carlis	128	91.0	80.8	92.3	124	92.0	83.5	94.2
West NI	131	88.1	80.9	92.3	121	83.6	83.4	94.3
Wrexm	136	86.4	81.0	92.2	136	87.9	83.8	94.1
Sthend	141	89.7	81.2	92.2	141	90.5	84.0	94.0
Krkcldy	141	87.1	81.2	92.2				
Antrim	143	86.7	81.2	92.1	134	85.3	83.8	94.1
Chelms	149	83.8	81.4	92.1	148	87.1	84.1	94.0
Klmarnk	164	84.0	81.7	91.9				
Plymth	166	83.3	81.7	91.9	164	87.4	84.5	93.8
Truro	180	87.9	82.0	91.7	180	91.0	84.8	93.7
Ipswi	188	85.8	82.2	91.7	181	88.8	84.8	93.7
Liv Ain	189	84.3	82.2	91.7	189	88.8	84.9	93.6
Dundee	191	92.1	82.2	91.6				
Basldn	204	90.6	82.4	91.5	203	92.9	85.2	93.5
Airdrie	207	87.6	82.5	91.5				
York	211	90.1	82.5	91.5	211	92.2	85.3	93.5
Donc	213	87.9	82.5	91.5	210	89.9	85.3	93.5
Belfast	218	87.6	82.6	91.4				
Wirral	224	86.1	82.7	91.4	223	89.9	85.4	93.4
Abrdn	226	87.2	82.7	91.4				
Dudley	250	86.6	83.0	91.2	250	89.8	85.7	93.2
Sund	263	88.0	83.1	91.1	261	90.6	85.8	93.2
Glouc	264	86.0	83.1	91.1	260	88.4	85.8	93.2
Shrew	267	89.2	83.2	91.1	267	90.8	85.9	93.1
Bradfd	279	86.3	83.3	91.0	278	89.7	86.0	93.1
Derby	312	86.7	83.5	90.9	312	89.1	86.2	92.9
L St.G	327	90.0	83.6	90.8	316	91.9	86.3	92.9
Redng	328	88.6	83.7	90.8	328	91.5	86.4	92.9
Dorset	329	88.8	83.7	90.8	329	90.3	86.4	92.9
Edinb	330	89.4	83.7	90.8				
Norwch	336	88.5	83.7	90.8	336	90.0	86.4	92.9
Middlbr	360	87.8	83.9	90.7	360	91.3	86.5	92.8
Stoke	366	83.9	83.9	90.7	364	87.2	86.6	92.8
Hull	379	84.9	84.0	90.6	378	87.8	86.6	92.7
Wolve	382	86.1	84.0	90.6	382	89.0	86.7	92.7
Camb	395	89.2	84.0	90.6	379	90.0	86.7	92.7
Newc	399	86.4	84.1	90.6	399	90.4	86.7	92.7
Covnt	415	88.9	84.1	90.5	408	90.4	86.8	92.6
Nottm	432	86.7	84.2	90.5	431	89.6	86.9	92.6
Swanse	442	86.5	84.3	90.4	442	89.6	86.9	92.5
Liv Roy	444	87.8	84.3	90.4	439	91.7	86.9	92.6
Kent	450	86.1	84.3	90.4	450	88.2	87.0	92.5
Oxford	488	86.2	84.4	90.3	477	89.0	87.1	92.5
Brightn	509	85.6	84.5	90.3	497	88.5	87.1	92.4
Salford	510	84.7	84.5	90.3	510	88.7	87.2	92.4
Bristol	511	87.1	84.5	90.3	510	90.4	87.2	92.4
Exeter	531	87.0	84.6	90.2	528	89.4	87.2	92.4
Stevng	534	85.3	84.6	90.2	532	87.7	87.2	92.4

Table 3.8 Continued

Centre	Age-adjusted survival				Case-mix adjusted survival1			
	N on dialysis	1 yr (%)	Lower 95% limit	Upper 95% limit	N on dialysis	1 yr (%)	Lower 95% limit	Upper 95% limit
Prestn	571	86.9	84.7	90.1	550	89.9	87.3	92.3
Leeds	592	90.1	84.8	90.1	591	92.3	87.4	92.3
Cardff	602	87.4	84.8	90.1	602	90.4	87.4	92.2
M RI	607	85.1	84.8	90.1	599	88.5	87.4	92.2
Glasgw	609	85.4	84.8	90.1				
Sheff	624	86.9	84.9	90.0	624	89.3	87.5	92.2
L Kings	658	89.5	84.9	90.0	656	91.9	87.6	92.2
Ports	681	86.1	85.0	89.9	672	89.1	87.6	92.1
L Guys	719	89.2	85.1	89.9	718	91.2	87.7	92.1
L Rfree	810	87.3	85.2	89.8	799	90.1	87.8	92.0
Carsh	944	88.8	85.4	89.6	930	90.3	88.0	91.9
Leic	1,012	88.3	85.5	89.6	1,006	90.1	88.1	91.8
L Barts	1,242	90.0	85.7	89.4	1,228	92.1	88.3	91.6
L West	1,530	88.9	85.9	89.2	1,470	90.9	88.5	91.5
Bham	1,615	89.9	86.0	89.2	1,610	91.8	88.5	91.5
Total	**27,870**	**87.7**			**25,351**	**90.1**		

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.

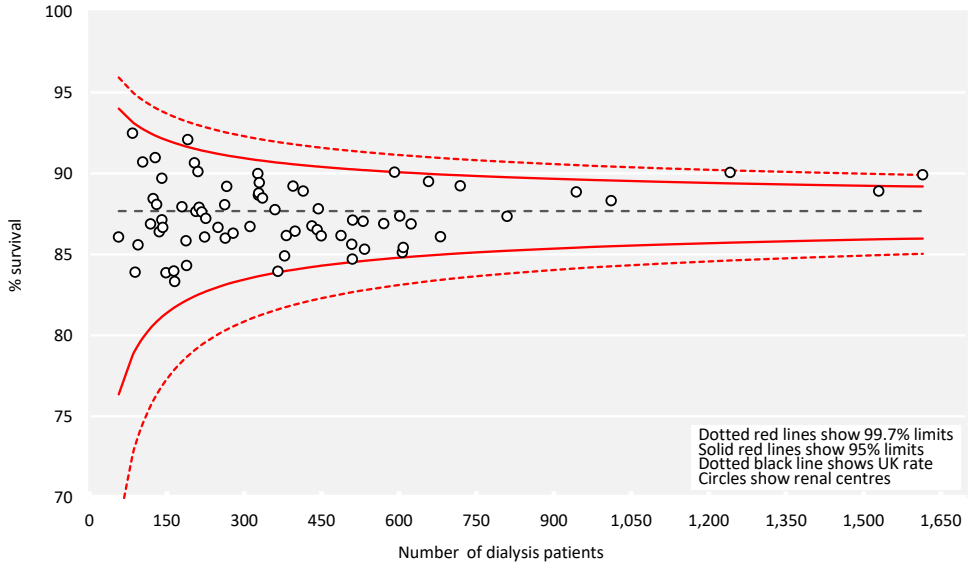


Figure 3.11 1 year survival (adjusted to age 60 years) of adult patients prevalent to dialysis on 31/12/2018 by centre

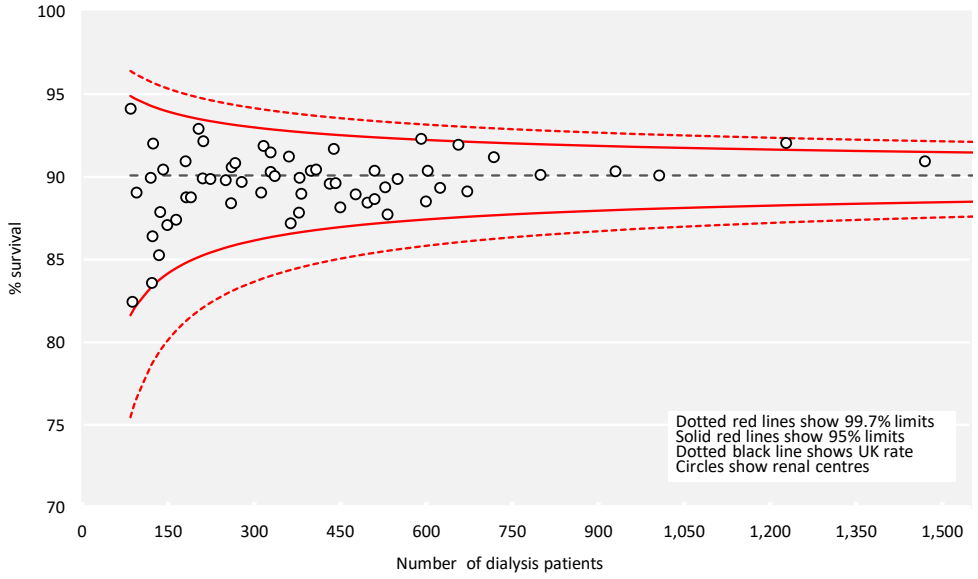


Figure 3.12 1 year survival (adjusted to 60 years, male and median comorbidity score) of adult patients prevalent to dialysis on 31/12/2018 by centre

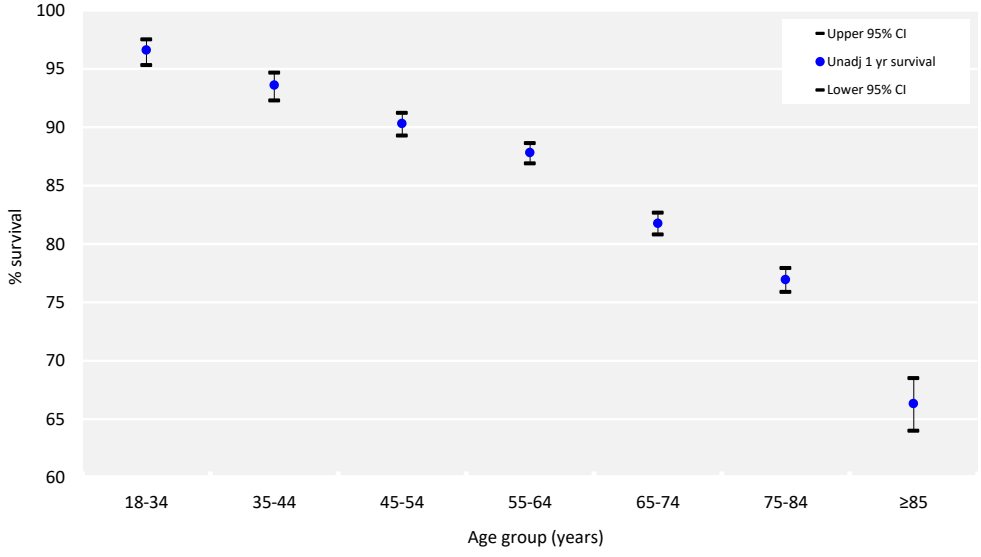


Figure 3.13 1 year survival (unadjusted) of adult patients prevalent to dialysis on 31/12/2018 by age group

CI – confidence interval

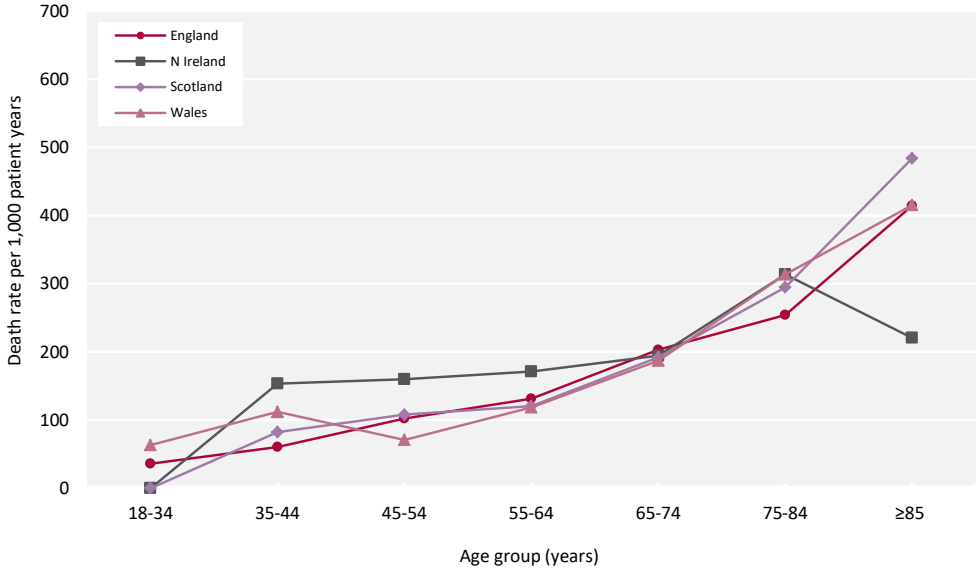


Figure 3.14 1 year death rate per 1,000 patient years for adult patients prevalent to dialysis on 31/12/2018 by country and age group

The serial one year death rate in prevalent adult dialysis patients by country is shown in figure 3.15, adjusted to age 60 years.

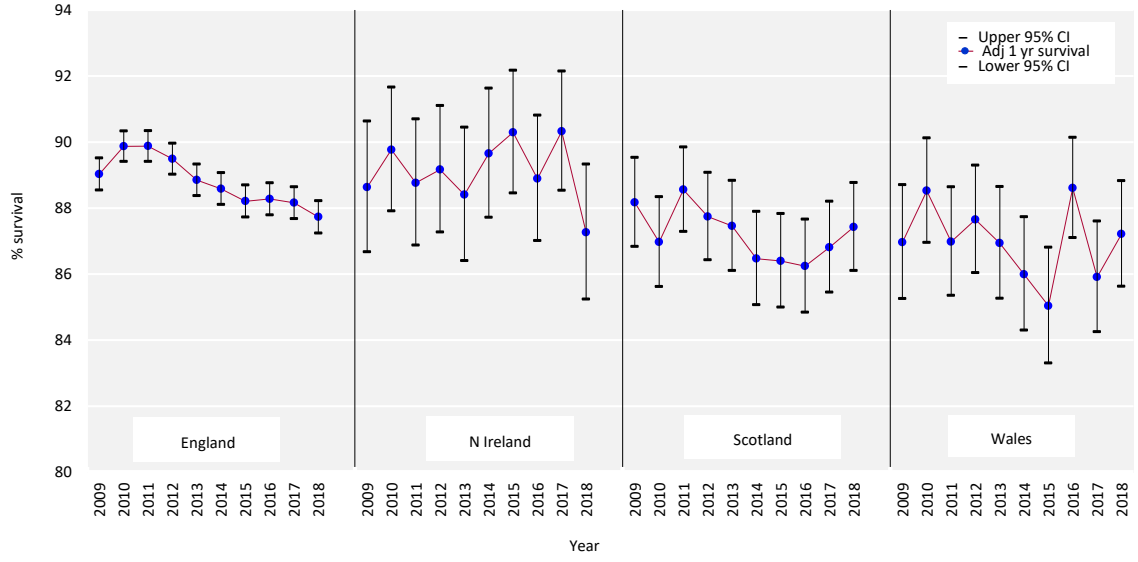


Figure 3.15 1 year survival (adjusted to age 60 years) for prevalent adult dialysis patients by country between 2009 and 2018

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 3.9.

Table 3.9 Death rate by age group for adult patients prevalent to RRT on 31/12/2018 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-2019 (thousands)	UK deaths in 2019	Death rate per 1,000 population	Expected number of deaths in UKRR population	UKRR deaths in 2019	UKRR death rate per 1,000 prevalent RRT patients	Relative risk of death in 2019	Relative risk of death 1998-2001 cohort
20-24	4,153	1,623	0.4	0	6	6	16.3	41.1
25-29	4,514	2,186	0.5	1	9	6	11.6	41.8
30-34	4,497	3,010	0.7	2	40	16	24.5	31.2
35-39	4,396	4,278	1.0	3	65	20	20.1	26.0
40-44	4,020	5,758	1.4	6	85	22	15.0	22.6
45-49	4,402	9,669	2.2	13	200	35	15.8	19.0
50-54	4,661	14,985	3.2	24	321	44	13.7	12.8
55-59	4,406	21,071	4.8	38	437	55	11.4	10.1
60-64	3,755	28,273	7.5	56	551	74	9.9	10.4
65-69	3,368	39,706	11.8	80	688	102	8.6	7.9
70-74	3,319	61,516	18.5	120	962	148	8.0	7.2
75-79	2,325	74,392	32.0	149	960	206	6.4	5.3
80-84	1,715	98,126	57.2	176	834	271	4.7	4.0
≥85	1,647	235,357	142.9	207	597	412	2.9	3.0
Total	**51,178**	**599,950**	**11.7**	**874**	**5,755**	**91**	**6.6**	**7.7**

Cause of death in adult RRT patients

Cause of death was analysed in prevalent patients receiving RRT on 31/12/2018 and followed-up for one year in 2019. 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 31/12/2018 followed-up in 2019 by age group

	RRT all ages		RRT <65 yrs		RRT ≥65 yrs	
Cause of death	N	%	N	%	N	%
Cardiac disease	780	19.5	260	22.2	520	18.4
Cerebrovascular disease	114	2.9	44	3.8	70	2.5
Infection	732	18.3	212	18.1	520	18.4
Malignancy	351	8.8	126	10.8	225	8.0
Treatment withdrawal	709	17.8	118	10.1	591	20.9
Other	1,003	25.1	315	27.0	688	24.4
Uncertain aetiology	306	7.7	94	8.0	212	7.5
Total (with data)	**3,995**	**100.0**	**1,169**	**100.0**	**2,826**	**100.0**
Missing	1,760	30.6	545	31.8	1,215	30.1

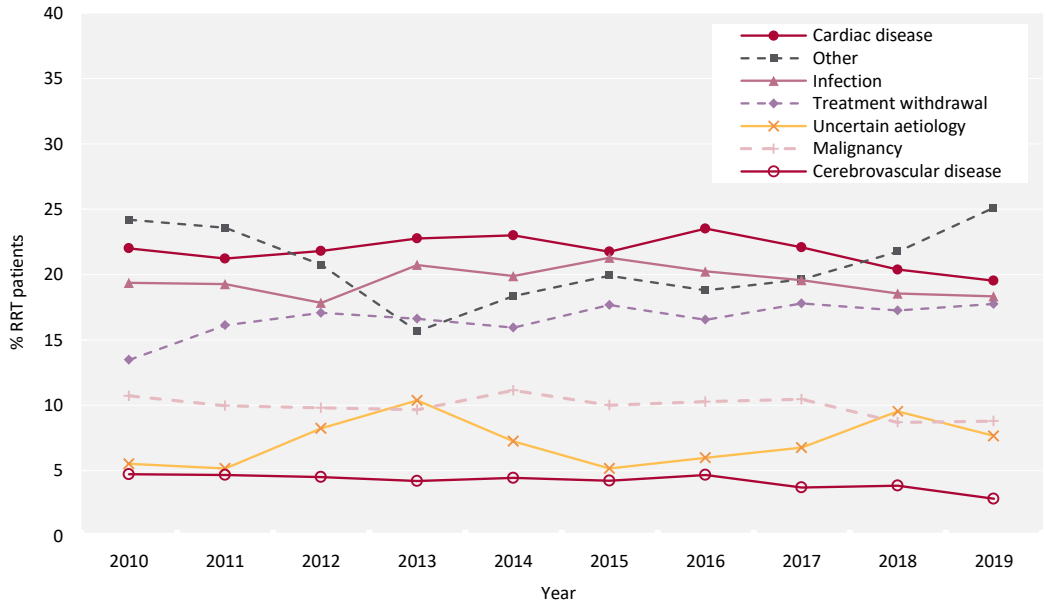


Figure 3.16 Cause of death between 2010 and 2019 for adult patients prevalent to RRT at the beginning of the year

THE RENAL ASSOCIATION
founded 1950

Chapter 4

Adults with a kidney transplant (Tx) in the UK at the end of 2019

Contents

Introduction 78

Rationale for analyses 80

Key findings 81

Analyses 82

- Kidney Tx activity 82
- Early kidney Tx outcomes 84
- Changes to the prevalent adult kidney Tx population 87
- Demographics of prevalent adult kidney Tx patients 91
- Graft function and anaemia in prevalent adult kidney Tx patients 94
- Blood pressure in prevalent adult kidney Tx patients 96
- Biochemistry parameters in prevalent adult kidney Tx patients 97
- Survival of adult kidney Tx patients 99
- Cause of death in adult kidney Tx patients 99
- Hospitalisation of Tx patients 100

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 2019 (figure 4.1). 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.

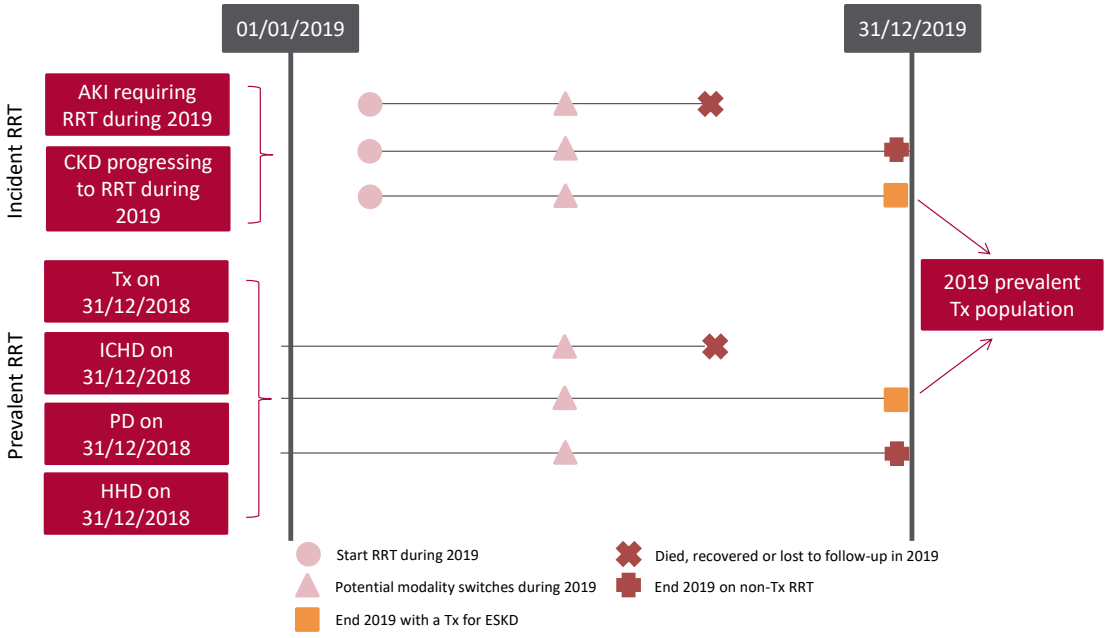


Figure 4.1 Pathways adult patients could follow to be included in the UK 2019 prevalent Tx population

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 2019 or if they had been on RRT for ≥90 days and were on ICHD at the end of 2019.
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 4.1):

- **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/helping-you-to-decide/about-organ-donation/statistics-about-organ-donation. The 2019 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 2019 is reported in this chapter (table 4.1). Audit measures 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 portal (renal.org/audit-research/data-portal). Audit measures that cannot be reported because the required data items were not collected by the UKRR are omitted. The chapter includes analyses carried out by Getting It Right First Time (GIRFT), a national programme designed to reduce unwarranted variation in medical care provided by the NHS by sharing best practice. The GIRFT metrics for renal services, analysed in collaboration with the UKRR, were based on data derived from multiple sources and included equity of access to services, outcomes and pathways in nephrology, dialysis and transplantation.

Table 4.1 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 4.8, figures 4.13–4.14 (proteinuria was not adequately collected)
	Proportion of patients achieving dyslipidaemia targets	Table 4.8
	Incidence of hyperparathyroidism	Table 4.8
	Prevalence of anaemia	Table 4.8, figures 4.11–4.12
Anaemia (2017)	Treatment guidelines for anaemia in kidney Tx patients should be similar to those for CKD patients not on dialysis	Table 4.8, figures 4.11–4.12

In 2019, 23 of the 70 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.

Key findings

- 38,716 adult patients had a kidney Tx for ESKD in the UK on 31/12/2019, which represented 56.8% of the RRT population
- The median age of kidney Tx patients was 55.6 years and 60.8% were male
- There was a 1% increase in overall kidney Tx performed in 2019 compared to 2018, with a decrease in kidney Tx from DBDs (-3%), but an increase in Tx from DCDs (9%). Tx from LKDs have remained the same
- The median eGFR for kidney Tx patients 1 year after transplantation was 56.2 mL/min/1.73m^2 from LKD, 51.9 mL/min/1.73m^2 from DBD and 49.5 mL/min/1.73m^2 from DCD
- 15.7% 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 33.2% of deaths on Tx. For those Tx patients with data, the leading cause of death was malignancy (22.2%), followed by infection (18.7%), 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 4.2). More detailed results are available at organdonation.nhs.uk/helping-you-to-decide/about-organ-donation/statistics-about-organ-donation. The number of patients receiving a pre-emptive Tx is reported by centre in chapter 2.

Table 4.2 Number of kidney and kidney plus other organ Tx (adult and paediatric) in the UK, 2017–2019 calendar years

Organ	2017	2018	2019	% change 2018-2019
Kidney DBD[1]	1,362	1,466	1,417	-3
Kidney DCD[2]	894	940	1024	9
Kidney LKD	1,016	1,036	1,038	0
Kidney and liver	14	18	18	0
Kidney and heart	0	0	1	-
Kidney and pancreas[3]	172	174	157	-10
Kidney and pancreas islets[4]	4	7	7	0
Small bowel (inc kidney)	1	3	4	33
Total kidney Tx	**3,463**	**3,644**	**3,666**	**1**

[1]Includes en bloc kidney Tx (3 in 2017, 6 in 2018 and 5 in 2019) and double kidney Tx (14 in 2017, 14 in 2018 and 18 in 2019).
[2]Includes en bloc kidney Tx (7 in 2017, 8 in 2018 and 3 in 2019) and double kidney Tx (26 in 2017, 15 in 2018 and 24 in 2019).
[3]Includes DCD Tx (48 in 2017, 48 in 2018 and 45 in 2019).
[4]Includes DCD Tx (1 kidney and pancreas islet transplant in 2017 and 3 kidney and pancreas islet transplants in 2018).
DBD – donor after brain death; DCD – donor after circulatory death; LKD – living kidney donor

Variation in the proportion of patients who received an LKD Tx or were on the Tx waiting list within two years of RRT start, is shown for patients incident to RRT in 2017, adjusted by sex, age and primary renal disease (PRD) (figure 4.2). The analysis for LKD transplantation only is shown separately (figure 4.3).

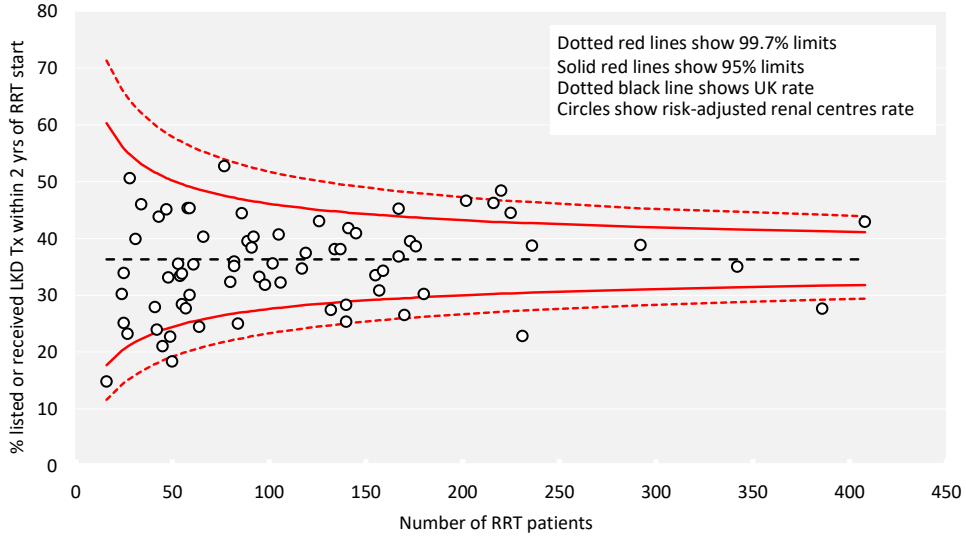


Figure 4.2 Percentage of adult patients incident to RRT in 2017 who were waitlisted or received a living kidney donor (LKD) Tx within 2 years of RRT start adjusted by age, sex and primary renal disease by centre

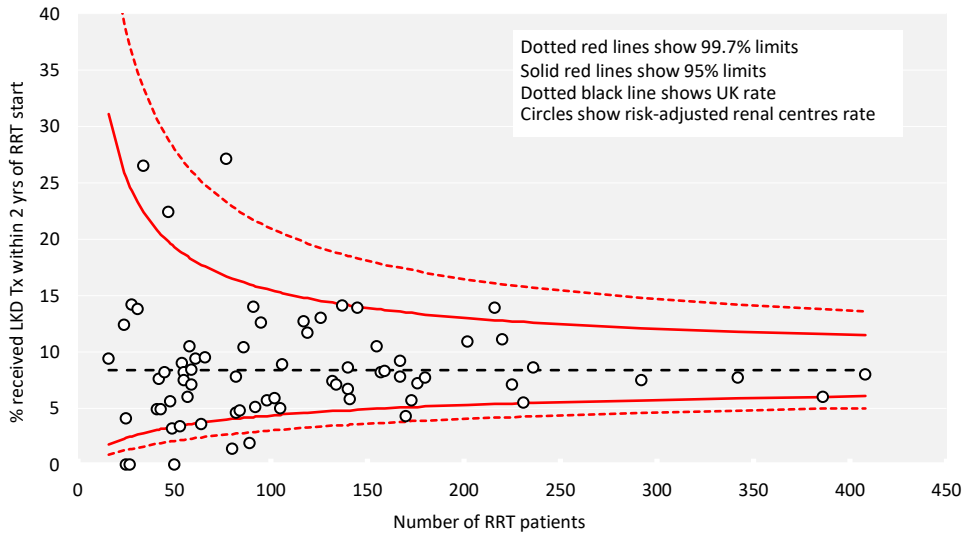


Figure 4.3 Percentage of adult patients incident to RRT in 2017 who received a living kidney donor (LKD) Tx within 2 years of RRT start adjusted by age, sex and primary renal disease by centre

Early kidney Tx outcomes

Kidney Tx recipient outcome data from NHSBT were reported against the Tx centre rather than the referring centre (table 4.3). Note that the survival rates were risk-adjusted and used financial year cohorts as per NHSBT methodology (see table footnote).

Table 4.3 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
Bham	91	97	83	88	99	99	93	92
Belfast	92	98	88	84	98	99	93	95
Bristol	93	95	89	83	99	100	92	92
Camb	97	98	91	89	99	99	95	95
Cardff	96	95	89	86	96	97	91	91
Covnt	90	97	81	82	100	100	93	98
Edin	97	100	86	93	100	100	92	99
Glasgw	93	97	86	84	98	100	89	90
L Barts	92	97	81	80	98	99	88	96
L Guy's	94	97	86	91	98	99	93	93
L Rfree	94	98	85	91	100	100	94	98
L St.G	93	97	88	94	99	100	95	97
L West	95	97	86	88	96	97	90	93
Leeds	93	97	87	89	98	100	89	94
Leic	96	96	87	94	98	99	91	92
Liv Roy	95	97	85	80	97	100	93	96
M RI	95	96	90	87	98	99	95	94
Newc	93	94	84	82	99	100	91	96
Nottm	96	96	88	89	96	96	92	91
Oxford	97	98	88	88	98	100	92	94
Plymth	92	95	78	90	97	100	88	94
Ports	95	99	85	84	100	99	96	98
Sheff	92	99	90	85	99	98	95	100
UK total	**94**	**97**	**87**	**87**	**98**	**99**	**92**	**94**

Cohorts for survival rate estimation: 1 year survival: 1/4/2014–31/03/2018; 5 year survival: 1/4/2010–31/3/2014; 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/17289/kidney-annual-report-2018-19-november19.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 2012–2018) was 97.1%.

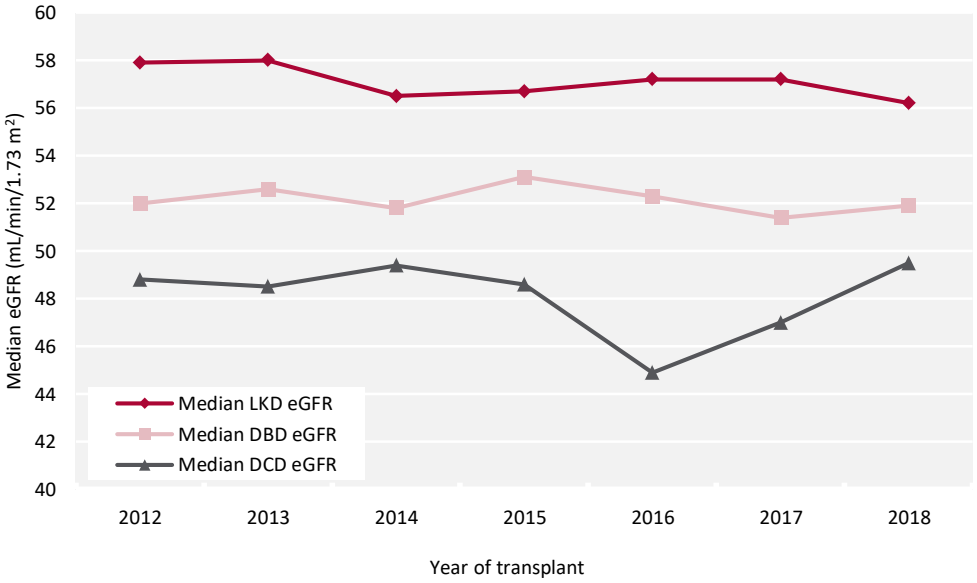


Figure 4.4 Median estimated glomerular filtration rate (eGFR) for kidney Tx at 1 year by donor type and year of transplantation between 2012 and 2018

DBD – donor after brain death; DCD – donor after circulatory death; LKD – living kidney donor

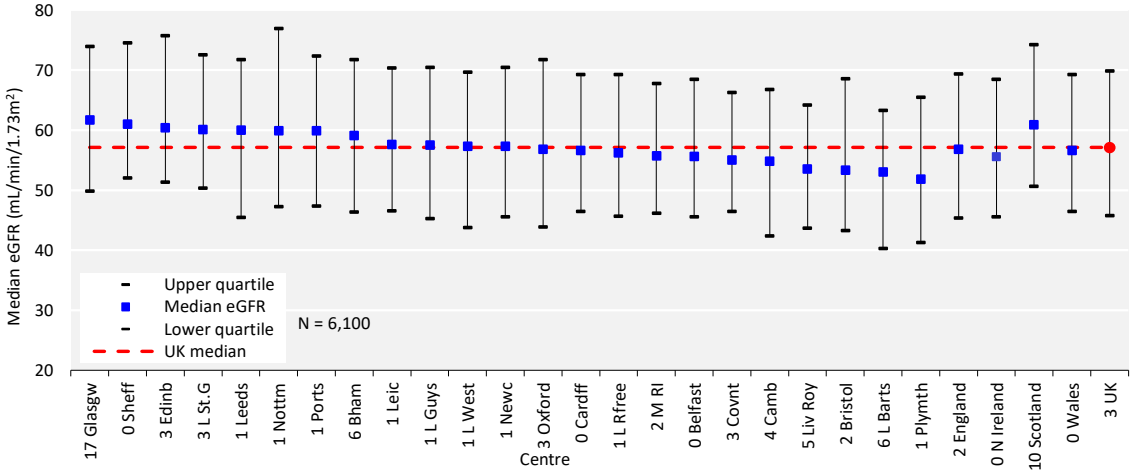


Figure 4.5 Median estimated glomerular filtration rate (eGFR) at 1 year post-living kidney donor (LKD) Tx by transplanting centre and year of transplantation between 2012 and 2018

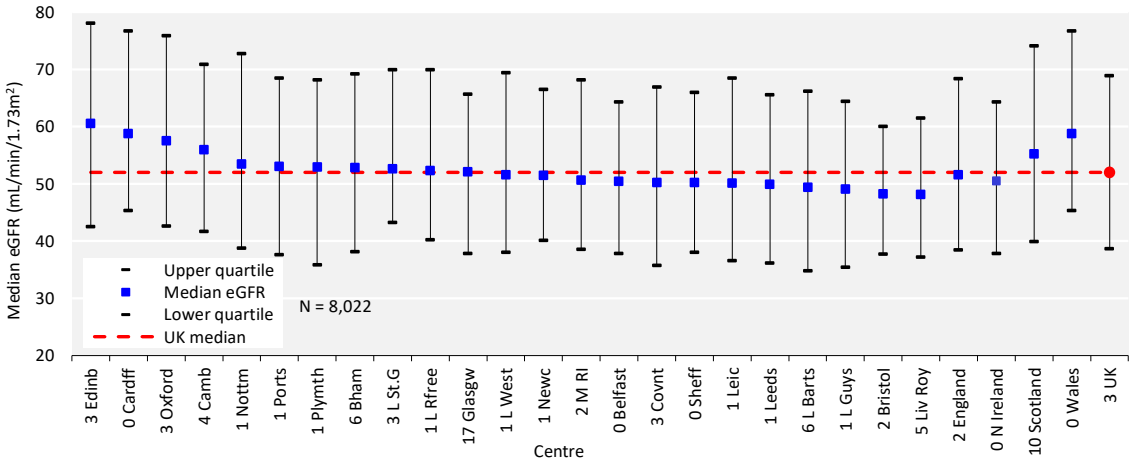


Figure 4.6 Median estimated glomerular filtration rate (eGFR) at 1 year post-donor after brain death (DBD) Tx by transplanting centre and by year of transplantation between 2012 and 2018

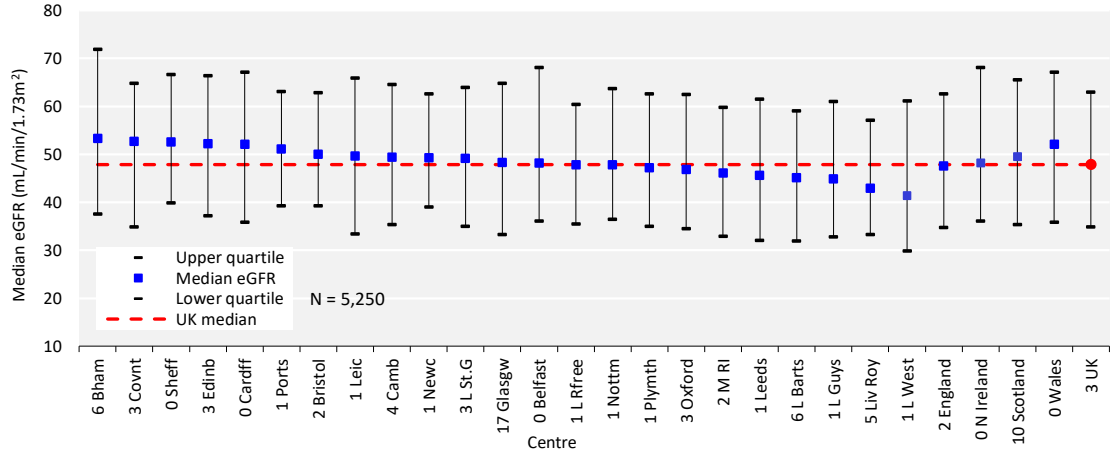


Figure 4.7 Median estimated glomerular filtration rate (eGFR) at 1 year post-donor after circulatory death (DCD) Tx by transplanting centre and by year of transplantation between 2012 and 2018

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 4.4 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 31/12/2019

		Data completeness (%)						
Centre	N with Tx	eGFR	Blood pressure	Haemoglobin	Total cholesterol	Adjusted calcium	Phosphate	PTH
TX CENTRES								
Bham	1,582	93.2	84.0	93.2	86.4	92.9	91.5	2.6
Belfast	676	99.3	96.2	98.5	99.6	98.7	98.4	31.4
Bristol	911	99.5	82.3	99.3	94.4	99.0	98.6	99.0
Camb	1,066	94.5	0.0	94.3	89.9	93.5	93.4	90.5
Cardff	1,052	98.8	96.6	98.8	83.3	98.0	97.9	27.6
Covnt	601	96.5	85.4	96.3	72.6	95.3	42.4	41.3
Edinb	526	88.4		97.0		89.5	87.8	
Glasgw	1,155	99.3		99.1		98.4	98.4	
L Barts	1,319	98.1	0.5	98.0	98.7	97.9	97.9	98.3
L Guys	1,496	98.7	0.0	98.7	49.0	96.2	96.3	38.8
L Rfree	1,376	98.2	87.5	98.2	59.9	97.2	97.2	68.5
L St.G	488	96.3	85.0	96.3	71.5	95.7	95.7	37.9
L West	1,980	97.0	0.0	97.1	45.2	96.3	97.0	40.1
Leeds	1,055	99.8	95.6	99.5	98.4	97.8	92.6	33.9
Leic	1,397	96.6	11.7	96.5	94.9	95.8	95.4	36.1
Liv Roy	778	96.5	2.2	96.4	54.5	95.4	95.8	0.5
M RI	1,346	95.0	3.3	95.0	52.6	95.0	95.0	44.4
Newc	745	97.7	94.8	97.6	63.6	97.3	96.9	76.9
Nottm	729	98.5	96.2	97.9	64.1	97.5	97.3	86.6
Oxford	1,377	86.0	1.5	86.4	51.3	84.5	84.4	41.7
Plymth	338	96.8	93.8	95.9	56.5	95.3	95.0	38.5
Ports	1,112	94.6	12.6	94.7	55.3	93.7	90.1	30.9
Sheff	814	98.5	96.8	98.4	53.4	98.2	97.2	18.2
DIALYSIS CENTRES								
Abrdn	336	99.4		99.1		97.0	96.4	
Airdrie	287	98.3		98.3		97.9	97.9	
Antrim	134	99.3	72.4	99.3	99.3	95.5	96.3	97.8
Bangor	106	100.0	80.2	98.1	97.2	100.0	100.0	22.6
Basldn	102	92.2	56.9	92.2	81.4	92.2	70.6	21.6
Bradfd	400	98.0	31.5	98.0	78.0	92.5	88.8	56.5
Brightn	523	98.3	26.0	97.9	76.5	97.1	95.6	53.7
Carlis	154	89.0	0.0	89.0	63.0	88.3	85.7	41.6
Carsh	811	84.5	4.7	84.3	42.9	83.0	82.9	27.5
Chelms	115	89.6	89.6	87.8	75.7	86.1	84.4	7.8
Clwyd	104	97.1	36.5	97.1	97.1	95.2	95.2	76.9
D&Gall	84	98.8		98.8		95.2	95.2	
Derby	284	97.5	95.4	97.5	93.0	97.2	95.8	89.4
Donc	129	96.9	91.5	96.9	63.6	96.9	96.9	20.9
Dorset	426	88.5	59.2	87.1	66.9	86.6	72.1	49.1
Dudley	109	96.3	53.2	95.4	82.6	87.2	96.3	0.9
Dundee	252	98.8		98.4		98.0	96.4	

Table 4.4 Continued

Centre	N with Tx	Data completeness (%)						
		eGFR	Blood pressure	Haemoglobin	Total cholesterol	Adjusted calcium	Phosphate	PTH
Exeter	530	97.4	86.0	97.0	90.6	96.4	95.7	73.4
Glouc	254	96.9	76.4	96.9	54.7	89.8	87.0	22.1
Hull	486	97.5	2.9	96.3	37.0	94.7	94.7	22.0
Inverns	168	84.5		89.3		87.5	88.1	
Ipswi	233	97.9	94.0	97.9	72.1	97.4	97.4	57.9
Kent	633	98.6	97.3	98.4	71.6	98.0	97.8	15.2
Klmarnk	174	98.3		98.3		96.6	96.6	
Krkcldy	139	95.0		98.6		98.6	98.6	
L Kings	506	97.8	0.2	97.8	77.9	97.8	97.8	80.6
Liv Ain	27	96.3	7.4	96.3	51.9	96.3	96.3	0.0
Middlbr	532	90.4	8.8	90.2	40.0	89.1	88.7	11.5
Newry	155	99.4	83.9	97.4	100.0	96.8	97.4	98.1
Norwch	443	98.4	4.1	96.6	98.4	94.4	93.5	25.1
Prestn	732	97.1	0.0	96.9	67.9	95.9	94.4	39.1
Redng	468	99.6	95.5	99.6	68.0	98.9	79.3	50.4
Salford	668	98.8	0.0	98.7	77.8	98.4	98.4	0.2
Shrew	140	79.3	14.3	78.6	70.0	78.6	78.6	17.1
Stevng	373	97.9	0.0	99.2	40.2	94.4	92.5	55.0
Sthend	105	98.1	91.4	98.1	51.4	97.1	94.3	24.8
Stoke	426	99.3	0.9	99.3	99.8	98.4	98.4	63.6
Sund	273	96.0	0.0	96.3	61.9	96.0	96.0	96.3
Swanse	346	99.7	98.3	98.8	62.1	99.1	99.1	67.9
Truro	252	99.2	0.4	98.8	92.9	98.0	98.0	89.3
Ulster	77	97.4	96.1	97.4	96.1	96.1	97.4	6.5
West NI	204	94.6	94.6	96.6	99.0	89.2	96.6	88.2
Wirral	174	92.0	1.2	89.7	46.6	81.0	79.9	6.3
Wolve	214	84.6	67.3	80.4	67.3	82.2	12.6	22.9
Wrexm	173	98.8	91.9	99.4	99.4	98.8	98.8	99.4
York	340	98.8	79.4	97.9	79.1	96.8	95.9	24.4
TOTALS								
England	**31,372**	**95.90**	**37.72**	**95.71**	**68.83**	**94.66**	**92.00**	**45.18**
N Ireland	**1,246**	**98.39**	**91.81**	**98.07**	**99.28**	**96.39**	**97.67**	**54.57**
Scotland	**3,121**	**96.28**		**97.98**		**95.93**	**95.48**	
Wales	**1,781**	**98.93**	**91.97**	**98.71**	**82.37**	**98.26**	**98.20**	**44.97**
UK	**37,520**	**96.16**	**38.96**	**96.12**	**64.75**	**95.00**	**92.77**	**41.98**

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 70 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 4.5 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)	2019 crude rate (pmp)
	2015	2016	2017	2018	2019	2015	2016	2017	2018	2019		
TX CENTRES												
Belfast	562	593	632	665	701	73.1	73.1	75.6	76.4	78.8	0.53	1,328
Bham	1,279	1,400	1,509	1,566	1,636	44.2	46.1	47.8	48.4	49.5	2.03	805
Bristol	895	907	906	923	938	60.6	61.8	61.6	62.8	63.1	1.21	775
Camb	919	950	972	1,017	1,123	70.5	71.9	73.1	73.4	76.5	0.93	1,211
Cardff	1,036	1,034	1,045	1,071	1,081	64.2	63.6	62.1	62.3	62.5	1.15	944
Covnt	518	528	565	577	620	54.0	54.3	58.6	60.3	57.6	0.79	787
Edinb	458	453	482	522	546	59.6	58.3	58.5	60.6	61.7	0.84	652
Glasgw	1,049	1,105	1,136	1,156	1,216	61.4	63.0	64.1	63.7	65.6	1.37	889
L Barts	1,067	1,138	1,195	1,265	1,376	46.8	48.1	48.0	48.7	51.7	1.57	874
L Guys	1,302	1,366	1,413	1,456	1,547	64.7	65.1	65.4	65.4	67.0	1.00	1,553
L Rfree	1,224	1,287	1,344	1,372	1,422	58.5	59.2	61.3	61.3	60.7	1.32	1,081
L St.G	456	458	479	487	502	54.5	54.8	57.8	58.9	58.9	0.66	763
L West	1,784	1,823	1,894	1,972	2,049	54.2	53.8	54.6	55.5	56.7	1.95	1,053
Leeds	954	977	997	1,051	1,078	62.6	63.0	61.6	62.5	62.6	1.36	793
Leic	1,149	1,242	1,288	1,361	1,442	52.9	54.2	54.7	55.5	55.7	2.07	698
Liv Roy	792	778	788	808	804	63.8	64.1	63.1	63.9	65.5	0.80	1,000
M RI	1,293	1,382	1,396	1,420	1,408	68.8	70.1	68.4	68.8	68.4	1.32	1,066
Newc	647	678	709	732	769	64.1	64.6	63.6	63.5	65.5	0.94	815
Nottm	644	678	720	738	751	57.9	58.8	61.2	61.9	61.7	0.92	816
Oxford	1,164	1,223	1,341	1,400	1,432	68.9	69.3	71.6	72.4	72.7	1.43	1,000
Plymth	332	328	339	360	356	66.0	63.9	62.8	66.9	67.0	0.40	896
Ports	928	979	1,052	1,067	1,134	55.6	57.9	60.2	60.5	60.2	1.73	654
Sheff	728	752	784	819	836	52.6	52.9	54.5	55.3	56.1	1.12	744
DIALYSIS CENTRES												
Abrdn	287	303	311	329	343	54.1	54.6	55.2	57.4	61.5	0.50	688
Airdrie	214	230	257	274	296	50.4	52.4	55.0	56.3	56.5	0.46	648
Antrim	99	112	120	131	139	41.1	44.4	47.1	47.8	49.6	0.24	572
Bangor	83	89	94	99	106	45.6	49.7	48.2	49.0	52.7	0.16	653
Basldn	75	79	99	107	104	27.3	28.9	32.9	33.8	32.3	0.34	305
Bradfd	329	360	375	391	413	56.4	56.6	55.7	56.8	56.3	0.49	849
Brightn	451	472	486	510	542	47.5	47.6	48.1	48.3	51.2	1.07	508
Carlis	162	148	155	161	156	57.7	53.1	55.2	55.0	51.5	0.25	617
Carsh	643	681	721	765	830	40.5	41.2	42.6	43.4	46.9	1.61	515
Chelms	112	107	116	118	116	39.7	39.5	42.0	45.0	44.4	0.37	312
Clwyd	81	89	94	98	104	43.8	50.3	52.2	51.6	50.7	0.18	580
D&Gall	65	71	76	83	87	50.0	54.2	56.3	57.2	58.4	0.12	713
Derby	213	223	233	258	294	39.6	41.1	42.0	44.0	45.1	0.56	529
Donc	97	110	117	120	131	32.1	33.2	35.1	36.1	38.3	0.37	352
Dorset	347	368	394	422	435	51.0	53.6	53.7	55.2	56.4	0.72	602
Dudley	84	94	95	106	111	26.7	27.2	25.8	29.0	30.3	0.34	326
Dundee	216	219	232	254	259	51.6	52.4	53.3	57.1	57.7	0.37	706
Exeter	446	477	513	539	543	46.1	47.1	48.5	49.5	49.8	0.94	575
Glouc	178	186	214	242	267	40.1	39.4	42.1	46.5	50.9	0.51	529
Hull	423	454	459	479	498	49.4	53.2	52.6	54.4	55.1	0.79	628
Inverns	146	154	164	169	171	57.9	59.7	62.6	60.6	60.6	0.22	768
Ipswi	221	232	235	232	237	55.1	55.8	54.0	54.2	55.9	0.31	766
Kent	555	584	594	633	650	53.3	54.4	54.5	56.9	57.0	1.06	614
Klmarnk	137	143	159	166	182	44.2	45.1	47.2	49.0	50.7	0.29	626
Krkcldy	125	132	149	153	143	42.4	44.9	49.0	51.3	48.5	0.27	525

Table 4.5 Continued

Centre	N with Tx					% with Tx					Estimated catchment population (millions)	2019 crude rate (pmp)
	2015	2016	2017	2018	2019	2015	2016	2017	2018	2019		
L Kings	428	434	459	481	524	39.5	39.1	40.0	40.6	42.1	0.92	567
Liv Ain	15	14	14	20	28	6.8	6.2	6.7	9.3	13.3	0.43	65
Middlbr	524	532	536	538	554	58.2	59.8	59.2	57.9	58.4	0.80	693
Newry	115	126	138	151	160	51.1	53.4	57.3	60.4	63.8	0.23	688
Norwch	346	391	418	442	451	48.1	50.8	53.8	56.3	55.8	0.68	660
Prestn	588	601	670	718	743	48.4	49.9	52.8	54.4	55.4	1.22	608
Redng	409	431	447	468	484	52.8	54.6	56.2	57.5	56.3	0.69	700
Salford	478	510	568	620	684	49.1	50.1	51.0	52.8	55.3	1.14	600
Shrew	136	133	137	143	142	36.9	35.3	35.7	33.4	33.2	0.41	349
Stevng	295	337	365	377	385	36.3	38.1	41.3	40.2	39.9	1.10	350
Sthend	103	92	97	104	106	41.9	39.0	38.2	39.5	40.2	0.27	391
Stoke	380	402	408	418	437	48.2	48.7	50.4	51.9	54.4	0.72	603
Sund	220	239	262	275	278	47.9	47.1	48.3	49.4	48.9	0.54	513
Swanse	329	328	334	346	356	43.0	42.4	42.0	41.8	41.0	0.75	474
Truro	231	239	242	249	259	55.8	56.1	57.1	57.0	57.7	0.35	730
Ulster	55	58	66	75	77	32.5	34.9	36.3	39.3	42.3	0.20	383
West NI	158	169	188	202	207	53.9	55.1	60.1	62.0	63.1	0.25	834
Wirral	74	117	156	165	179	26.3	34.7	40.4	41.8	43.6	0.47	385
Wolve	185	185	193	201	215	31.8	32.5	33.1	33.1	36.0	0.54	396
Wrexm	144	155	170	170	175	49.2	50.0	52.8	54.3	56.3	0.21	850
York	301	304	324	338	348	61.4	56.8	58.4	59.6	59.9	0.48	723
TOTALS												
England	**27,124**	**28,410**	**29,793**	**31,031**	**32,367**	**52.9**	**53.7**	**54.6**	**55.4**	**56.3**	**44.33**	**730**
N Ireland	**989**	**1,058**	**1,144**	**1,224**	**1,284**	**58.3**	**59.7**	**62.6**	**64.0**	**66.5**	**1.45**	**884**
Scotland	**2,697**	**2,810**	**2,966**	**3,106**	**3,243**	**55.7**	**56.9**	**58.2**	**59.3**	**60.6**	**4.43**	**732**
Wales	**1,673**	**1,695**	**1,737**	**1,784**	**1,822**	**55.1**	**55.3**	**54.7**	**54.8**	**55.0**	**2.45**	**744**
UK	**32,483**	**33,973**	**35,640**	**37,145**	**38,716**	**53.4**	**54.2**	**55.1**	**55.9**	**56.8**	**52.67**	**735**

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.
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 4.6 Demographics of adult patients prevalent to Tx on 31/12/2019 by centre

Centre	N on RRT	N with Tx	% with Tx	Median age (yrs)	% male	Ethnicity				
						% White	% Asian	% Black	% Other	% missing
TX CENTRES										
Belfast	890	701	78.8	55.5	58.5	97.4	1.8	0.7	0.2	2.6
Bham	3,308	1,636	49.5	53.1	58.4	63.1	27.5	7.1	2.3	0.6
Bristol	1,486	938	63.1	55.6	60.5	90.1	4.3	4.0	1.7	0.2
Camb	1,469	1,123	76.4	54.7	62.4	90.8	6.2	1.9	1.1	0.2
Cardff	1,730	1,081	62.5	55.5	63.1	92.9	4.6	0.4	2.0	0.4
Covnt	1,076	620	57.6	55.0	61.9	80.5	15.7	3.9	0.0	0.2
Edinb	885	546	61.7	56.3	63.4					71.6
Glasgw	1,854	1,216	65.6	55.5	59.4					40.6
L Barts	2,660	1,376	51.7	53.8	60.3	39.4	32.4	18.9	9.3	0.2
L Guys	2,310	1,547	67.0	53.0	59.3	66.2	10.2	19.2	4.4	0.8
L Rfree	2,344	1,422	60.7	54.8	58.7	48.2	21.9	19.3	10.6	2.8
L St.G	852	502	58.9	56.9	57.6	48.1	24.9	17.5	9.7	3.0
L West	3,613	2,049	56.7	57.5	63.1	44.1	32.7	14.6	8.5	0.0
Leeds	1,723	1,078	62.6	55.3	60.5	80.7	14.8	3.4	1.1	0.0
Leic	2,587	1,442	55.7	56.6	58.4	73.2	21.4	4.0	1.3	1.5
Liv Roy	1,227	804	65.5	55.0	62.2	92.8	2.7	2.4	2.1	0.3
M RI	2,060	1,408	68.3	54.8	60.4	76.7	15.0	6.6	1.7	1.1
Newc	1,175	769	65.4	56.5	59.6	94.4	4.4	0.7	0.5	0.0
Nottm	1,218	751	61.7	54.5	60.6	84.3	8.0	4.9	2.8	0.0
Oxford	1,969	1,432	72.7	55.5	62.8	81.5	11.8	3.2	3.5	7.8
Plymth	531	356	67.0	58.4	67.1	96.4	1.1	0.3	2.3	0.0
Ports	1,883	1,134	60.2	56.4	59.5	93.5	4.1	0.7	1.7	2.2
Sheff	1,491	836	56.1	55.2	62.1	89.8	5.9	1.8	2.5	0.7
DIALYSIS CENTRES										
Abrdn	558	343	61.5	51.9	57.1					53.6
Airdrie	524	296	56.5	55.2	59.5	96.1	2.1	0.4	1.4	3.7
Antrim	280	139	49.6	55.8	63.3	100.0	0.0	0.0	0.0	0.0
Bangor	201	106	52.7	56.0	61.3	98.1	0.0	1.0	1.0	0.9
Basldn	322	104	32.3	53.0	65.4	87.5	4.8	3.9	3.9	0.0
Bradfd	733	413	56.3	52.3	61.5	54.0	43.3	2.2	0.5	0.0
Brightn	1,059	542	51.2	55.5	62.0	90.0	6.3	2.0	1.7	0.4
Carlis	303	156	51.5	56.2	66.7	98.1	1.9	0.0	0.0	0.0
Carsh	1,771	830	46.9	57.0	63.3	70.8	17.1	8.6	3.5	0.6
Chelms	261	116	44.4	58.1	69.0	88.8	2.6	3.5	5.2	0.0
Colchr	145	0								
Clwyd	205	104	50.7	57.0	60.6	97.1	1.9	0.0	1.0	1.0
D&Gall	149	87	58.4	56.5	60.9	97.2	1.4	0.0	1.4	18.4
Derby	652	294	45.1	56.7	61.9	83.7	10.5	2.7	3.1	0.0
Donc	342	131	38.3	58.4	67.9	95.4	2.3	0.8	1.5	0.0
Dorset	772	435	56.3	59.5	58.2	97.7	0.9	0.2	1.2	0.2
Dudley	366	111	30.3	58.6	67.6	79.3	14.4	3.6	2.7	0.0
Dundee	449	259	57.7	56.0	60.6					54.4
Exeter	1,091	543	49.8	56.3	57.6	98.5	0.6	0.6	0.4	0.0
Glouc	525	267	50.9	58.1	60.7	93.6	3.8	1.1	1.5	0.0
Hull	904	498	55.1	55.1	64.1	97.0	1.4	0.6	1.0	0.2

Table 4.6 Continued

Centre	N on RRT	N with Tx	% with Tx	Median age (yrs)	% male	Ethnicity				
						% White	% Asian	% Black	% Other	% missing
Inverns	282	171	60.6	54.5	57.3	95.0	2.5	2.5	0.0	29.2
Ipswi	424	237	55.9	58.3	64.1	85.1	2.6	2.6	9.8	0.8
Kent	1,140	650	57.0	57.0	58.8	92.5	4.8	0.9	1.9	0.0
Klmarnk	359	182	50.7	56.9	60.4					42.3
Krkcldy	295	143	48.5	57.5	62.2					70.6
L Kings	1,244	524	42.1	57.2	62.4	49.7	15.4	30.1	4.8	0.6
Liv Ain	210	28	13.3	50.9	50.0	100.0	0.0	0.0	0.0	0.0
Middlbr	949	554	58.4	56.4	61.6	95.1	4.3	0.4	0.2	0.0
Newry	251	160	63.7	56.1	54.4	98.1	0.6	0.6	0.6	0.0
Norwch	809	451	55.7	57.5	59.7	96.9	2.0	0.9	0.2	0.0
Prestn	1,341	743	55.4	55.8	61.6	86.3	12.7	0.7	0.4	0.0
Redng	860	484	56.3	57.6	62.2	67.0	25.3	5.7	2.0	6.0
Salford	1,237	684	55.3	55.8	58.9	82.5	14.6	1.9	1.0	0.0
Shrew	428	142	33.2	55.7	61.3	93.7	2.8	2.1	1.4	0.0
Stevng	966	385	39.9	56.0	62.6	69.4	18.9	8.4	3.4	0.8
Sthend	264	106	40.2	54.6	55.7	86.8	7.6	1.9	3.8	0.0
Stoke	803	437	54.4	54.4	62.7	91.0	6.0	1.2	1.9	1.1
Sund	568	278	48.9	56.4	60.8	96.0	2.9	1.1	0.0	0.0
Swanse	868	356	41.0	57.7	61.2	97.2	1.7	0.0	1.1	0.6
Truro	449	259	57.7	56.5	56.4	98.1	0.4	0.0	1.5	0.0
Ulster	182	77	42.3	55.3	54.6	94.8	1.3	3.9	0.0	0.0
West NI	328	207	63.1	53.5	61.8	98.1	1.5	0.5	0.0	0.0
Wirral	411	179	43.6	58.1	63.7	95.5	2.8	1.1	0.6	0.0
Wolve	598	215	36.0	54.4	57.7	70.8	22.6	6.6	0.0	1.4
Wrexm	311	175	56.3	52.7	67.4	96.0	1.7	0.0	2.3	0.0
York	581	348	59.9	56.4	58.9	97.4	1.5	0.0	1.2	0.6
TOTALS										
England	**57,510**	**32,367**	**56.3**	**55.6**	**60.8**	**76.3**	**13.9**	**6.6**	**3.2**	**1.0**
N Ireland	**1,931**	**1,284**	**66.5**	**55.4**	**58.8**	**97.7**	**1.3**	**0.8**	**0.2**	**1.4**
Scotland	**5,355**	**3,243**	**60.6**	**55.3**	**60.0**					**45.2**
Wales	**3,315**	**1,822**	**55.0**	**55.6**	**62.9**	**94.6**	**3.4**	**0.3**	**1.8**	**0.4**
UK	**68,111**	**38,716**	**56.8**	**55.6**	**60.8**	**78.5**	**12.6**	**6.0**	**2.9**	**4.7**

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.

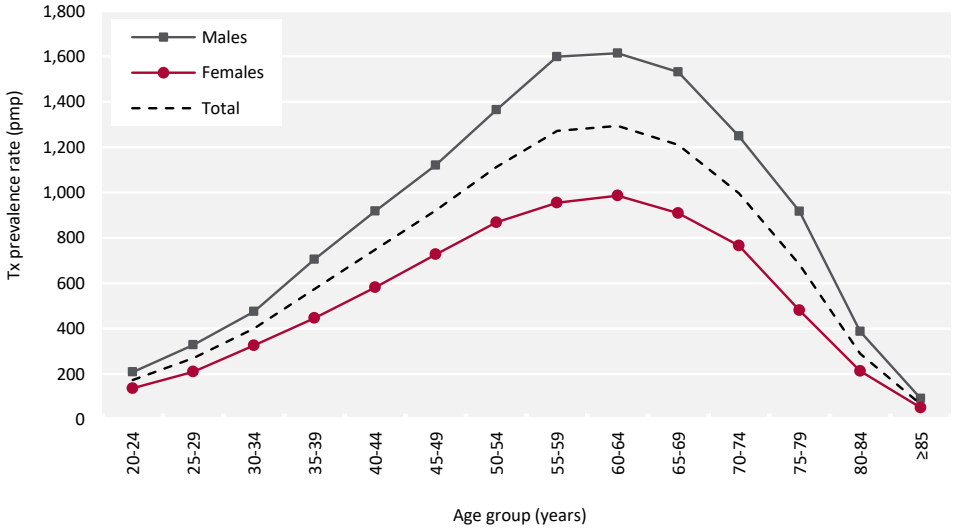


Figure 4.8 Adult Tx prevalence rate on 31/12/2019 by age group and sex
pmp – per million population

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 4.7). Comparison to dialysis populations is shown in chapter 3. 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 4.7 Primary renal diseases (PRDs) of adult patients incident to Tx in 2019 and adult patients prevalent to Tx on 31/12/2019

	Incident Tx		Prevalent Tx	
PRD	N	%	N	%
Diabetes	565	16.7	4,543	11.9
Glomerulonephritis	788	23.3	8,851	23.2
Hypertension	240	7.1	2,049	5.4
Polycystic kidney disease	403	11.9	5,266	13.8
Pyelonephritis	233	6.9	4,287	11.2
Renal vascular disease	59	1.7	437	1.1
Other	638	18.9	7,187	18.9
Uncertain aetiology	456	13.5	5,500	14.4
Total (with data)	**3,382**	**100.0**	**38,120**	100.0
Missing	147	4.2	596	1.5

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).

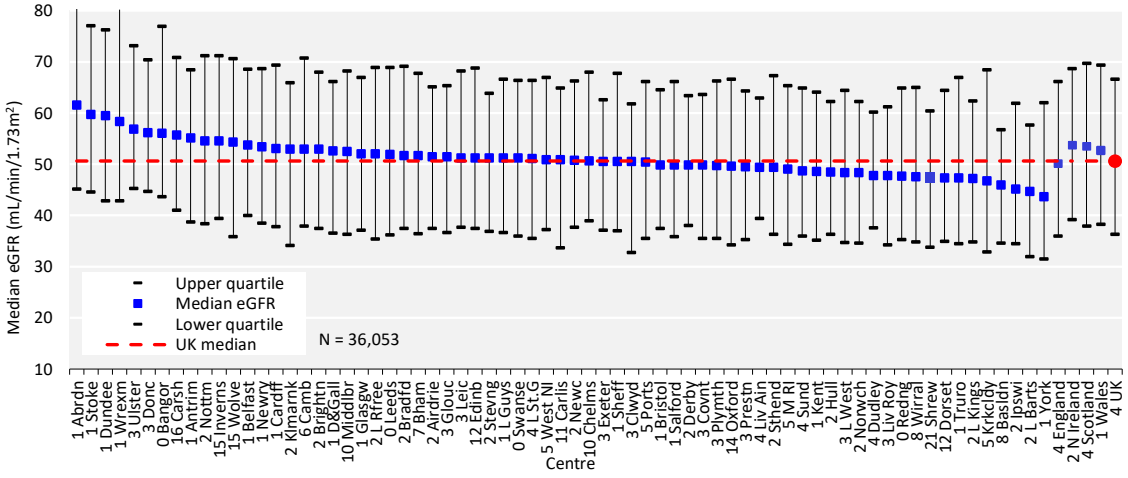


Figure 4.9 Median estimated glomerular filtration rate (eGFR) in adult patients prevalent to Tx on 31/12/2019 by centre

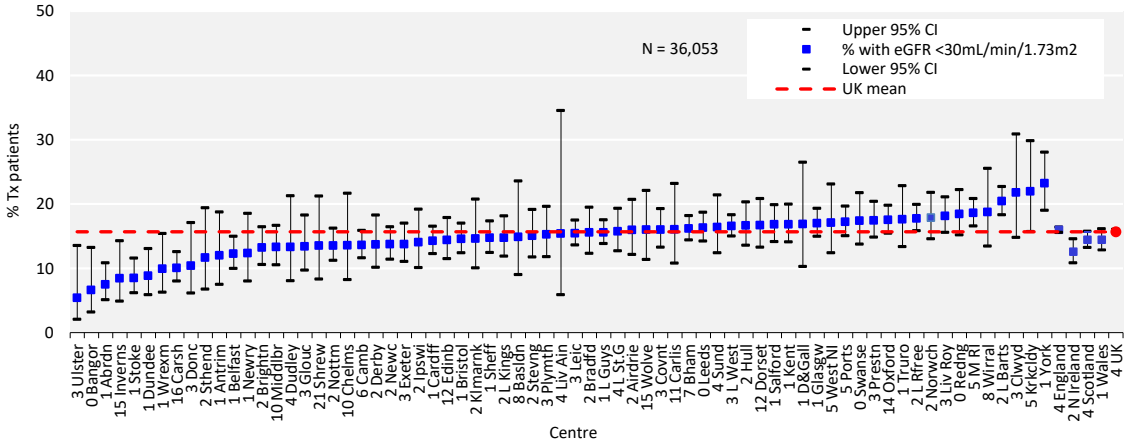


Figure 4.10 Percentage of adult patients prevalent to Tx on 31/12/2019 with an estimated glomerular filtration rate (eGFR) <30mL/min/1.73m^2 by centre
CI – confidence interval

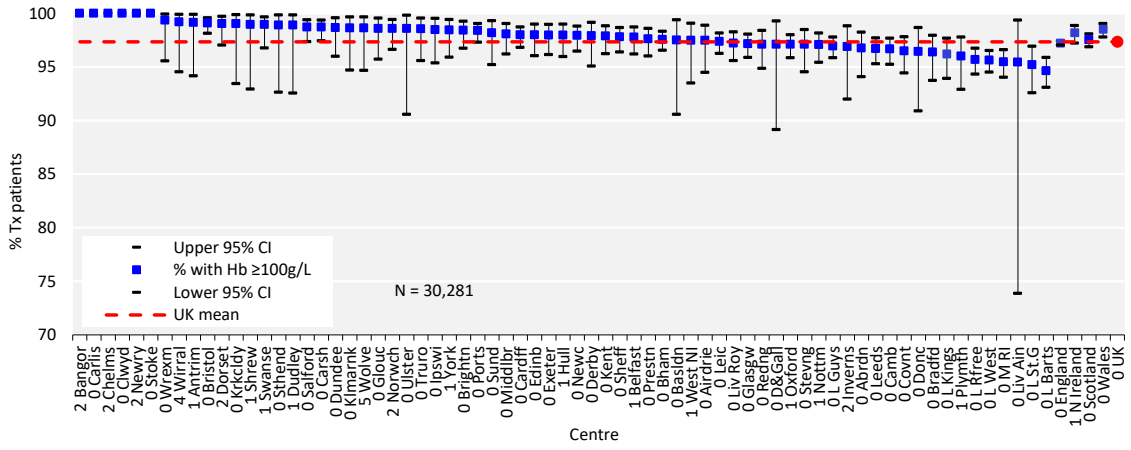


Figure 4.11 Percentage of adult patients prevalent to Tx on 31/12/2019 with an estimated glomerular filtration rate (eGFR) ≥30mL/min/1.73m^2 achieving haemoglobin (Hb) ≥100g/L by centre
CI – confidence interval

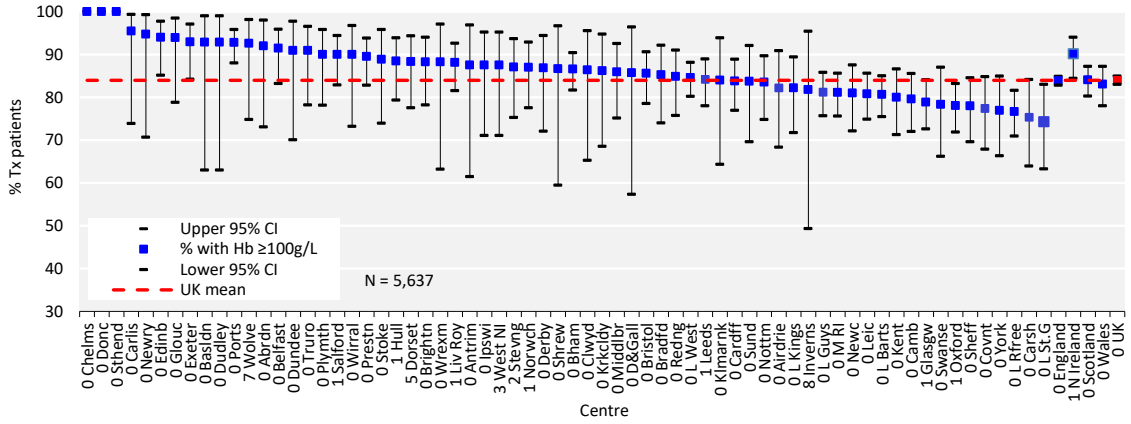


Figure 4.12 Percentage of adult patients prevalent to Tx on 31/12/2019 with an estimated glomerular filtration rate (eGFR) <30mL/min/1.73m^2 achieving haemoglobin (Hb) ≥100g/L by centre
CI – confidence interval

Blood pressure in prevalent adult kidney Tx patients

Blood pressure data completeness was variable (table 4.4) 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.

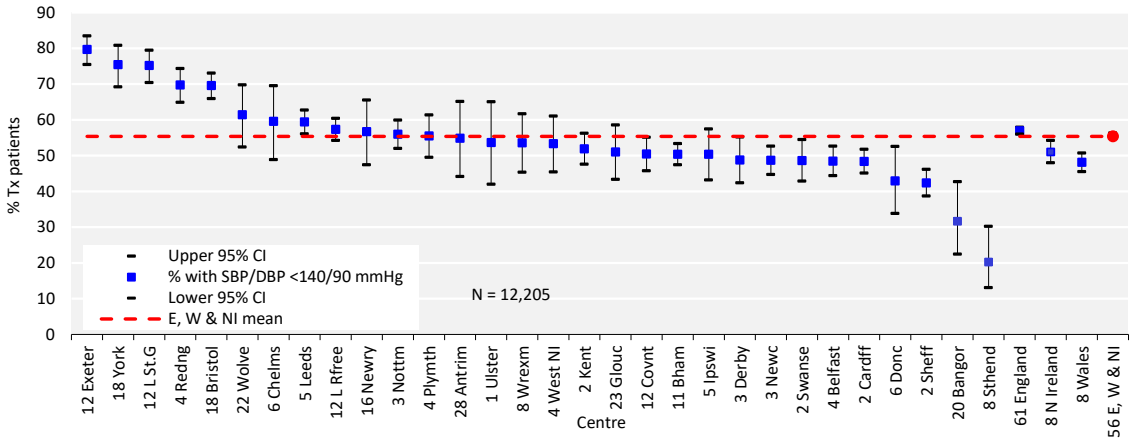


Figure 4.13 Percentage of adult patients prevalent to Tx on 31/12/2019 with estimated glomerular filtration rate (eGFR) ≥30 mL/min/1.73m^2 achieving blood pressure of <140/90 mmHg by centre
CI – confidence interval; DBP – diastolic blood pressure; SBP – systolic blood pressure

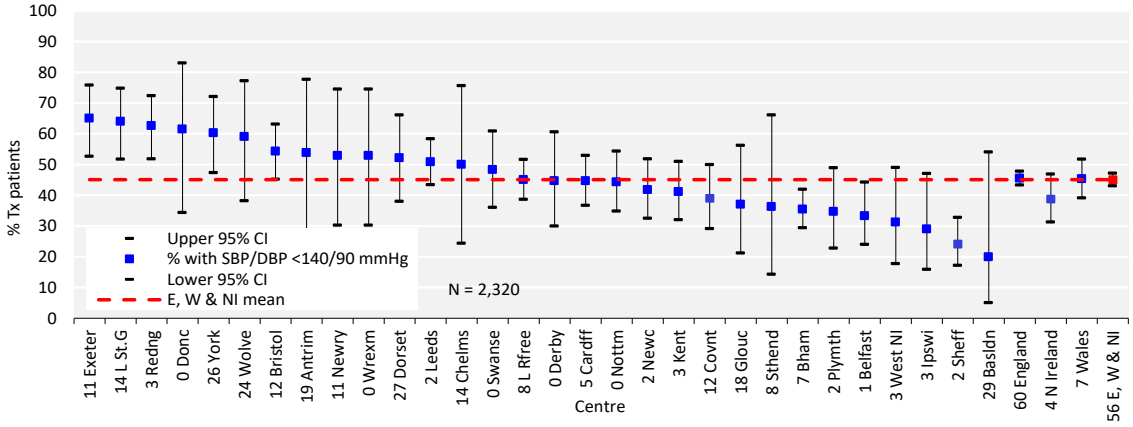


Figure 4.14 Percentage of adult patients prevalent to Tx on 31/12/2019 with estimated glomerular filtration rate (eGFR) <30 mL/min/1.73m^2 achieving blood pressure of <140/90 mmHg by centre
CI – confidence interval; DBP – diastolic blood pressure; SBP – systolic blood pressure

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 4.8 Estimated glomerular filtration rate (eGFR), blood pressure and biochemical parameters in adult patients prevalent to Tx on 31/12/2019 compared with adult patients prevalent to dialysis on 31/12/2019 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	12,346	18,073	4,801	858	22,475
%	34.2	50.1	13.3	2.4	
eGFR (mL/min/1.73m²)					
mean ± SD	76.9 ± 13.5	45.3 ± 8.4	23.6 ± 4.1	11.8 ± 2.4	
median	73.5	45.4	24.2	12.3	
SBP (mmHg)					
mean ± SD	135 ± 17	138 ± 18	141 ± 19	143 ± 20	136 ± 25
% ≥140 mmHg	35.6	42.8	49.7	57.9	41.5
DBP (mmHg)					
mean ± SD	80 ± 11	80 ± 11	80 ± 12	80 ± 14	69 ± 15
% ≥90 mmHg	17.1	18.3	18.9	24.2	9.6
Total cholesterol (mmol/L)					
mean ± SD	4.3 ± 1.1	4.4 ± 1.1	4.5 ± 1.2	4.6 ± 1.3	3.8 ± 1.1
% ≥4.0 mmol/L	63.8	64.4	63.3	70.4	40.2
Haemoglobin (g/L)					
mean ± SD	137 ± 16	129 ± 17	116 ± 16	107 ± 16	110 ± 14
% <100 g/L	1.4	3.5	12.9	33.5	19.8
Phosphate (mmol/L)					
mean ± SD	0.9 ± 0.2	1.0 ± 0.2	1.1 ± 0.2	1.4 ± 0.4	1.7 ± 0.4
% >1.7 mmol/L	0.1	0.2	1.8	19.8	40.4
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	26.2	25.8	21.4	14.2	16.2
% <2.2 mmol/L	2.4	3.2	7.0	13.6	15.8
PTH (pmol/L)					
median	8.4	9.8	15.8	27.2	31.6
% >72 pmol/L	0.2	0.6	2.8	13.0	16.7

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 01/01/2009 and 31/12/2017 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 4.9 Differences in median estimated glomerular filtration rate (eGFR) slope between demographic subgroups of adult patients who received their first kidney Tx between 01/01/2009 and 31/12/2017

Characteristic	N	Median slope	Lower quartile	Upper quartile
Age at Tx (yrs)				
<40	4,875	-1.38	-4.63	0.83
40-55	7,715	-0.64	-2.94	1.18
>55	7,340	-0.66	-3.06	1.10
Ethnicity				
White	14,398	-0.66	-3.06	1.12
Asian	2,583	-1.34	-4.19	0.85
Black	1,361	-1.62	-5.08	0.69
Other	310	-0.95	-4.09	0.97
Sex				
Male	12,290	-0.54	-2.95	1.28
Female	7,640	-1.26	-3.98	0.75
Diabetes				
No Diabetes	16,571	-0.71	-3.19	1.10
Diabetes	3,145	-1.34	-4.22	0.85
Tx donor				
Deceased	13,162	-0.81	-3.42	1.14
Living	6,768	-0.80	-3.21	1.00
Year of Tx				
2009	1,904	-0.93	-2.72	0.33
2010	1,995	-0.87	-2.65	0.51
2011	1,971	-0.78	-3.02	0.67
2012	2,175	-0.97	-3.14	0.63
2013	2,391	-0.97	-3.22	0.77
2014	2,326	-0.70	-3.23	1.13
2015	2,313	-0.60	-3.28	1.59
2016	2,366	-0.60	-3.90	2.38
2017	2,489	-0.45	-5.96	4.01
Status of Tx patients at end of follow-up				
Died	1,715	-1.20	-4.29	1.07
Graft failed	1,662	-6.33	-12.38	-3.32
Re-transplanted	82	-3.70	-7.31	-1.66
Graft functioning	16,553	-0.49	-2.58	1.27
Total	**19,930**	**-0.80**	**-3.35**	**1.09**

Survival of adult kidney Tx patients

Survival of incident and prevalent RRT patients is described in detail in chapters 2 and 3, respectively. Survival of incident Tx patients is reported in table 4.3. 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 31/12/2018 and followed-up for one year in 2019, with comparisons between Tx and dialysis presented in table 4.10. 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 4.10 Cause of death in adult patients prevalent to RRT on 31/12/2018 followed-up in 2019 by modality

	All modalities		Dialysis		Tx	
Cause of death	N	%	N	%	N	%
Cardiac disease	780	19.5	665	20.5	115	15.3
Cerebrovascular disease	114	2.9	79	2.4	35	4.6
Infection	732	18.3	591	18.2	141	18.7
Malignancy	351	8.8	184	5.7	167	22.2
Treatment withdrawal	709	17.7	680	21.0	29	3.9
Other	1,003	25.1	801	24.7	202	26.8
Uncertain aetiology	306	7.7	242	7.5	64	8.5
Total (with data)	**3,995**	**100.0**	**3,242**	**100.0**	**753**	**100.0**
Missing	1,760	30.6	1,386	29.9	374	33.2

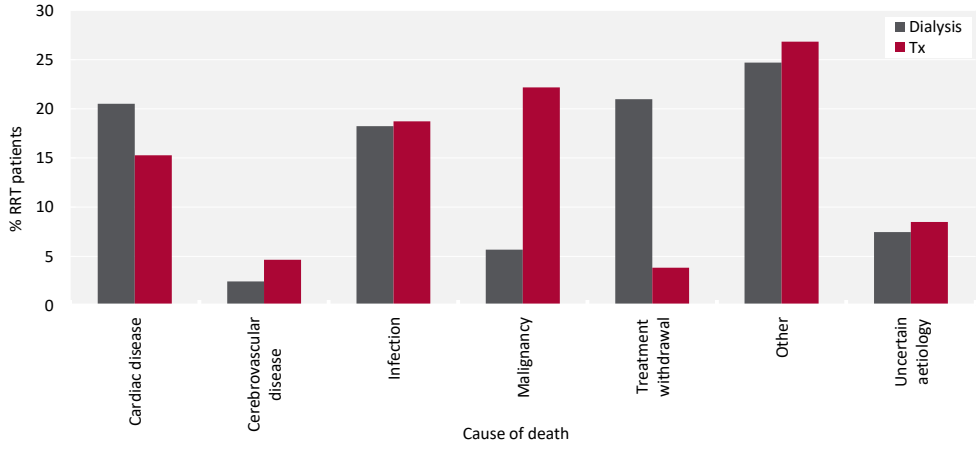


Figure 4.15 Cause of death for adult patients prevalent to RRT on 31/12/2018 followed-up in 2019 by modality

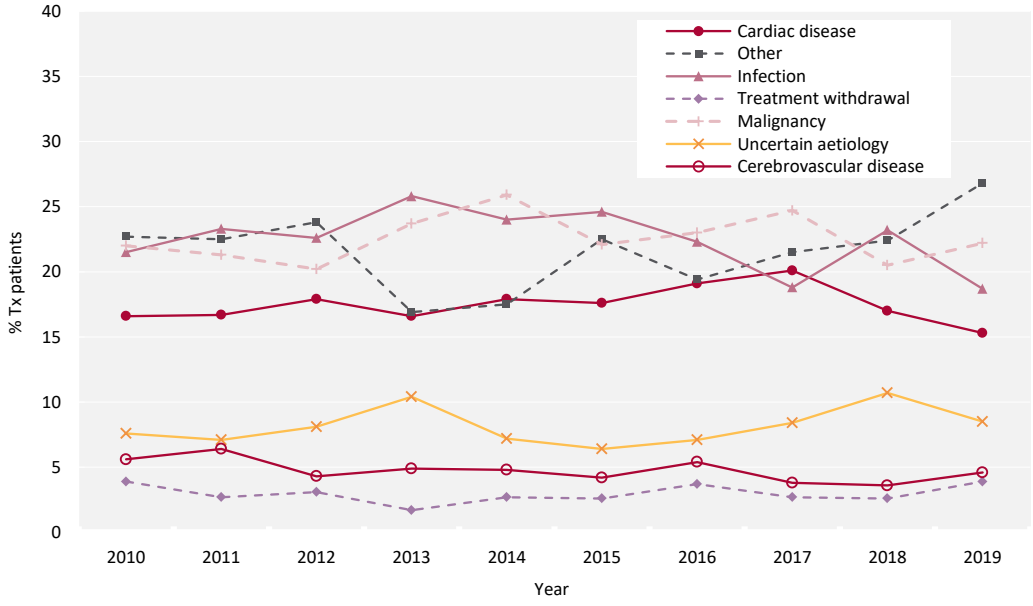


Figure 4.16 Cause of death for adult patients prevalent to RRT on 31/12/2018 followed-up in 2019 by modality

Hospitalisation of Tx patients

Hospital Episodes Statistics (HES) and Patient Episode Database for Wales (PEDW) data for prevalent RRT patients on 31/12/2018 were used to compare emergency admission hospitalisation amongst Tx patients (figure 4.17). The y-axis displays the total number of hospitalised days following an emergency admission for Tx patients divided by the total number of Tx patient-years at that centre for 2019. The average rate in England and Wales was 4.2 days per patient-year, compared to 14.3 days for ICHD patients and 13.2 days for PD patients. HES and PEDW data were also used to calculate the length of stay (LoS) following transplantation in England and Wales. The median LoS for each centre is presented in figure 4.18 and varied from 5 to 11 days. The median for England and Wales was 7 days.

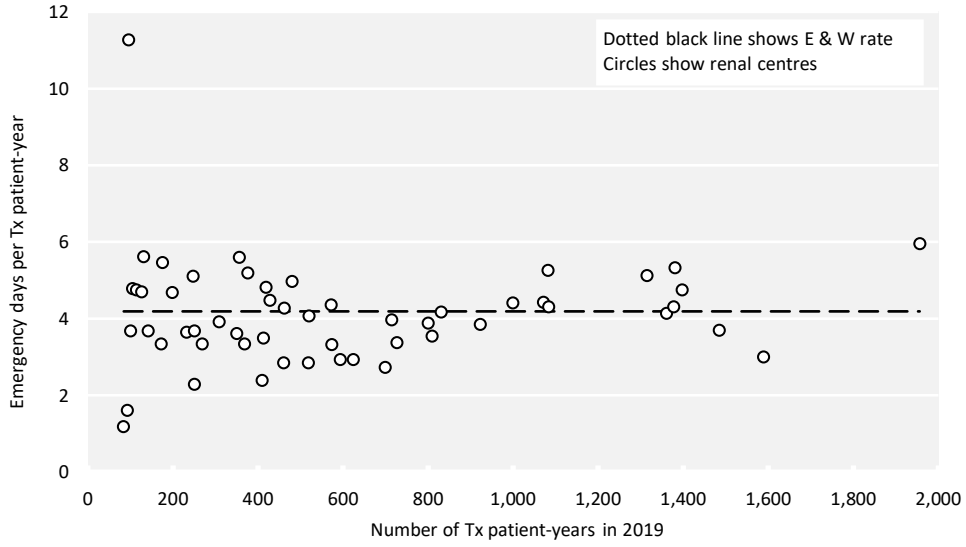


Figure 4.17 Emergency inpatient days per Tx patient-year in 2019 for patients prevalent to RRT in England and Wales on 31/12/2018 by centre

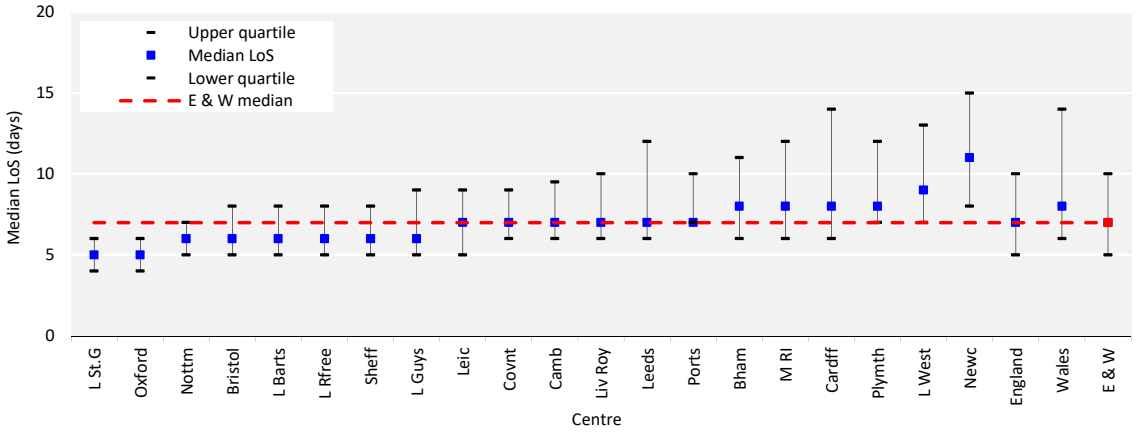


Figure 4.18 Median length of stay (LoS) after transplantation for patients who received a Tx in England and Wales in 2019 by centre

THE RENAL ASSOCIATION
founded 1950

Chapter 5

Adults on in-centre haemodialysis (ICHD) in the UK at the end of 2019

Contents

Introduction 104

Rationale for analyses 106

Key findings 108

Analyses 109

- Changes to the prevalent adult ICHD population 109
- Demographics of prevalent adult ICHD patients 111
- Adequacy of dialysis in prevalent adult ICHD patients 113
- Biochemistry parameters in prevalent adult ICHD patients 116
- Anaemia in prevalent adult ICHD patients 123
- Dialysis access in prevalent adult dialysis patients 129
- Infections in adult haemodialysis patients 130
- Cause of death in adult ICHD patients 134
- Hospitalisation of ICHD patients 135

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 2019 (figure 5.1). This population comprises patients who were on ICHD at the end of 2018 and remained on ICHD throughout 2019, as well as patients who commenced/re-commenced ICHD in 2019. This latter group includes both incident renal replacement therapy (RRT) patients who ended 2019 on ICHD and prevalent RRT patients who switched to ICHD from home haemodialysis (HHD), peritoneal dialysis (PD), or a transplant (Tx) in 2019. 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.

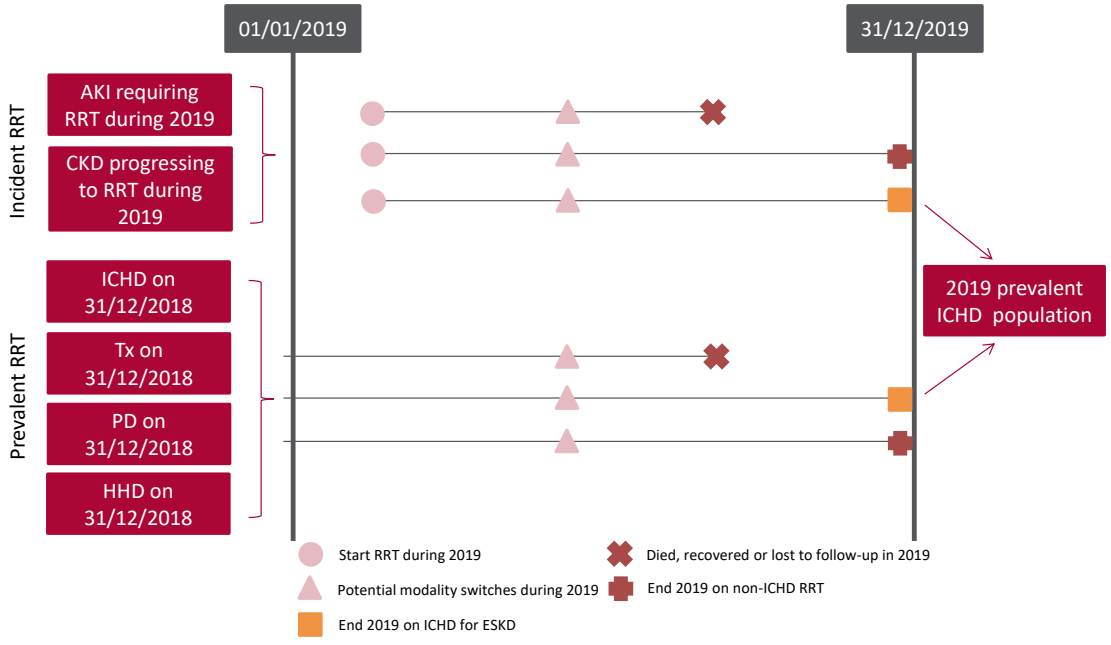


Figure 5.1 Pathways adult patients could follow to be included in the UK 2019 prevalent ICHD population

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 2019 or if they had been on RRT for ≥90 days and were on ICHD at the end of 2019.

CKD – chronic kidney disease

The infection analyses used a rolling two year cohort as per the audit measures (table 5.1). 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 5.1):

- **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 – 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 2019 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 2019 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. Further detail about the completeness of data returned to the UKRR is available through the UKRR data portal (renal.org/audit-research/data-portal). Audit measures that cannot be reported because the required data items were not collected by the UKRR are omitted.

The chapter includes analyses carried out by Getting It Right First Time (GIRFT), a national programme designed to reduce unwarranted variation in medical care provided by the NHS by sharing best practice. The GIRFT metrics for renal services, analysed in collaboration with the UKRR, were based on data derived from multiple sources and included equity of access to services, outcomes and pathways in nephrology, dialysis and transplantation.

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.

Table 5.1 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 5.6, figure 5.6
HD (2019)	Proportion of patients with pre-dialysis bicarbonate 18–26 mmol/L	Table 5.7, figure 5.8
	Proportion of patients with pre-dialysis potassium 4.0–6.0 mmol/L	Table 5.7, figure 5.9
Anaemia (2017)	Proportion of patients with serum ferritin <100 µg/L at start of treatment with erythropoiesis stimulating agent (ESA)	Table 5.8, figure 5.13 (the UKRR does not hold treatment with ESA start dates)
	Proportion of patients with haemoglobin <100 g/L not on ESA	Table 5.9
	Proportion of patients on ESA with haemoglobin >120 g/L	Table 5.9, figure 5.15
	Mean (median) ESA dose in patients maintained on ESA therapy	Table 5.9
Vascular access (2015)	Proportion of prevalent dialysis patients with definitive access (AVF/AVG/PD catheter) – ≥80%	Figure 5.17
	Annual rate of MRSA <1 episode/100 patient-years (measured over 2 years)	Table 5.10, figures 5.18, 5.20
	Annual rate of MSSA <2.5 episodes/100 patient-years (measured over 2 years)	Table 5.10, figures 5.19, 5.21
Planning, initiating and withdrawing RRT (2014)	Number of patients withdrawing from ICHD as a proportion of all deaths on ICHD	Table 5.11, figure 5.22

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

Key findings

- 24,365 adult patients were receiving ICHD for ESKD in the UK on 31/12/2019, which represented 35.8% of the RRT population
- The median age of ICHD patients was 67.5 years and 62.1% were male
- 86.0% of ICHD patients achieved a dialysis adequacy of URR >65%
- 93.0% of ICHD patients had dialysis 3 times a week
- 70.9% of ICHD patients had dialysis for 4–5 hours per session
- The median adjusted calcium for ICHD patients was 2.3 mmol/L and 10.0% were above the target range 2.2–2.5 mmol/L
- The median pre-dialysis bicarbonate for ICHD patients was 23 mmol/L and 82.2% were within the target range 18–26 mmol/L
- The median haemoglobin and ferritin for ICHD patients was 111 g/L and 445 µg/L, respectively, and 91.2% were on an ESA at a median dose of 8,000 IU/week
- 1.2% of ICHD patients had a haemoglobin <100 g/L and not on an ESA and 18.1% had a haemoglobin >120 g/L and on an ESA
- Of the 43 centres that provided adequate data on long term dialysis access in England, Northern Ireland and Wales, 9 centres achieved the 80% target for definitive access amongst prevalent dialysis patients (AVF/AVG/PD catheter)
- There was no cause of death data available for 29.5% of deaths. For those with data, the leading cause of death in younger patients (<65 years) was cardiac disease (24.2%) and in older patients (≥65 years) was treatment withdrawal (24.2%).
- The 2 year rates (2018–2019) of MRSA and MSSA bacteraemia were 0.17/100 patient years and 2.72/100 patient years, respectively

Analyses

Changes to the prevalent adult ICHD population

For the 70 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 5.2 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)	2019 crude rate (pmp)
Centre	2015	2016	2017	2018	2019	2015	2016	2017	2018	2019		
ENGLAND												
Basldn	160	151	165	172	188	58.2	55.3	54.8	54.3	58.4	0.34	551
Bham	1,361	1,332	1,321	1,346	1,339	47.0	43.8	41.9	41.6	40.5	2.03	659
Bradfd	229	244	269	262	280	39.3	38.4	40.0	38.1	38.2	0.49	576
Brightn	387	419	425	447	430	40.7	42.2	42.1	42.3	40.6	1.07	403
Bristol	503	489	491	475	468	34.1	33.3	33.4	32.3	31.5	1.21	387
Camb	332	328	305	304	288	25.5	24.8	22.9	21.9	19.6	0.93	311
Carlis	81	95	98	101	111	28.8	34.1	34.9	34.5	36.6	0.25	439
Carsh	802	831	848	870	837	50.5	50.2	50.1	49.3	47.3	1.61	519
Chelms	142	129	126	112	114	50.4	47.6	45.7	42.7	43.7	0.37	306
Colchr	120	123	129	124	145	100.0	100.0	100.0	100.0	100.0	0.29	502
Covnt	347	366	333	306	354	36.2	37.6	34.5	32.0	32.9	0.79	450
Derby	209	200	191	197	238	38.8	36.9	34.4	33.6	36.5	0.56	428
Donc	172	185	178	179	181	57.0	55.9	53.5	53.9	52.9	0.37	487
Dorset	285	273	295	291	289	41.9	39.8	40.2	38.1	37.4	0.72	400
Dudley	161	188	206	210	207	51.1	54.3	55.8	57.5	56.6	0.34	608
Exeter	435	443	457	455	443	44.9	43.7	43.2	41.7	40.6	0.94	469
Glouc	224	235	244	238	226	50.5	49.8	48.0	45.8	43.0	0.51	447
Hull	350	324	351	352	350	40.9	37.9	40.3	40.0	38.7	0.79	442
Ipswi	143	147	147	151	141	35.7	35.3	33.8	35.3	33.3	0.31	456
Kent	410	409	424	418	420	39.4	38.1	38.9	37.6	36.8	1.06	397
L Barts	982	1,005	1,030	1,061	1,037	43.1	42.4	41.3	40.8	39.0	1.57	659
L Guys	628	645	667	691	666	31.2	30.7	30.9	31.0	28.8	1.00	669
L Kings	554	567	573	597	607	51.1	51.1	49.9	50.4	48.8	0.92	656
L Rfree	694	709	686	687	743	33.2	32.6	31.3	30.7	31.7	1.32	565
L St.G	329	330	308	294	300	39.3	39.5	37.2	35.6	35.2	0.66	456
L West	1,422	1,453	1,446	1,428	1,379	43.2	42.8	41.6	40.2	38.2	1.95	709
Leeds	491	509	539	543	552	32.2	32.8	33.3	32.3	32.0	1.36	406
Leic	856	889	899	919	964	39.4	38.8	38.2	37.5	37.3	2.07	467
Liv Ain	159	173	160	153	151	71.6	76.2	76.6	70.8	71.9	0.43	353
Liv Roy	345	325	352	360	355	27.8	26.8	28.2	28.5	28.9	0.80	442
M RI	473	465	497	501	499	25.2	23.6	24.3	24.3	24.2	1.32	378
Middlbr	340	321	334	349	344	37.7	36.1	36.9	37.6	36.2	0.80	431
Newc	292	295	326	339	327	28.9	28.1	29.3	29.4	27.8	0.94	346
Norwch	311	315	302	294	297	43.2	40.9	38.9	37.5	36.7	0.68	435
Nottm	358	365	354	351	360	32.2	31.7	30.1	29.4	29.6	0.92	391
Oxford	412	429	450	445	455	24.4	24.3	24.0	23.0	23.1	1.43	318
Plymth	129	136	142	128	126	25.6	26.5	26.3	23.8	23.7	0.40	317
Ports	614	562	548	532	591	36.8	33.2	31.3	30.2	31.4	1.73	341
Prestn	533	522	517	520	507	43.9	43.4	40.7	39.4	37.8	1.22	415
Redng	295	295	303	297	312	38.1	37.4	38.1	36.5	36.3	0.69	452

Table 5.2 Continued

Centre	N on ICHD					% on ICHD					Estimated catchment population (millions)	2019 crude rate (pmp)
	2015	2016	2017	2018	2019	2015	2016	2017	2018	2019		
Salford	387	375	387	404	392	39.7	36.8	34.8	34.4	31.7	1.14	344
Sheff	546	560	549	550	539	39.5	39.4	38.2	37.2	36.2	1.12	480
Shrew	178	186	183	207	204	48.2	49.3	47.7	48.4	47.7	0.41	502
Stevng	480	501	465	489	507	59.0	56.6	52.7	52.2	52.5	1.10	461
Sthend	124	111	121	128	118	50.4	47.0	47.6	48.7	44.7	0.27	435
Stoke	300	311	302	284	267	38.1	37.7	37.3	35.3	33.3	0.72	369
Sund	219	245	243	243	252	47.7	48.3	44.8	43.6	44.4	0.54	465
Truro	150	160	158	168	166	36.2	37.6	37.3	38.4	37.0	0.35	468
Wirral	174	188	202	202	207	61.9	55.8	52.3	51.1	50.4	0.47	445
Wolve	295	286	304	320	302	50.7	50.2	52.1	52.6	50.5	0.54	556
York	149	184	183	183	184	30.4	34.4	33.0	32.3	31.7	0.48	382
N IRELAND												
Antrim	120	123	117	119	118	49.8	48.8	45.9	43.4	42.1	0.24	485
Belfast	174	185	179	173	157	22.6	22.8	21.4	19.9	17.6	0.53	297
Newry	85	86	77	81	78	37.8	36.4	32.0	32.4	31.1	0.23	335
Ulster	106	101	109	106	97	62.7	60.8	59.9	55.5	53.3	0.20	483
West NI	119	125	113	113	106	40.6	40.7	36.1	34.7	32.3	0.25	427
SCOTLAND												
Abrdn	213	227	226	214	190	40.1	40.9	40.1	37.3	34.1	0.50	381
Airdrie	195	185	192	192	207	45.9	42.1	41.1	39.4	39.5	0.46	453
D&Gall	51	47	51	55	52	39.2	35.9	37.8	37.9	34.9	0.12	426
Dundee	184	176	183	161	162	43.9	42.1	42.1	36.2	36.1	0.37	442
Edinb	279	282	305	300	296	36.3	36.3	37.0	34.8	33.4	0.84	354
Glasgw	579	571	574	589	575	33.9	32.6	32.4	32.5	31.0	1.37	420
Inverns	90	86	83	90	92	35.7	33.3	31.7	32.3	32.6	0.22	413
Klmarnk	126	133	144	141	139	40.6	42.0	42.7	41.6	38.7	0.29	478
Krkcldy	149	144	144	135	138	50.5	49.0	47.4	45.3	46.8	0.27	507
WALES												
Bangor	69	64	73	70	66	37.9	35.8	37.4	34.7	32.8	0.16	407
Cardff	470	486	529	555	552	29.1	29.9	31.4	32.3	31.9	1.15	482
Clwyd	77	69	72	75	86	41.6	39.0	40.0	39.5	42.0	0.18	480
Swanse	338	340	353	376	389	44.2	43.9	44.4	45.4	44.8	0.75	518
Wrexm	107	115	120	113	106	36.5	37.1	37.3	36.1	34.1	0.21	515
TOTALS												
England	**20,072**	**20,328**	**20,533**	**20,677**	**20,759**	**39.1**	**38.4**	**37.6**	**36.9**	**36.1**	**44.33**	**468**
N Ireland	**604**	**620**	**595**	**592**	**556**	**35.6**	**35.0**	**32.6**	**31.0**	**28.8**	**1.45**	**383**
Scotland	**1,866**	**1,851**	**1,902**	**1,877**	**1,851**	**38.6**	**37.5**	**37.3**	**35.8**	**34.6**	**4.43**	**418**
Wales	**1,061**	**1,074**	**1,147**	**1,189**	**1,199**	**34.9**	**35.0**	**36.1**	**36.6**	**36.2**	**2.45**	**490**
UK	**23,603**	**23,873**	**24,177**	**24,335**	**24,365**	**38.8**	**38.1**	**37.4**	**36.6**	**35.8**	**52.67**	**463**

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.
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 5.3 Demographics of adult patients prevalent to ICHD on 31/12/2019 by centre

Centre	N on RRT	N on ICHD	% on ICHD	Median age (yrs)	% male	Ethnicity				
						% White	% Asian	% Black	% Other	% missing
ENGLAND										
Basldn	322	188	58.4	67.0	67.0	83.2	8.1	6.5	2.2	1.6
Bham	3,308	1,339	40.5	66.7	57.1	49.6	32.7	14.7	3.0	1.9
Bradfd	733	280	38.2	64.3	60.7	44.7	50.5	3.3	1.5	1.8
Brightn	1,059	430	40.6	71.4	62.6	89.7	6.0	2.3	2.0	7.2
Bristol	1,486	468	31.5	69.2	64.3	85.1	4.4	8.5	2.0	2.4
Camb	1,469	288	19.6	72.5	63.5	91.2	5.4	1.9	1.5	9.4
Carlis	303	111	36.6	68.2	58.6	100.0	0.0	0.0	0.0	0.0
Carsh	1,771	837	47.3	69.8	63.1	62.2	17.4	14.0	6.3	5.5
Chelms	261	114	43.7	71.5	71.9	90.6	4.7	2.8	1.9	7.0
Colchr	145	145	100.0	72.5	61.4	95.1	1.4	0.7	2.8	0.7
Covnt	1,076	354	32.9	69.7	61.0	73.7	19.5	6.8	0.0	0.0
Derby	652	238	36.5	68.3	61.8	81.8	10.2	5.1	3.0	0.8
Donc	342	181	52.9	70.6	61.9	91.7	3.9	1.7	2.8	0.0
Dorset	772	289	37.4	72.6	63.7	95.4	2.1	0.0	2.5	1.7
Dudley	366	207	56.6	69.9	60.4	80.7	12.6	6.8	0.0	0.0
Exeter	1,091	443	40.6	73.6	67.7	96.1	0.7	1.6	1.6	0.5
Glouc	525	226	43.0	74.2	67.7	91.2	2.7	3.5	2.7	0.0
Hull	904	350	38.7	66.2	63.4	95.4	2.9	0.9	0.9	0.9
Ipswi	424	141	33.3	71.3	63.8	79.9	1.5	4.5	14.2	5.0
Kent	1,140	420	36.8	68.8	61.9	96.3	1.0	1.5	1.2	3.6
L Barts	2,660	1,037	39.0	62.7	60.2	24.1	33.3	28.5	14.1	1.8
L Guys	2,310	666	28.8	63.2	58.6	41.4	8.6	45.6	4.4	4.5
L Kings	1,244	607	48.8	63.0	61.8	38.0	12.5	45.3	4.2	2.1
L Rfree	2,344	743	31.7	65.4	62.6	38.4	23.6	28.4	9.6	7.5
L St.G	852	300	35.2	67.1	61.7	22.3	27.8	38.5	11.3	3.0
L West	3,613	1,379	38.2	67.0	59.1	31.2	39.4	24.4	4.9	0.0
Leeds	1,723	552	32.0	63.4	64.5	69.5	21.8	7.1	1.6	0.2
Leic	2,587	964	37.3	67.2	64.1	72.0	19.5	6.1	2.5	7.5
Liv Ain	210	151	71.9	71.0	64.9	96.6	0.7	1.3	1.3	1.3
Liv Roy	1,227	355	28.9	63.8	61.4	86.9	3.8	5.8	3.5	3.4
M RI	2,060	499	24.2	65.0	59.7	46.0	13.8	37.6	2.7	2.4
Middlbr	949	344	36.2	67.9	69.5	91.9	7.0	1.2	0.0	0.0
Newc	1,175	327	27.8	65.8	61.5	90.8	4.0	2.1	3.1	0.0
Norwch	809	297	36.7	72.9	63.6	96.6	0.7	1.0	1.7	1.0
Nottm	1,218	360	29.6	67.4	62.5	74.2	11.7	10.6	3.6	0.0
Oxford	1,969	455	23.1	70.0	61.1	75.5	11.6	8.1	4.8	18.2
Plymth	531	126	23.7	72.5	67.5	97.6	0.0	0.8	1.6	0.0
Ports	1,883	591	31.4	67.5	64.5	89.6	4.4	2.3	3.7	12.0
Prestn	1,341	507	37.8	68.0	60.4	79.3	18.9	1.2	0.6	0.0
Redng	860	312	36.3	69.6	63.8	64.3	26.4	7.2	2.2	11.2
Salford	1,237	392	31.7	63.9	65.6	70.9	21.4	4.3	3.3	0.0
Sheff	1,491	539	36.2	68.3	63.1	84.6	8.2	4.0	3.2	2.6
Shrew	428	204	47.7	72.3	67.2	93.1	3.9	0.5	2.5	0.5
Stevng	966	507	52.5	66.8	63.5	71.0	12.9	10.0	6.1	12.8
Sthend	264	118	44.7	69.3	63.6	83.9	8.5	6.8	0.8	0.0

Table 5.3 Continued

Centre	N on RRT	N on ICHD	% on ICHD	Median age (yrs)	% male	Ethnicity				
						% White	% Asian	% Black	% Other	% missing
Stoke	803	267	33.3	70.9	65.5	89.9	5.4	1.2	3.5	3.4
Sund	568	252	44.4	67.5	59.5	96.0	3.2	0.4	0.4	0.4
Truro	449	166	37.0	73.1	60.8	99.4	0.6	0.0	0.0	0.0
Wirral	411	207	50.4	65.7	58.0	96.1	1.9	0.5	1.4	0.0
Wolve	598	302	50.5	66.0	62.3	59.3	26.7	12.3	1.7	0.7
York	581	184	31.7	72.0	65.8	96.7	1.1	0.6	1.7	2.2
N IRELAND										
Antrim	280	118	42.1	73.5	64.4	100.0	0.0	0.0	0.0	0.0
Belfast	890	157	17.6	68.4	63.7	97.0	1.5	0.0	1.5	14.6
Newry	251	78	31.1	68.7	61.5	98.7	1.3	0.0	0.0	3.8
Ulster	182	97	53.3	77.7	53.6	95.9	4.1	0.0	0.0	0.0
West NI	328	106	32.3	69.4	58.5	99.1	0.9	0.0	0.0	0.0
SCOTLAND										
Abrdn	558	190	34.1	67.0	60.0					86.8
Airdrie	524	207	39.5	63.0	58.5	97.3	2.7	0.0	0.0	10.6
D&Gall	149	52	34.9	71.8	67.3					61.5
Dundee	449	162	36.1	66.7	59.3					82.1
Edinb	885	296	33.4	62.4	61.5					80.4
Glasgw	1,854	575	31.0	65.4	59.8					65.7
Inverns	282	92	32.6	70.5	58.7					77.2
Klmarnk	359	139	38.7	67.3	59.7					71.9
Krkcldy	295	138	46.8	66.8	58.0					88.4
WALES										
Bangor	201	66	32.8	73.5	65.2	98.4	0.0	0.0	1.6	6.1
Cardff	1,730	552	31.9	66.3	62.1	88.5	8.8	1.3	1.5	0.9
Clwyd	205	86	42.0	70.4	68.6	98.7	1.3	0.0	0.0	10.5
Swanse	868	389	44.8	70.6	65.8	97.2	1.6	0.8	0.5	0.8
Wrexm	311	106	34.1	68.2	63.2	98.1	1.0	1.0	0.0	1.9
TOTALS										
England	**57,510**	**20,759**	**36.1**	**67.5**	**62.2**	**67.7**	**16.0**	**12.5**	**3.8**	**3.4**
N Ireland	**1,931**	**556**	**28.8**	**72.2**	**60.8**	**98.1**	**1.5**	**0.0**	**0.4**	**4.7**
Scotland	**5,355**	**1,851**	**34.6**	**65.4**	**59.9**					**68.1**
Wales	**3,315**	**1,199**	**36.2**	**68.4**	**64.1**	**93.4**	**4.8**	**0.9**	**0.9**	**1.9**
UK	**68,111**	**24,365**	**35.8**	**67.5**	**62.1**	**70.3**	**14.8**	**11.4**	**3.5**	**8.3**

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 5.4, 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 5.4 Primary renal diseases (PRDs) of adult patients prevalent to ICHD on 31/12/2019

PRD	N on ICHD	% ICHD population	Age <65 yrs		Age ≥65 yrs		M/F ratio
			N	%	N	%	
Diabetes	6,540	27.8	3,023	28.9	3,517	27.0	1.6
Glomerulonephritis	3,222	13.7	1,806	17.3	1,416	10.9	2.1
Hypertension	1,816	7.7	775	7.4	1,041	8.0	2.3
Polycystic kidney disease	1,297	5.5	680	6.5	617	4.7	1.1
Pyelonephritis	1,706	7.3	803	7.7	903	6.9	1.6
Renal vascular disease	1,196	5.1	167	1.6	1,029	7.9	2.0
Other	4,065	17.3	1,914	18.3	2,151	16.5	1.3
Uncertain aetiology	3,646	15.5	1,284	12.3	2,362	18.1	1.6
Total (with data)	**23,488**	**100.0**	**10,452**	**100.0**	**13,036**	**100.0**	
Missing	877	3.6	402	3.7	475	3.5	1.7

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 2019 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 5.5 Median urea reduction ratio (URR) and distribution of session frequency and time for adult patients prevalent to ICHD on 31/12/2019 using end of third quarter data (30/09/2019)

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											
Basldn	71	80.0	11.3	85.1	3.6	42.0	58.0	0.0	97.9	100.0	100.0
Bham	79	91.4	5.8	92.6	1.6	16.9	82.9	0.2	99.7	97.0	96.7
Bradfd	71	69.9	9.1	89.3	1.6	27.6	72.4	0.0	75.9	99.2	98.7
Brightn	74	86.8	1.0	99.0	0.0	8.4	91.6	0.0	90.9	99.8	99.5
Bristol	72	81.1	3.2	96.8	0.0	23.4	76.6	0.0	99.8	99.8	100.0
Camb			2.5	90.3	7.2	46.0	54.0	0.0	0.0	98.9	98.4
Carlis	72	70.4	4.3	95.7	0.0	16.9	83.1	0.0	99.0	90.3	89.9
Carsh	78	89.9	2.3	97.2	0.5	5.9	93.7	0.4	86.4	99.8	99.2
Chelms	71	83.2	0.0	96.7	3.3	34.1	65.9	0.0	96.7	95.8	95.7
Colchr	79	98.1	1.5	98.5	0.0	3.0	96.2	0.8	80.5	100.0	100.0
Covnt	77	90.4	8.3	89.9	1.8	29.9	70.1	0.0	95.3	99.4	97.6
Derby	76	87.2	2.9	95.2	1.9				86.9	100.0	19.7
Donc	75	83.0	1.3	98.1	0.6	28.4	71.6	0.0	97.6	95.2	95.1
Dorset	76	94.8	2.3	97.0	0.8	7.8	92.2	0.0	89.1	99.6	100.0
Dudley	78	87.9	2.7	96.2	1.1	14.2	85.2	0.6	96.8	94.3	94.1
Exeter	75	89.3	1.4	97.8	0.7	49.9	50.1	0.0	99.3	100.0	100.0
Glouc	76	93.2	5.5	94.5	0.0				100.0	99.5	0.0
Hull	78	93.5							98.8	0.0	1.2
Ipswi			13.1	86.2	0.8	17.0	83.0	0.0	0.0	99.2	93.8
Kent	71	76.6	1.5	96.4	2.1	76.5	23.5	0.0	94.7	99.2	100.0
L Barts			10.8	89.0	0.2	44.3	55.7	0.0	0.0	97.5	97.2
L Guys	75	89.4	8.0	91.7	0.3	24.1	75.9	0.0	97.9	98.1	97.9

Table 5.5 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 Kings	73	84.1	6.6	93.1	0.4	56.6	43.4	0.0	99.6	99.1	99.0
L Rfree			19.8	79.6	0.6	61.4	38.4	0.2	0.0	97.0	96.3
L St.G	80	95.1	0.4	99.6	0.0	6.7	93.3	0.0	83.0	98.2	94.1
L West	78	90.8	8.6	90.6	0.8	26.5	73.0	0.5	91.3	92.1	91.5
Leeds	73	84.5	9.1	89.9	1.0	22.5	77.5	0.0	99.6	98.6	99.4
Leic	75	85.9	2.6	96.9	0.5	13.8	83.3	3.0	99.5	99.2	99.4
Liv Ain			1.5	96.2	2.3	16.7	83.3	0.0	0.0	100.0	100.0
Liv Roy			0.0	90.9	9.1	7.1	92.9	0.0	0.0	99.7	99.7
M RI	75	83.5	4.6	94.4	1.0	6.7	93.3	0.0	79.0	91.2	90.7
Middlbr	73	80.7	2.8	96.0	1.2	33.8	64.3	1.9	99.4	99.7	99.7
Newc			7.0	91.7	1.3	26.0	74.0	0.0	16.3	100.0	100.0
Norwch	75	86.7	2.2	96.3	1.5	63.5	36.5	0.0	85.3	99.3	99.3
Nottm	75	87.5	0.6	94.6	4.8	7.6	91.8	0.6	94.0	100.0	100.0
Oxford	75	86.1	0.0	100.0	0.0	28.5	71.5	0.0	81.0	99.5	99.5
Plymth	76	89.3	2.6	96.5	0.9				100.0	99.1	0.0
Ports			9.6	89.8	0.6	48.1	51.9	0.0	0.0	99.2	99.2
Prestn	73	75.9							82.1	0.0	0.2
Redng	75	90.0	0.7	98.9	0.4	22.5	77.5	0.0	100.0	96.5	98.2
Salford			2.5	79.2	18.3	27.1	72.5	0.4	69.3	99.2	96.9
Sheff	74	87.0	2.8	95.1	2.2	83.1	16.9	0.0	99.2	99.0	99.0
Shrew	75	91.4	1.0	96.4	2.6	13.4	86.6	0.0	97.9	98.5	98.4
Stevng	72	74.1	15.9	80.2	4.0	68.9	31.1	0.0	97.9	78.6	74.7
Sthend	72	86.5	1.9	98.1	0.0	30.8	69.2	0.0	100.0	100.0	100.0
Stoke	74	87.1	6.8	89.6	3.6	14.8	85.2	0.0	86.6	100.0	100.0
Sund			4.4	86.8	8.8	27.0	73.0	0.0	1.0	98.3	88.6
Truro	74	87.6	2.0	98.0	0.0				97.3	99.3	0.0
Wirral	74	83.5	0.5	95.7	3.8	29.1	70.9	0.0	98.3	99.5	100.0
Wolve	76	89.1	2.9	96.7	0.4				98.2	98.2	61.8
York	77	93.7	3.2	89.8	7.0	15.9	84.1	0.0	100.0	89.7	91.2
N IRELAND											
Antrim	71	70.0	0.9	99.1	0.0	9.0	91.0	0.0	99.1	99.1	100.0
Belfast	75	89.6	0.7	97.3	2.0	15.2	84.1	0.7	99.3	99.3	100.0
Newry	72	81.5	13.9	86.1	0.0	60.3	39.7	0.0	84.4	97.3	98.4
Ulster	72	77.9	4.4	93.4	2.2	18.6	81.4	0.0	98.9	97.9	98.9
West NI	70	71.4	6.3	86.5	7.3	66.3	33.7	0.0	98.8	98.0	97.7
SCOTLAND											
Abrdn	72	82.7	0.5	93.7	5.8	7.3	90.4	2.2	100.0	99.5	99.4
Airdrie	69	71.4	0.6	96.5	2.9	15.5	81.0	3.6	100.0	97.7	100.0
D&Gall	70	75.0	11.8	84.3	3.9	22.7	70.5	6.8	100.0	98.1	100.0
Dundee	75	89.4	0.0	95.9	4.1	5.7	94.3	0.0	97.9	96.7	96.6
Edinb	72	87.9	0.0	98.0	2.0	35.5	64.5	0.0	100.0	92.6	92.5
Glasgw	71	75.1	2.6	95.5	2.0	8.8	88.6	2.5	100.0	94.6	99.4
Inverns	72	90.2	0.0	95.3	4.7	25.6	74.4	0.0	100.0	100.0	100.0
Klmarnk	71	81.7	2.3	97.7	0.0				100.0	99.3	31.3
Krkcldy	71	79.4	1.7	98.3	0.0	25.4	74.6	0.0	100.0	93.0	93.7
WALES											
Bangor	74	89.1	5.0	90.0	5.0				100.0	98.4	0.0
Cardff	75	92.2							99.8	0.0	0.0
Clwyd	72	80.8	0.0	100.0	0.0				100.0	100.0	0.0
Swanse	75	85.1	5.8	91.9	2.2	34.4	65.6	0.0	99.1	99.7	99.7
Wrexm	74	82.8	4.8	94.2	1.0				100.0	99.1	0.0

Table 5.5 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**	**86.7**	**5.5**	**92.7**	**1.8**	**29.7**	**70.0**	**0.3**	**77.1**	**93.4**	**88.7**
N Ireland	**72**	**78.9**	**4.2**	**93.4**	**2.3**	**28.9**	**70.9**	**0.2**	**97.2**	**98.5**	**99.2**
Scotland	**71**	**80.4**	**1.6**	**95.8**	**2.6**	**15.7**	**82.0**	**2.2**	**99.8**	**95.9**	**92.3**
Wales	**75**	**88.3**	**4.9**	**93.1**	**2.0**	**34.4**	**65.6**	**0.0**	**99.6**	**53.0**	**30.5**
UK	**75**	**86.0**	**5.1**	**93.0**	**1.9**	**28.6**	**70.9**	**0.4**	**80.5**	**91.7**	**86.3**

Blank cells – no data returned by the centre or data completeness <70%.
Data for Scotland refer to patients prevalent to ICHD on 31/05/2019 due to data availability.

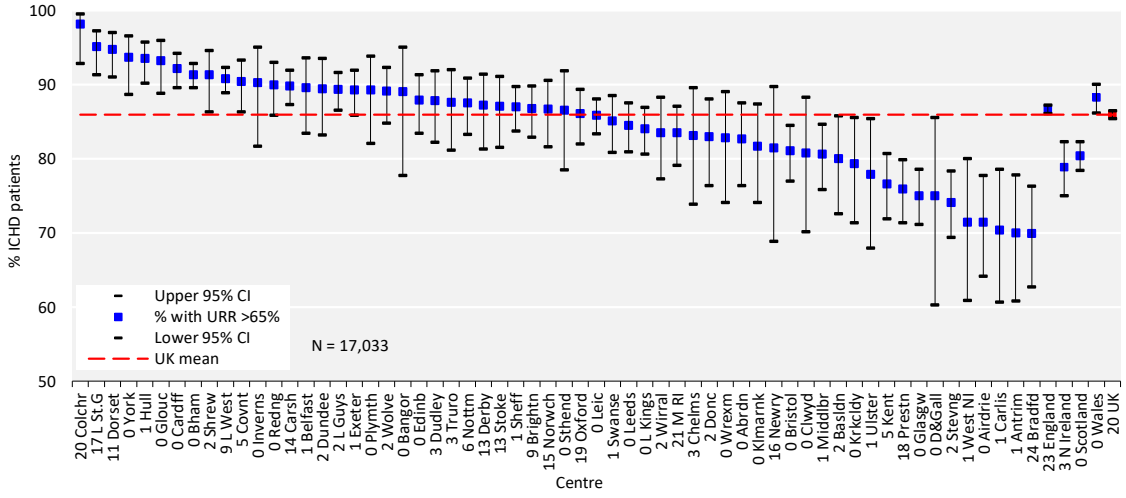


Figure 5.2 Percentage of adult patients prevalent to ICHD on 31/12/2019 with urea reduction ratio (URR) >65% by centre
CI – confidence interval

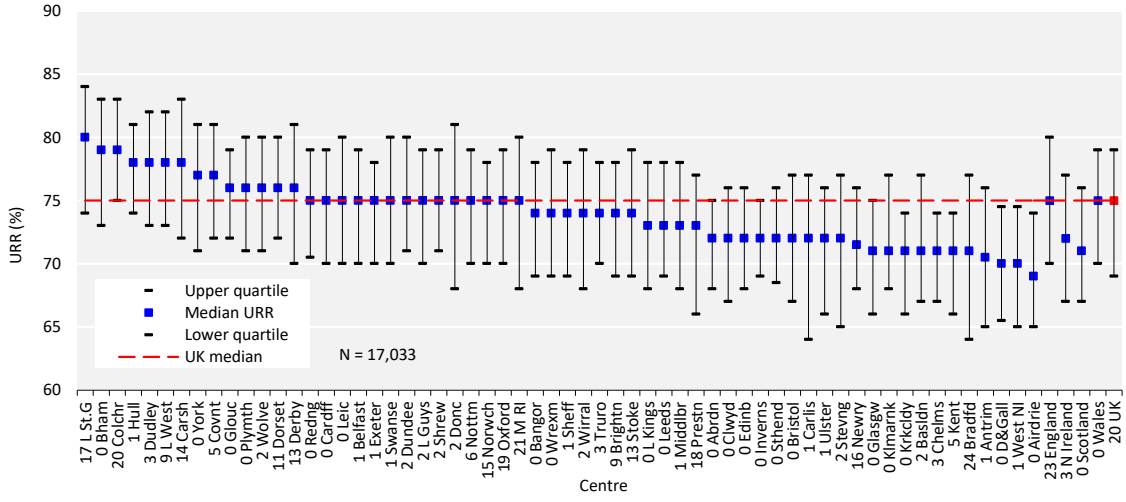


Figure 5.3 Median urea reduction ratio (URR) achieved in adult patients prevalent to ICHD on 31/12/2019 by centre

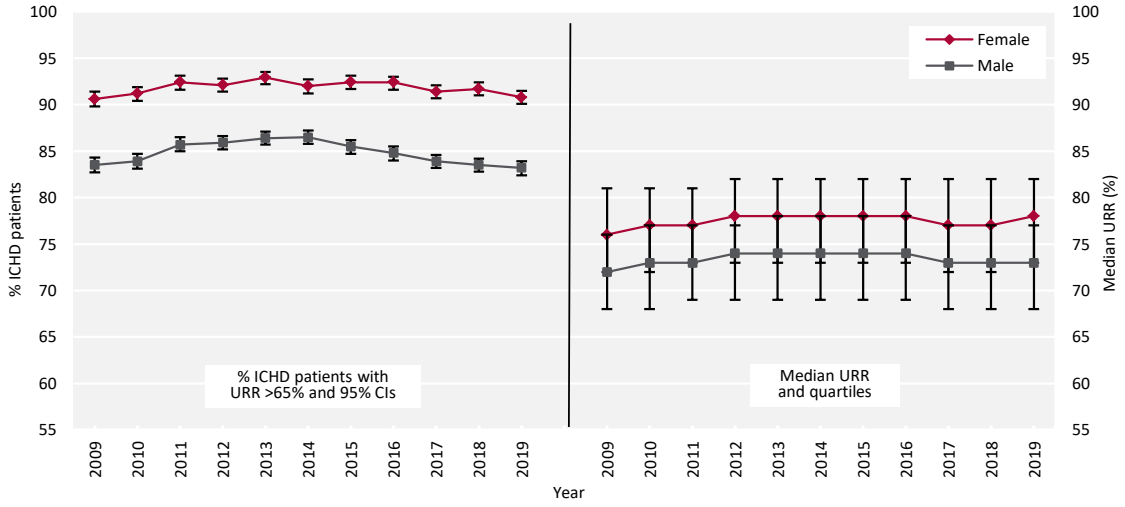


Figure 5.4 Change in the percentage of prevalent adult ICHD patients with urea reduction ratio (URR) >65% and the median URR by sex between 2009 and 2019

CI – confidence interval

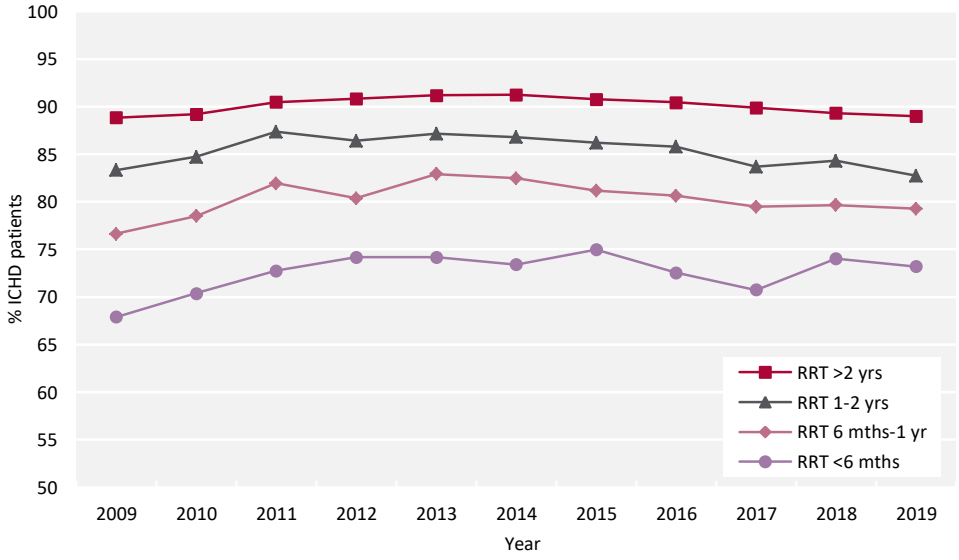


Figure 5.5 Percentage of prevalent adult ICHD patients achieving urea reduction ratio (URR) >65% by time on RRT between 2009 and 2019

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.

Table 5.6 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 31/12/2019 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				
Basldn	2.4	81.5	13.3	100.0
Bham	2.4	80.7	10.6	99.8
Bradfd	2.4	74.2	21.5	98.8
Brightn	2.3	79.4	7.5	99.8
Bristol	2.4	85.3	11.7	99.8
Camb	2.4	77.4	17.2	98.6
Carlis	2.3	77.9	8.7	100.0
Carsh	2.3	77.2	7.9	99.9
Chelms	2.3	86.0	3.2	100.0
Colchr	2.3	84.7	3.8	94.2
Covnt	2.3	78.6	7.1	100.0
Derby	2.4	87.3	5.4	100.0
Donc	2.3	86.7	2.4	100.0
Dorset	2.3	85.2	7.6	100.0
Dudley	2.4	81.4	13.3	99.5
Exeter	2.3	89.4	9.2	100.0
Glouc	2.4	87.1	5.7	100.0
Hull	2.4	76.5	18.3	100.0
Ipswi	2.4	76.6	8.1	100.0
Kent	2.4	75.7	15.3	99.7
L Barts	2.3	78.5	8.3	99.6
L Guys	2.4	83.0	10.2	100.0
L Kings	2.3	79.7	6.7	99.5
L Rfree	2.3	79.4	7.9	100.0
L St.G	2.4	80.4	11.4	97.5
L West	2.3	74.3	11.5	87.0
Leeds	2.4	81.0	10.9	100.0
Leic	2.3	77.9	7.0	100.0
Liv Ain	2.4	81.2	15.9	99.3
Liv Roy	2.4	80.4	12.2	99.4
M RI	2.4	77.0	13.9	92.7
Middlbr	2.2	69.7	3.5	99.7
Newc	2.4	74.7	10.7	100.0
Norwch	2.3	84.0	10.2	93.8
Nottm	2.4	84.5	8.2	100.0
Oxford	2.3	78.3	9.1	87.9
Plymth	2.3	83.6	4.6	100.0
Ports	2.3	80.9	8.2	100.0
Prestn	2.3	80.7	4.8	92.8
Redng	2.4	81.3	11.3	100.0
Salford	2.4	78.9	11.6	100.0
Sheff	2.3	76.3	3.9	99.4
Shrew	2.4	82.8	13.4	98.9
Stevng	2.3	84.2	6.5	100.0
Sthend	2.4	75.9	17.6	100.0
Stoke	2.4	85.4	10.8	98.4
Sund	2.3	75.7	12.8	99.1
Truro	2.5	70.7	29.3	100.0
Wirral	2.3	85.3	6.3	100.0
Wolve	2.3	82.7	8.3	99.3
York	2.4	86.9	9.7	100.0

Table 5.6 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	2.3	89.3	4.9	99.0
Belfast	2.3	80.3	7.5	100.0
Newry	2.4	87.7	5.5	100.0
Ulster	2.5	67.1	31.8	100.0
West NI	2.3	78.4	7.2	98.0
SCOTLAND				
Abrdn	2.4	83.2	11.2	100.0
Airdrie	2.4	86.5	10.3	100.0
D&Gall	2.3	79.2	6.3	98.0
Dundee	2.4	77.8	16.3	99.4
Edinb	2.4	76.0	12.2	100.0
Glasgw	2.4	78.5	14.9	100.0
Inverns	2.3	80.9	7.9	100.0
Klmarnk	2.3	87.5	6.3	100.0
Krkcldy	2.4	74.2	21.1	100.0
WALES				
Bangor	2.3	82.3	1.6	100.0
Cardff	2.3	80.2	8.3	99.8
Clwyd	2.5	75.7	23.0	100.0
Swanse	2.4	83.9	8.9	100.0
Wrexm	2.3	88.7	7.2	99.0
TOTALS				
England	**2.3**	**79.9**	**9.7**	**98.1**
N Ireland	**2.4**	**80.5**	**10.8**	**99.4**
Scotland	**2.4**	**79.9**	**12.9**	**99.9**
Wales	**2.3**	**82.0**	**9.0**	**99.8**
UK	**2.3**	**80.0**	**10.0**	**98.4**

.

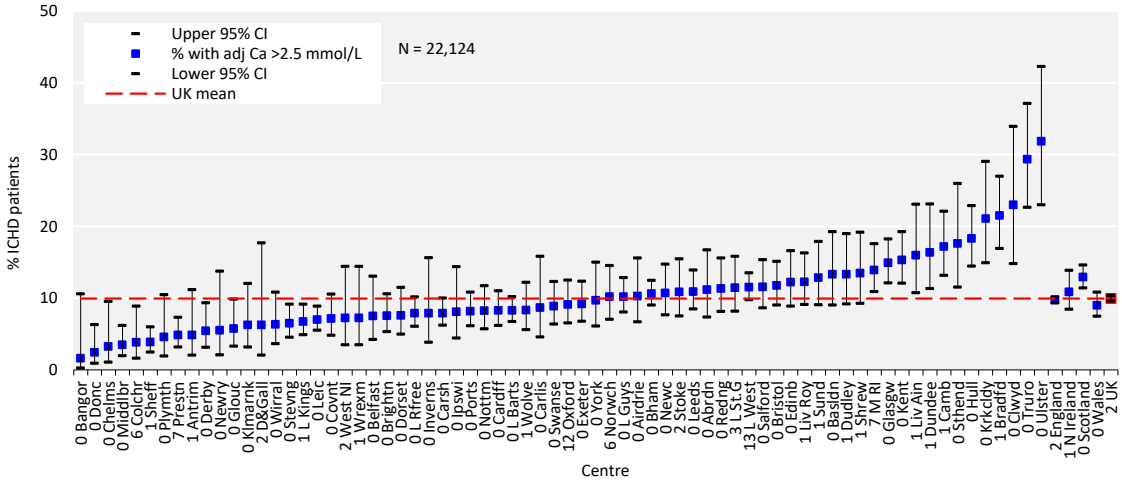


Figure 5.6 Percentage of adult patients prevalent to ICHD on 31/12/2019 with adjusted calcium (Ca) above the target range (>2.5 mmol/L) by centre
CI – confidence interval

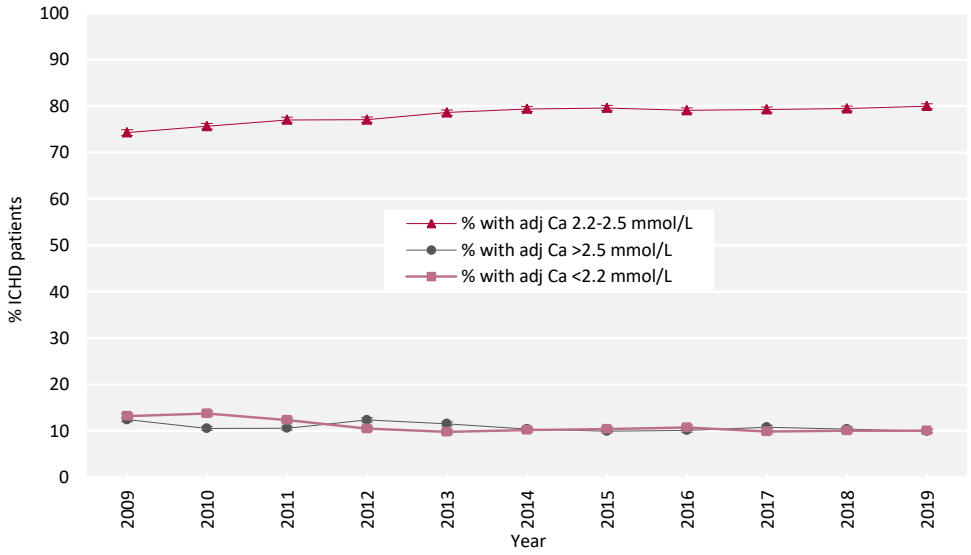


Figure 5.7 Change in percentage of prevalent adult ICHD patients within, above and below the target range for adjusted calcium (Ca 2.2–2.5 mmol/L) between 2009 and 2019

Table 5.7 Median pre-dialysis potassium and bicarbonate and percentage attaining target ranges in adult patients prevalent to ICHD on 31/12/2019 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										
Basldn	4.7	11.0	85.6	7.1	100.0	22	2.3	95.4	2.3	100.0
Bham	4.8	10.9	81.9	9.3	99.8	23	2.1	88.0	9.9	99.7
Bradfd	4.5	21.8	75.5	17.2	99.2	24	1.6	88.3	10.2	98.8
Brightn					0.0	24	1.5	77.1	21.4	99.8
Bristol	4.6	17.9	77.8	14.6	100.0	23	2.3	92.4	5.3	99.8
Camb	4.9	5.1	91.6	3.1	98.6					19.8
Carlis					0.0	21	14.4	83.7	1.9	100.0
Carsh					0.0	25	0.2	67.9	31.9	71.7
Chelms	5.0	9.7	83.9	5.1	100.0	23	1.1	90.3	8.6	100.0
Colchr	4.9	10.7	87.8	6.4	94.2	21	3.1	96.2	0.8	94.2
Covnt					0.0	23	4.0	80.4	15.5	100.0
Derby					0.0	22	0.9	95.0	4.1	100.0
Donc	4.8	10.9	86.1	7.0	100.0	24	1.8	84.2	13.9	100.0
Dorset	4.8	6.8	88.6	4.3	100.0	21	9.1	87.8	3.0	99.6
Dudley	4.7	12.2	83.1	8.2	100.0					57.1
Exeter	4.6	20.2	77.8	16.7	100.0	21	5.1	94.7	0.2	100.0
Glouc					0.0	23	1.4	91.9	6.7	100.0
Hull	4.8	10.8	84.5	7.9	100.0	24	1.9	79.9	18.3	100.0
Ipswi					0.0	24	1.6	83.1	15.3	100.0
Kent	4.2	40.9	54.9	36.1	99.7	22	2.1	90.4	7.5	99.7
L Barts	4.8	15.1	80.3	13.0	99.6	21	14.5	79.0	6.5	99.6
L Guys	4.7	25.4	69.9	22.1	100.0	24	1.1	87.2	11.7	99.8
L Kings	5.3	6.9	79.9	5.1	99.5	22	5.3	92.0	2.7	99.5
L Rfree	4.9	12.2	80.6	9.9	100.0	23	3.6	87.1	9.3	95.7
L St.G					0.0	24	2.3	72.8	24.9	92.5

Table 5.7 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 completeness	Median (mmoI/L)	% <18 mmol/L	% 18–26 mmol/L	% >26 mmol/L	% data completeness
L West					0.0					53.6
Leeds	5.0	3.5	89.3	2.2	100.0	23	1.6	89.9	8.5	100.0
Leic	4.9	9.5	83.9	7.7	100.0	24	1.1	77.0	21.9	99.9
Liv Ain					0.0	23	2.2	87.7	10.1	99.3
Liv Roy					0.0	27	0.6	43.6	55.8	99.7
M RI					0.0	22	2.4	84.6	13.0	92.0
Middlbr	4.8	8.5	86.1	5.9	99.7	26	0.6	59.0	40.4	99.7
Newc					0.0	22	4.0	88.0	8.0	100.0
Norwch	5.2	6.2	84.6	3.9	100.0	23	3.1	88.4	8.5	94.9
Nottm	4.8	11.9	82.7	8.8	100.0	24	0.6	76.0	23.4	100.0
Oxford	4.9	7.7	85.6	5.4	87.4	24	3.3	87.5	9.2	86.7
Plymth	4.6	12.7	81.8	7.7	100.0	28	0.0	36.4	63.6	100.0
Ports	4.7	9.3	88.1	7.1	100.0	24	1.9	80.5	17.6	100.0
Prestn					0.0	23	4.1	86.3	9.6	99.8
Redng					0.0	23	1.4	88.3	10.3	100.0
Salford	4.6	20.3	78.0	16.4	100.0					0.0
Sheff	5.0	6.3	85.2	4.5	99.4	23	1.8	88.2	9.9	99.4
Shrew					0.0	25	3.2	64.9	31.9	98.4
Stevng	4.9	9.4	86.9	7.0	100.0	24	1.1	82.4	16.5	100.0
Sthend	4.7	10.2	84.3	5.7	100.0	25	0.9	63.9	35.2	100.0
Stoke					0.0	26	0.0	62.0	38.0	99.2
Sund					0.0	27	0.4	41.0	58.6	99.6
Truro	4.8	5.3	90.7	2.7	100.0	26	0.0	62.7	37.3	100.0
Wirral					0.0	25	1.1	76.2	22.8	99.5
Wolve	4.9	6.9	85.6	4.4	99.3	23	2.9	92.8	4.3	99.3
York	5.3	5.1	82.4	2.7	100.0	23	2.3	90.3	7.4	100.0
N IRELAND										
Antrim	4.7	11.5	86.5	6.7	100.0	26	1.0	58.7	40.4	100.0
Belfast	5.2	3.4	86.4	1.4	100.0	21	4.1	91.2	4.8	100.0
Newry	4.8	13.7	79.5	7.5	100.0					19.2
Ulster	4.9	11.4	84.1	6.2	100.0	24	0.0	89.8	10.2	100.0
West NI	4.9	8.1	85.9	4.1	100.0	22	1.0	97.0	2.0	100.0
SCOTLAND										
Abrdn	4.9	12.9	81.6	8.7	100.0					5.6
Airdrie	4.3	26.5	70.8	20.6	100.0	20	9.8	88.5	1.6	98.9
D&Gall	4.9	8.3	87.5	3.2	98.0	23.5	2.1	89.6	8.3	98.0
Dundee	5.0	7.8	85.6	4.5	99.4	25	0.7	80.7	18.7	97.4
Edinb	4.9	13.4	79.8	9.8	99.3					47.3
Glasgw	4.9	9.2	85.9	7.0	99.0	21	7.7	89.0	3.3	93.0
Inverns	5.1	2.6	80.8	0.6	87.6	25	1.3	67.5	31.2	86.5
Klmarnk	4.8	12.6	80.3	7.9	99.2	22	5.4	90.1	4.5	86.7
Krkcldy	4.8	7.9	86.6	4.3	99.2	24	1.6	89.8	8.7	99.2
WALES										
Bangor					0.0	25.5	1.6	66.1	32.3	100.0
Cardff					0.0	23	3.0	90.0	7.1	99.8
Clwyd					0.0	22	2.7	93.2	4.1	100.0
Swanse					0.0	24	1.7	84.5	13.9	100.0
Wrexm					0.0	27	2.1	36.1	61.9	99.0

Table 5.7 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	**4.8**	**12.4**	**81.8**	**11.9**	**65.4**	**23**	**3.3**	**81.9**	**14.8**	**91.2**
N Ireland	**4.9**	**8.8**	**84.9**	**6.6**	**100.0**	**23**	**1.8**	**84.5**	**13.7**	**88.5**
Scotland	**4.8**	**11.9**	**82.2**	**10.4**	**98.7**	**22**	**5.4**	**85.9**	**8.7**	**77.2**
Wales					**0.0**	**23**	**2.4**	**82.3**	**15.3**	**99.8**
UK	**4.8**	**12.3**	**82.0**	**11.7**	**65.5**	**23**	**3.4**	**82.2**	**14.4**	**90.5**

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

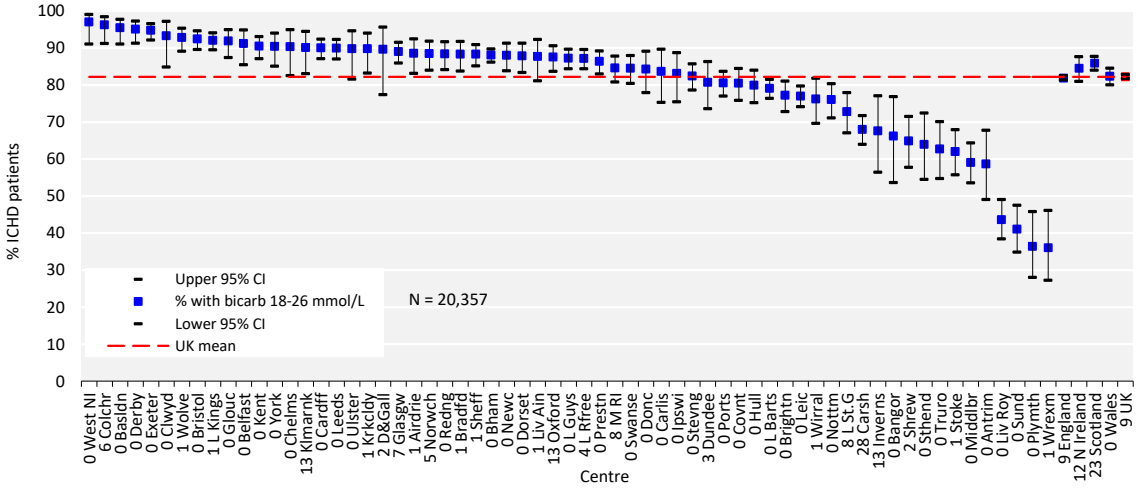


Figure 5.8 Percentage of adult patients prevalent to ICHD on 31/12/2019 with pre-dialysis bicarbonate (bicarb) within the target range (18–26 mmol/L) by centre

CI – confidence interval

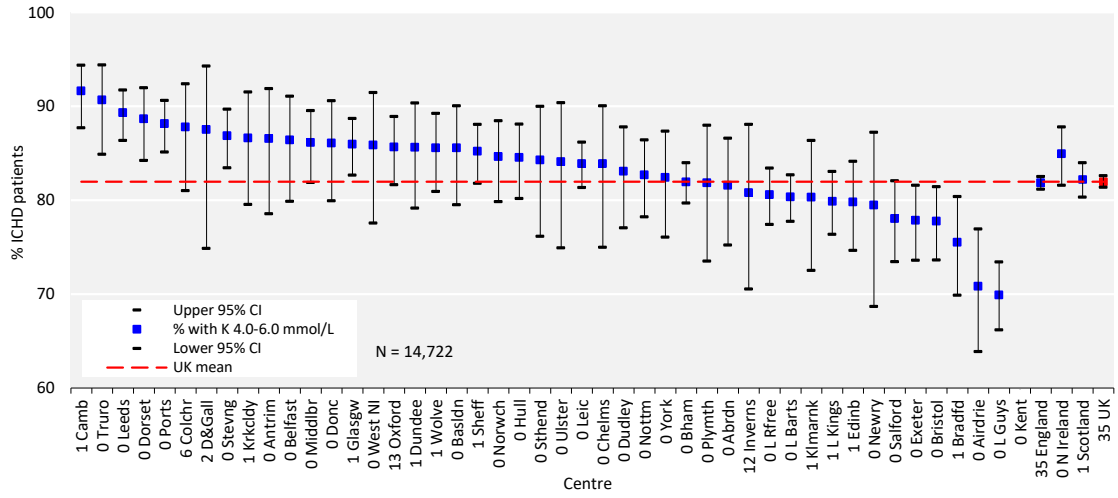


Figure 5.9 Percentage of adult patients prevalent to ICHD on 31/12/2019 with pre-dialysis potassium (K) within the target range (4.0–6.0 mmol/L) by centre

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.

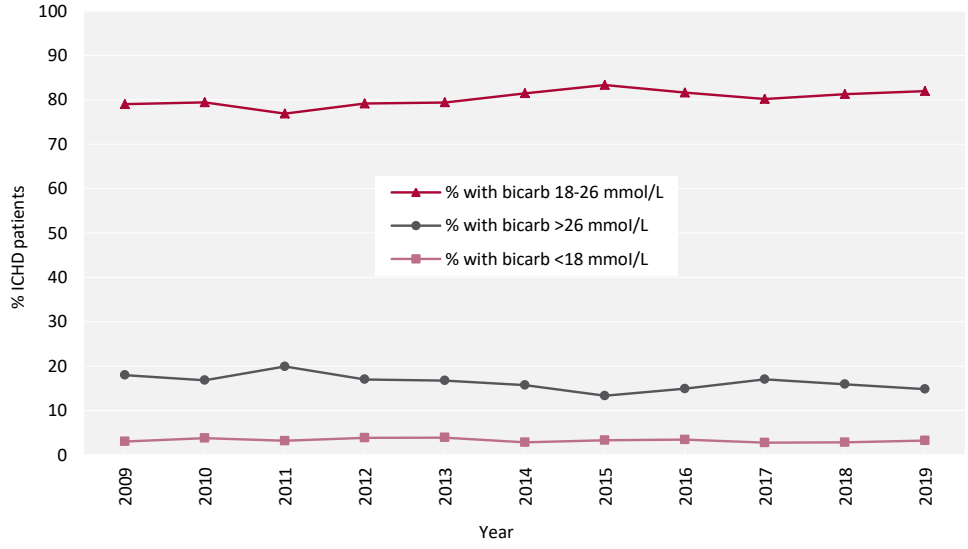


Figure 5.10 Change in percentage of prevalent adult ICHD patients within, above and below the target range for pre-dialysis bicarbonate (bicarb 18–26 mmol/L) between 2009 and 2019

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 5.8 Median haemoglobin and ferritin and percentage attaining target ranges in adult patients prevalent to ICHD on 31/12/2019 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							
Basldn	111	17.9	22.5	100.0	678	5.8	99.4
Bham	111	20.4	18.1	99.8	335	9.1	99.1
Bradfd	114	18.1	35.1	100.0	452	7.0	99.2
Brightn	111	20.1	22.6	99.8	513	3.0	99.5
Bristol	111	10.6	20.0	100.0	622	1.4	99.8
Camb	114	15.2	27.9	96.8			52.9
Carlis	114	14.4	24.0	100.0	609	5.8	100.0
Carsh	111	18.9	21.1	100.0	419	5.7	98.2
Chelms	116	8.6	35.5	100.0	318	18.3	100.0
Colchr	110	17.4	16.7	95.0	546	3.0	96.4
Covnt	108	27.3	11.5	100.0	433	3.8	99.4
Derby	113	14.9	33.9	100.0	536	1.4	98.6
Donc	110	23.0	18.2	100.0	430	1.2	100.0
Dorset	114	14.2	27.1	90.9	596	1.1	100.0
Dudley	116	10.2	28.9	98.9	224	11.4	74.1
Exeter	112	9.4	21.0	100.0	311	6.0	100.0
Glouc	111	17.7	20.1	100.0	464	7.4	97.6
Hull	113	18.9	25.1	100.0	429	2.8	100.0
Ipswi	109	29.0	12.1	100.0	420	12.1	100.0
Kent	112	19.9	24.6	99.7	457	7.5	99.7
L Barts	109	24.3	18.2	99.6	617	3.5	99.7
L Guys	109	25.1	16.2	100.0	486	3.7	99.7
L Kings	110	19.4	16.5	99.5	547	1.8	99.3
L Rfree	109	25.1	15.9	100.0	454	6.0	99.1
L St.G	109	28.1	23.4	98.6	359	10.0	93.2
L West	113	14.1	17.8	94.8	352	4.8	93.6
Leeds	108	24.7	10.1	100.0	363	6.4	100.0
Leic	113	18.7	27.1	100.0	392	6.9	99.9
Liv Ain	111	15.3	16.8	98.6	636	2.2	100.0
Liv Roy	113	18.0	28.1	99.4	449	4.0	99.1
M RI	110	25.2	22.3	92.5	390	3.1	79.4
Middlbr	111	20.5	19.6	99.7	871	4.8	98.4
Newc	110	24.0	23.3	100.0	563	4.3	99.7
Norwch	110	25.8	22.3	95.2	417	8.7	93.0
Nottm	114	14.3	27.1	99.7	385	5.8	100.0
Oxford	108	27.1	21.9	88.2	387	3.7	99.0
Plymth	110	20.9	21.8	100.0	370	5.5	100.0
Ports	112	19.5	25.4	100.0	394	4.7	99.1
Prestn	111	20.1	26.3	99.8	698	2.4	96.0
Redng	112	17.7	25.1	100.0	627	2.8	99.7

Table 5.8 Continued

Centre	Haemoglobin				Ferritin		
	Median (g/L)	% <100 g/L	% >120 g/L	% data completeness	Median (µg/L)	% <100 µg/L	% data completeness
Salford	110	27.3	21.4	100.0	362	12.4	100.0
Sheff	109	28.4	18.5	99.4	442	1.6	99.6
Shrew	115	14.0	33.9	98.9	598	1.1	98.9
Stevng	108	29.6	14.0	100.0	467	4.3	98.9
Sthend	109	18.5	11.1	100.0	348	1.9	100.0
Stoke	113	12.0	28.5	99.2	483	2.5	98.4
Sund	114	16.3	25.1	99.6	384	4.0	99.6
Truro	108	20.7	17.3	100.0	397	0.7	100.0
Wirral	114	13.2	26.8	100.0	629	6.3	100.0
Wolve	114	17.0	26.0	99.3	535	5.4	99.3
York	110	21.6	18.8	100.0	395	4.5	100.0
N IRELAND							
Antrim	106	32.7	13.5	100.0	350	4.8	100.0
Belfast	112	15.0	27.9	100.0	470	2.7	100.0
Newry	109	17.8	16.4	100.0	495	4.1	100.0
Ulster	109	19.3	19.3	100.0	704	0.0	100.0
West NI	114	17.3	24.5	99.0	742	1.0	100.0
SCOTLAND							
Abrdn	110	25.1	16.2	100.0	557	5.9	95.0
Airdrie	112	16.8	14.6	100.0	629	1.6	100.0
D&Gall	115	25.0	31.3	98.0	852	2.1	98.0
Dundee	110	17.6	22.2	99.4	421	9.8	99.4
Edinb	115	13.3	34.4	100.0	475	7.2	99.6
Glasgw	110	20.9	22.6	100.0	525	2.9	98.5
Inverns	112	7.9	23.6	100.0	535	3.8	87.6
Klmarnk	111	25.8	17.2	100.0	292	5.5	100.0
Krkcldy	115	13.3	34.4	100.0	428	8.7	99.2
WALES							
Bangor	116	12.9	30.6	100.0	387	1.6	100.0
Cardff	110	21.0	22.8	99.8	393	3.5	99.8
Clwyd	122	4.1	52.7	100.0	427	2.7	100.0
Swanse	111	23.0	16.9	100.0	394	9.7	99.7
Wrexm	109	24.7	11.3	99.0	526	1.0	99.0
TOTALS							
England	**111**	**20.1**	**21.2**	**98.8**	**441**	**5.1**	**97.3**
N Ireland	**111**	**20.2**	**21.2**	**99.8**	**547**	**2.5**	**100.0**
Scotland	**112**	**18.6**	**23.7**	**99.9**	**510**	**5.1**	**98.1**
Wales	**111**	**20.4**	**22.3**	**99.8**	**405**	**5.2**	**99.7**
UK	**111**	**20.0**	**21.5**	**98.9**	**445**	**5.0**	**97.6**

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

Table 5.9 Distribution of haemoglobin and erythropoiesis stimulating agent (ESA) dose values in adult patients prevalent to ICHD on 31/12/2019 by centre

Centre	ESA		Haemoglobin and ESA	
	% on ESA	Median dose (IU/week)	% <100 g/L and not on ESA	% >120 g/L and on ESA
ENGLAND				
Basldn	91.3	5,000	0.0	18.5
Bham	23.3			
Bradfd	92.7	8,000	0.0	30.9
Brightn	95.2	6,600	0.5	20.6
Bristol	94.5	8,000	0.2	17.4
Camb	43.5			
Carlis	83.7	4,000	0.0	17.3
Carsh	1.0			
Chelms	96.8	12,000	0.0	33.3
Colchr	0.0			
Covnt	88.2	8,000	1.6	8.4
Derby	0.0			
Donc	97.0	6,000	0.0	17.0
Dorset	92.0	6,000	0.4	21.7
Dudley	87.8	10,000	0.5	25.1
Exeter	92.3	6,000	0.0	18.1
Glouc	89.5		0.0	17.2
Hull	40.6			
Ipswi	33.9			
Kent	95.9	9,000	0.3	23.1
L Barts	92.8	8,000	1.4	15.1
L Guys	0.2			
L Kings	89.7	6,000	0.7	11.4
L Rfree	0.0			
L St.G	0.0			
L West	0.1			
Leeds	96.9	8,000	0.4	9.1
Leic	88.5	6,000	0.8	20.7
Liv Ain	0.0			
Liv Roy	0.3			
M RI	0.2			
Middlbr	61.6			
Newc	92.3	6,000	1.0	21.3
Norwch	90.8	9,000	1.2	18.8
Nottm	97.0	6,000	0.0	25.6
Oxford	83.1	9,000	4.4	17.0
Plymth	0.0			
Ports	63.8			
Prestn	93.2		0.4	22.4
Redng	94.0	13,500	3.2	23.0
Salford	20.8			
Sheff	86.9	6,000	4.3	15.8
Shrew	0.5			
Stevng	96.2	10,000	0.9	12.7
Sthend	94.4	12,000	0.0	9.3
Stoke	0.0			
Sund	92.1	6,900	0.9	22.5
Truro	0.0			
Wirral	91.1	9,000	0.5	22.1
Wolve	86.4	8,000	1.4	21.7
York	90.3	5,000	1.7	12.5

Table 5.9 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
N IRELAND				
Antrim	93.3	4,000	1.0	10.6
Belfast	97.3	6,000	0.7	25.9
Newry	97.3	6,000	0.0	15.1
Ulster	93.2	6,000	0.0	17.0
West NI	98.0	6,000	0.0	23.5
SCOTLAND				
Abrdn	93.2		0.5	13.6
Airdrie	97.1		1.1	12.6
D&Gall	82.7		0.0	19.2
Dundee	72.8		4.0	14.0
Edinb	76.7		4.4	26.3
Glasgw	90.1		1.7	17.2
Inverns	82.6		1.3	10.7
Klmarnk	95.5		1.5	14.9
Krkcldy	86.7		3.1	25.0
WALES				
Bangor	83.9		4.8	9.7
Cardff	41.4			
Clwyd	27.0			
Swanse	66.5			
Wrexm	57.1			
TOTAL[1]				
UK	**91.2**	**8,000**	**1.2**	**18.1**

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 31/05/2019 due to ESA data availability.
[1]This is the total of only those centres with at least 70% of ICHD patients on an ESA.

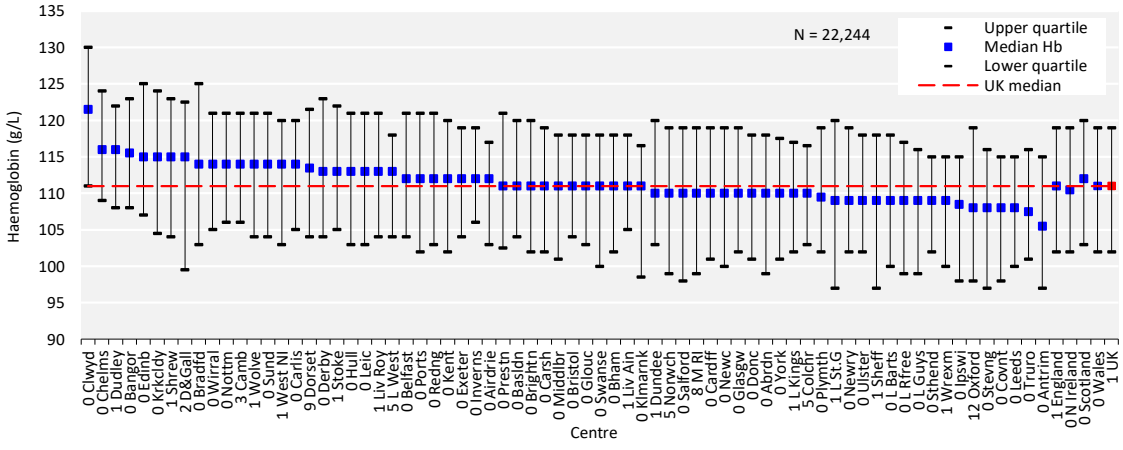


Figure 5.11 Median haemoglobin (Hb) in adult patients prevalent to ICHD on 31/12/2019 by centre

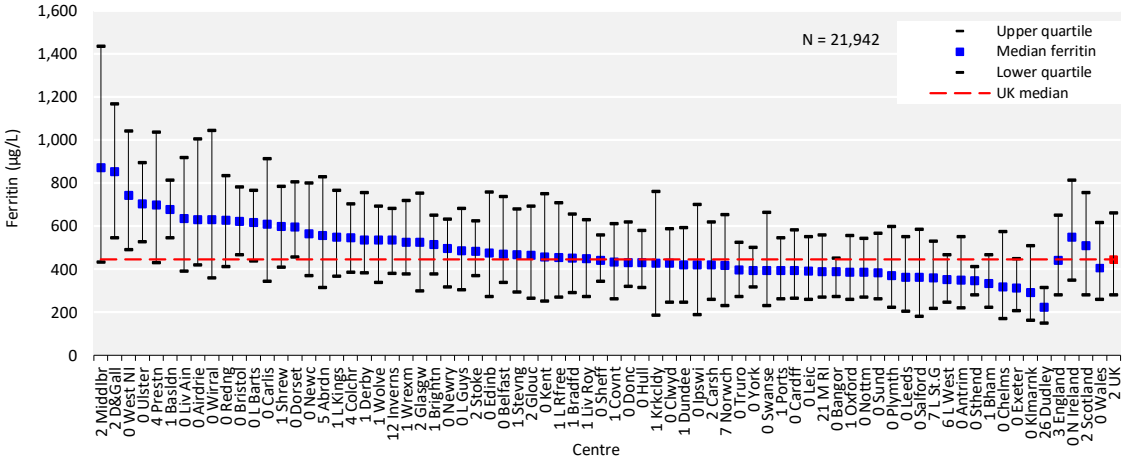


Figure 5.12 Median ferritin in adult patients prevalent to ICHD on 31/12/2019 by centre

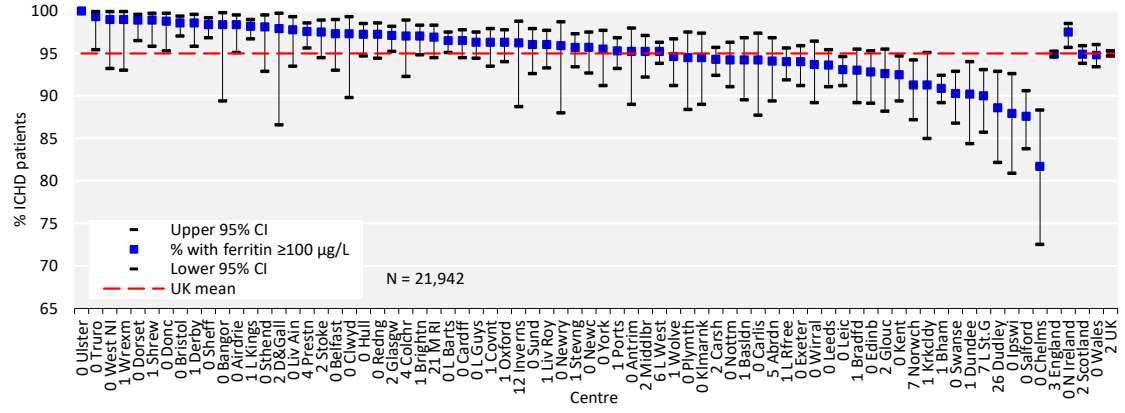


Figure 5.13 Percentage of adult patients prevalent to ICHD on 31/12/2019 with ferritin ≥100 µg/L by centre
CI – confidence interval

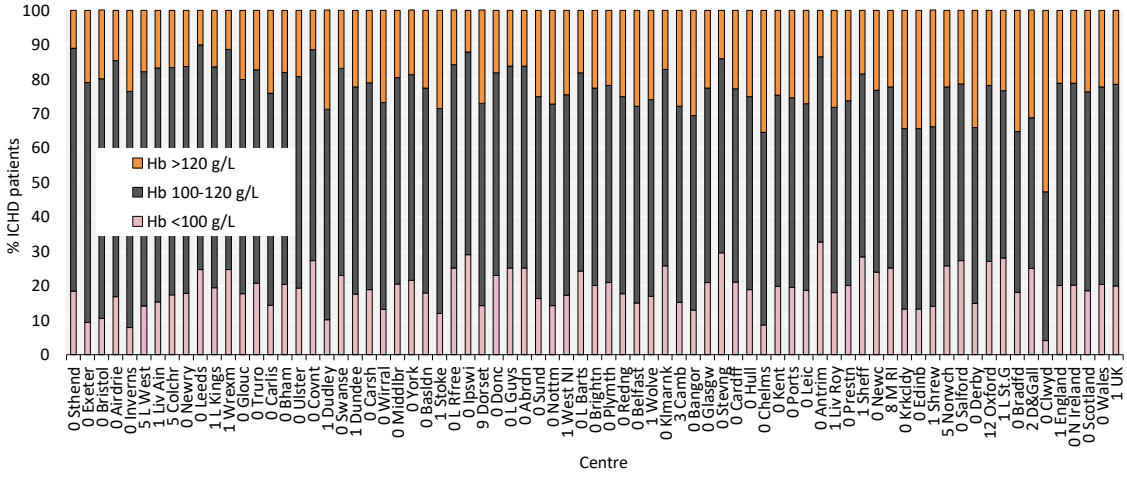


Figure 5.14 Distribution of haemoglobin (Hb) in adult patients prevalent to ICHD on 31/12/2019 by centre

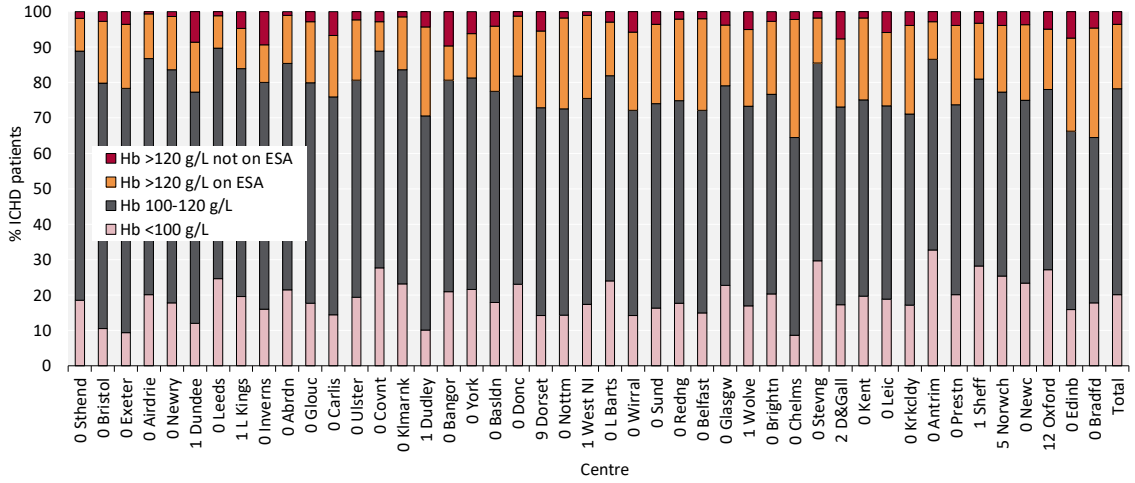


Figure 5.15 Distribution of haemoglobin (Hb) in adult patients prevalent to ICHD on 31/12/2019 and the proportion with haemoglobin >120 g/L receiving erythropoiesis stimulating agent (ESA) by centre

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 31/5/2019 due to ESA data availability.

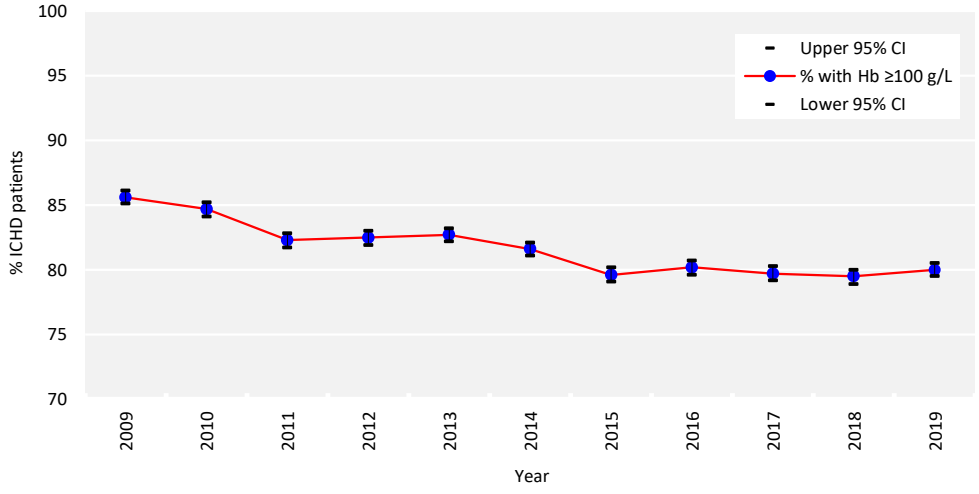


Figure 5.16 Percentage of prevalent adult ICHD patients with haemoglobin (Hb) ≥100 g/L between 2009 and 2019
CI – confidence interval

Dialysis access in prevalent adult dialysis patients

Prevalent dialysis access data were collected separately to the main UKRR quarterly data returns via the 2019 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 2). The type of prevalent dialysis access is presented in figure 5.17 for the 43 of 61 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. West NI is two centres combined, but only one submitted vascular access data. The number of patients on dialysis at West NI is therefore lower than presented elsewhere in the report.

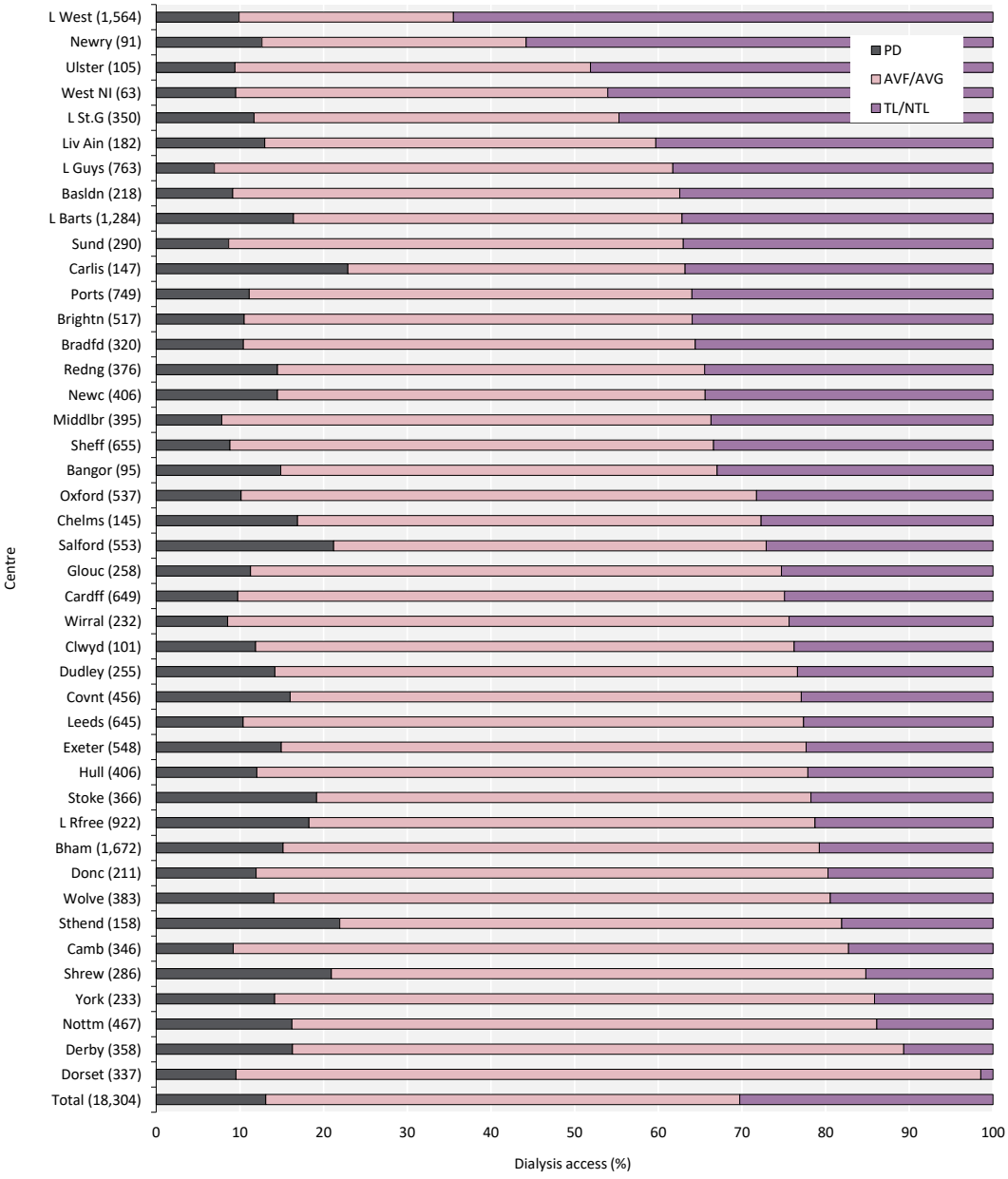


Figure 5.17 Dialysis access in adult patients prevalent to dialysis on 31/12/2019 by centre (2019 Multisite Dialysis Access Audit)

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 5.10 Rate of infection episodes per 100 HD patient-years in prevalent adult HD patients in England and Wales from January 2018 to December 2019 by centre

		Rate per 100 HD patient-years			
Centre	HD patient-years	MRSA	MSSA	C.difficile	E.coli
ENGLAND					
Basldn	368	0.27	4.62	2.72	0.54
Bham	2,886	0.14	2.36	1.32	1.70
Bradfd	558	0.36	2.69	0.18	1.97
Brightn	960	0.21	3.75	1.25	2.08
Bristol	993	0.91	2.42	0.81	2.32
Camb	782	0.13	2.17	0.51	1.15
Carlis	211	0.00	4.75	0.95	1.42
Carsh	1,776	0.06	1.75	0.84	2.08
Chelms	229	0.00	2.18	1.74	3.05
Colchr	271	0.37	1.84	0.00	1.48
Covnt	771	0.00	1.43	0.91	3.63
Derby	518	0.00	1.35	0.58	1.16
Donc	378	0.00	4.50	0.79	2.12
Dorset	610	0.16	2.30	1.15	1.97
Dudley	432	0.00	3.71	0.70	2.32
Exeter	949	0.11	1.48	0.95	1.79
Glouc	480	0.42	2.50	1.67	0.62
Hull	719	0.00	2.92	1.11	1.25
Ipswi	310	0.00	3.22	1.61	2.26
Kent	900	0.11	2.78	0.44	2.44
L Barts	2,172	0.14	3.08	0.74	1.98
L Guys	1,450	0.07	2.21	0.62	1.52
L Kings	1,212	0.00	2.56	1.07	1.65
L Rfree	1,430	0.00	1.68	1.68	2.87
L St.G	610	0.33	0.82	0.66	0.82
L West	2,932	0.17	2.05	1.23	1.77
Leeds	1,124	0.27	3.12	1.25	2.58
Leic	1,976	0.10	2.89	0.71	1.82
Liv Ain	343	0.00	3.21	2.04	4.37
Liv Roy	805	0.25	2.73	2.11	1.74
M RI	1,147	0.26	3.75	1.31	2.35
Middlbr	717	0.00	1.67	0.42	1.95
Newc	717	0.14	6.97	1.81	2.23
Norwch	619	0.00	1.29	0.65	0.81
Nottm	783	0.00	2.04	1.66	2.04
Oxford	967	0.10	1.03	0.72	1.96

Table 5.10 Continued

Centre	HD patient-years	Rate per 100 HD patient-years			
		MRSA	MSSA	C.difficile	E.coli
Plymth	274	0.00	2.56	1.10	1.83
Ports	1,286	0.31	4.35	1.09	1.32
Prestn	1,126	0.09	2.58	1.78	2.04
Redng	622	0.16	2.57	0.32	1.93
Salford	864	0.12	3.47	1.39	2.66
Sheff	1,202	0.17	2.50	0.75	1.58
Shrew	446	0.22	2.47	0.90	1.12
Stevng	1,053	0.57	2.28	1.33	2.00
Sthend	248	0.00	4.03	0.81	3.63
Stoke	622	0.00	1.61	1.13	3.54
Sund	534	0.00	2.81	1.69	1.87
Truro	337	0.00	2.38	0.89	2.08
Wirral	423	0.00	0.95	3.31	2.13
Wolve	675	0.00	1.93	0.30	2.37
York	394	0.51	5.59	0.25	1.27
WALES					
Bangor	162	0.00	4.95	1.24	2.48
Cardff	1,178	0.17	5.26	1.02	2.04
Clwyd	158	0.00	5.70	1.90	1.90
Swanse	836	0.96	3.71	0.48	3.23
Wrexm	237	1.27	7.60	0.42	0.84
TOTALS					
England	**44,207**	**0.15**	**2.59**	**1.08**	**1.95**
Wales	**2,571**	**0.51**	**4.98**	**0.86**	**2.33**
E & W	**46,778**	**0.17**	**2.72**	**1.06**	**1.98**

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.

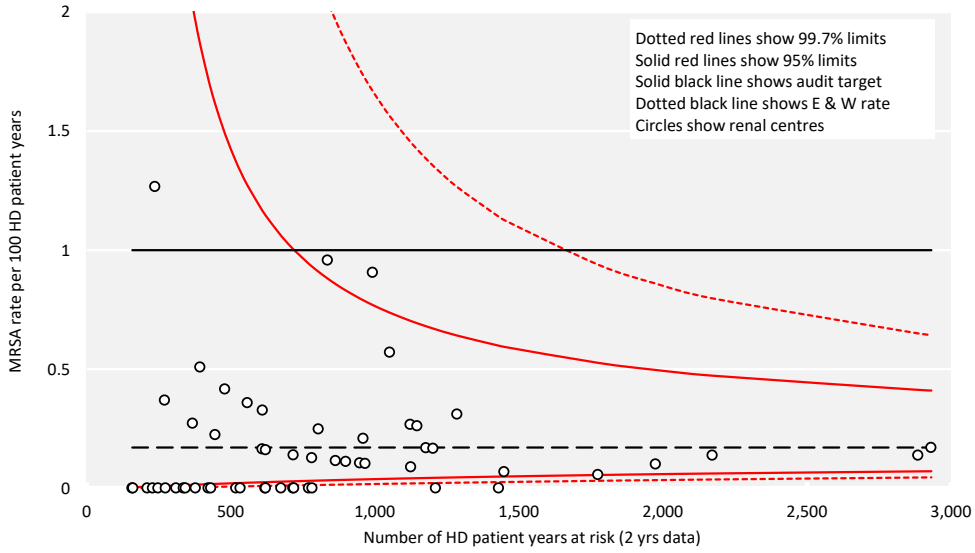


Figure 5.18 Methicillin-resistant *Staphylococcus aureus* (MRSA) rates by centre per 100 HD adult patient-years (2018–2019 data) compared to the England and Wales average, with the audit target also shown.

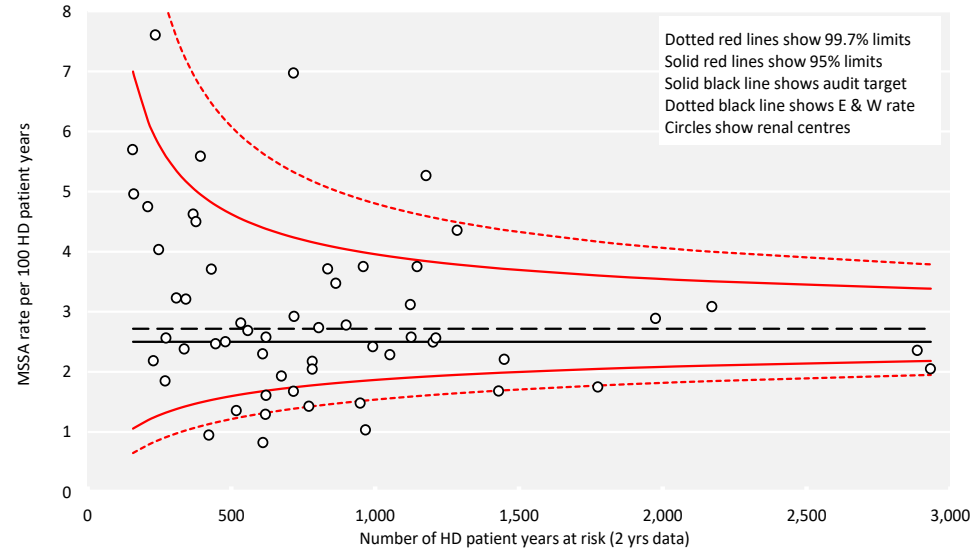


Figure 5.19 Methicillin-sensitive *Staphylococcus aureus* (MSSA) rates by centre per 100 HD adult patient-years (2018–2019 data) compared to the England and Wales average, with the audit target also shown.

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).

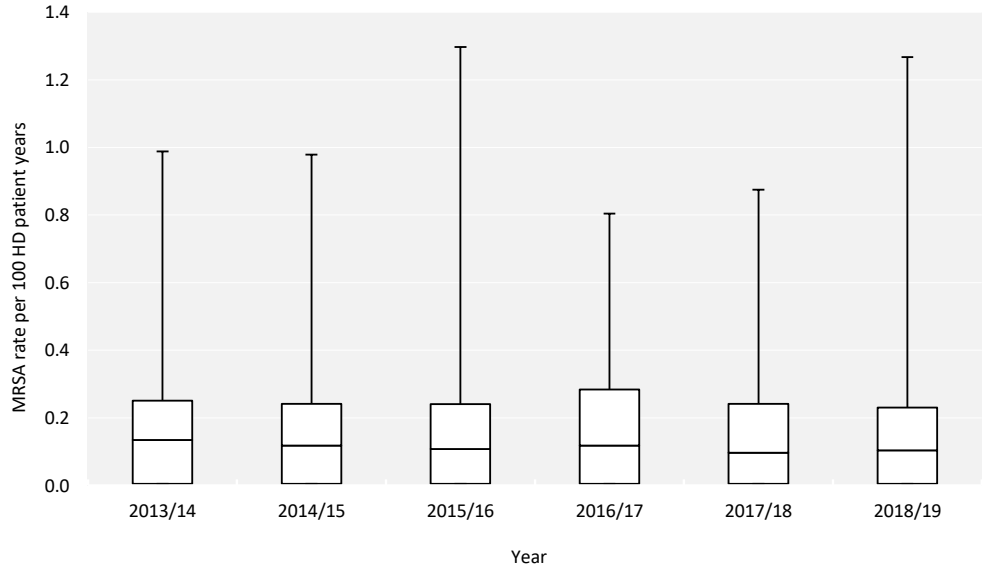


Figure 5.20 Distribution of methicillin-resistant *Staphylococcus aureus* (MRSA) centre rates per 100 HD adult patient-years by rolling 2 calendar year cohort (Wales included from 2016 onwards)

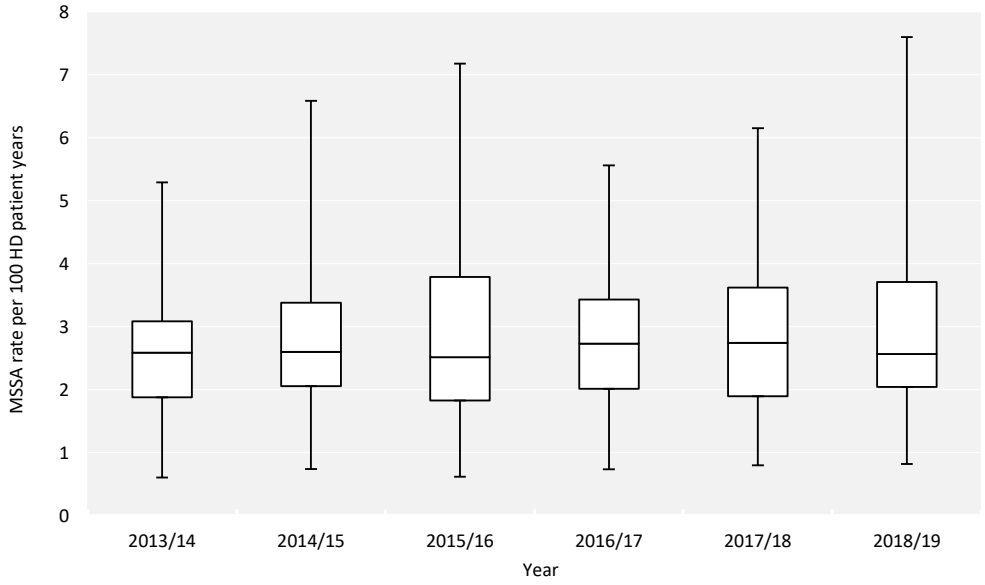


Figure 5.21 Distribution of methicillin-sensitive *Staphylococcus aureus* (MSSA) centre rates per 100 HD adult patient-years by rolling 2 calendar year cohort (Wales included from 2016 onwards)

Cause of death in adult ICHD patients

Cause of death was analysed in prevalent patients receiving ICHD on 31/12/2018 and followed-up for one year in 2019. 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 3.

Table 5.11 Cause of death in adult patients prevalent to ICHD on 31/12/2018 followed-up in 2019 by age group

	ICHD all ages		ICHD <65 years		ICHD ≥65 years	
Cause of death	N	%	N	%	N	%
Cardiac disease	566	20.1	172	24.2	394	18.7
Cerebrovascular disease	64	2.3	20	2.8	44	2.1
Infection	516	18.4	129	18.2	387	18.4
Malignancy	165	5.9	37	5.2	128	6.1
Treatment withdrawal	597	21.2	89	12.5	508	24.2
Other	700	24.9	202	28.5	498	23.7
Uncertain aetiology	204	7.3	61	8.6	143	6.8
Total (with data)	**2,812**	**100.0**	**710**	**100.0**	**2,102**	**100.0**
Missing	1,177	29.5	315	30.7	862	29.1

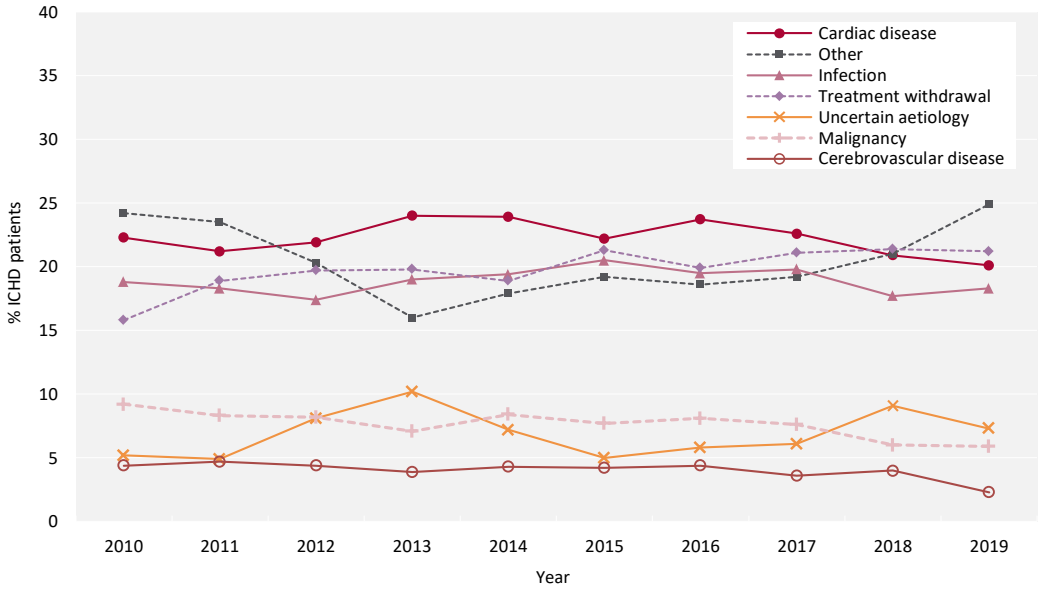


Figure 5.22 Cause of death between 2010 and 2019 for adult patients prevalent to ICHD at the beginning of the year

Hospitalisation of ICHD patients

Hospital Episodes Statistics (HES) and Patient Episode Database for Wales (PEDW) data for prevalent RRT patients on 31/12/2018 were used to compare emergency admission hospitalisation amongst ICHD patients (figure 5.23). The y-axis displays the total number of hospitalised days following an emergency admission for ICHD patients divided by the total number of ICHD patient-years at that centre for 2019. The average rate in England and Wales was 14.3 days per patient-year, compared to 4.2 days for Tx patients and 13.2 days for PD patients. Please visit the UKRR data portal (renal.org/audit-research/data-portal) to identify individual renal centres.

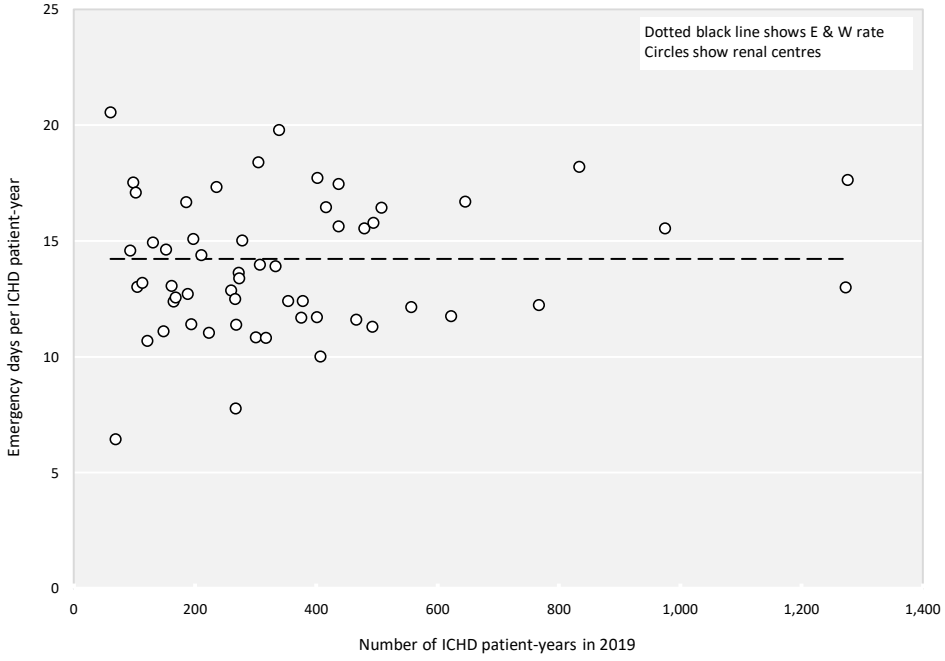


Figure 5.23 Emergency inpatient days per ICHD patient-year in 2019 for patients prevalent to RRT in England and Wales on 31/12/2018 by centre

THE RENAL ASSOCIATION
founded 1950

Chapter 6

Adults on peritoneal dialysis (PD) in the UK at the end of 2019

Contents

Introduction 138

Rationale for analyses 139

Key findings 141

Analyses 142

- Changes to the prevalent adult PD population 142
- Demographics of prevalent adult PD patients 145
- Biochemistry parameters in prevalent adult PD patients 147
- Anaemia in prevalent adult PD patients 150
- Infections in adult PD patients 156
- Cause of death in adult PD patients 158
- Hospitalisation of PD patients 159

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 2019 (figure 6.1). This population comprises patients who were on PD at the end of 2018 and remained on PD throughout 2019, as well as patients who commenced/re-commenced PD in 2019. This latter group includes both incident renal replacement therapy (RRT) patients who ended 2019 on PD and prevalent RRT patients who switched to PD from in-centre haemodialysis (ICHD), home haemodialysis (HHD) or a transplant (Tx) in 2019. 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.

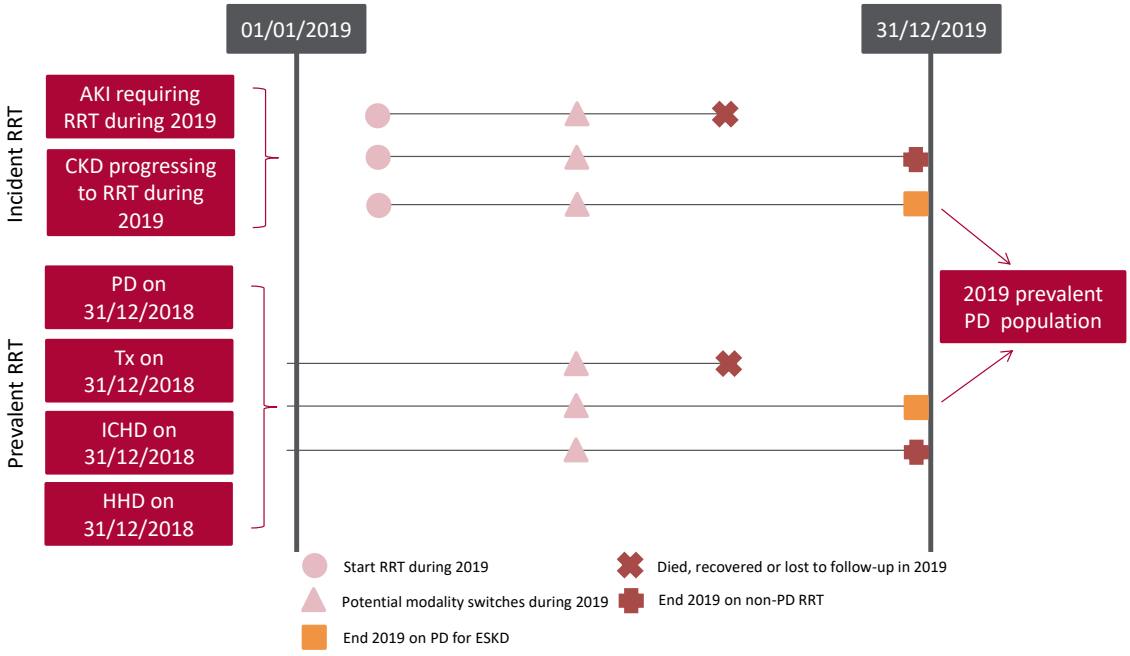


Figure 6.1 Pathways adult patients could follow to be included in the UK 2019 prevalent PD population

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 2019 or if they had been on RRT for ≥90 days and were on PD at the end of 2019.
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 5. 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 6.1):

- **Complications associated with ESKD and PD:** these include anaemia, mineral bone disorders and metabolic acidosis
- **Infections associated with PD:** rates of PD peritonitis are reported 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 2019 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 2019 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. Detail about the completeness of data returned to the UK Renal Registry (UKRR) is available through the UKRR data portal (renal.org/audit-research/data-portal) Audit measures that cannot be reported because the required data items were not collected by the UKRR are omitted.

The chapter includes analyses carried out by Getting It Right First Time (GIRFT), a national programme designed to reduce unwarranted variation in medical care provided by the NHS by sharing best practice. The GIRFT metrics for renal services, analysed in collaboration with the UKRR, were based on data derived from multiple sources and included equity of access to services, outcomes and pathways in nephrology, dialysis and transplantation.

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.

Table 6.1 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 6.5, figure 6.3
PD (2017)	Plasma bicarbonate should be maintained in the normal reference range 22–30 mmol/L – 100%	Table 6.5, figure 6.5
Anaemia (2017)	Proportion of patients with serum ferritin <100 µg/L at start of treatment with erythropoiesis stimulating agent (ESA)	Table 6.6, figure 6.9 (the UKRR does not hold treatment with ESA start dates)
	Proportion of patients with haemoglobin <100 g/L not on ESA	Table 6.7
	Proportion of patients on ESA with haemoglobin >120 g/L	Table 6.7, figure 6.11
	Mean (median) ESA dose in patients maintained on ESA therapy	Table 6.7
Peritoneal access (2009)	>80% of PD catheters should be patent at 1 year (censoring for death and elective modality change)	See chapter 2
	Peritonitis within 2 weeks of PD catheter insertion <5%	For peritonitis in prevalent patients see table 6.9 and figure 6.13
Planning, initiating and withdrawing RRT (2014)	Number of patients withdrawing from PD as a proportion of all deaths on PD	Table 6.10, figure 6.14

ESA – erythropoiesis stimulating agent

Key findings

- 3,644 adult patients were receiving PD for ESKD in the UK on 31/12/2019, which represented 5.4% of the RRT population
- The median age of PD patients was 64.4 years and 59.5% were male
- The median adjusted calcium for PD patients was 2.4 mmol/L and 13.2% were above the target range of 2.2–2.5 mmol/L
- The median bicarbonate for PD patients was 24 mmol/L and 79.1% were within the target range of 22–30 mmol/L
- The median haemoglobin and ferritin for PD patients was 111 g/L and 335 µg/L, respectively, and 77.3% were on an ESA at a median dose of 4,800 IU/week
- The PD peritonitis rate in 2019 (England only) was 0.38/1 PD patient-year
- There was no cause of death data available for 32.3% of deaths. For those with data, the leading cause of death in younger patients (<65 years) was cardiac disease (24.7%) and in older patients (≥65 years) was treatment withdrawal (23.1%).

Analyses

Changes to the prevalent adult PD population

For the 70 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 6.2 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)	2019 crude rate (pmp)
Centre	2015	2016	2017	2018	2019	2015	2016	2017	2018	2019		
ENGLAND												
Basldn	35	34	28	27	20	12.7	12.5	9.3	8.5	6.2	0.34	59
Bham	193	231	249	256	257	6.7	7.6	7.9	7.9	7.8	2.03	126
Bradfd	18	25	20	26	34	3.1	3.9	3.0	3.8	4.6	0.49	70
Brightn	67	64	59	60	55	7.1	6.5	5.8	5.7	5.2	1.07	52
Bristol	57	53	58	56	64	3.9	3.6	3.9	3.8	4.3	1.21	53
Camb	31	22	26	32	28	2.4	1.7	2.0	2.3	1.9	0.93	30
Carlis	38	36	28	31	36	13.5	12.9	10.0	10.6	11.9	0.25	142
Carsh[1]	113	113	96	99	69	7.1	6.8	5.7	5.6	3.9	1.61	43
Chelms	26	32	31	30	31	9.2	11.8	11.2	11.5	11.9	0.37	83
Colchr	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.29	0
Covnt	78	67	52	52	82	8.1	6.9	5.4	5.4	7.6	0.79	104
Derby	78	77	79	79	62	14.5	14.2	14.2	13.5	9.5	0.56	112
Donc	23	27	29	24	25	7.6	8.2	8.7	7.2	7.3	0.37	67
Dorset	42	36	35	38	33	6.2	5.2	4.8	5.0	4.3	0.72	46
Dudley	57	50	55	37	36	18.1	14.5	14.9	10.1	9.8	0.34	106
Exeter	82	84	75	77	84	8.5	8.3	7.1	7.1	7.7	0.94	89
Glouc	37	42	45	37	29	8.3	8.9	8.9	7.1	5.5	0.51	57
Hull	75	72	56	45	49	8.8	8.4	6.4	5.1	5.4	0.79	62
Ipswi	36	34	45	40	42	9.0	8.2	10.3	9.3	9.9	0.31	136
Kent	60	58	52	44	51	5.8	5.4	4.8	4.0	4.5	1.06	48
L Barts	207	202	236	237	229	9.1	8.5	9.5	9.1	8.6	1.57	145
L Guys	33	39	39	43	53	1.6	1.9	1.8	1.9	2.3	1.00	53
L Kings	90	91	97	90	95	8.3	8.2	8.4	7.6	7.6	0.92	103
L Rfree	154	159	145	166	168	7.4	7.3	6.6	7.4	7.2	1.32	128
L St.G	48	44	37	40	44	5.7	5.3	4.5	4.8	5.2	0.66	67
L West	70	100	120	135	156	2.1	2.9	3.5	3.8	4.3	1.95	80
Leeds	57	47	59	64	67	3.7	3.0	3.6	3.8	3.9	1.36	49
Leic	107	88	96	108	127	4.9	3.8	4.1	4.4	4.9	2.07	61
Liv Ain	38	27	21	25	18	17.1	11.9	10.0	11.6	8.6	0.43	42
Liv Roy	67	71	70	57	32	5.4	5.9	5.6	4.5	2.6	0.80	40
M RI	65	63	72	70	77	3.5	3.2	3.5	3.4	3.7	1.32	58
Middlbr	22	26	23	29	32	2.4	2.9	2.5	3.1	3.4	0.80	40
Newc	46	53	58	60	60	4.6	5.0	5.2	5.2	5.1	0.94	64
Norwch	38	48	43	36	47	5.3	6.2	5.5	4.6	5.8	0.68	69
Nottm	82	81	69	70	76	7.4	7.0	5.9	5.9	6.2	0.92	83
Oxford	95	95	67	69	57	5.6	5.4	3.6	3.6	2.9	1.43	40
Plymth	34	41	49	40	42	6.8	8.0	9.1	7.4	7.9	0.40	106
Ports	71	75	84	94	88	4.3	4.4	4.8	5.3	4.7	1.73	51
Prestn	53	40	34	38	42	4.4	3.3	2.7	2.9	3.1	1.22	34

Table 6.2 Continued

Centre	N on PD					% on PD					Estimated catchment population (millions)	2019 crude rate (pmp)
	2015	2016	2017	2018	2019	2015	2016	2017	2018	2019		
Redng	66	56	39	40	56	8.5	7.1	4.9	4.9	6.5	0.69	81
Salford	94	106	117	115	120	9.7	10.4	10.5	9.8	9.7	1.14	105
Sheff	64	55	55	61	60	4.6	3.9	3.8	4.1	4.0	1.12	53
Shrew	32	39	42	58	55	8.7	10.3	10.9	13.6	12.9	0.41	135
Stevng	15	21	23	28	37	1.8	2.4	2.6	3.0	3.8	1.10	34
Sthend	17	30	34	30	34	6.9	12.7	13.4	11.4	12.9	0.27	125
Stoke	75	79	72	81	71	9.5	9.6	8.9	10.1	8.8	0.72	98
Sund	18	17	16	17	26	3.9	3.4	3.0	3.1	4.6	0.54	48
Truro	23	18	15	17	20	5.6	4.2	3.5	3.9	4.5	0.35	56
Wirral	21	22	19	20	17	7.5	6.5	4.9	5.1	4.1	0.47	37
Wolve	79	69	54	54	49	13.6	12.1	9.3	8.9	8.2	0.54	90
York	29	33	35	29	33	5.9	6.2	6.3	5.1	5.7	0.48	69
N IRELAND												
Antrim	20	16	14	20	19	8.3	6.3	5.5	7.3	6.8	0.24	78
Belfast	24	24	17	23	19	3.1	3.0	2.0	2.6	2.1	0.53	36
Newry	22	21	23	16	11	9.8	8.9	9.5	6.4	4.4	0.23	47
Ulster	6	6	6	10	8	3.6	3.6	3.3	5.2	4.4	0.20	40
West NI	12	10	9	9	14	4.1	3.3	2.9	2.8	4.3	0.25	56
SCOTLAND												
Abrdn	26	21	22	26	22	4.9	3.8	3.9	4.5	3.9	0.50	44
Airdrie	16	24	16	21	21	3.8	5.5	3.4	4.3	4.0	0.46	46
D&Gall	11	10	6	6	8	8.5	7.6	4.4	4.1	5.4	0.12	66
Dundee	17	21	18	22	21	4.1	5.0	4.1	4.9	4.7	0.37	57
Edinb	26	36	33	36	41	3.4	4.6	4.0	4.2	4.6	0.84	49
Glasgw	55	54	48	52	45	3.2	3.1	2.7	2.9	2.4	1.37	33
Inverns	13	11	10	13	12	5.2	4.3	3.8	4.7	4.3	0.22	54
Klmarnk	37	33	24	19	24	11.9	10.4	7.1	5.6	6.7	0.29	83
Krkcldy	21	18	11	10	12	7.1	6.1	3.6	3.4	4.1	0.27	44
WALES												
Bangor	15	16	17	20	14	8.2	8.9	8.7	9.9	7.0	0.16	86
Cardff	79	75	72	60	64	4.9	4.6	4.3	3.5	3.7	1.15	56
Clwyd	20	15	12	15	13	10.8	8.5	6.7	7.9	6.3	0.18	72
Swanse	62	67	74	70	78	8.1	8.7	9.3	8.5	9.0	0.75	104
Wrexm	37	32	27	24	23	12.6	10.3	8.4	7.7	7.4	0.21	112
TOTALS												
England	**3,056**	**3,092**	**3,058**	**3,111**	**3,175**	**6.0**	**5.8**	**5.6**	**5.6**	**5.5**	**44.33**	**72**
N Ireland	**84**	**77**	**69**	**78**	**71**	**4.9**	**4.3**	**3.8**	**4.1**	**3.7**	**1.45**	**49**
Scotland	**222**	**228**	**188**	**205**	**206**	**4.6**	**4.6**	**3.7**	**3.9**	**3.8**	**4.43**	**47**
Wales	**213**	**205**	**202**	**189**	**192**	**7.0**	**6.7**	**6.4**	**5.8**	**5.8**	**2.45**	**78**
UK	**3,575**	**3,602**	**3,517**	**3,583**	**3,644**	**5.9**	**5.7**	**5.4**	**5.4**	**5.4**	**52.67**	**69**

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.
[1]Carshalton discovered a problem related to the submission of PD patients after the closing date. As a consequence, 26 PD patients are not included in this report. No adjustment has been made this year, but the problem has been resolved and numbers will be correct next year.
pmp – per million population

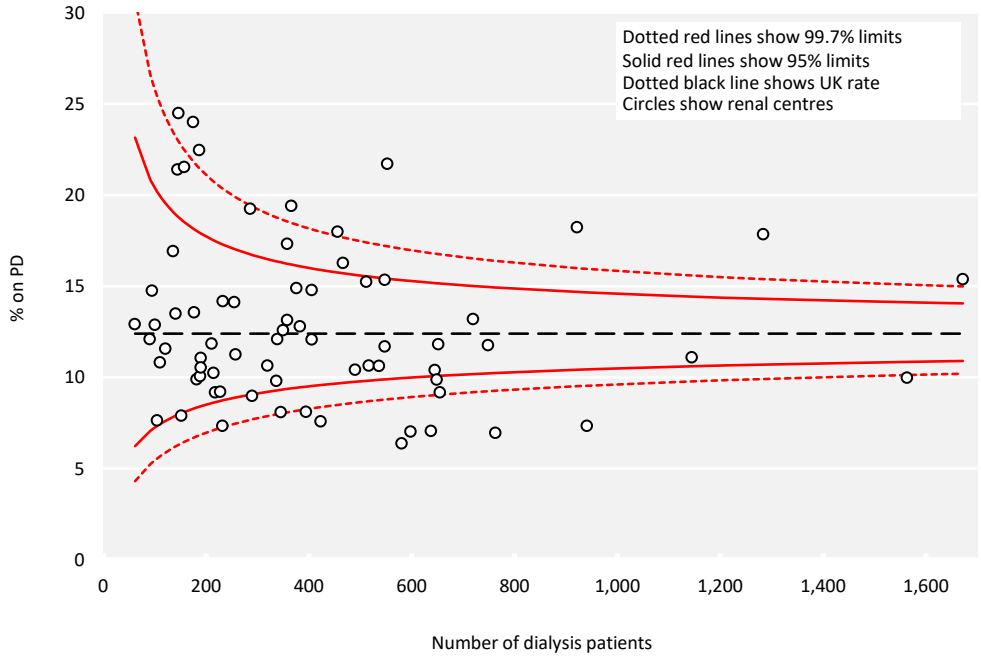


Figure 6.2 Percentage of adult patients prevalent to dialysis on 31/12/2019 who were on PD by centre

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 6.3 Demographics of adult patients prevalent to PD on 31/12/2019 by centre

Centre	N on RRT	N on PD	% on PD	Median age (yrs)	% male	Ethnicity				
						% White	% Asian	% Black	% Other	% missing
ENGLAND										
Basldn	322	20	6.2	71.8	75.0	90.0	5.0	0.0	5.0	0.0
Bham	3,308	257	7.8	61.0	60.3	56.6	27.0	13.1	3.3	5.1
Bradfd	733	34	4.6	58.7	47.1	54.5	36.4	3.0	6.1	2.9
Brightn	1,059	55	5.2	67.2	60.0	84.6	11.5	1.9	1.9	5.5
Bristol	1,486	64	4.3	60.3	64.1	90.5	0.0	7.9	1.6	1.6
Camb	1,469	28	1.9	72.7	67.9	92.6	3.7	3.7	0.0	3.6
Carlis	303	36	11.9	68.5	55.6	100.0	0.0	0.0	0.0	0.0
Carsh[1]	1,771	69	3.9	65.3	56.5	67.6	17.6	14.7	0.0	1.4
Chelms	261	31	11.9	67.1	61.3	100.0	0.0	0.0	0.0	6.5
Colchr	145	0	0.0							
Covnt	1,076	82	7.6	62.8	63.4	84.1	8.5	7.3	0.0	0.0
Derby	652	62	9.5	70.3	56.5	87.1	11.3	1.6	0.0	0.0
Donc	342	25	7.3	66.5	52.0	100.0	0.0	0.0	0.0	0.0
Dorset	772	33	4.3	67.5	60.6	93.5	0.0	0.0	6.5	6.1
Dudley	366	36	9.8	64.2	61.1	86.1	8.3	5.6	0.0	0.0
Exeter	1,091	84	7.7	70.6	61.9	90.4	1.2	0.0	8.4	1.2
Glouc	525	29	5.5	69.0	51.7	93.1	0.0	3.4	3.4	0.0
Hull	904	49	5.4	65.4	65.3	100.0	0.0	0.0	0.0	0.0
Ipswi	424	42	9.9	72.8	69.0	77.8	0.0	8.3	13.9	14.3
Kent	1,140	51	4.5	60.4	52.9	91.8	8.2	0.0	0.0	3.9
L Barts	2,660	229	8.6	61.5	57.6	28.8	40.5	18.0	12.6	3.1
L Guys	2,310	53	2.3	54.4	50.9	48.0	14.0	32.0	6.0	5.7
L Kings	1,244	95	7.6	55.6	58.9	47.8	13.0	31.5	7.6	3.2
L Rfree	2,344	168	7.2	63.0	56.0	35.1	27.2	26.5	11.3	10.1
L St.G	852	44	5.2	67.8	54.5	31.6	21.1	21.1	26.3	13.6
L West	3,613	156	4.3	66.8	53.2	46.8	31.4	19.9	1.9	0.0
Leeds	1,723	67	3.9	58.0	62.7	82.1	10.4	6.0	1.5	0.0
Leic	2,587	127	4.9	62.8	55.9	78.5	13.2	6.6	1.7	4.7
Liv Ain	210	18	8.6	68.4	66.7	100.0	0.0	0.0	0.0	0.0
Liv Roy	1,227	32	2.6	63.8	56.3	93.5	0.0	0.0	6.5	3.1
M RI	2,060	77	3.7	63.2	58.4	65.8	21.9	9.6	2.7	5.2
Middlbr	949	32	3.4	62.6	56.3	96.9	3.1	0.0	0.0	0.0
Newc	1,175	60	5.1	63.6	63.3	93.3	5.0	0.0	1.7	0.0
Norwch	809	47	5.8	70.6	63.8	95.7	2.1	0.0	2.1	0.0
Nottm	1,218	76	6.2	61.7	57.9	77.6	15.8	5.3	1.3	0.0
Oxford	1,969	57	2.9	60.4	59.6	81.4	7.0	7.0	4.7	24.6
Plymth	531	42	7.9	68.2	76.2	95.2	0.0	0.0	4.8	0.0
Ports	1,883	88	4.7	68.0	69.3	92.6	2.5	1.2	3.7	8.0
Prestn	1,341	42	3.1	62.3	52.4	85.7	14.3	0.0	0.0	0.0
Redng	860	56	6.5	68.4	66.1	75.6	13.3	6.7	4.4	19.6
Salford	1,237	120	9.7	64.5	61.7	90.0	8.3	1.7	0.0	0.0
Sheff	1,491	60	4.0	68.7	68.3	89.7	10.3	0.0	0.0	3.3
Shrew	428	55	12.9	72.1	63.6	88.9	3.7	3.7	3.7	1.8
Stevng	966	37	3.8	68.1	67.6	85.2	11.1	0.0	3.7	27.0
Sthend	264	34	12.9	75.5	70.6	97.1	0.0	0.0	2.9	0.0

Table 6.3 Continued

Centre	N on RRT	N on PD	% on PD	Median age (yrs)	% male	Ethnicity				
						% White	% Asian	% Black	% Other	% missing
Stoke	803	71	8.8	65.5	53.5	89.6	9.0	1.5	0.0	5.6
Sund	568	26	4.6	50.1	38.5	92.3	7.7	0.0	0.0	0.0
Truro	449	20	4.5	66.5	65.0	100.0	0.0	0.0	0.0	0.0
Wirral	411	17	4.1	62.0	58.8	94.1	0.0	5.9	0.0	0.0
Wolve	598	49	8.2	61.3	57.1	61.2	28.6	8.2	2.0	0.0
York	581	33	5.7	72.0	81.8	100.0	0.0	0.0	0.0	6.1
N IRELAND										
Antrim	280	19	6.8	70.9	68.4	100.0	0.0	0.0	0.0	0.0
Belfast	890	19	2.1	68.4	52.6					63.2
Newry	251	11	4.4	79.5	54.5	100.0	0.0	0.0	0.0	0.0
Ulster	182	8	4.4	69.4	87.5	87.5	0.0	0.0	12.5	0.0
West NI	328	14	4.3	59.3	64.3	100.0	0.0	0.0	0.0	0.0
SCOTLAND										
Abrdn	558	22	3.9	60.8	59.1					90.9
Airdrie	524	21	4.0	63.5	52.4	100.0	0.0	0.0	0.0	9.5
D&Gall	149	8	5.4	47.0	37.5					75.0
Dundee	449	21	4.7	66.0	66.7					100.0
Edinb	885	41	4.6	67.2	53.7					95.1
Glasgw	1,854	45	2.4	58.0	51.1					60.0
Inverns	282	12	4.3	61.0	41.7					91.7
Klmarnk	359	24	6.7	62.3	45.8					66.7
Krkcldy	295	12	4.1	61.2	66.7					100.0
WALES										
Bangor	201	14	7.0	65.3	64.3	100.0	0.0	0.0	0.0	14.3
Cardff	1,730	64	3.7	62.6	51.6	88.3	6.7	3.3	1.7	6.3
Clwyd	205	13	6.3	68.7	69.2	90.0	10.0	0.0	0.0	23.1
Swanse	868	78	9.0	65.5	66.7	97.4	2.6	0.0	0.0	2.6
Wrexm	311	23	7.4	59.9	56.5	90.9	0.0	9.1	0.0	4.3
TOTALS										
England	**57,510**	**3,175**	**5.5**	**64.3**	**59.8**	**72.7**	**14.6**	**8.8**	**3.9**	**4.1**
N Ireland	**1,931**	**71**	**3.7**	**71.4**	**63.4**	**98.3**	**0.0**	**0.0**	**1.7**	**16.9**
Scotland	**5,355**	**206**	**3.8**	**63.0**	**53.4**					**74.8**
Wales	**3,315**	**192**	**5.8**	**64.6**	**60.4**	**93.3**	**3.9**	**2.2**	**0.6**	**6.3**
UK	**68,111**	**3,644**	**5.4**	**64.4**	**59.5**	**74.5**	**13.6**	**8.2**	**3.7**	**8.5**

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.
[1]Carshalton discovered a problem related to the submission of PD patients after the closing date. As a consequence, 26 PD patients are not included in this report. No adjustment has been made this year, but the problem has been resolved and numbers will be correct next year.

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 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 6.4 Primary renal diseases (PRDs) of adult patients prevalent to PD on 31/12/2019

PRD	N on PD	% PD population	Age <65 yrs		Age ≥65 yrs		M/F ratio
			N	%	N	%	
Diabetes	862	24.7	479	26.7	383	22.7	1.7
Glomerulonephritis	560	16.1	348	19.4	212	12.6	1.7
Hypertension	272	7.8	119	6.6	153	9.1	2.1
Polycystic kidney disease	244	7.0	154	8.6	90	5.3	0.9
Pyelonephritis	216	6.2	105	5.8	111	6.6	1.5
Renal vascular disease	199	5.7	41	2.3	158	9.4	2.3
Other	546	15.7	301	16.8	245	14.5	1.0
Uncertain aetiology	586	16.8	249	13.9	337	20.0	1.4
Total (with data)	**3,485**	**100.0**	**1,796**	**100.0**	**1,689**	**100.0**	
Missing	159	4.4	78	4.2	81	4.6	1.6

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.

Table 6.5 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 31/12/2019 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									
Basldn	2.4	94.4	5.6	100.0	27	5.6	77.8	16.7	100.0
Bham	2.4	85.0	9.7	100.0	22	37.5	62.0	0.5	95.2
Bradfd	2.5	73.1	26.9	100.0	25	19.2	73.1	7.7	100.0
Brightn	2.4	70.0	14.0	100.0	25	12.0	88.0	0.0	100.0
Bristol	2.4	87.5	10.7	100.0	24	26.8	73.2	0.0	100.0
Camb	2.4	78.3	13.0	100.0	26	4.4	87.0	8.7	100.0
Carlis	2.3	88.9	3.7	90.0	24	22.2	74.1	3.7	90.0
Carsh	2.3	69.8	13.2	82.8					0.0
Chelms	2.3	78.6	7.1	100.0	24	21.4	78.6	0.0	100.0
Colchr									
Covnt	2.3	80.0	5.0	96.8	25	10.5	89.5	0.0	91.9
Derby	2.4	74.1	20.7	100.0	24	12.1	84.5	3.5	100.0
Donc	2.3	85.7	9.5	100.0	24	14.3	85.7	0.0	100.0
Dorset	2.4	93.6	3.2	93.9	22	46.9	53.1	0.0	97.0
Dudley	2.5	72.7	24.2	97.1	24	14.7	85.3	0.0	100.0
Exeter	2.4	84.9	13.7	100.0	23	28.8	71.2	0.0	100.0
Glouc	2.4	68.4	10.5	90.5	25	5.3	94.7	0.0	90.5
Hull	2.4	76.3	21.1	100.0	26	10.5	79.0	10.5	100.0
Ipswi	2.3	68.6	11.4	97.2	26	11.8	88.2	0.0	94.4
Kent	2.4	74.3	20.0	89.7	24	21.1	76.3	2.6	97.4
L Barts	2.3	76.3	7.7	93.7	24	23.8	71.5	4.7	93.2
L Guys	2.4	85.4	12.2	100.0	25	19.5	80.5	0.0	100.0
L Kings	2.3	81.6	9.2	98.7	25	25.0	73.7	1.3	98.7

Table 6.5 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 Rfree	2.4	78.3	16.8	100.0	24	13.6	85.7	0.7	97.9
L St.G	2.5	69.7	27.3	91.7	23	21.2	78.8	0.0	91.7
L West				54.5					53.7
Leeds	2.4	78.2	20.0	98.2	26	5.4	80.4	14.3	100.0
Leic	2.4	91.2	5.9	99.0	26	11.8	85.3	2.9	99.0
Liv Ain	2.4	93.3	0.0	100.0	26	0.0	86.7	13.3	100.0
Liv Roy	2.4	86.7	10.0	100.0	25	3.3	93.3	3.3	100.0
M RI	2.4	74.6	20.3	98.3	24	8.6	91.4	0.0	96.7
Middlbr	2.3	59.3	11.1	96.4	25	7.4	92.6	0.0	96.4
Newc	2.4	62.8	19.6	98.1	23	27.5	66.7	5.9	98.1
Norwch	2.4	75.6	12.2	100.0	24	29.3	70.7	0.0	100.0
Nottm	2.3	83.6	9.8	100.0					47.5
Oxford	2.4	77.5	12.5	83.3					62.5
Plymth	2.4	89.5	2.6	100.0	25	7.9	84.2	7.9	100.0
Ports	2.4	86.3	11.3	100.0	26	10.0	87.5	2.5	100.0
Prestn	2.3	81.3	3.1	97.0	25	3.2	87.1	9.7	93.9
Redng	2.4	76.1	17.4	100.0	25	8.7	87.0	4.4	100.0
Salford	2.4	76.9	18.3	99.1					0.0
Sheff	2.3	81.1	3.8	100.0	23	35.9	64.2	0.0	100.0
Shrew	2.4	70.0	24.0	98.0	25	14.0	82.0	4.0	98.0
Stevng	2.4	75.9	17.2	100.0	25	10.3	89.7	0.0	100.0
Sthend	2.4	86.7	13.3	100.0	25	6.9	86.2	6.9	96.7
Stoke	2.4	80.4	16.1	96.6	27	1.8	87.5	10.7	96.6
Sund	2.4	66.7	27.8	100.0					11.1
Truro	2.5	70.6	29.4	100.0	24	5.9	76.5	17.7	100.0
Wirral	2.3	92.3	7.7	92.9	23	23.1	76.9	0.0	92.9
Wolve	2.4	88.6	6.8	95.7	25	9.1	90.9	0.0	95.7
York	2.4	89.7	10.3	96.7	27	3.3	90.0	6.7	100.0
N IRELAND									
Antrim	2.4	81.3	12.5	100.0	23	12.5	87.5	0.0	100.0
Belfast	2.4	75.0	18.8	94.1	23	12.5	87.5	0.0	94.1
Newry	2.4	72.7	27.3	100.0	26	9.1	90.9	0.0	100.0
Ulster				100.0					100.0
West NI	2.4	85.7	0.0	100.0	25	14.3	78.6	7.1	100.0
SCOTLAND									
Abrdn	2.4	77.3	18.2	100.0					0.0
Airdrie	2.4	84.2	15.8	100.0	24	10.5	89.5	0.0	100.0
D&Gall				100.0					100.0
Dundee	2.5	81.3	18.8	100.0	28	0.0	100.0	0.0	93.8
Edinb	2.4	84.2	10.5	100.0					60.5
Glasgw	2.4	70.3	24.3	100.0	25	8.1	89.2	2.7	100.0
Inverns				90.0					90.0
Klmarnk	2.4	76.2	19.1	100.0	23	15.8	84.2	0.0	90.5
Krkcldy	2.4	90.9	9.1	100.0	24	27.3	72.7	0.0	100.0
WALES									
Bangor	2.3	76.9	7.7	100.0	27	0.0	92.3	7.7	100.0
Cardff	2.4	77.4	15.1	98.2	25	12.8	82.1	5.1	72.2
Clwyd				100.0					100.0
Swanse	2.4	90.3	6.9	98.6	26	8.3	87.5	4.2	98.6
Wrexm	2.3	89.5	5.3	100.0	28	0.0	73.7	26.3	100.0

Table 6.5 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**	**79.5**	**13.1**	**95.4**	**24**	**18.9**	**78.1**	**2.9**	**86.9**
N Ireland	**2.4**	**76.6**	**15.6**	**98.5**	**24**	**10.9**	**87.5**	**1.6**	**98.5**
Scotland	**2.4**	**79.9**	**15.6**	**99.4**	**25**	**13.7**	**85.6**	**0.7**	**77.2**
Wales	**2.4**	**82.5**	**12.1**	**98.8**	**26**	**7.9**	**84.9**	**7.2**	**90.5**
UK	**2.4**	**79.6**	**13.2**	**95.9**	**24**	**17.9**	**79.1**	**3.0**	**86.7**

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

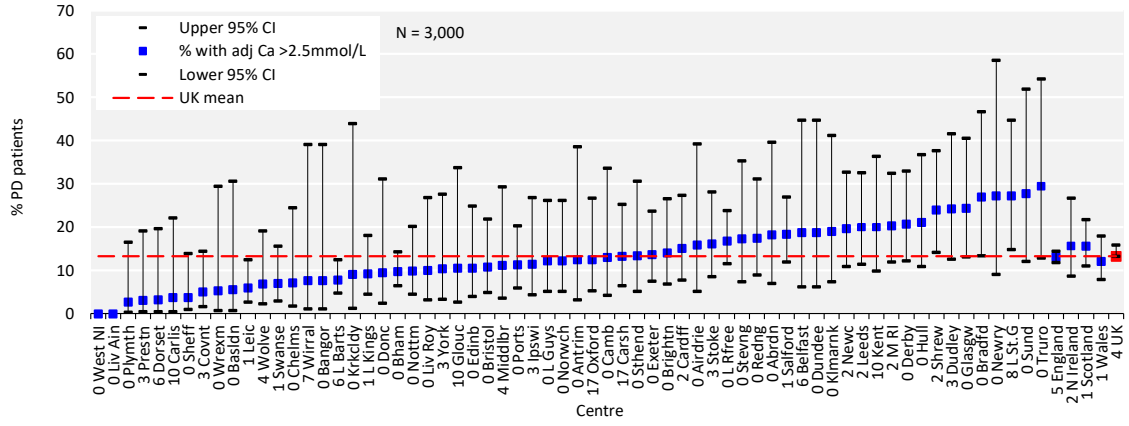


Figure 6.3 Percentage of adult patients prevalent to PD on 31/12/2019 with adjusted calcium (Ca) above the target range (>2.5 mmol/L) by centre
CI – confidence interval

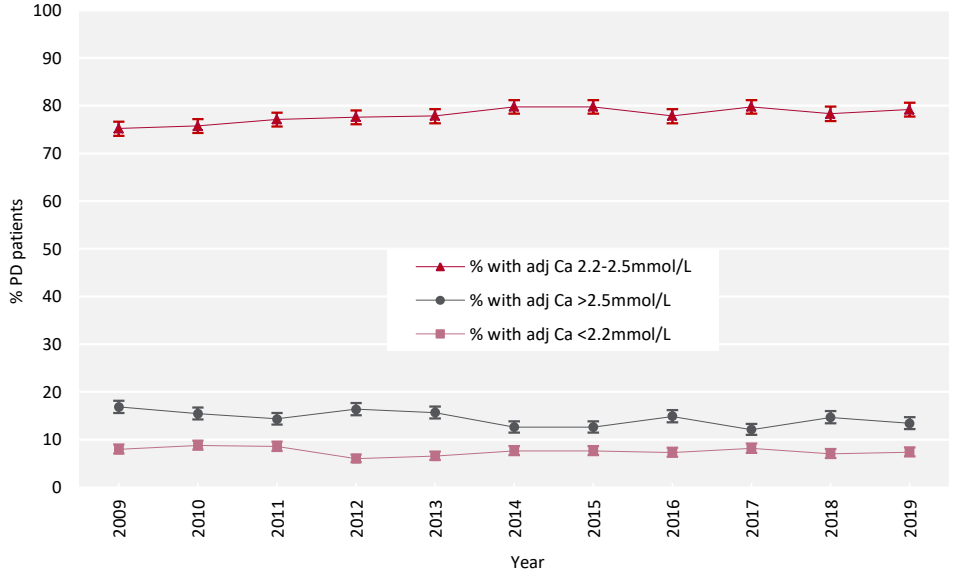


Figure 6.4 Change in percentage of prevalent adult PD patients within, above and below the target range for adjusted calcium (Ca 2.2–2.5 mmol/L) between 2009 and 2019

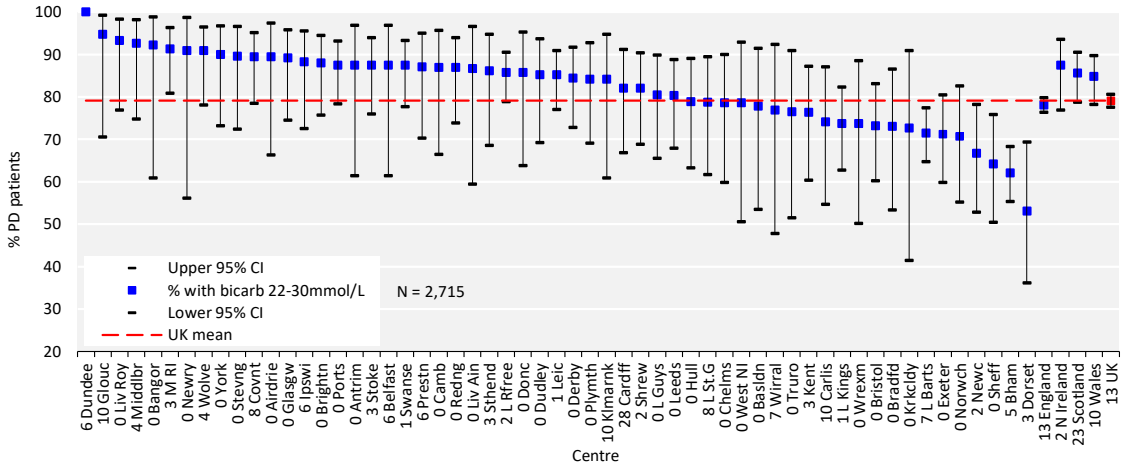


Figure 6.5 Percentage of adult patients prevalent to PD on 31/12/2019 with bicarbonate (bicarb) within the target range (22–30 mmol/L) by centre

CI – confidence interval

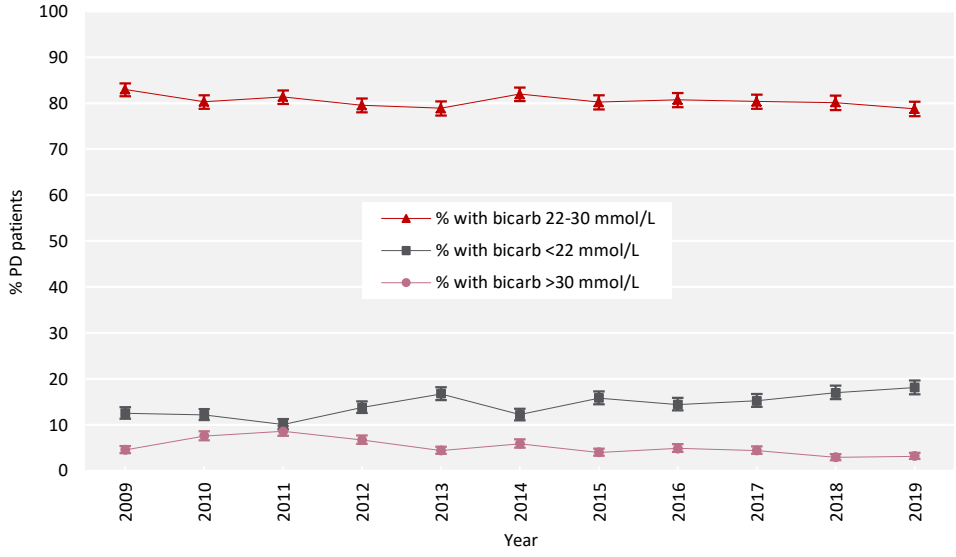


Figure 6.6 Percentage of prevalent adult PD patients within, above and below the target range for bicarbonate (bicarb 22–30 mmol/L) between 2009 and 2019

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 6.6 Median haemoglobin and ferritin and percentage attaining target ranges in adult patients prevalent to PD on 31/12/2019 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							
Basldn	116	5.6	44.4	100.0	168	27.8	100.0
Bham	110	22.6	18.6	99.6	280	8.0	99.1
Bradfd	116	3.8	34.6	100.0	371	4.0	96.2
Brightn	115	10.0	28.0	100.0	440	10.0	100.0
Bristol	117	5.4	37.5	100.0	335	1.8	98.2
Camb	115	13.0	43.5	100.0	399	0.0	100.0
Carlis	111	14.8	18.5	90.0	331	18.5	90.0
Carsh	114	22.2	20.4	84.4	205	21.8	85.9
Chelms	116	32.1	17.9	100.0	163	22.2	96.4
Colchr							
Covnt	111	26.2	19.7	98.4	289	16.4	98.4
Derby	108	27.6	15.5	100.0	556	1.7	100.0
Donc	118	4.8	38.1	100.0	211	19.0	100.0
Dorset	111	21.9	6.3	97.0	326	12.9	93.9
Dudley	116	11.8	29.4	100.0			2.9
Exeter	112	4.1	19.2	100.0	272	12.5	98.6
Glouc	107	28.6	28.6	100.0	279	5.3	90.5
Hull	114	7.9	36.8	100.0	474	5.3	100.0
Ipswi	110	17.1	11.4	97.2	367	14.7	94.4
Kent	111	25.0	38.9	92.3	236	16.2	94.9
L Barts	108	29.7	24.6	94.2	333	12.9	89.9
L Guys	104	41.5	7.3	100.0	211	26.8	100.0
L Kings	113	19.7	23.7	98.7	321	9.6	94.8
L Rfree	105	32.2	17.5	100.0	534	5.7	98.6
L St.G	108	30.3	9.1	91.7	312	3.0	91.7
L West				56.0			44.8
Leeds	108	23.6	14.5	98.2	430	7.3	98.2
Leic	111	17.6	18.6	99.0	276	21.8	98.1
Liv Ain	115	6.7	40.0	100.0	491	0.0	100.0
Liv Roy	113	23.3	10.0	100.0	345	0.0	100.0
M RI	107	25.4	15.3	98.3	252	6.8	98.3
Middlbr	110	18.5	25.9	96.4	448	11.5	92.9
Newc	115	11.5	26.9	100.0	382	6.3	92.3
Norwch	113	12.2	36.6	100.0	250	19.5	100.0
Nottm	111	16.4	24.6	100.0	522	0.0	100.0
Oxford	106	23.9	17.4	95.8	296	2.1	100.0
Plymth	110	15.8	21.1	100.0	301	23.7	100.0
Ports	114	13.8	27.5	100.0	394	6.7	93.8
Prestn	113	21.9	28.1	97.0	760	3.1	97.0
Redng	111	23.9	28.3	100.0	418	8.7	100.0
Salford	113	13.3	29.5	100.0	635	3.8	99.1
Sheff	108	24.5	22.6	100.0	475	1.9	100.0
Shrew	107	26.0	10.0	98.0	422	4.1	96.1
Stevng	106	31.0	17.2	100.0	135	39.3	96.6
Sthend	114	16.7	33.3	100.0	333	6.7	100.0
Stoke	112	12.5	19.6	96.6	425	1.9	93.1
Sund	118	11.1	38.9	100.0	363	31.3	88.9
Truro	114	11.8	29.4	100.0	167	21.4	82.4
Wirral	106	15.4	15.4	92.9	448	7.7	92.9
Wolve	109	29.5	18.2	95.7	153	38.6	95.7

Table 6.6 Continued

Centre	Haemoglobin				Ferritin		
	Median (g/L)	% <100 g/L	% >120 g/L	% data completeness	Median (µg/L)	% <100 µg/L	% data completeness
York	107	30.0	26.7	100.0	311	6.7	100.0
N IRELAND							
Antrim	109	18.8	25.0	100.0	437	6.3	100.0
Belfast	120	0.0	47.1	100.0	396	0.0	100.0
Newry	110	27.3	9.1	100.0	240	18.2	100.0
Ulster				100.0			100.0
West NI	117	14.3	35.7	100.0	316	14.3	100.0
SCOTLAND							
Abrdn	116	9.1	27.3	100.0	365	0.0	100.0
Airdrie	107	21.1	10.5	100.0	279	26.3	100.0
D&Gall				100.0			100.0
Dundee	117	25.0	37.5	100.0	262	25.0	100.0
Edinb	113	18.4	34.2	100.0	271	20.0	92.1
Glasgw	107	27.0	21.6	100.0	245	25.7	94.6
Inverns	110	40.0	30.0	100.0			80.0
Klmarnk	109	28.6	14.3	100.0	363	9.5	100.0
Krkcldy	122	0.0	54.5	100.0	153	40.0	90.9
WALES							
Bangor	112	15.4	30.8	100.0	248	0.0	100.0
Cardff	113	18.9	26.4	98.2	156	36.5	96.3
Clwyd				100.0			100.0
Swanse	111	23.3	23.3	100.0	264	14.1	97.3
Wrexm	117	5.3	36.8	100.0	278	0.0	100.0
TOTALS							
England	**111**	**20.9**	**22.4**	**96.0**	**343**	**10.4**	**92.8**
N Ireland	**116**	**12.3**	**32.3**	**100.0**	**360**	**7.7**	**100.0**
Scotland	**112**	**21.1**	**27.2**	**100.0**	**287**	**18.6**	**95.6**
Wales	**112**	**18.0**	**26.3**	**99.4**	**237**	**18.3**	**97.6**
UK	**111**	**20.6**	**23.1**	**96.5**	**335**	**11.3**	**93.4**

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

Table 6.7 Distribution of haemoglobin and erythropoiesis stimulating agent (ESA) dose values in adult patients prevalent to PD on 31/12/2019 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				
Basldn	61.1			
Bham	16.7			
Bradfd	80.8	5,000	0.0	19.2
Brightn	8.0			
Bristol	71.4	4,000	0.0	23.2
Camb	60.9			
Carlis	60.0			
Carsh	1.6			
Chelms	78.6	5,000	0.0	10.7
Colchr				
Covnt	66.1			
Derby	0.0			
Donc	71.4	4,000	0.0	14.3
Dorset	81.8	4,000	0.0	3.1

Table 6.7 Continued

	ESA		Haemoglobin and ESA	
Centre	% on ESA	Median dose (IU/week)	% <100g/L and not on ESA	% >120g/L and on ESA
Dudley	76.5	6,000	0.0	17.6
Exeter	71.2	4,000	0.0	8.2
Glouc	66.7			
Hull	63.2			
Ipswi	0.0			
Kent	48.7			
L Barts	70.0	6,000	5.1	12.8
L Guys	0.0			
L Kings	85.7	6,000	1.3	21.1
L Rfree	0.0			
L St.G	0.0			
L West	0.0			
Leeds	75.0	3,000	1.8	9.1
Leic	73.8	3,000	3.9	11.8
Liv Ain	0.0			
Liv Roy	0.0			
M RI	0.0			
Middlbr	82.1	3,000	0.0	18.5
Newc	3.8			
Norwch	53.7			
Nottm	85.2	4,000	1.6	19.7
Oxford	79.2	6,000	6.5	15.2
Plymth	0.0			
Ports	60.0			
Prestn	81.8		0.0	21.9
Redng	10.9			
Salford	83.8	8,000	0.0	19.0
Sheff	75.5	5,000	5.7	20.8
Shrew	2.0			
Stevng	62.1			
Sthend	53.3			
Stoke	0.0			
Sund	55.6			
Truro	0.0			
Wirral	100.0	6,000	0.0	15.4
Wolve	65.2			
York	53.3			
N IRELAND				
Antrim	56.3			
Belfast	82.4	3,000	0.0	35.3
Newry	81.8		0.0	9.1
Ulster	100.0			
West NI	71.4	3,000	0.0	14.3
WALES				
Bangor	46.2			
Cardff	31.5			
Clwyd	44.4			
Swanse	23.3			
Wrexm	21.1			
TOTAL[1]				
UK	**77.3**	**4,800**	**2.1**	**15.8**

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.

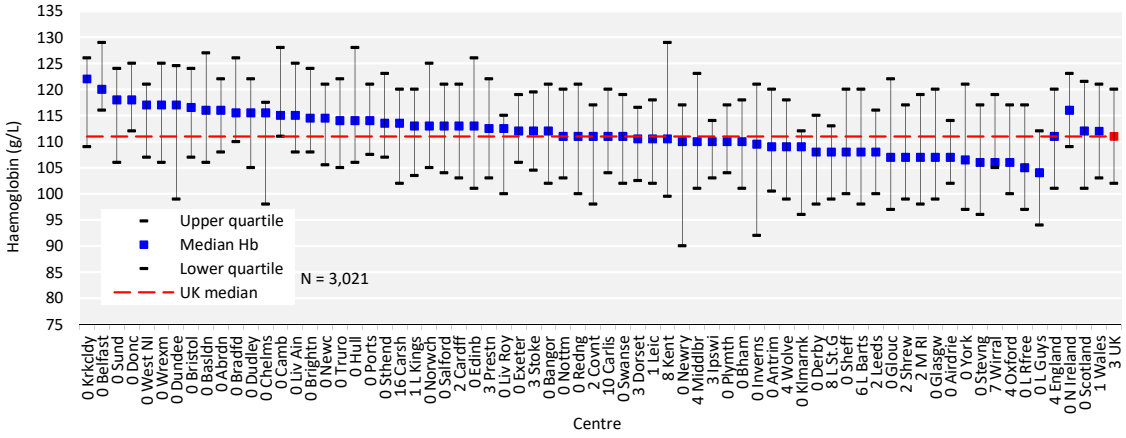


Figure 6.7 Median haemoglobin (Hb) in adult patients prevalent to PD on 31/12/2019 by centre

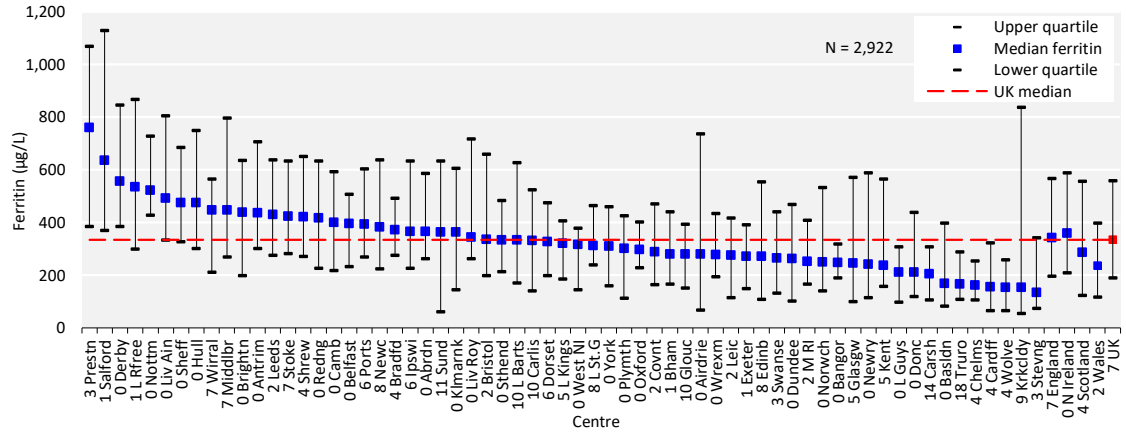


Figure 6.8 Median ferritin in adult patients prevalent to PD on 31/12/2019 by centre

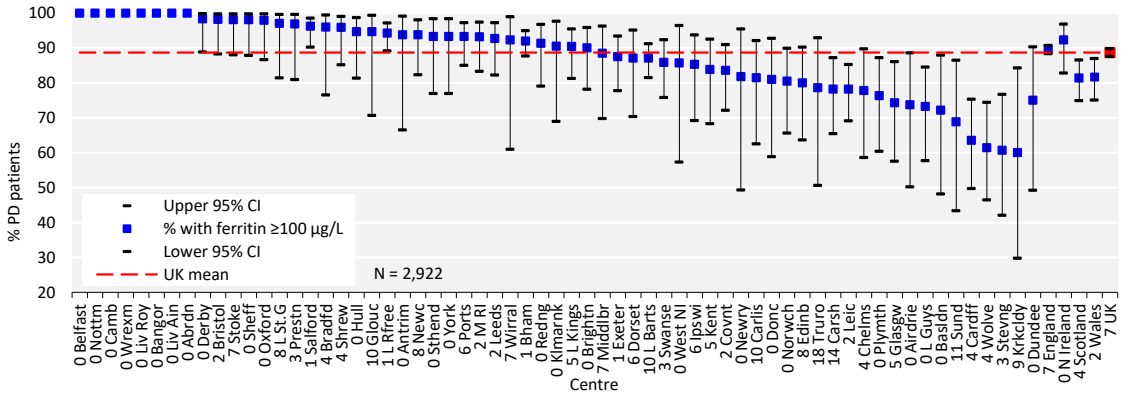


Figure 6.9 Percentage of adult patients prevalent to PD on 31/12/2019 with ferritin ≥100 µg/L by centre
CI – confidence interval

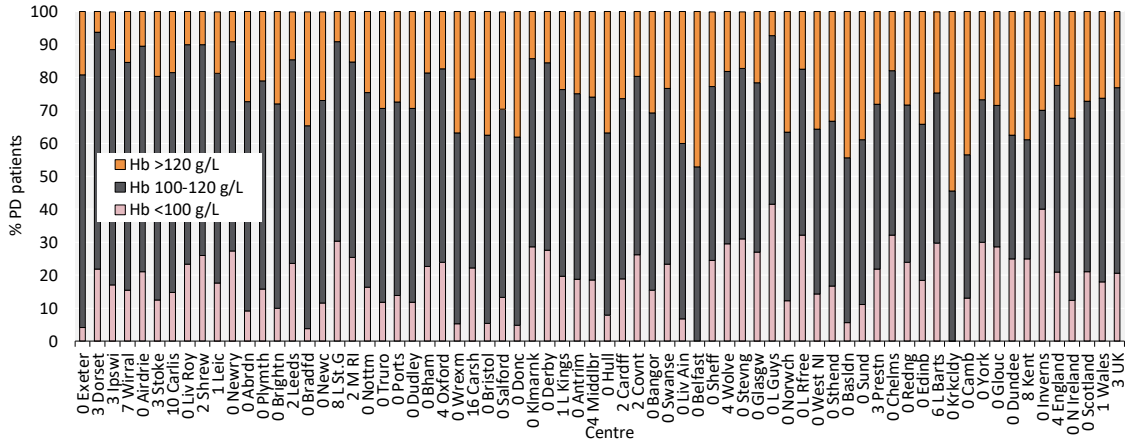


Figure 6.10 Distribution of haemoglobin (Hb) in adult patients prevalent to PD on 31/12/2019 by centre

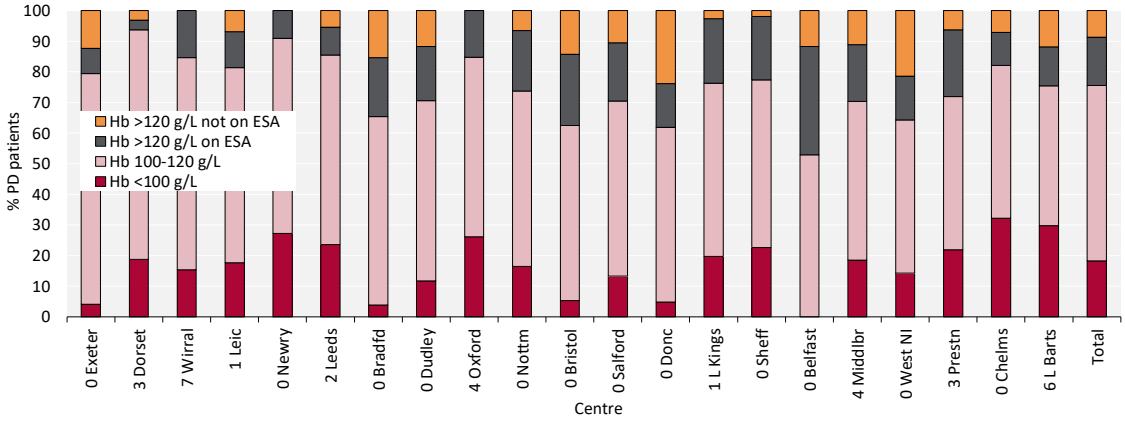


Figure 6.11 Distribution of haemoglobin (Hb) in adult patients prevalent to PD on 31/12/2019 and the proportion with haemoglobin >120 g/L receiving erythropoiesis stimulating agent (ESA) by centre
Figure (including total) does not include centres with <70% data completeness (or <70% ESA use).

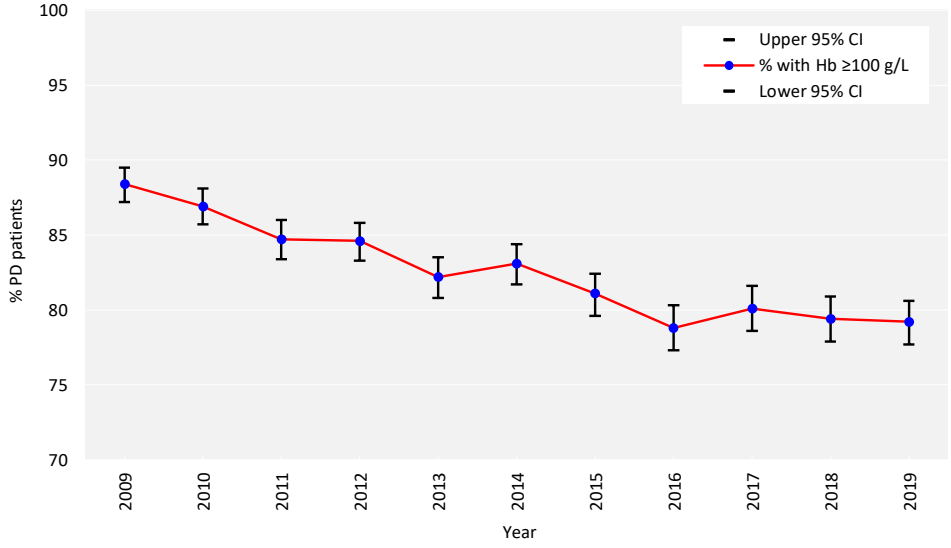


Figure 6.12 Percentage of prevalent adult PD patients with haemoglobin (Hb) ≥100 g/L between 2009 and 2019
CI – confidence interval

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 5. These analyses included all patients on HD, whether on HHD or ICHD.

Table 6.8 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 2018 to December 2019

	Infection			
	MRSA	MSSA	*C. difficile*	*E.coli*
Number of episodes				
HD	80	1,271	498	924
PD	1	29	56	67
Rate per 100 patient-years (with range between centres)				
HD	0.17 (0.0 - 1.27)	2.72 (0.82 - 7.60)	1.06 (0.0 - 3.31)	1.96 (0.54 - 4.37)
PD	0.01 (0.0 - 0.67)	0.43 (0.0 - 5.36)	0.83 (0.0 - 6.26)	0.99 (0.0 - 7.34)

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 for the Renal Dialysis Quality Dashboard (renal.org/audit-research/data-permissions/data/ukrr-nhs-england-quality-dashboard-dataset) and are listed in the table below. The funnel plot (figure 6.13) shows each centre's 2019 peritonitis rate per one PD patient-year against the number of patient-years at risk to take into account the greater variation expected as centre size decreases.

Table 6.9 Number of patient-years and peritonitis rate in adult patients receiving PD in 2019 by centre in England

Centre	PD patient-years	Peritonitis rate per 1 PD patient-year
Basldn	27	0.22
Birm	249	0.45
Bradfd	29	0.24
Brightn	53	0.36
Bristol	71	0.42
Camb	30	0.39
Carlis	24	0.17
Carsh	102	0.46
Chelms	32	0.06
Covnt	78	0.45
Derby	66	0.46
Donc	24	0.34
Dorset	38	0.49
Dudley	41	0.36
Exeter	80	0.28
Glouc	39	0.47
Hull	43	0.33
Ipswi	45	0.31
Kent	59	0.34
L Barts	244	0.32
L Guys	47	0.38
L Kings	95	0.41
L Rfree	166	0.35
L St.G	49	0.37
L West	153	0.37
Leeds	63	0.27
Leic	115	0.24
Liv Ain	31	0.49
Liv Roy*	50	0.36
M RI	75	0.41
Middlbr	27	0.37
Newc	56	0.92
Norwch	42	0.31
Nottm	76	0.47
Oxford	61	0.30
Plymth	38	0.21
Ports	88	0.45
Prestn	44	0.41
Redng	50	0.55
Salford	124	0.51
Sheff	59	0.02
Shrew	68	0.50
Stevng	32	0.37
Sthend	25	0.04
Stoke	76	0.53
Sund	21	0.24
Truro	20	0.41
Wirral	20	0.30
Wolve	58	0.45
York	30	0.23
	TOTAL	
England	**3,232**	**0.38**

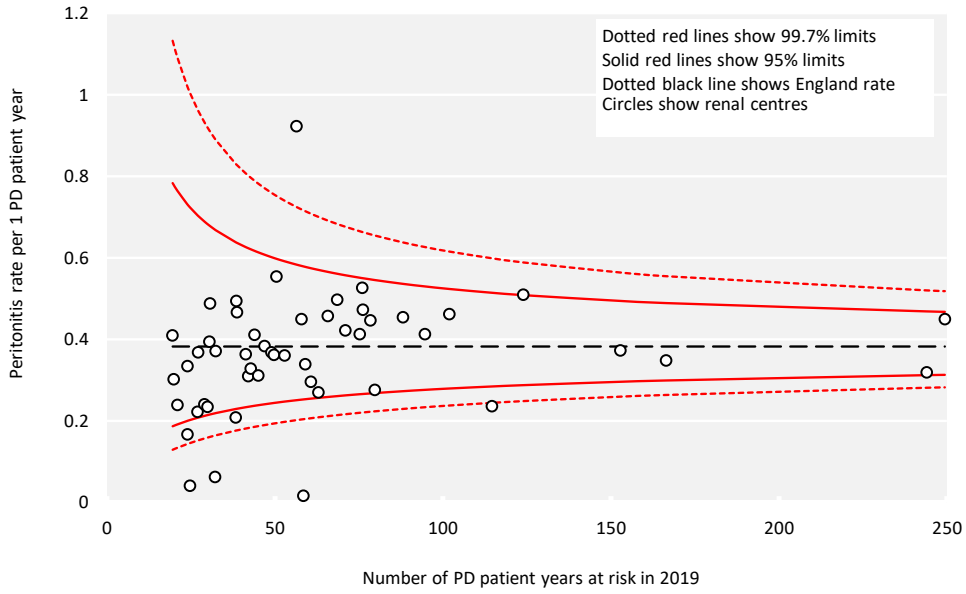


Figure 6.13 PD peritonitis rates in adult patients receiving PD in 2019 per 1 PD patient-year by centre in England
Please visit the UKRR data portal (renal.org/audit-research/data-portal) to identify individual renal centres.

Cause of death in adult PD patients

Cause of death was analysed in prevalent patients receiving PD on 31/12/2018 and followed-up for one year in 2019. 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 3.

Table 6.10 Cause of death in adult patients prevalent to PD on 31/12/2018 followed-up in 2019 by age group

	PD all ages		PD <65 years		PD ≥65 years	
Cause of death	N	%	N	%	N	%
Cardiac disease	75	21.8	24	24.7	51	20.7
Cerebrovascular disease	11	3.2	7	7.2	4	1.6
Infection	64	18.6	21	21.7	43	17.4
Malignancy	10	2.9	1	1.0	9	3.6
Treatment withdrawal	69	20.1	12	12.4	57	23.1
Other	86	25.0	24	24.7	62	25.1
Uncertain aetiology	29	8.4	8	8.3	21	8.5
Total (with data)	**344**	**100.0**	**97**	**100.0**	**247**	**100.0**
Missing	164	32.3	38	28.2	126	33.8

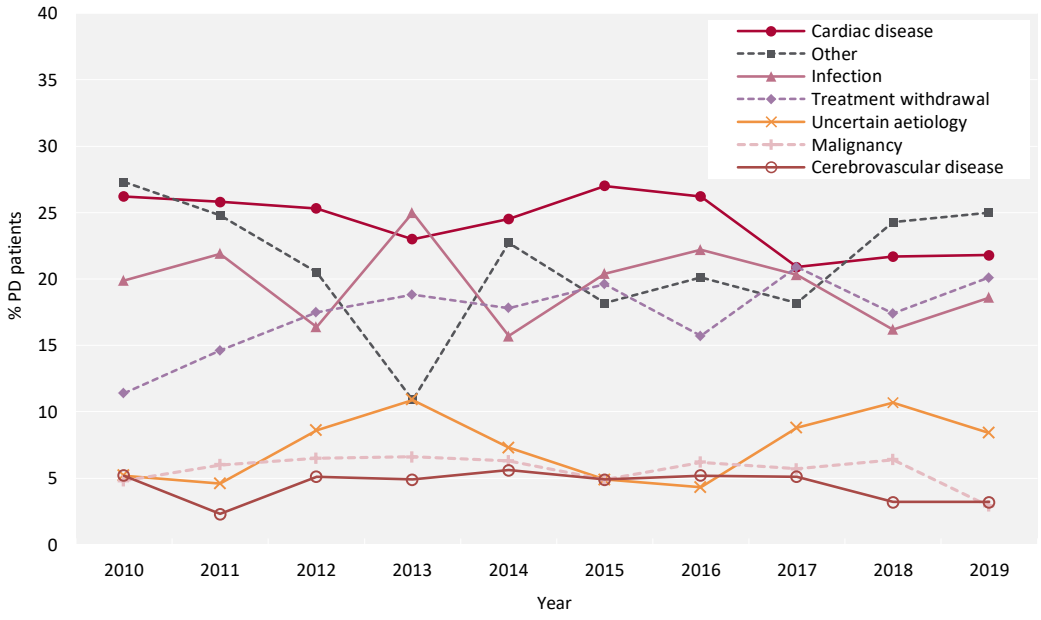


Figure 6.14 Cause of death between 2010 and 2019 for adult patients prevalent to PD at the beginning of the year

Hospitalisation of PD patients

Hospital Episodes Statistics (HES) and Patient Episode Database for Wales (PEDW) data for prevalent RRT patients on 31/12/2018 were used to compare emergency admission hospitalisation amongst PD patients (figure 6.15). The y-axis displays the total number of hospitalised days following an emergency admission for PD patients divided by the total number of PD patient-years at that centre for 2019. The average rate in England and Wales was 13.2 days per patient-year, compared to 4.2 days for Tx patients and 14.3 days for ICHD patients.

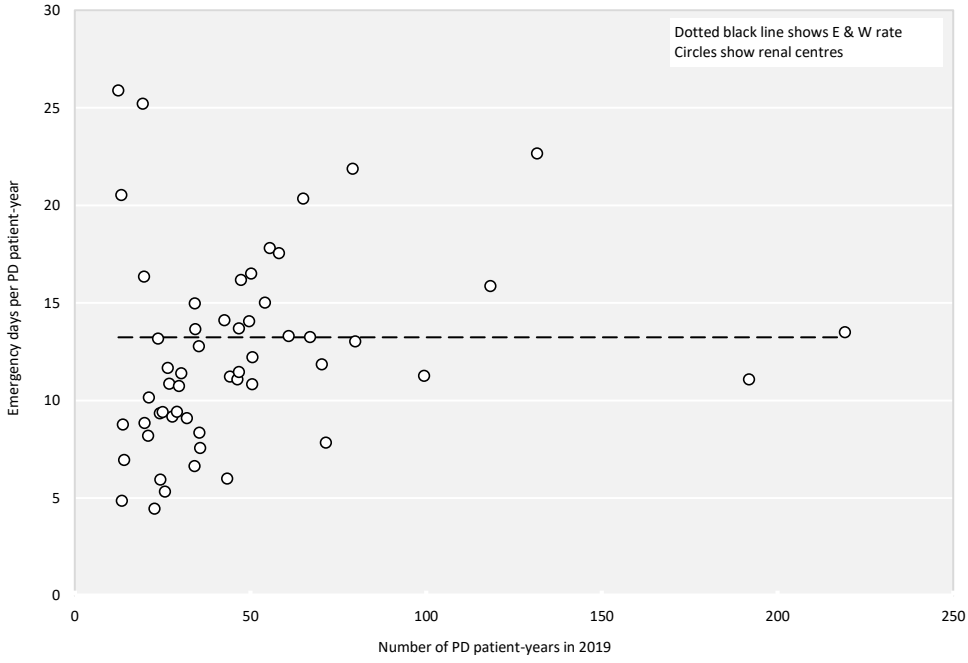


Figure 6.15 Emergency inpatient days per PD patient-year in 2019 for patients prevalent to RRT in England and Wales on 31/12/2018 by centre

THE RENAL ASSOCIATION
founded 1950

Chapter 7

Adults on home haemodialysis (HHD) in the UK at the end of 2019

Contents

Introduction 162

Rationale for analyses 163

Key findings 164

Analyses 165

- Changes to the prevalent adult HHD population 165
- Demographics of prevalent adult HHD patients 168
- Biochemistry parameters in prevalent adult HHD patients 170
- Anaemia in prevalent adult HHD patients 175
- Cause of death in adult HHD patients 181

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 2019 (figure 7.1). This population comprises patients who were on HHD at the end of 2018 and remained on HHD throughout 2019, as well as patients who commenced/re-commenced HHD in 2019. This latter group includes both incident renal replacement therapy (RRT) patients who ended 2019 on HHD and prevalent RRT patients who switched to HHD from in-centre haemodialysis (ICHD), peritoneal dialysis (PD), or a transplant (Tx) in 2019. 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.

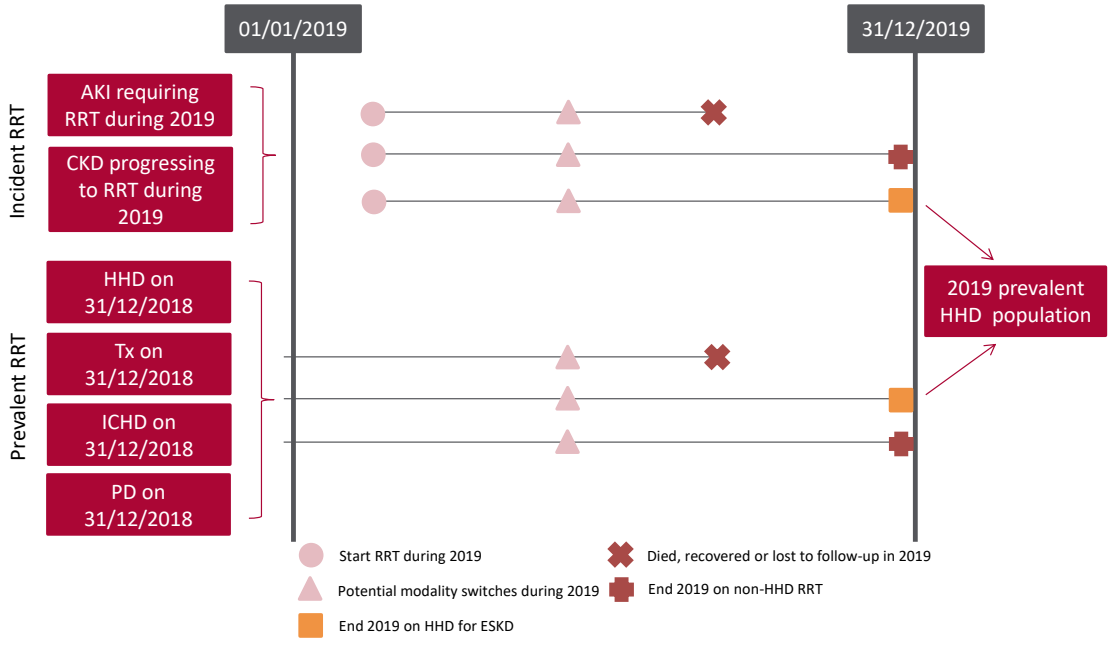


Figure 7.1 Pathways adult patients could follow to be included in the UK 2019 prevalent HHD population

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 2019 or if they had been on RRT for ≥90 days and were on HHD at the end of 2019

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 7.1). 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 5 on a combined ICHD and HHD population.

Rationale for analyses

The analyses begin with a description of the 2019 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 2019 is reported in this chapter (table 7.1). 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 portal (renal.org/audit-research/data-portal). Audit measures that cannot be reported because the required data items were not collected by the UKRR are omitted.

Table 7.1 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 7.5, figure 7.3
HD (2019)	Proportion of patients with pre-dialysis bicarbonate 18–26 mmol/L	Table 7.6, figure 7.4
	Proportion of patients with pre-dialysis potassium 4.0–6.0 mmol/L	Table 7.6, figure 7.5
Anaemia (2017)	Proportion of patients with serum ferritin <100 µg/L at start of treatment with erythropoiesis stimulating agent (ESA)	Table 7.7, figure 7.8 (the UKRR does not hold treatment with ESA start dates)
	Proportion of patients with haemoglobin <100 g/L not on ESA	Table 7.8
	Proportion of patients on ESA with haemoglobin >120 g/L	Table 7.8, figure 7.10
	Mean (median) ESA dose in patients maintained on ESA therapy	Table 7.8
Planning, initiating and withdrawing RRT (2014)	Number of patients withdrawing from HHD as a proportion of all deaths on HHD	Table 7.9, figure 7.11

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.

Key findings

- 1,386 adult patients were receiving HHD for ESKD in the UK on 31/12/2019, which represented 2.0% of the RRT population
- The median age of HHD patients was 55.2 years and 61.0% were male
- The median adjusted calcium for HHD patients was 2.4 mmol/L and 12.8% were above the target range 2.2–2.5 mmol/L
- The median pre-dialysis bicarbonate for HHD patients was 24 mmol/L and 77.2% were within the target range 18–26 mmol/L
- The median pre-dialysis potassium for HHD patients was 5.0 mmol/L and 81.1% were within the target range 4.0–6.0 mmol/L
- The median haemoglobin and ferritin for HHD patients was 108 g/L and 297 µg/L, respectively, and 90.0% were on an ESA at a median dose of 8,000 IU/week
- 2.0% of HHD patients had a haemoglobin <100 g/L not on an ESA and 13.2% had a haemoglobin >120 g/L on an ESA
- There was no cause of death data available for 34.4% of deaths. For those with data, the leading cause of death in both younger (<65 years) and older (≥65 years) patients was cardiac disease (28.3% and 27.5%, respectively).

Analyses

Changes to the prevalent adult HHD population

For the 70 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 7.2 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)	2019 crude rate (pmp)
Centre	2015	2016	2017	2018	2019	2015	2016	2017	2018	2019		
ENGLAND												
Basldn	5	9	9	11	10	1.8	3.3	3.0	3.5	3.1	0.34	29
Bham	63	75	75	66	76	2.2	2.5	2.4	2.0	2.3	2.03	37
Bradfd	7	7	9	9	6	1.2	1.1	1.3	1.3	0.8	0.49	12
Brightn	45	37	40	39	32	4.7	3.7	4.0	3.7	3.0	1.07	30
Bristol	22	19	17	15	16	1.5	1.3	1.2	1.0	1.1	1.21	13
Camb	21	22	26	32	30	1.6	1.7	2.0	2.3	2.0	0.93	32
Carlis	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.25	0
Carsh	29	29	27	29	35	1.8	1.8	1.6	1.6	2.0	1.61	22
Chelms	2	3	3	2	0	0.7	1.1	1.1	0.8	0.0	0.37	0
Colchr	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.29	0
Covnt	16	12	14	22	20	1.7	1.2	1.5	2.3	1.9	0.79	25
Derby	38	42	52	53	58	7.1	7.7	9.4	9.0	8.9	0.56	104
Donc	10	9	9	9	5	3.3	2.7	2.7	2.7	1.5	0.37	13
Dorset	7	9	10	13	15	1.0	1.3	1.4	1.7	1.9	0.72	21
Dudley	13	14	13	12	12	4.1	4.0	3.5	3.3	3.3	0.34	35
Exeter	5	9	13	19	21	0.5	0.9	1.2	1.7	1.9	0.94	22
Glouc	5	9	5	3	3	1.1	1.9	1.0	0.6	0.6	0.51	6
Hull	8	4	6	5	7	0.9	0.5	0.7	0.6	0.8	0.79	9
Ipswi	1	3	8	5	4	0.2	0.7	1.8	1.2	0.9	0.31	13
Kent	16	22	21	18	19	1.5	2.1	1.9	1.6	1.7	1.06	18
L Barts	23	23	31	36	18	1.0	1.0	1.2	1.4	0.7	1.57	11
L Guys	49	48	41	38	44	2.4	2.3	1.9	1.7	1.9	1.00	44
L Kings	12	18	20	17	18	1.1	1.6	1.7	1.4	1.4	0.92	19
L Rfree	21	20	17	12	11	1.0	0.9	0.8	0.5	0.5	1.32	8
L St.G	4	4	5	6	6	0.5	0.5	0.6	0.7	0.7	0.66	9
L West	18	15	12	19	29	0.5	0.4	0.3	0.5	0.8	1.95	15
Leeds	23	17	23	23	26	1.5	1.1	1.4	1.4	1.5	1.36	19
Leic	60	73	72	64	54	2.8	3.2	3.1	2.6	2.1	2.07	26
Liv Ain	10	13	14	18	13	4.5	5.7	6.7	8.3	6.2	0.43	30
Liv Roy	37	39	39	39	36	3.0	3.2	3.1	3.1	2.9	0.80	45
M RI	49	61	77	74	76	2.6	3.1	3.8	3.6	3.7	1.32	58
Middlbr	15	11	12	13	19	1.7	1.2	1.3	1.4	2.0	0.80	24
Newc	24	24	21	22	19	2.4	2.3	1.9	1.9	1.6	0.94	20
Norwch	25	16	14	13	14	3.5	2.1	1.8	1.7	1.7	0.68	20
Nottm	29	29	34	34	31	2.6	2.5	2.9	2.8	2.5	0.92	34
Oxford	19	19	16	21	25	1.1	1.1	0.9	1.1	1.3	1.43	17
Plymth	8	8	10	10	7	1.6	1.6	1.9	1.9	1.3	0.40	18
Ports	56	75	65	70	70	3.4	4.4	3.7	4.0	3.7	1.73	40
Prestn	41	41	49	43	49	3.4	3.4	3.9	3.3	3.7	1.22	40

Table 7.2 Continued

Centre	N on HHD					% on HHD					Estimated catchment population (millions)	2019 crude rate (pmp)
	2015	2016	2017	2018	2019	2015	2016	2017	2018	2019		
Redng	5	7	6	9	8	0.6	0.9	0.8	1.1	0.9	0.69	12
Salford	15	28	41	35	41	1.5	2.7	3.7	3.0	3.3	1.14	36
Sheff	45	54	51	50	56	3.3	3.8	3.5	3.4	3.8	1.12	50
Shrew	23	19	22	20	27	6.2	5.0	5.7	4.7	6.3	0.41	66
Stevng	23	26	30	43	37	2.8	2.9	3.4	4.6	3.8	1.10	34
Sthend	2	3	2	1	6	0.8	1.3	0.8	0.4	2.3	0.27	22
Stoke	33	34	28	22	28	4.2	4.1	3.5	2.7	3.5	0.72	39
Sund	2	6	21	22	12	0.4	1.2	3.9	3.9	2.1	0.54	22
Truro	10	9	9	3	4	2.4	2.1	2.1	0.7	0.9	0.35	11
Wirral	12	10	9	8	8	4.3	3.0	2.3	2.0	1.9	0.47	17
Wolve	23	30	32	33	32	4.0	5.3	5.5	5.4	5.4	0.54	59
York	11	14	13	17	16	2.2	2.6	2.3	3.0	2.8	0.48	33
N IRELAND												
Antrim	2	1	4	4	4	0.8	0.4	1.6	1.5	1.4	0.24	16
Belfast	9	9	8	10	13	1.2	1.1	1.0	1.1	1.5	0.53	25
Newry	3	3	3	2	2	1.3	1.3	1.2	0.8	0.8	0.23	9
Ulster	2	1	1	0	0	1.2	0.6	0.5	0.0	0.0	0.20	0
West NI	4	3	3	2	1	1.4	1.0	1.0	0.6	0.3	0.25	4
SCOTLAND												
Abrdn	5	4	4	4	3	0.9	0.7	0.7	0.7	0.5	0.50	6
Airdrie	0	0	2	0	0	0.0	0.0	0.4	0.0	0.0	0.46	0
D&Gall	3	3	2	1	2	2.3	2.3	1.5	0.7	1.3	0.12	16
Dundee	2	2	2	8	7	0.5	0.5	0.5	1.8	1.6	0.37	19
Edinb	6	6	4	3	2	0.8	0.8	0.5	0.3	0.2	0.84	2
Glasgw	26	23	15	18	18	1.5	1.3	0.8	1.0	1.0	1.37	13
Inverns	3	7	5	7	7	1.2	2.7	1.9	2.5	2.5	0.22	31
Klmarnk	10	8	10	13	14	3.2	2.5	3.0	3.8	3.9	0.29	48
Krkcldy	0	0	0	0	2	0.0	0.0	0.0	0.0	0.7	0.27	7
WALES												
Bangor	15	10	11	13	15	8.2	5.6	5.6	6.4	7.5	0.16	92
Cardff	28	31	38	34	33	1.7	1.9	2.3	2.0	1.9	1.15	29
Clwyd	7	4	2	2	2	3.8	2.3	1.1	1.1	1.0	0.18	11
Swanse	36	39	34	36	45	4.7	5.0	4.3	4.3	5.2	0.75	60
Wrexm	5	8	5	6	7	1.7	2.6	1.6	1.9	2.3	0.21	34
TOTALS												
England	**1,040**	**1,128**	**1,193**	**1,197**	**1,209**	**2.0**	**2.1**	**2.2**	**2.1**	**2.1**	**44.33**	**27**
N Ireland	**20**	**17**	**19**	**18**	**20**	**1.2**	**1.0**	**1.0**	**0.9**	**1.0**	**1.45**	**14**
Scotland	**55**	**53**	**44**	**54**	**55**	**1.1**	**1.1**	**0.9**	**1.0**	**1.0**	**4.43**	**12**
Wales	**91**	**92**	**90**	**91**	**102**	**3.0**	**3.0**	**2.8**	**2.8**	**3.1**	**2.45**	**42**
UK	**1,206**	**1,290**	**1,346**	**1,360**	**1,386**	**2.0**	**2.1**	**2.1**	**2.0**	**2.0**	**52.67**	**26**

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.
pmp – per million population

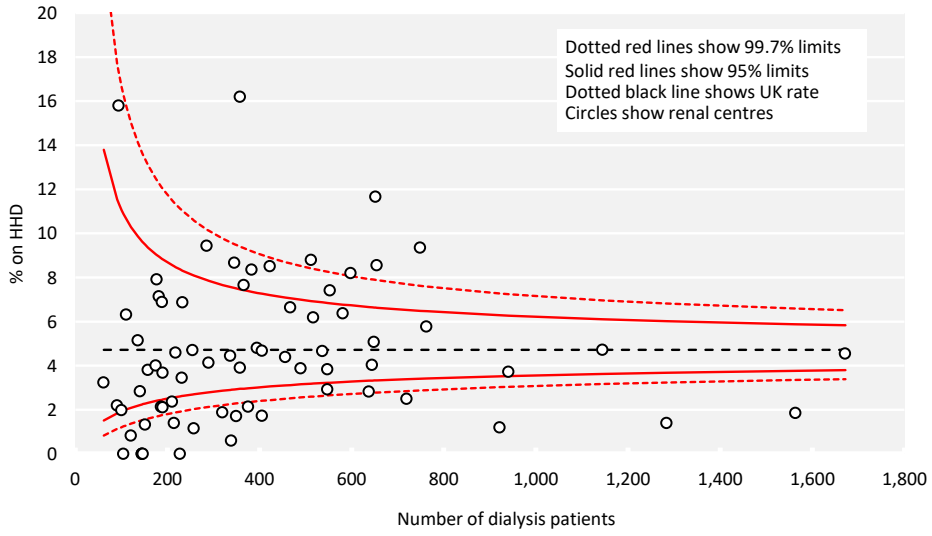


Figure 7.2 Percentage of adult patients prevalent to dialysis on 31/12/2019 who were on HHD by centre

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 7.3 Demographics of adult patients prevalent to HHD on 31/12/2019 by centre

Centre	N on RRT	N on HHD	% on HHD	Median age (yrs)	% male	Ethnicity				
						% White	% Asian	% Black	% Other	% missing
ENGLAND										
Basldn	322	10	3.1	63.6	20.0	100.0	0.0	0.0	0.0	0.0
Bham	3,308	76	2.3	53.0	73.7	65.3	17.3	9.3	8.0	1.3
Bradfd	733	6	0.8	47.8	66.7	100.0	0.0	0.0	0.0	0.0
Brightn	1,059	32	3.0	66.3	68.8	96.9	3.1	0.0	0.0	0.0
Bristol	1,486	16	1.1	58.1	50.0	93.8	0.0	6.3	0.0	0.0
Camb	1,469	30	2.0	59.5	60.0	90.0	0.0	6.7	3.3	0.0
Carlis	303	0	0.0							
Carsh	1,771	35	2.0	59.2	62.9	82.9	5.7	8.6	2.9	0.0
Chelms	261	0	0.0							
Colchr	145	0	0.0							
Covnt	1,076	20	1.9	52.3	60.0	85.0	15.0	0.0	0.0	0.0
Derby	652	58	8.9	60.9	63.8	81.0	15.5	1.7	1.7	0.0
Donc	342	5	1.5	58.7	60.0	100.0	0.0	0.0	0.0	0.0
Dorset	772	15	1.9	67.6	66.7	100.0	0.0	0.0	0.0	0.0
Dudley	366	12	3.3	56.4	75.0	100.0	0.0	0.0	0.0	0.0
Exeter	1,091	21	1.9	49.5	61.9	100.0	0.0	0.0	0.0	0.0
Glouc	525	3	0.6	56.2	66.7	100.0	0.0	0.0	0.0	0.0
Hull	904	7	0.8	66.0	85.7	85.7	0.0	0.0	14.3	0.0
Ipswi	424	4	0.9	54.5	25.0	100.0	0.0	0.0	0.0	0.0
Kent	1,140	19	1.7	57.0	68.4	94.7	0.0	0.0	5.3	0.0
L Barts	2,660	18	0.7	54.4	50.0	38.9	5.6	44.4	11.1	0.0
L Guys	2,310	44	1.9	47.5	59.1	61.4	11.4	27.3	0.0	0.0
L Kings	1,244	18	1.4	55.1	72.2	61.1	5.6	27.8	5.6	0.0
L Rfree	2,344	11	0.5	60.0	63.6	54.5	0.0	45.5	0.0	0.0
L St.G	852	6	0.7	52.9	33.3	83.3	0.0	16.7	0.0	0.0
L West	3,613	29	0.8	54.0	31.0	41.4	20.7	34.5	3.4	0.0
Leeds	1,723	26	1.5	51.0	53.8	76.9	7.7	15.4	0.0	0.0
Leic	2,587	54	2.1	57.2	68.5	84.9	9.4	1.9	3.8	1.9
Liv Ain	210	13	6.2	53.5	53.8	100.0	0.0	0.0	0.0	0.0
Liv Roy	1,227	36	2.9	55.2	58.3	94.4	0.0	2.8	2.8	0.0
M RI	2,060	76	3.7	54.0	57.9	63.2	14.5	21.1	1.3	0.0
Middlbr	949	19	2.0	52.8	47.4	94.7	0.0	0.0	5.3	0.0
Newc	1,175	19	1.6	53.4	57.9	94.7	5.3	0.0	0.0	0.0
Norwch	809	14	1.7	58.4	71.4	100.0	0.0	0.0	0.0	0.0
Nottm	1,218	31	2.5	53.7	41.9	83.9	3.2	6.5	6.5	0.0
Oxford	1,969	25	1.3	60.6	64.0	85.7	9.5	4.8	0.0	16.0
Plymth	531	7	1.3	72.7	57.1	100.0	0.0	0.0	0.0	0.0
Ports	1,883	70	3.7	53.3	62.9	90.8	0.0	3.1	6.2	7.1
Prestn	1,341	49	3.7	56.1	61.2	91.8	8.2	0.0	0.0	0.0
Redng	860	8	0.9	51.7	75.0	71.4	0.0	28.6	0.0	12.5
Salford	1,237	41	3.3	51.9	63.4	90.2	2.4	4.9	2.4	0.0
Sheff	1,491	56	3.8	55.4	55.4	92.9	1.8	3.6	1.8	0.0
Shrew	428	27	6.3	59.8	70.4	96.3	3.7	0.0	0.0	0.0
Stevng	966	37	3.8	55.8	62.2	79.4	5.9	8.8	5.9	8.1
Sthend	264	6	2.3	55.5	33.3	100.0	0.0	0.0	0.0	0.0

Table 7.3 Continued

Centre	N on RRT	N on HHD	% on HHD	Median age (yrs)	% male	Ethnicity				
						% White	% Asian	% Black	% Other	% missing
Stoke	803	28	3.5	54.2	75.0	92.9	0.0	3.6	3.6	0.0
Sund	568	12	2.1	55.5	83.3	100.0	0.0	0.0	0.0	0.0
Truro	449	4	0.9	56.5	75.0	100.0	0.0	0.0	0.0	0.0
Wirral	411	8	1.9	52.0	75.0	87.5	12.5	0.0	0.0	0.0
Wolve	598	32	5.4	49.4	65.6	75.0	15.6	3.1	6.3	0.0
York	581	16	2.8	54.0	62.5	93.8	0.0	6.3	0.0	0.0
N IRELAND										
Antrim	280	4	1.4	63.3	100.0	100.0	0.0	0.0	0.0	0.0
Belfast	890	13	1.5	50.7	69.2	100.0	0.0	0.0	0.0	0.0
Newry	251	2	0.8	68.4	100.0	100.0	0.0	0.0	0.0	0.0
Ulster	182	0	0.0							
West NI	328	1	0.3	51.5	0.0	100.0	0.0	0.0	0.0	0.0
SCOTLAND										
Abrdn	558	3	0.5	58.7	0.0					66.7
Airdrie	524	0	0.0							
D&Gall	149	2	1.3	54.3	50.0					50.0
Dundee	449	7	1.6	64.7	71.4					71.4
Edinb	885	2	0.2	43.1	100.0	50.0	50.0	0.0	0.0	0.0
Glasgw	1,854	18	1.0	54.5	50.0					33.3
Inverns	282	7	2.5	50.3	42.9					42.9
Klmarnk	359	14	3.9	60.2	57.1					71.4
Krkcldy	295	2	0.7	64.0	50.0					100.0
WALES										
Bangor	201	15	7.5	55.9	80.0	100.0	0.0	0.0	0.0	0.0
Cardff	1,730	33	1.9	55.6	54.5	97.0	3.0	0.0	0.0	0.0
Clwyd	205	2	1.0	60.5	50.0	100.0	0.0	0.0	0.0	0.0
Swanse	868	45	5.2	58.5	57.8	100.0	0.0	0.0	0.0	0.0
Wrexm	311	7	2.3	60.1	42.9	100.0	0.0	0.0	0.0	0.0
TOTALS										
England	**57,510**	**1,209**	**2.1**	**54.8**	**61.4**	**82.8**	**6.5**	**7.9**	**2.8**	**1.2**
N Ireland	**1,931**	**20**	**1.0**	**54.5**	**75.0**	**100.0**	**0.0**	**0.0**	**0.0**	**0.0**
Scotland	**5,355**	**55**	**1.0**	**56.6**	**52.7**					**52.7**
Wales	**3,315**	**102**	**3.1**	**57.4**	**58.8**	**99.0**	**1.0**	**0.0**	**0.0**	**0.0**
UK	**68,111**	**1,386**	**2.0**	**55.2**	**61.0**	**84.6**	**6.0**	**7.0**	**2.5**	**3.2**

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.

Primary renal diseases (PRDs) were grouped into categories as shown in table 7.4, 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 7.4 Primary renal diseases (PRDs) of adult patients prevalent to HHD on 31/12/2019

PRD	N on HHD	% HHD population	Age <65 yrs		Age ≥65 yrs		M/F ratio
			N	%	N	%	
Diabetes	195	14.5	144	14.0	51	15.9	1.7
Glomerulonephritis	335	24.9	274	26.7	61	19.0	1.7
Hypertension	63	4.7	45	4.4	18	5.6	2.9
Polycystic kidney disease	120	8.9	87	8.5	33	10.3	1.4
Pyelonephritis	146	10.8	122	11.9	24	7.5	1.1
Renal vascular disease	28	2.1	12	1.2	16	5.0	2.1
Other	281	20.9	216	21.1	65	20.2	1.2
Uncertain aetiology	178	13.2	125	12.2	53	16.5	2.0
Total (with data)	**1,346**	**100.0**	**1,025**	**100.0**	**321**	**100.0**	
Missing	40	2.9	29	2.8	11	3.3	1.4

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.

Table 7.5 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 31/12/2019 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				
Basldn				100.0
Bham	2.4	77.0	16.2	100.0
Bradfd				100.0
Brightn	2.4	87.5	3.1	100.0
Bristol	2.4	87.5	12.5	100.0
Camb	2.4	80.0	13.3	100.0
Carlis				
Carsh	2.3	81.3	3.1	97.0
Chelms				
Colchr				
Covnt	2.3	75.0	10.0	100.0
Derby	2.4	82.5	10.5	100.0
Donc				100.0
Dorset	2.2	80.0	6.7	100.0
Dudley	2.4	83.3	16.7	100.0
Exeter	2.3	95.2	0.0	100.0
Glouc				100.0
Hull				100.0
Ipswi				100.0
Kent	2.4	68.4	21.1	100.0
L Barts	2.3	83.3	11.1	100.0
L Guys	2.4	70.5	13.6	100.0
L Kings	2.3	77.8	5.6	100.0
L Rfree	2.5	54.6	27.3	100.0
L St.G				100.0
L West	2.3	78.3	0.0	82.1
Leeds	2.3	88.5	11.5	100.0
Leic	2.4	85.2	1.9	100.0
Liv Ain	2.4	69.2	23.1	100.0

Table 7.5 Continued

Centre	Median adj Ca (mmol/L)	% adj Ca 2.2-2.5 mmoI/L	% adj Ca >2.5 mmoI/L	% data completeness
Liv Roy	2.4	76.5	17.7	100.0
M RI	2.5	70.8	29.2	96.0
Middlbr	2.2	63.2	5.3	100.0
Newc	2.4	73.7	5.3	100.0
Norwch	2.3	92.9	0.0	100.0
Nottm	2.3	87.1	3.2	100.0
Oxford	2.4	72.2	16.7	72.0
Plymth				100.0
Ports	2.3	80.6	7.5	100.0
Prestn	2.4	66.0	17.0	100.0
Redng				100.0
Salford	2.4	69.2	25.6	100.0
Sheff	2.3	63.6	10.9	100.0
Shrew	2.4	80.8	15.4	100.0
Stevng	2.3	71.9	9.4	100.0
Sthend				100.0
Stoke	2.5	80.0	20.0	92.6
Sund	2.3	80.0	10.0	83.3
Truro				100.0
Wirral				100.0
Wolve	2.4	66.7	16.7	100.0
York	2.3	87.5	6.3	100.0
N IRELAND				
Antrim				100.0
Belfast	2.4	83.3	8.3	100.0
Newry				100.0
Ulster				
West NI				100.0
SCOTLAND				
Abrdn				100.0
Airdrie				
D&Gall				100.0
Dundee				100.0
Edinb				
Glasgw	2.4	88.9	5.6	100.0
Inverns				100.0
Klmarnk	2.3	92.9	7.1	100.0
Krkcldy				100.0
WALES				
Bangor	2.4	86.7	6.7	100.0
Cardff	2.4	65.6	18.8	100.0
Clwyd				100.0
Swanse	2.4	88.9	6.7	100.0
Wrexm				100.0
TOTALS				
England	**2.4**	**76.6**	**12.9**	**98.3**
N Ireland	**2.4**	**84.2**	**10.5**	**100.0**
Scotland	**2.4**	**84.9**	**11.3**	**98.2**
Wales	**2.4**	**78.2**	**12.9**	**100.0**
UK	**2.4**	**77.1**	**12.8**	**98.5**

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

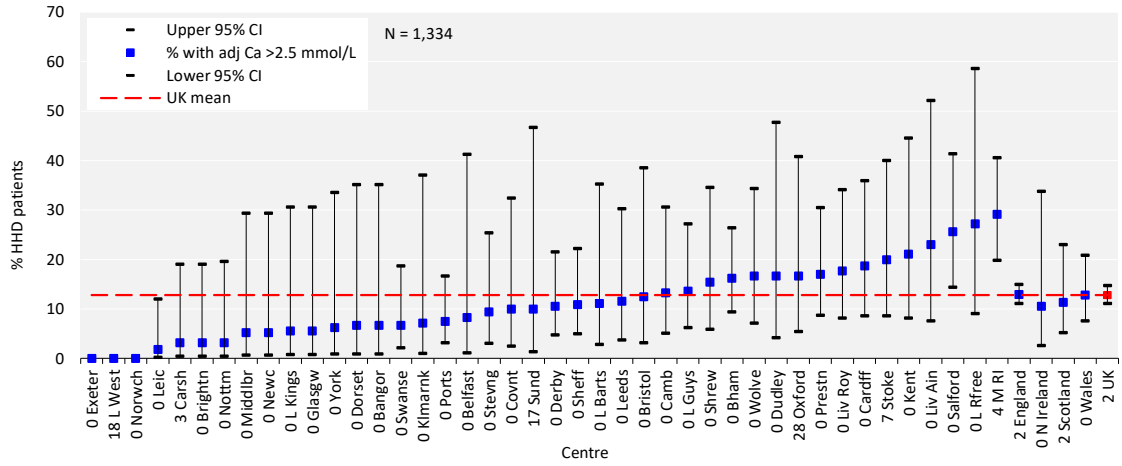


Figure 7.3 Percentage of adult patients prevalent to HHD on 31/12/2019 with adjusted calcium (Ca) above the target range (>2.5 mmol/L) by centre

CI – confidence interval

Table 7.6 Median pre-dialysis potassium and bicarbonate and percentage attaining target ranges in adult patients prevalent to HHD on 31/12/2019 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 completeness	Median (mmol/L)	% <18 mmol/L	% 18–26 mmol/L	% >26 mmol/L	% data completeness
ENGLAND										
Basldn					100.0					100.0
Bham	5.1	5.4	81.1	13.5	100.0					63.5
Bradfd					100.0					100.0
Brightn					0.0	23	0.0	93.6	6.5	96.9
Bristol	4.7	6.3	87.5	6.3	100.0	24	6.3	75.0	18.8	100.0
Camb	5.3	0.0	80.0	20.0	100.0	25	0.0	73.3	26.7	100.0
Carlis										
Carsh					0.0					0.0
Chelms										
Colchr										
Covnt					0.0	23	5.0	80.0	15.0	100.0
Derby					0.0	25	0.0	82.5	17.5	100.0
Donc					100.0					100.0
Dorset	4.8	0.0	93.3	6.7	100.0	23	6.7	86.7	6.7	100.0
Dudley	5.6	0.0	91.7	8.3	100.0	24	0.0	91.7	8.3	100.0
Exeter	4.6	4.8	95.2	0.0	100.0	23	9.5	90.5	0.0	100.0
Glouc					0.0					100.0
Hull					100.0					100.0
Ipswi					0.0					100.0
Kent	3.9	52.6	36.8	10.5	100.0	23	0.0	94.7	5.3	100.0
L Barts	5.1	0.0	88.9	11.1	100.0	25	0.0	77.8	22.2	100.0
L Guys	4.7	25.0	68.2	6.8	100.0	25	0.0	68.2	31.8	100.0
L Kings	3.8	55.6	44.4	0.0	100.0	22	16.7	72.2	11.1	100.0
L Rfree	5.5	18.2	63.6	18.2	100.0	23	9.1	90.9	0.0	100.0
L St.G					0.0					100.0
L West					0.0					50.0
Leeds	5.2	7.7	88.5	3.9	100.0	24	0.0	92.3	7.7	100.0
Leic	5.1	7.4	83.3	9.3	100.0	24	3.8	79.3	17.0	98.2
Liv Ain					0.0	23	7.7	76.9	15.4	100.0

Table 7.6 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
Liv Roy					0.0	22	5.9	73.5	20.6	100.0
M RI					0.0	24	1.4	75.0	23.6	96.0
Middlbr	5.4	5.3	84.2	10.5	100.0	27	0.0	36.8	63.2	100.0
Newc					0.0	22	5.3	94.7	0.0	100.0
Norwch	5.2	7.1	64.3	28.6	100.0	24	0.0	92.9	7.1	100.0
Nottm	5.0	6.5	93.6	0.0	100.0					48.4
Oxford					68.0	24	5.6	77.8	16.7	72.0
Plymth					100.0					100.0
Ports	4.7	10.5	83.6	6.0	100.0	24	3.0	74.6	22.4	100.0
Prestn					0.0	24	4.8	81.0	14.3	89.4
Redng					0.0					100.0
Salford	4.9	12.8	79.5	7.7	100.0					0.0
Sheff	5.0	3.6	89.1	7.3	100.0	24	1.8	85.5	12.7	100.0
Shrew					0.0	23	0.0	84.6	15.4	100.0
Stevng	5.1	6.3	87.5	6.3	100.0	25	0.0	68.8	31.3	100.0
Sthend					100.0					100.0
Stoke					0.0	28	0.0	37.0	63.0	100.0
Sund					0.0	25	0.0	70.0	30.0	83.3
Truro					100.0					100.0
Wirral					0.0					100.0
Wolve	4.8	10.0	83.3	6.7	100.0	21	3.3	86.7	10.0	100.0
York	5.4	0.0	68.8	31.3	100.0	23	0.0	87.5	12.5	100.0
N IRELAND										
Antrim					100.0					100.0
Belfast	5.6	8.3	83.3	8.3	100.0	23	0.0	91.7	8.3	100.0
Newry					100.0					100.0
Ulster										
West NI					100.0					100.0
SCOTLAND										
Abrdn					100.0					0.0
Airdrie										
D&Gall					100.0					100.0
Dundee					100.0					100.0
Edinb					100.0					0.0
Glasgw	5.0	0.0	92.3	7.7	72.2					50.0
Inverns					100.0					100.0
Klmarnk	4.8	7.1	92.9	0.0	100.0	23	8.3	91.7	0.0	85.7
Krkcldy					100.0					100.0
WALES										
Bangor					0.0	26	0.0	60.0	40.0	100.0
Cardff					0.0	26	0.0	62.5	37.5	100.0
Clwyd					0.0					100.0
Swanse					0.0	25	0.0	77.8	22.2	100.0
Wrexm					0.0					100.0
TOTALS										
England	**4.9**	**10.7**	**80.6**	**8.7**	**61.1**	**24**	**2.7**	**77.7**	**19.6**	**87.5**
N Ireland	**5.2**	**10.5**	**84.2**	**5.3**	**100.0**	**23**	**0.0**	**84.2**	**15.8**	**100.0**
Scotland	**5.1**	**6.1**	**87.8**	**6.1**	**90.7**	**24**	**2.6**	**81.6**	**15.8**	**70.4**
Wales					**0.0**	**26**	**0.0**	**68.3**	**31.7**	**100.0**
UK	**5.0**	**10.4**	**81.1**	**8.5**	**58.2**	**24**	**2.4**	**77.2**	**20.4**	**87.9**

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

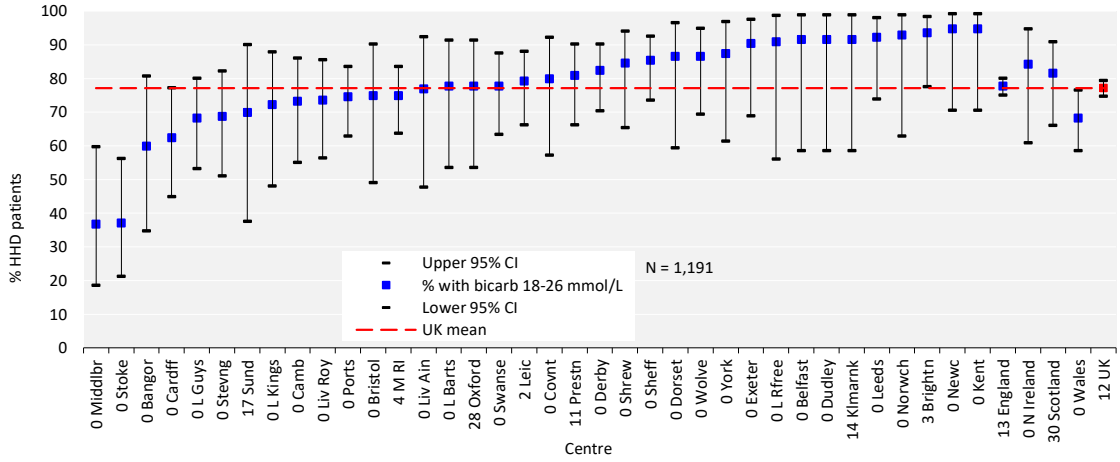


Figure 7.4 Percentage of adult patients prevalent to HHD on 31/12/2019 with pre-dialysis bicarbonate (bicarb) within the target range (18–26 mmol/L) by centre

CI – confidence interval

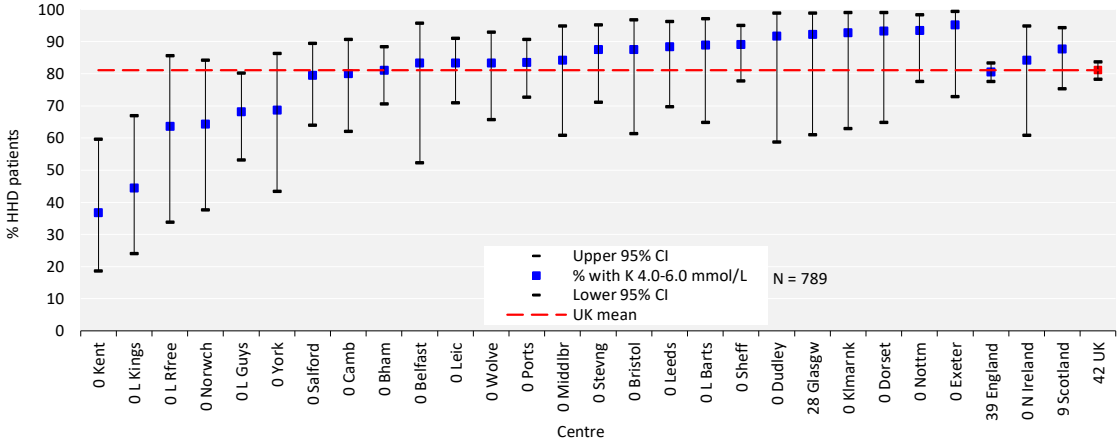


Figure 7.5 Percentage of adult patients prevalent to HHD on 31/12/2019 with pre-dialysis potassium (K) within the target range (4.0–6.0 mmol/L) by centre

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 7.7 Median haemoglobin and ferritin and percentage attaining target ranges in adult patients prevalent to HHD on 31/12/2019 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							
Basldn				100.0			100.0
Bham	106	31.1	20.3	100.0	304	17.6	100.0
Bradfd				100.0			100.0
Brightn	112	15.6	12.5	100.0	422	9.4	100.0
Bristol	105	12.5	18.8	100.0	298	6.3	100.0
Camb				10.0			10.0
Carlis							
Carsh	107	31.3	18.8	97.0	236	9.1	100.0
Chelms							
Colchr							
Covnt	104	40.0	15.0	100.0	198	10.0	100.0
Derby	114	15.8	26.3	100.0	542	0.0	100.0
Donc				100.0			100.0
Dorset	109	21.4	21.4	93.3	374	0.0	100.0
Dudley	116	16.7	16.7	100.0			8.3
Exeter	104	28.6	0.0	100.0	199	19.0	100.0
Glouc				100.0			100.0
Hull				100.0			100.0
Ipswi				100.0			100.0
Kent	105	31.6	26.3	100.0	270	15.8	100.0
L Barts	109	33.3	22.2	100.0	636	5.6	100.0
L Guys	103	43.2	20.5	100.0	283	20.9	97.7
L Kings	105	27.8	0.0	100.0	514	0.0	100.0
L Rfree	103	27.3	27.3	100.0	269	9.1	100.0
L St.G				100.0			100.0
L West	102	37.5	8.3	85.7	357	16.7	85.7
Leeds	110	19.2	15.4	100.0	309	15.4	100.0
Leic	106	33.3	16.7	100.0	291	14.8	100.0
Liv Ain	111	7.7	30.8	100.0	178	15.4	100.0
Liv Roy	102	44.1	11.8	100.0	157	35.3	100.0
M RI	106	29.2	19.4	96.0	259	25.0	96.0
Middlbr	106	26.3	21.1	100.0	728	0.0	89.5
Newc	111	10.5	5.3	100.0	392	5.3	100.0
Norwch	111	28.6	7.1	100.0	194	7.1	100.0
Nottm	110	16.7	16.7	96.8	383	9.7	100.0
Oxford	119	20.0	30.0	80.0	308	8.0	100.0
Plymth				100.0			100.0
Ports	116	21.2	42.4	98.5	255	12.1	98.5
Prestn	108	27.7	12.8	100.0	197	14.9	100.0
Redng				100.0			100.0

Table 7.7 Continued

Centre	Haemoglobin				Ferritin		
	Median (g/L)	% <100 g/L	% >120 g/L	% data completeness	Median (µg/L)	% <100 µg/L	% data completeness
Salford	102	43.6	15.4	100.0	194	33.3	100.0
Sheff	102	40.0	16.4	100.0	390	20.4	98.2
Shrew	111	7.7	15.4	100.0	494	11.5	100.0
Stevng	107	31.3	28.1	100.0	508	10.0	93.8
Sthend				100.0			100.0
Stoke	112	18.5	40.7	100.0	309	4.0	92.6
Sund	111	18.2	18.2	91.7	546	9.1	91.7
Truro				100.0			100.0
Wirral				100.0			100.0
Wolve	110	43.3	20.0	100.0	257	23.3	100.0
York	111	18.8	18.8	100.0	320	6.3	100.0
N IRELAND							
Antrim				100.0			100.0
Belfast	114	16.7	25.0	100.0	105	41.7	100.0
Newry				100.0			100.0
Ulster							
West NI				100.0			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	109	16.7	27.8	100.0	209	16.7	100.0
Inverns				100.0			100.0
Klmarnk	96	71.4	7.1	100.0	309	14.3	100.0
Krkcldy				100.0			100.0
WALES							
Bangor	116	0.0	33.3	100.0	170	20.0	100.0
Cardff	100	50.0	6.3	100.0	156	34.4	100.0
Clwyd				100.0			100.0
Swanse	106	22.2	22.2	100.0	144	40.0	100.0
Wrexm				100.0			100.0
TOTALS							
England	**108**	**27.5**	**19.3**	**96.3**	**313**	**14.8**	**95.3**
N Ireland	**114**	**10.5**	**26.3**	**100.0**	**107**	**36.8**	**100.0**
Scotland	**108**	**37.0**	**16.7**	**100.0**	**282**	**18.5**	**100.0**
Wales	**106**	**26.7**	**18.8**	**100.0**	**159**	**32.7**	**100.0**
UK	**108**	**27.6**	**19.3**	**96.8**	**297**	**16.7**	**95.9**

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

Table 7.8 Distribution of haemoglobin and erythropoiesis stimulating agent (ESA) dose values in adult patients prevalent to HHD on 31/12/2019 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				
Basldn	88.9			
Bham	31.1			
Bradfd	100.0			
Brightn	53.1			
Bristol	100.0	12,000	0.0	18.8
Camb	80.0			
Carlis				
Carsh	6.1			
Chelms				
Colchr				
Covnt	95.0	8,000	0.0	10.0
Derby	0.0			
Donc	100.0			
Dorset	100.0	5,400	0.0	28.6
Dudley	100.0	10,000	0.0	16.7
Exeter	95.2	7,000	0.0	0.0
Glouc	66.7			
Hull	0.0			
Ipswi	0.0			
Kent	94.7	13,500	0.0	21.1
L Barts	83.3	8,000	0.0	11.1
L Guys	0.0			
L Kings	77.8	9,000	5.6	0.0
L Rfree	0.0			
L St.G	0.0			
L West	0.0			
Leeds	100.0	10,000	0.0	15.4
Leic	90.7	8,000	1.9	9.3
Liv Ain	0.0			
Liv Roy	0.0			
M RI	0.0			
Middlbr	89.5	6,000	0.0	10.5
Newc	36.8			
Norwch	85.7	9,000	0.0	7.1
Nottm	83.9	13,500	3.3	10.0
Oxford	96.0	9,000	0.0	30.0
Plymth	0.0			
Ports	55.2			
Prestn	95.7		2.1	10.6
Redng	37.5			
Salford	84.6	10,000	10.3	12.8
Sheff	67.3			
Shrew	0.0			
Stevng	90.6	6,000	0.0	18.8
Sthend	83.3			
Stoke	0.0			
Sund	33.3			
Truro	0.0			
Wirral	100.0			
Wolve	83.3	8,000	3.3	6.7

Table 7.8 Continued

	ESA		Haemoglobin and ESA	
Centre	% on ESA	Median dose (IU/week)	% <100g/L and not on ESA	% >120g/L and on ESA
York	100.0	5,500	0.0	18.8
N IRELAND				
Antrim	100.0			
Belfast	91.7	8,000	0.0	16.7
Newry	50.0			
Ulster				
West NI	100.0			
SCOTLAND				
Abrdn	75.0			
Airdrie				
D&Gall	50.0			
Dundee	50.0			
Edinb	100.0			
Glasgw	83.3		0.0	16.7
Inverns	100.0			
Klmarnk	81.8		9.1	9.1
Krkcldy	0.0			
WALES				
Bangor	40.0			
Cardff	56.3			
Clwyd	50.0			
Swanse	82.2	6,000	4.4	13.3
Wrexm	28.6			
TOTAL[1]				
UK	**90.0**	**8,000**	**2.0**	**13.2**

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 31/05/2019 due to ESA data availability.
[1]This is the total of only those centres with at least 70% of HHD patients on an ESA.

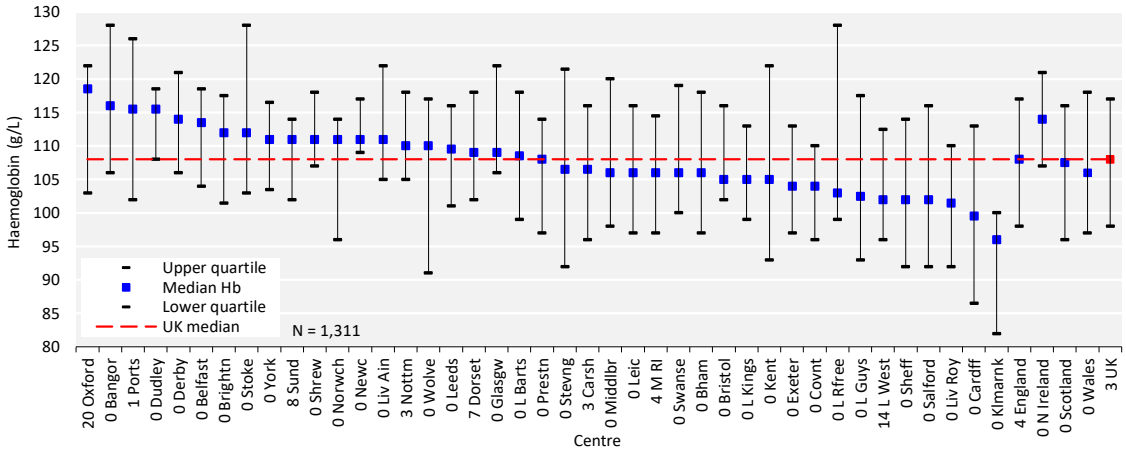


Figure 7.6 Median haemoglobin (Hb) in adult patients prevalent to HHD on 31/12/2019 by centre

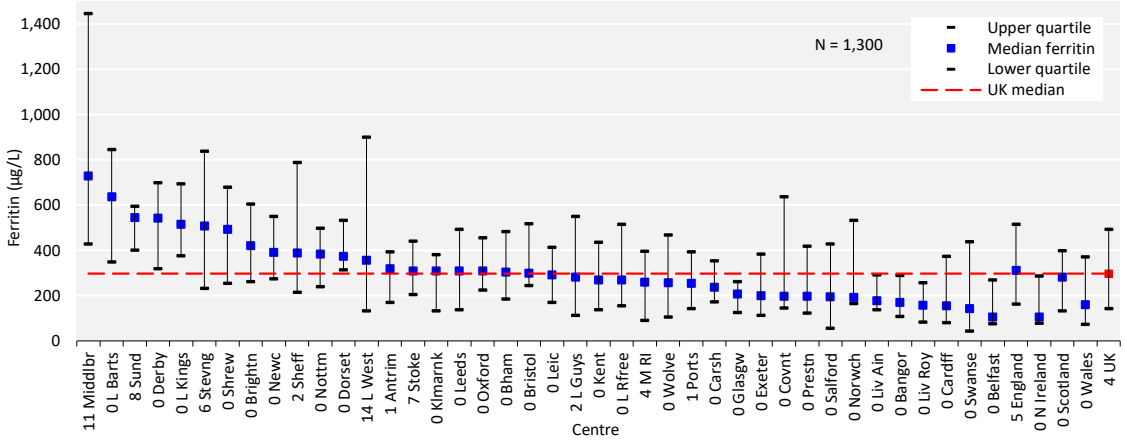


Figure 7.7 Median ferritin in adult patients prevalent to HHD on 31/12/2019 by centre

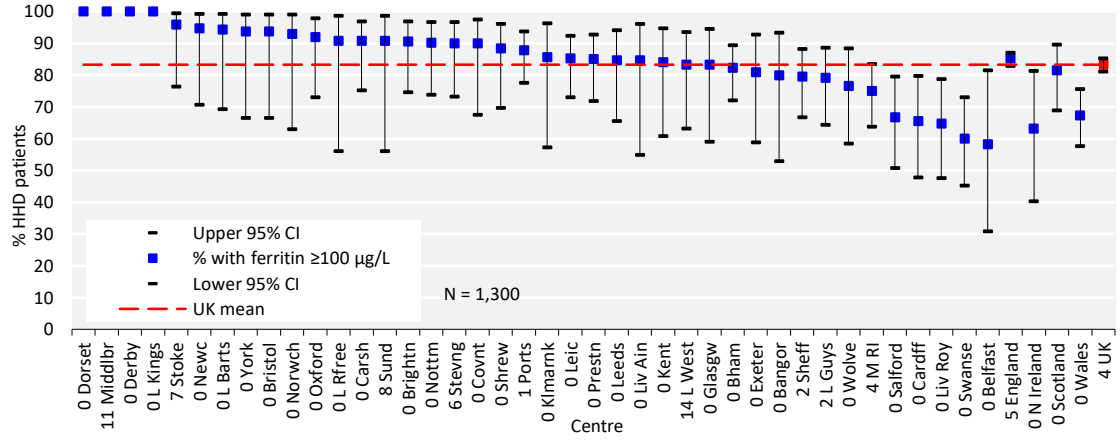


Figure 7.8 Percentage of adult patients prevalent to HHD on 31/12/2019 with ferritin ≥100 µg/L by centre
CI – confidence interval

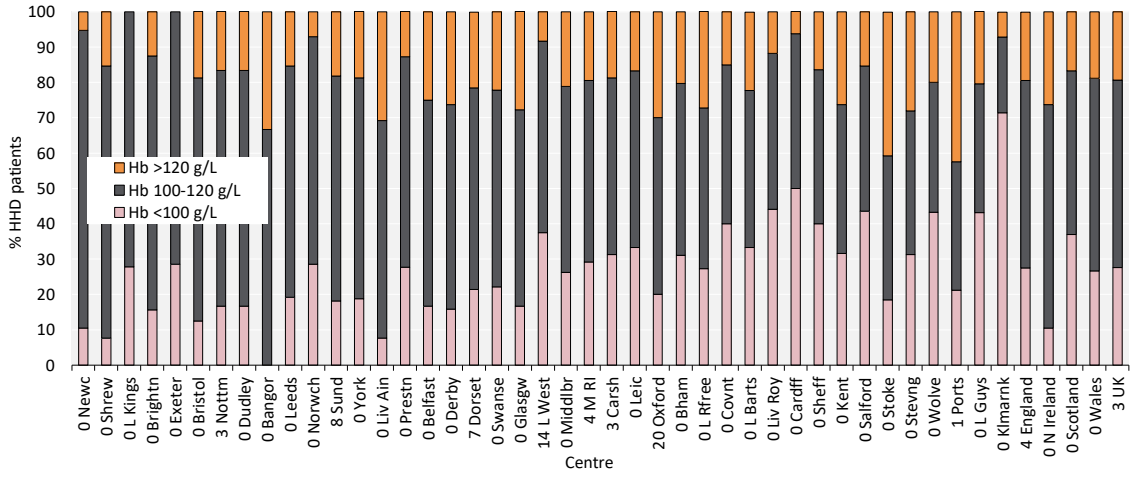


Figure 7.9 Distribution of haemoglobin (Hb) in adult patients prevalent to HHD on 31/12/2019 by centre

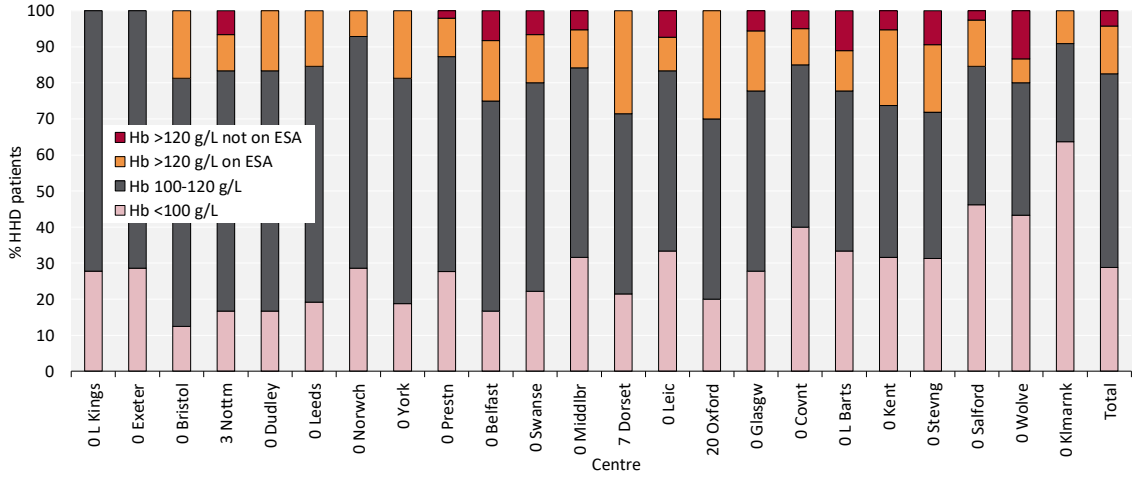


Figure 7.10 Distribution of haemoglobin (Hb) in adult patients prevalent to HHD on 31/12/2019 and the proportion with haemoglobin >120 g/L receiving erythropoiesis stimulating agent (ESA) by centre

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 31/12/2018 and followed-up for one year in 2019. 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 3.

Table 7.9 Cause of death in adult patients prevalent to HHD on 31/12/2018 followed-up in 2019 by age group

	HHD all ages		HHD <65 yrs		HHD ≥65 yrs	
Cause of death	N	%	N	%	N	%
Cardiac disease	24	27.9	13	28.3	11	27.5
Cerebrovascular disease	4	4.7	3	6.5	1	2.5
Infection	11	12.8	6	13.0	5	12.5
Malignancy	9	10.5	6	13.0	3	7.5
Treatment withdrawal	14	16.3	7	15.2	7	17.5
Other	15	17.4	6	13.0	9	22.5
Uncertain aetiology	9	10.5	5	10.9	4	10.0
Total (with data)	**86**	**100.0**	**46**	**100.0**	**40**	**100.0**
Missing	45	34.4	28	37.8	17	29.8

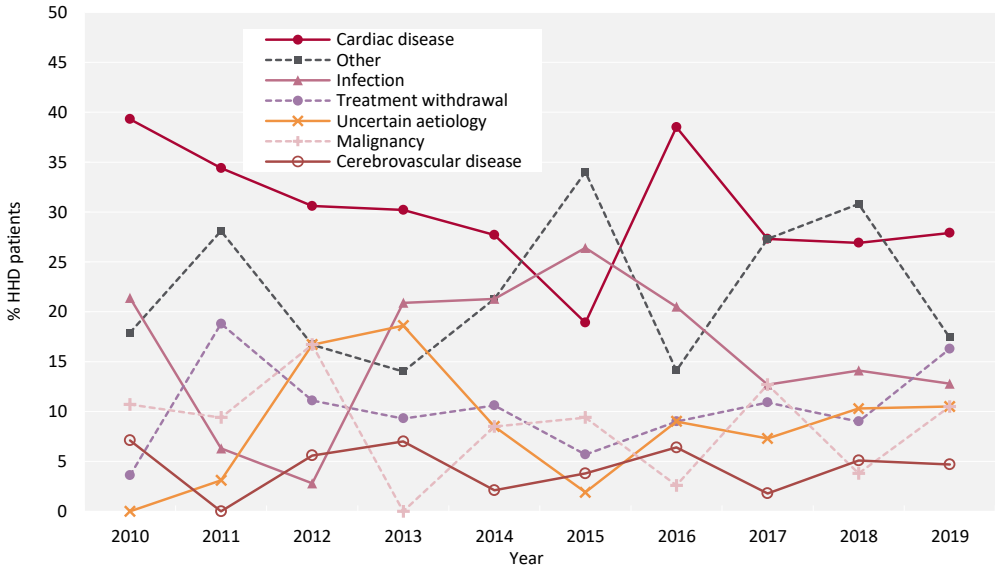


Figure 7.11 Cause of death between 2010 and 2019 for adult patients prevalent to HHD at the beginning of the year

THE RENAL ASSOCIATION
founded 1950

Chapter 8

Children and young people on renal replacement therapy (RRT) for end-stage kidney disease (ESKD) in the UK in 2019

Contents

Introduction 184

Rationale for analyses 186

Key findings 188

- Children 188
- Young people 188

Analyses – children 189

- Data completeness for prevalent paediatric RRT patients 189
- Changes to the incident paediatric RRT population 190
- Start modality of incident paediatric RRT patients 191
- Pre-emptive transplantation in incident paediatric RRT patients 192
- Demographics of prevalent paediatric RRT patients 193
- Treatment modality in prevalent paediatric RRT patients 193
- Causes of ESKD in prevalent paediatric RRT patients 194
- Growth of prevalent paediatric RRT patients 195
- Cardiovascular risk factor evaluation in prevalent paediatric RRT patients 198
- Biochemistry parameters in prevalent paediatric RRT patients 201
- Transfer to adult renal services for prevalent paediatric RRT patients 203
- Survival in paediatric RRT patients 204

Analyses – young people 205

- RRT incidence and prevalence in young people 205
- Transplant parameters in young people 206
- Biochemical and blood pressure measures in young people 207

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 2019 (figure 8.1). 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. Children (aged <16 years) and young people (aged 16 to <18 years) are reported separately. Data about young people also include those managed in adult centres, to provide a more complete epidemiological picture for this population.

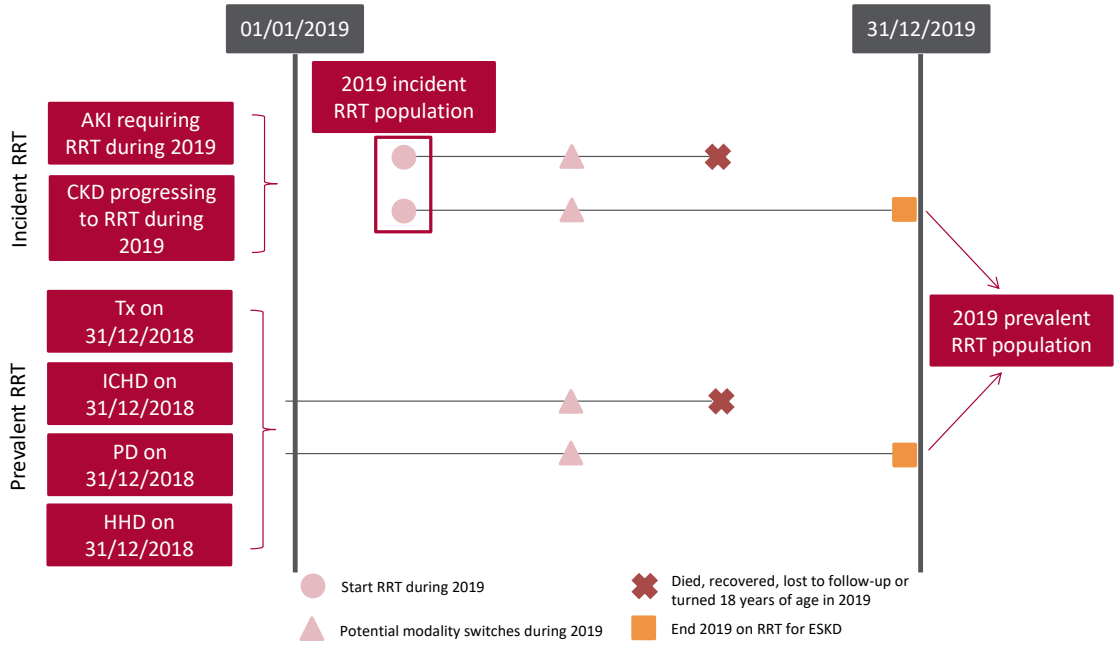


Figure 8.1 Pathways children and young people could follow to be included in the UK 2019 incident and/or prevalent RRT populations

Note that patients starting RRT in 2019 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 2019 and remained on RRT for at least 90 days.
- **Prevalent population:** patients who were on RRT at the end of 2019 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 2005–2009, 2010–2014 and 2015–2019.

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

- **Incident population:** patients who started RRT during 2019 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 2019 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 8.1):

- **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 2019 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 2019 is reported in this chapter (table 8.1). 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 8.1 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 8.6–8.13
	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 8.14–8.15, figures 8.14–8.15
	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 8.17
	Serum bicarbonate concentrations should be 20–26 mmol/L	Table 8.17
	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 8.17
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 8.2–8.3, 8.15

Detail about the completeness of data returned to the UK Renal Registry (UKRR) is available through the UKRR data portal (renal.org/audit-research/data-portal). 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

- 101 patients aged <16 years started RRT for ESKD in the UK in 2019 compared to 115 patients in 2018
- RRT incidence in patients aged <16 years was 8.0 pmarp compared to 9.1 pmarp in 2018
- 832 patients aged <16 years were receiving RRT at UK paediatric renal centres on 31/12/2019, an increase from 826 patients in 2018
- RRT prevalence in patients aged <16 years was 65.5 pmarp. 78.4% had a functioning Tx (48.6% living donor and 29.8% deceased donor), 10.8% were receiving HD and 10.7% 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 2005 and 2019, 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, 78.7% of paediatric patients had a functioning kidney Tx
- The median height z-score for children on dialysis was −2.1 compared with -1.1 for those with a functioning Tx
- The median weight z-score for children on dialysis was -1.3 compared with −0.1 for those with a functioning Tx
- The overall median eGFR of the 652 children with a kidney transplant on 31/12/2019 was 61 mL/min/1.73m^2 and 6.6% had an eGFR of <30 mL/min/1.73m^2
- Of those with complete data, 74.1% of the prevalent paediatric RRT population had 1 or more risk factors for cardiovascular disease; 3.7% had 3 risk factors
- 55.1% and 64.3% of prevalent HD patients achieved systolic blood pressure (SBP) and diastolic blood pressure (DBP) values <90th percentile, respectively
- 62.0% and 64.0% of prevalent PD patients achieved SBP and DBP values <90th percentile, respectively
- 74.4% and 78.6% of prevalent Tx patients achieved SBP and DBP values <90th percentile, respectively.

Young people

- 31 patients aged 16 to <18 years started RRT for ESKD in the UK in 2019
- RRT incidence in young people was 21.7 pmarp
- 219 patients aged 16 to <18 years were receiving RRT on 31/12/2019, of whom the majority (86.8%) were managed in paediatric renal centres
- RRT prevalence in patients aged 16 to <18 years was 153.6 pmarp
- Tubulointerstital disease accounted for 49.8% of all PRDs in prevalent young people, followed by familial/hereditary nephropathies (18.5%) and glomerular disease (18.5%). Diabetic nephropathy was seen in 0.5%
- The overall median eGFR of young people with a kidney transplant on 31/12/2019 was 67 mL/min/1.73m^2 and 2.5% had an eGFR of <30 mL/min/1.73m^2
- The proportion of young people prevalent to RRT on 31/12/2019 with a blood pressure within the 'normal' range (<130/80 mmHg) was 47.4% of dialysis and 72.1% 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 2019 are shown in tables 8.2 and 8.3, respectively, with further detail available through the UKRR data portal (renal.org/audit-research/data-portal).

Table 8.2 Data completeness for paediatric patients (<16 years old) prevalent to Tx on 31/12/2019 by centre

		Data completeness (%)														
Centre	N with Tx	Height at start	Weight at start	BMI	SBP	DBP	Hb	Creat at start	GH	ESA	IV iron	Chol	Bicarb	PTH	Ca	Phos
Bham_P	67	91.0	95.5	97.0	97.0	97.0	98.5	91.0	0.0	0.0	0.0	92.5	97.0	9.0	98.5	97.0
Blfst_P	25	84.0	92.0	96.0	100.0	96.0	100.0	96.0	92.0	96.0	92.0	72.0	100.0	100.0	100.0	100.0
Brstl_P	41	85.4	95.1	97.6	95.1	75.6	100.0	100.0	0.0	100.0	0.0	26.8	97.6	82.9	100.0	100.0
Cardf_P	26	92.3	92.3	11.5	92.3	46.2	96.2	96.2	0.0	15.4	0.0	96.2	96.2	96.2	96.2	96.2
Glasg_P	43	95.4	97.7	97.7	97.7	97.7	100.0	97.7	97.7	100.0	95.4	27.9	100.0	97.7	100.0	100.0
L Eve_P	68	72.1	73.5	100.0	100.0	100.0	100.0	75.0	0.0	0.0	0.0	58.8	100.0	98.5	100.0	100.0
L GOSH_P	125	84.0	91.2	98.4	53.6	53.6	95.2	92.8	96.0	99.2	99.2	39.2	90.4	88.0	90.4	95.2
Leeds_P	45	91.1	97.8	100.0	100.0	93.3	100.0	97.8	100.0	100.0	100.0	13.3	100.0	100.0	100.0	100.0
Livpl_P	27	66.7	77.8	0.0	0.0	0.0	92.6	88.9	0.0	0.0	0.0	63.0	92.6	92.6	92.6	92.6
Manch_P	69	95.7	97.1	98.6	100.0	100.0	100.0	97.1	98.6	100.0	1.5	43.5	100.0	97.1	100.0	100.0
Newc_P	27	81.5	85.2	92.6	92.6	0.0	100.0	74.1	0.0	0.0	0.0	85.2	100.0	85.2	100.0	100.0
Nottm_P	65	80.0	98.5	90.8	86.2	84.6	93.9	98.5	0.0	98.5	98.5	89.2	93.9	92.3	93.9	93.9
Soton_P	24	75.0	75.0	100.0	100.0	100.0	100.0	87.5	83.3	100.0	100.0	79.2	100.0	100.0	100.0	100.0
UK	**652**	**84.8**	**91.0**	**89.9**	**84.2**	**76.5**	**97.9**	**92.0**	**48.8**	**67.2**	**49.4**	**56.8**	**96.6**	**84.8**	**96.9**	**97.7**

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

Table 8.3 Data completeness for paediatric patients (<16 years old) prevalent to dialysis on 31/12/2019 by centre

		Data completeness (%)													
Centre	N on dialysis	Height at start	Weight at start	BMI	SBP	DBP	Hb	GH	ESA	IV iron	Chol	Bicarb	PTH	Ca	Phos
Bham_P	31	67.7	74.2	93.6	93.6	93.6	96.8	0.0	0.0	0.0	96.8	96.8	6.5	96.8	96.8
Blfst_P	4	100.0	100.0	75.0	75.0	0.0	100.0	75.0	100.0	100.0	75.0	100.0	100.0	100.0	100.0
Brstl_P	15	73.3	93.3	100.0	100.0	14.3	100.0	0.0	100.0	0.0	71.4	100.0	100.0	100.0	100.0
Cardf_P	6	66.7	50.0	0.0	83.3	0.0	83.3	0.0	0.0	0.0	50.0	83.3	83.3	83.3	83.3
Glasg_P	12	91.7	91.7	100.0	100.0	100.0	100.0	100.0	100.0	100.0	75.0	100.0	100.0	100.0	100.0
L Eve_P	11	90.9	90.9	100.0	100.0	100.0	100.0	0.0	0.0	0.0	9.1	100.0	100.0	100.0	100.0
L GOSH_P	30	66.7	70.0	100.0	83.3	83.3	96.7	23.3	23.3	23.3	43.3	56.7	96.7	56.7	96.7
Leeds_P	10	80.0	100.0	60.0	100.0	80.0	100.0	60.0	100.0	100.0	50.0	100.0	100.0	90.0	100.0
Livpl_P	10	80.0	80.0	0.0	0.0	0.0	80.0	0.0	0.0	0.0	20.0	80.0	80.0	80.0	80.0
Manch_P	20	100.0	100.0	95.0	95.0	45.0	100.0	95.0	95.0	0.0	55.0	100.0	90.0	100.0	100.0
Newc_P	10	70.0	70.0	50.0	50.0	0.0	100.0	0.0	0.0	0.0	30.0	100.0	100.0	100.0	100.0
Nottm_P	16	75.0	81.3	87.5	81.3	62.5	100.0	0.0	100.0	100.0	62.5	100.0	100.0	100.0	100.0
Soton_P	5	100.0	100.0	100.0	100.0	80.0	100.0	80.0	100.0	100.0	60.0	100.0	100.0	100.0	100.0
UK	**180**	**78.3**	**82.8**	**82.7**	**84.4**	**61.5**	**97.2**	**28.3**	**48.6**	**30.2**	**57.5**	**90.5**	**80.5**	**89.9**	**97.2**

Bicarb – bicarbonate; BMI – body mass index; Ca – calcium; Chol – cholesterol; DBP – diastolic blood pressure; ESA – erythropoiesis stimulating agent; GH – growth hormone; 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 8.4 Paediatric patients (<16 years old) incident to RRT in 2019 by age and sex

	All patients		Male		Female	
Age group (yrs)	N	pmarp	N	pmarp	N	pmarp
0-<2	14	9.5	5	6.6	9	12.5
2-<4	12	7.6	7	8.6	5	6.5
4-<8	16	4.9	10	5.9	6	3.7
8-<12	27	8.2	11	6.5	16	10.0
12-<16	32	10.5	19	12.1	13	8.7
<16 yrs	**101**	**8.0**	**52**	**8.0**	**49**	**7.9**

pmarp – per million age-related population

Table 8.5 Paediatric patients (<16 years old) incident to RRT by age and 5 year time period

	2005-2009		2010-2014		2015-2019	
Age group (yrs)	N	pmarp	N	pmarp	N	pmarp
0-<2	104	14.0	99	12.2	103	13.3
2-<4	45	6.3	74	9.4	63	7.9
4-<8	100	7.4	91	6.0	117	7.1
8-<12	127	8.8	128	9.2	128	8.1
12-<16	221	14.6	174	11.7	173	12.0
<16 yrs	**597**	**10.4**	**566**	**9.4**	**584**	**9.3**

pmarp – per million age-related population

Table 8.6 Paediatric patients (<16 years old) incident to RRT by ethnicity and 5 year time period

	2005-2009		2010-2014		2015-2019	
Ethnicity	N	%	N	%	N	%
White	443	75.2	400	70.7	376	67.1
Asian	101	17.1	101	17.8	110	19.6
Black	26	4.4	26	4.6	37	6.6
Other	19	3.2	39	6.9	37	6.6
<16 yrs	**589**	**100.0**	**566**	**100.0**	**560**	**100.0**

8 children in 2005–2009, 0 in 2010–2014 and 24 in 2015–2019 with no ethnicity recorded were excluded.

Table 8.7 Paediatric patients (<16 years old) incident to RRT by centre and 5 year time period

	2005-2009		2010-2014		2015-2019	
Centre	N	%	N	%	N	%
Blfst_P	17	2.8	21	3.7	10	1.7
Bham_P	66	11.1	62	11.0	81	13.9
Brstl_P	32	5.4	38	6.7	30	5.1
Cardf_P	21	3.5	21	3.7	20	3.4
Glasg_P	49	8.2	33	5.8	47	8.0
L Eve_P	65	10.9	56	9.9	65	11.1
L GOSH_P	121	20.3	104	18.4	103	17.6
Leeds_P	56	9.4	52	9.2	41	7.0
Livpl_P	26	4.4	30	5.3	23	3.9
Manch_P	47	7.9	56	9.9	63	10.8
Newc_P	23	3.9	22	3.9	32	5.5
Nottm_P	61	10.2	51	9.0	47	8.0
Soton_P	13	2.2	20	3.5	22	3.8
<16 yrs	**597**	**100.0**	**566**	**100.0**	**584**	**100.0**

PRDs were grouped into categories as shown in table 8.8, with the mapping of disease codes into groups explained in more detail in appendix A.

Table 8.8 Paediatric patients (<16 years old) incident to RRT by primary renal disease (PRD) and 5 year time period

	2005-2009		2010-2014		2015-2019	
PRD	N	%	N	%	N	%
Tubulointerstitial disease	282	47.8	303	53.6	263	48.0
- CAKUT	260	44.1	286	50.6	256	46.7
- Non-CAKUT	22	3.7	17	3.0	7	1.3
Glomerular disease	128	21.7	93	16.5	109	19.9
Familial/hereditary nephropathies	95	16.1	98	17.3	78	14.2
Systemic diseases affecting the kidney	28	4.7	21	3.7	22	4.0
Miscellaneous renal disorders	57	9.7	50	8.8	76	13.9

7 children in 2005–2009, 1 in 2010–2014 and 36 in 2015–2019 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 2005 and 2019 was grouped by five year time periods.

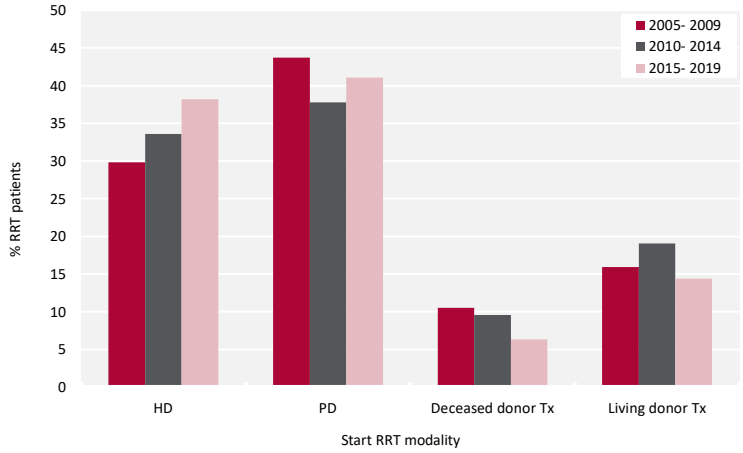


Figure 8.2 Start RRT modality for paediatric patients (<16 years old) incident to RRT by 5 year time period

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 8.9 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)

	N on RRT	N (%) with pre-emptive Tx
Total cohort analysed (2005-2019)	1,277	416 (32.6)
Time period		
2005-2009	422	151 (35.8)
2010-2014	419	153 (36.5)
2015-2019	436	112 (25.7)
Sex		
Male	812	287 (35.3)
Female	465	129 (27.7)
Ethnicity		
White	887	329 (37.1)
Asian	235	49 (20.9)
Black	61	9 (14.8)
Other	68	19 (28.0)
Age at start of RRT (yrs)		
3 mths-<2	146	6 (4.1)
2-<4	157	45 (28.7)
4-<8	248	104 (42)
8-<12	294	102 (34.7)
12-<16	432	159 (36.8)
PRD		
Tubulointerstitial disease	676	285 (42.2)
Glomerular disease	237	14 (5.9)
Familial/hereditary nephropathies	190	64 (33.7)
Miscellaneous renal disorders	98	28 (28.6)
Systemic diseases affecting the kidney	39	16 (41)

98 children were excluded because they were aged <3 months; 372 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 8.10 Age and sex breakdown of paediatric patients (<16 years old) prevalent to RRT on 31/12/2019

	All patients		Male		Female		
Age group (yrs)	N	pmarp	N	pmarp	N	pmarp	M/F ratio
0-<2	15	10.2	6	7.9	9	12.5	0.6
2-<4	53	33.6	33	40.7	20	26.0	1.6
4-<8	160	48.6	113	67.0	47	29.3	2.3
8-<12	258	78.3	159	94.2	99	61.6	1.5
12-<16	346	113.2	207	132.1	139	93.3	1.4
<16 yrs	**832**	**65.5**	**518**	**79.6**	**314**	**50.7**	**1.6**

pmarp – per million age-related population

Table 8.11 Age and ethnicity breakdown of paediatric patients (<16 years old) prevalent to RRT on 31/12/2019

	N			
Age group (yrs)	White	Asian	Black	Other
0-<4	49	5	4	6
4-<8	105	30	10	13
8-<12	178	48	9	17
12-<16	238	66	18	17
<16 yrs	**570**	**149**	**41**	**53**

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 2019.
19 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 8.3 and 8.4, respectively. Table 8.12 breaks down current modality for prevalent patients by age group.

Table 8.12 RRT modality used by paediatric patients (<16 years old) prevalent to RRT on 31/12/2019 by age group

		HD		PD		Living donor Tx		Deceased donor Tx	
Age group (yrs)	Total N	N	%	N	%	N	%	N	%
0-<2	15	6	40.0	9	60.0	0	0.0	0	0.0
2-<4	53	15	28.3	20	37.7	13	24.5	5	9.4
4-<8	160	21	13.1	22	13.8	82	51.3	35	21.9
8-<12	258	17	6.6	15	5.8	147	57.0	79	30.6
12-<16	345	31	9.0	23	6.7	162	47.0	129	37.4
<16 yrs	**831**	**90**	**10.8**	**89**	**10.7**	**404**	**48.6**	**248**	**29.8**

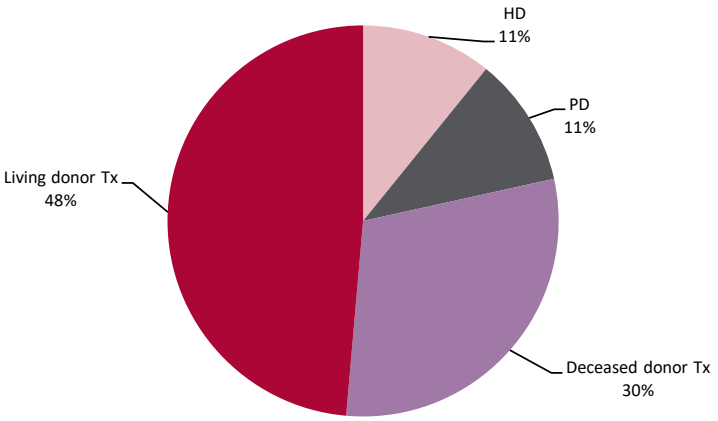


Figure 8.3 RRT modality used by paediatric patients (<16 years old) prevalent to RRT on 31/12/2019

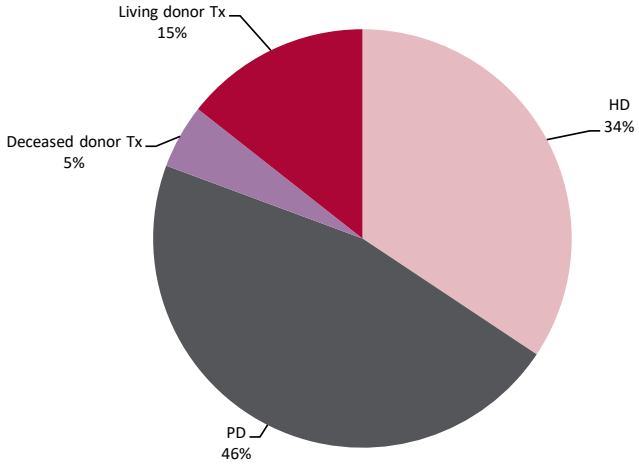


Figure 8.4 RRT modality used at the start of RRT by paediatric patients (<16 years old) prevalent to RRT on 31/12/2019

Causes of ESKD in prevalent paediatric RRT patients

PRDs were grouped into categories as shown in table 8.13.

Table 8.13 Primary renal diseases (PRDs) of paediatric patients (<16 years old) prevalent to RRT on 31/12/2019 by sex and ethnicity

PRD	N	%	N male	N female	% non-White
Tubulointerstitial disease	425	53.1	326	99	28.2
- CAKUT	415	51.8	320	95	27.6
- Non-CAKUT	10	1.2	6	4	40.0
Glomerular disease	155	19.4	83	72	34.0
Familial/hereditary nephropathies	105	13.1	38	67	38.8
Systemic diseases affecting the kidney	38	4.7	17	21	10.5
Miscellaneous renal disorders	78	9.7	42	36	25.6
Total (with data)	**801**	**100.0**	**506**	**295**	**29.4**
Missing	31	3.9	12	19	47.6

CAKUT – congenital anomalies of the kidneys and urinary tract

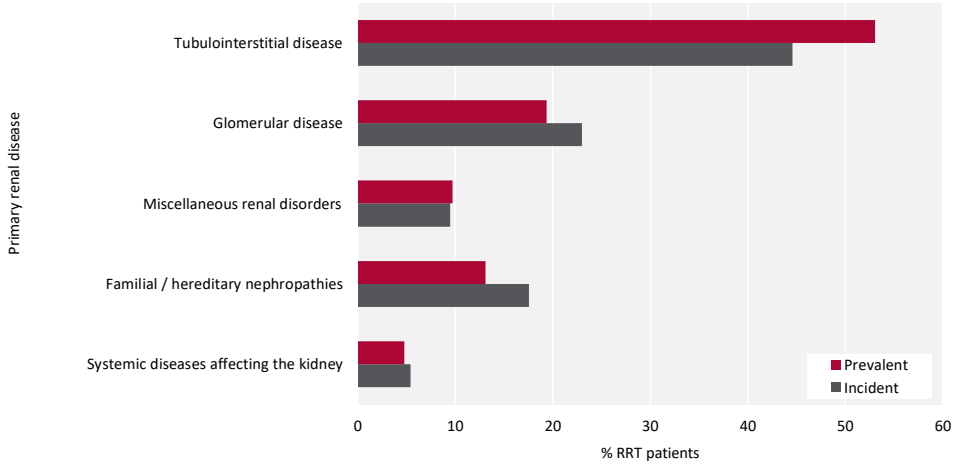


Figure 8.5 Comparison of primary renal diseases for paediatric patients (<16 years old) incident and prevalent to RRT in 2019 with no missing data

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

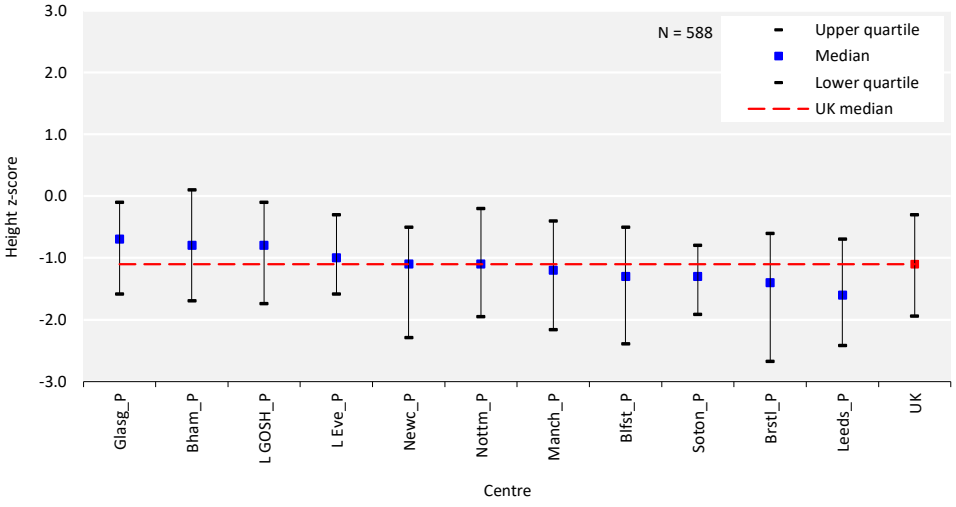


Figure 8.6 Median height z-scores for paediatric patients (<16 years old) prevalent to Tx on 31/12/2019 by centre

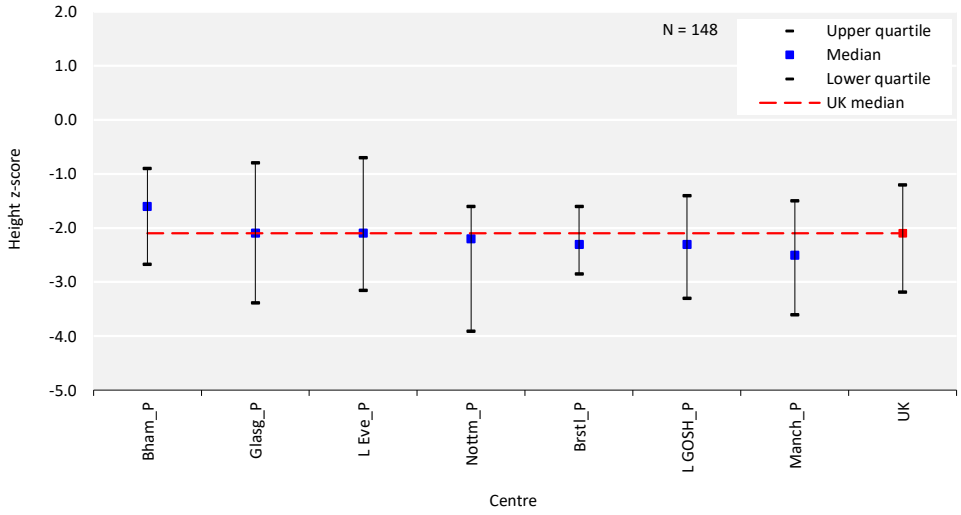


Figure 8.7 Median height z-scores for paediatric patients (<16 years old) prevalent to dialysis on 31/12/2019 by centre

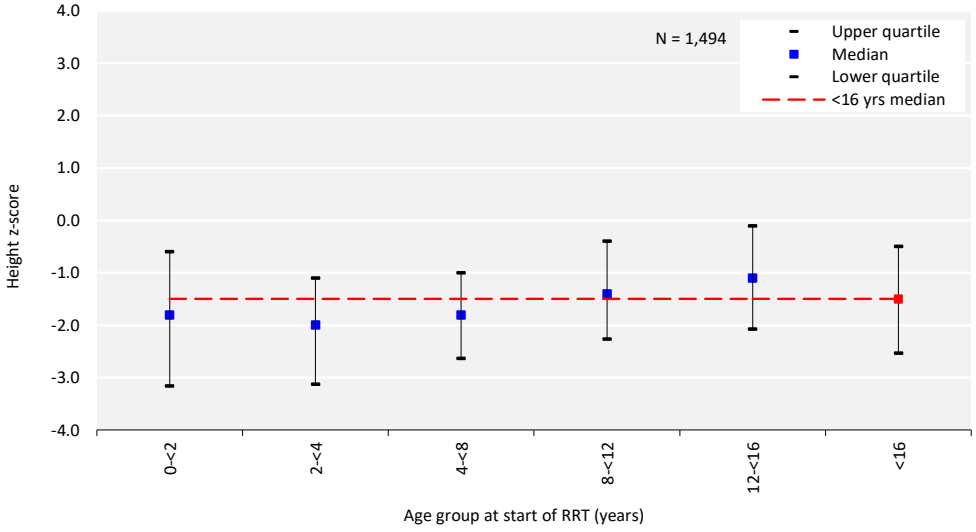


Figure 8.8 Median height z-scores at start of RRT for incident paediatric RRT patients (<16 years old) between 2005 and 2019 by age group at start of RRT

Weight of paediatric RRT patients

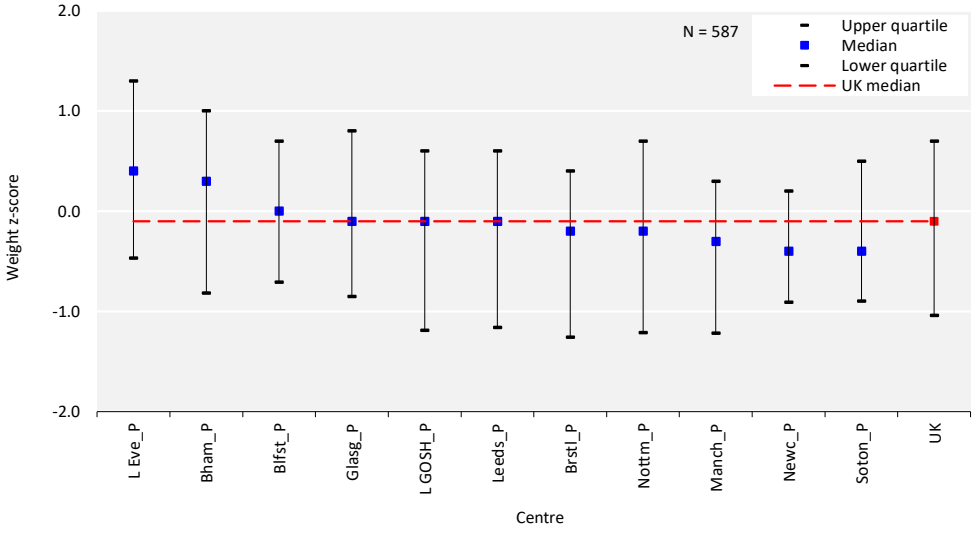


Figure 8.9 Median weight z-scores for paediatric patients (<16 years old) prevalent to Tx on 31/12/2019 by centre

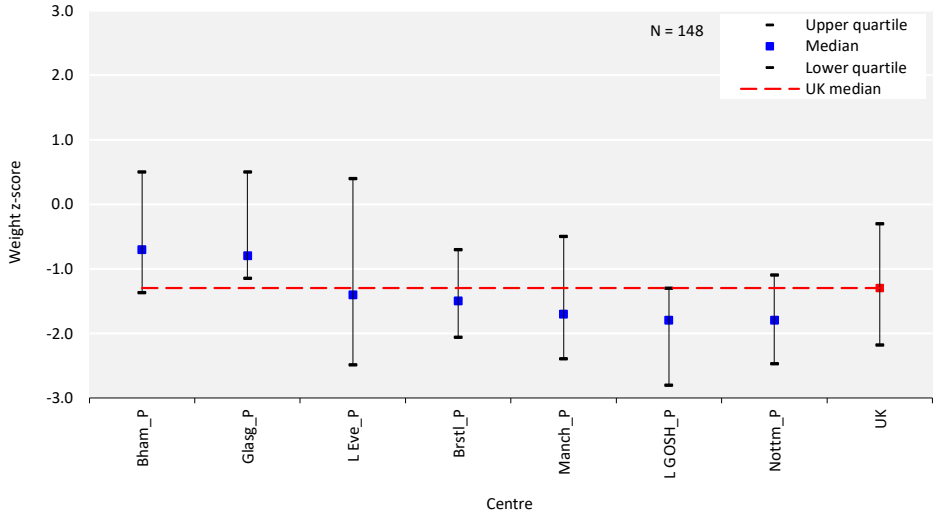


Figure 8.10 Median weight z-scores for paediatric patients (<16 years old) prevalent to dialysis on 31/12/2019 by centre

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.

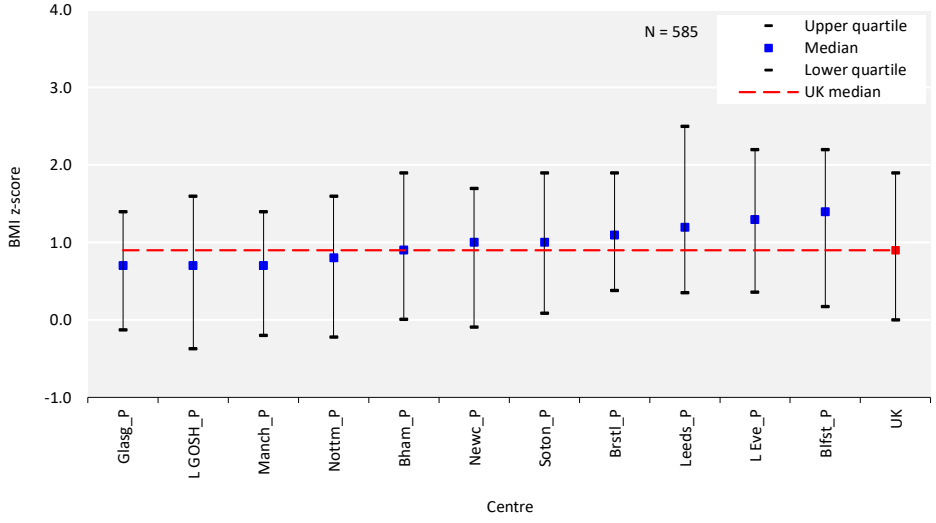


Figure 8.11 Median body mass index (BMI) z-scores for paediatric patients (<16 years old) prevalent to Tx on 31/12/2019 by centre

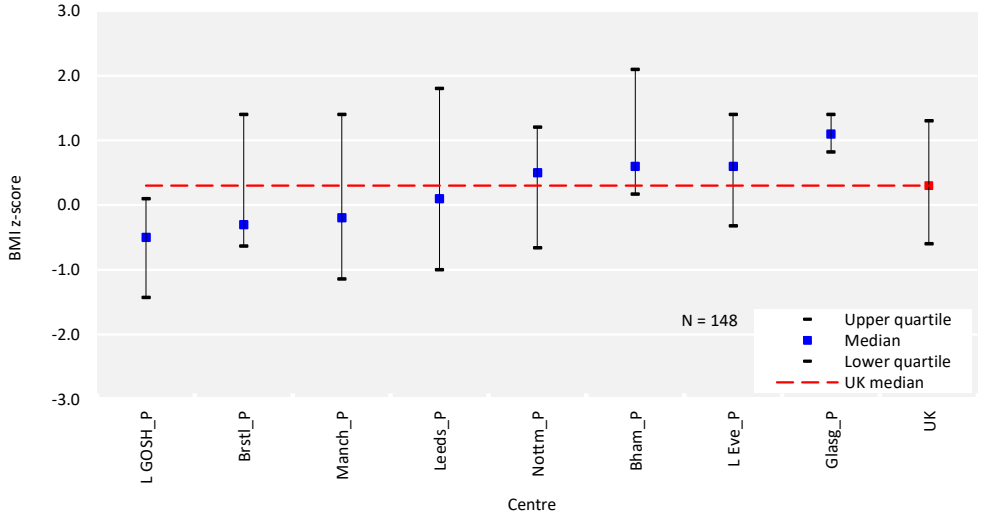


Figure 8.12 Median body mass index (BMI) z-scores for paediatric patients (<16 years old) prevalent to dialysis on 31/12/2019 by centre

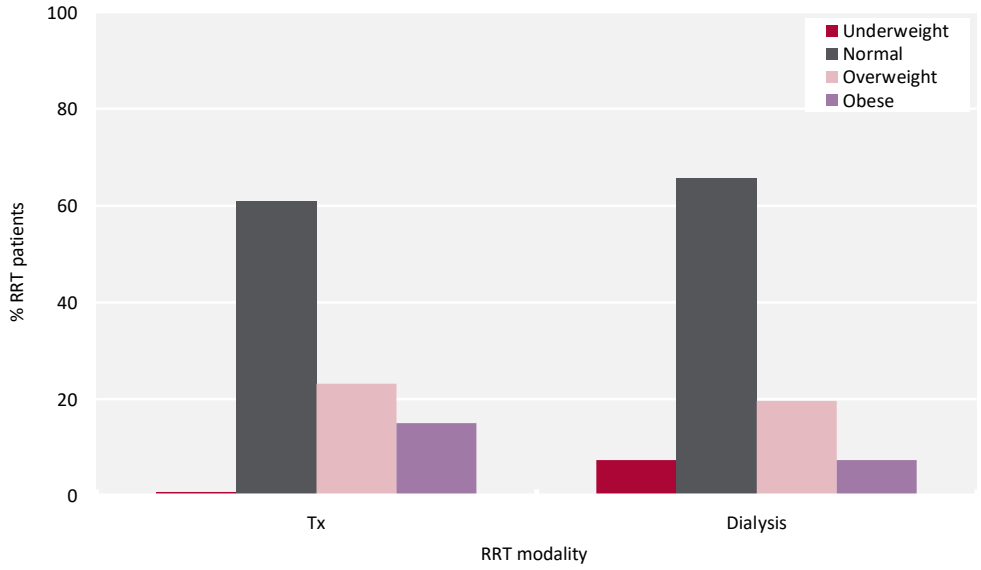


Figure 8.13 Body mass index categorisation of paediatric patients (<16 years old) prevalent to RRT on 31/12/2019 by RRT modality

Hypertension in paediatric RRT patients

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

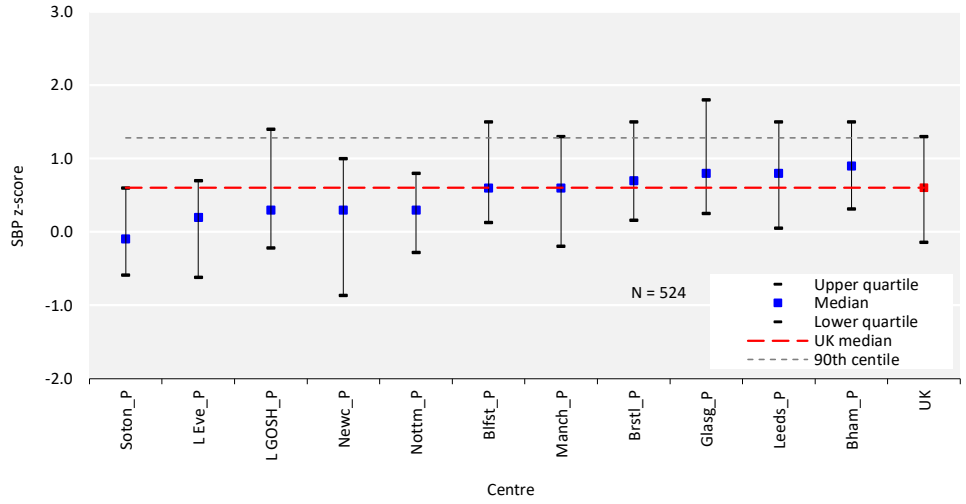


Figure 8.14 Median systolic blood pressure (SBP) z-scores for paediatric patients (<16 years old) prevalent to Tx on 31/12/2019 by centre

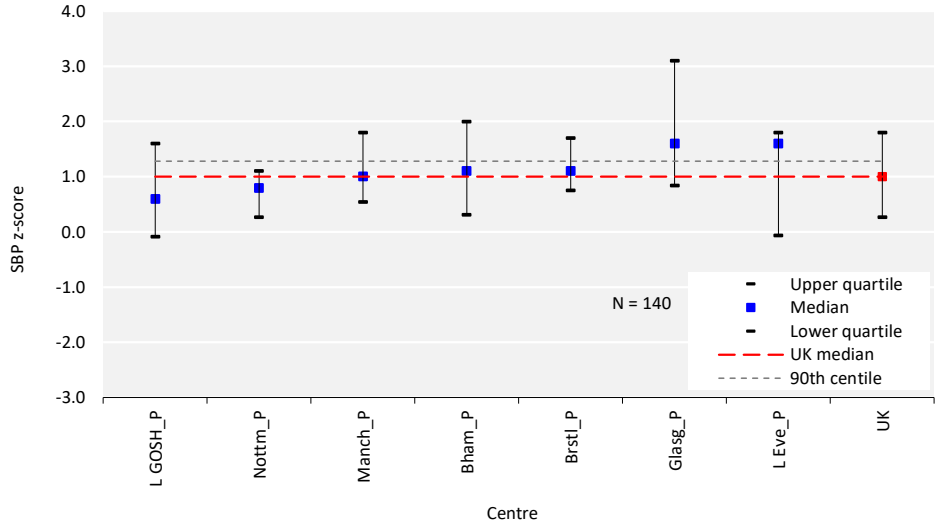


Figure 8.15 Median systolic blood pressure (SBP) z-scores for paediatric patients (<16 years old) prevalent to dialysis on 31/12/2019 by centre

Table 8.14 Percentage of paediatric patients (<16 years old) prevalent to RRT on 31/12/2019 achieving the standards for blood pressures

	SBP		DBP	
Characteristic	N	% <90th percentile	N	% <90th percentile
Total	665	71.1	584	76.0
Age group (yrs)				
0-<5	82	64.6	58	70.7
5-<12	314	68.5	278	75.9
12-<16	269	76.2	248	77.4
Sex				
Male	415	70.6	369	74.0
Female	250	72.0	215	79.5
Ethnicity				
White	447	73.4	389	78.9
Asian	126	62.7	116	68.1
Black	37	70.3	33	75.8
Other	41	78.1	36	80.6
Modality				
HD	69	55.1	56	64.3
PD	71	62.0	50	64.0
Tx	524	74.4	477	78.6

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 402 of the 832 patients (48.3%) with data for all three risk factors.

Table 8.15 Frequency of number of cardiovascular risk factors in paediatric patients (<16 years old) prevalent to RRT on 31/12/2019

N cardiovascular risk factors	Hypertensive	Overweight/Obese	Hypercholesterolaemic	N	%	Total %
0	No	No	No	104	25.9	25.9
1	Yes	No	No	61	15.2	
	No	Yes	No	67	16.7	43.8
	No	No	Yes	48	11.9	
2	Yes	Yes	No	45	11.2	
	Yes	No	Yes	31	7.7	26.6
	No	Yes	Yes	31	7.7	
3	Yes	Yes	Yes	15	3.7	3.7
Total N	**152**	**158**	**125**	**402**		
Total %	**37.8**	**39.3**	**31.1**			**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 2019 paediatric Tx patients are presented in table 8.16.

Table 8.16 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 31/12/2019 by centre

Centre	N with Tx	Median eGFR (mL/min/1.73m^2)	% eGFR <30 mL/min/1.73m^2	% data completeness
Bham_P	67	55	9.2	97.0
Blfst_P	25	75	8.3	96.0
Brstl_P	41	64	2.6	92.7
Cardf_P[1]	26			15.4
Glasg_P	43	87	0.0	97.7
L Eve_P	68	56	4.4	100.0
L GOSH_P	125			68.0
Leeds_P	45	72	2.2	100.0
Livpl_P[1]	27			0.0
Manch_P	69	67	5.9	98.6
Newc_P	27	79	0.0	88.9
Nottm_P	65	50	8.5	90.8
Soton_P	24	68	4.2	100.0
UK	**652**	**61**	**6.6**	**83.7**

Blank cells – centres with <70% data completeness or <10 patients.
[1]Although completeness of creatinine data was good, height data completeness was very low – heights are needed to calculate eGFRs from creatinine.

Table 8.17 Attainment of targets for haemoglobin, calcium, phosphate, parathyroid hormone and bicarbonate in paediatric patients (<16 years old) (a) prevalent to dialysis on 31/12/2019 by centre and (b) prevalent to Tx on 31/12/2019 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	31	3.3	60.0	0.0	73.3	10.0	63.3		0.0	80.0
Blfst_P	4									
Brstl_P	15	28.6	57.1	0.0	78.6	21.4	50.0	42.9	7.1	71.4
Cardf_P	6									
Glasg_P	12	8.3	50.0	8.3	83.3	41.7	41.7	16.7	0.0	75.0
L Eve_P	11	18.2	63.6	0.0	90.9	0.0	45.5	36.4	9.1	90.9
L GOSH_P	30	20.7	34.5			0.0	58.6	62.1		
Leeds_P	10	50.0	40.0	0.0	77.8	10.0	50.0	30.0	0.0	70.0
Livpl_P	10	12.5	62.5	0.0	50.0	25.0	37.5	50.0	0.0	50.0
Manch_P	20	20.0	50.0	10.0	55.0	20.0	40.0	44.4	5.0	75.0
Newc_P	10	30.0	60.0	0.0	70.0	30.0	30.0	60.0	0.0	90.0
Nottm_P	16	31.3	37.5	0.0	81.3	6.3	25.0	25.0	0.0	81.3
Soton_P	5									
UK	**180**	**20.1**	**49.4**	**4.4**	**70.2**	**13.8**	**47.1**	**44.4**	**3.1**	**75.9**
TX PATIENTS WITH EGFR <30 ML/MIN/1.73 M^2										
UK	**36**	**41.7**	**58.3**	**4.0**	**84.0**	**11.1**	**69.4**	**54.2**	**47.2**	**52.8**

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 8.18 Median estimated glomerular filtration rate (eGFR) in paediatric patients (<16 years old) prevalent to Tx on 31/12/2019 by time since transplantation and age group

	Age group (yrs)					
	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	12	92	20	67	22	66
1 yr	16	74	35	72	23	59
3 yrs	12	83	73	68	46	65
5 yrs	0	0	98	61	55	55
≥7 yrs	0	0	48	56	86	54
Total (IQR)	**40**	**87 (64-110)**	**274**	**64 (47-83)**	**232**	**56 (44-73)**

IQR – interquartile range

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

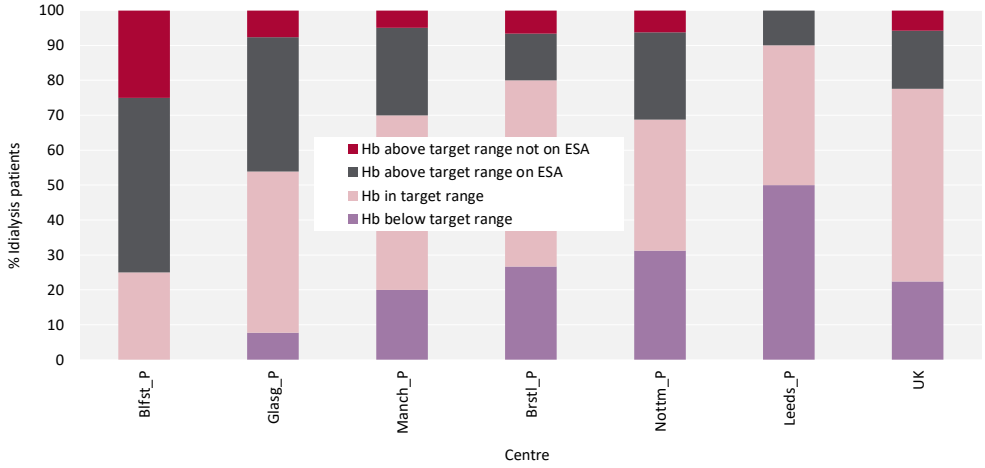


Figure 8.16 Proportion of paediatric patients (<16 years old) prevalent to dialysis on 31/12/2019 with haemoglobin (Hb) below, within and above target by centre; for those above target the proportion on erythropoiesis stimulating agent (ESA) therapy is shown

Transfer to adult renal services for prevalent paediatric RRT patients

Seventy-five paediatric patients transitioned to adult renal centres in 2019. The median age of patients at transfer was 17.8 years with an IQR of 17.4–18.2 years. Overall, the demographics of this population reflected those of the prevalent paediatric RRT population.

Survival in paediatric RRT patients

Of patients aged <16 years, 1,616 started RRT between 2005 and 2018 at paediatric renal centres and were included in survival analyses, to allow at least one year follow-up. At the end of 2019, 90 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 3.8 years (range three days to 14.7 years).

Table 8.19 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 (%)	93.8	98.2	98.6	99.4	99.2
95% CI	90.4-96.1	94.6-99.4	96.4-99.5	97.8-99.9	97.5-99.7
Survival at 2 years (%)	92.4	96.3	95.3	98.5	97.6
95% CI	88.6-94.9	92-98.3	92.1-97.3	96.5-99.4	95-98.9
Survival at 3 years (%)	90.0	94.9	94.6	97.9	97.6
95% CI	85.8-93	90.1-97.4	91.1-96.7	95.6-99	95-98.9
Survival at 4 years (%)	87.9	94.2	94.6	97.2	
95% CI	83.3-91.2	89-96.9	91.1-96.7	94.7-98.5	
Survival at 5 years (%)	86.9	93.3	93.5	96.7	
95% CI	82.2-90.5	87.8-96.4	89.8-96	93.9-98.2	

CI – confidence interval

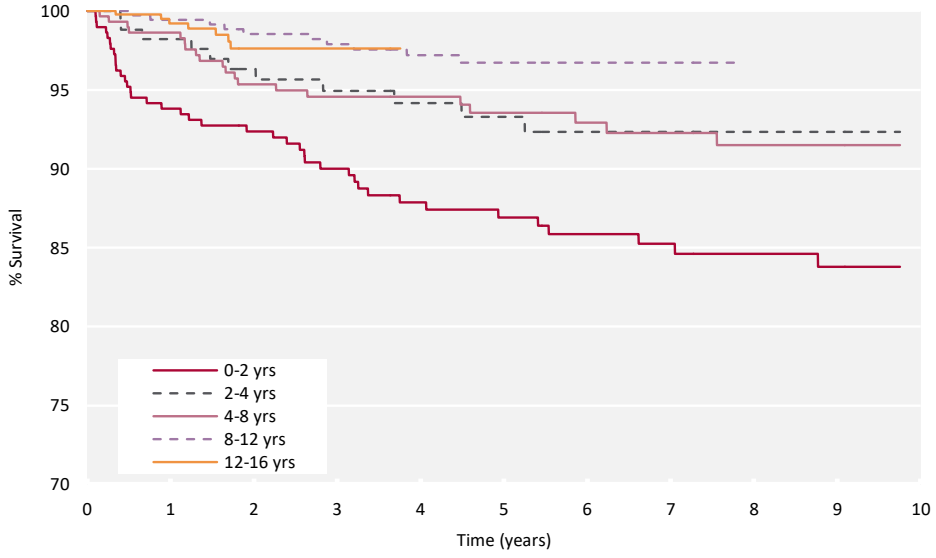


Figure 8.17 Unadjusted Kaplan-Meier survival (from day 90) of incident paediatric RRT patients (<16 years old) between 2005 and 2018 by age group at start of RRT

The 8–12 yrs and 12–16 yrs lines stop before 10 years, because the analysis was censored at age 16 years. The UKRR is combining the paediatric and adult databases and so in future will be able to report survival extended into adulthood.

Analyses – young people

RRT incidence and prevalence in young people

Table 8.20 reports the numbers of young people who started RRT in 2019 (incidence) as well as those on RRT as of 31/12/2019 (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 8.20 Demographics of young people (16–<18 years) incident to RRT in 2019 and/or prevalent to RRT on 31/12/2019, by care setting

	Incident			Prevalent		
Characteristic	Paediatric centres	Adult centres	All	Paediatric centres	Adult centres	All
N	21	10	31	190	29	219
pmarp			21.7			153.6
Median age (yrs)	16.7	17.5	17.0	16.9	17.7	17.0
% male	57.1	60.0	58.1	61.6	72.4	63.0
Ethnicity[1] (%)						
White	52.9	77.8	61.5	65.2	65.4	65.2
Asian	23.5	11.1	19.2	21.0	11.5	19.8
Black	11.8	11.1	11.5	9.4	15.4	10.1
Other	11.8	0.0	7.7	4.4	7.7	4.8
Missing	19.0	10.0	16.1	4.7	10.3	5.5
PRD[1] (%)						
Tubulointerstitial disease	35.3	33.3	34.6	50.6	44.0	49.8
Glomerular disease	29.4	44.4	34.6	18.9	16.0	18.5
Familial/hereditary nephropathies	23.5	11.1	19.2	17.8	24.0	18.5
Systemic diseases affecting the kidney	0.0	0.0	0.0	1.7	4.0	2.0
Diabetes	0.0	0.0	0.0	0.0	4.0	0.5
Miscellaneous renal disorders	11.8	11.1	11.5	11.1	8.0	10.7
Missing	19.0	10.0	16.1	5.3	13.8	6.4
Modality (%)						
HD	42.9	60.0	48.4	12.1	31.0	14.6
PD	38.1	30.0	35.5	6.8	10.3	7.3
Tx	19.1	10.0	16.1	81.1	58.6	78.1

[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 8.21 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 8.21 Number of centres that submitted data for young people (16–<18 years) incident to RRT in 2019 and/or prevalent to RRT on 31/12/2019, by care setting

Setting	Incident	Prevalent
Paediatric centres	10 out of 13	13 out of 13
Adult centres	10 out of 70	18 out of 70

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 31/12/2019 are presented by care setting (adult or paediatric centre).

Table 8.22 Measures of graft function in young people (16–<18 years) prevalent to Tx on 31/12/2019, by care setting

Setting	N on Tx	Median age (yrs)	N with creatinine data	Creatinine (µmol/L)	Median FAS-eGFR (mL/min/1.73m^2)	% FAS-eGFR <30 mL/min/1.73m^2	% creatinine completeness
Paediatric centres	154	16.9	141	107	67	2.1	94.1
Adult centres	17	17.8	16	122	60	6.3	91.6

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

Table 8.23 reports the median eGFR for all young people prevalent to Tx on 31/12/2019 by time since transplantation. Small numbers preclude further analysis by care setting (adult or paediatric centre).

Table 8.23 Estimated glomerular filtration rate (eGFR) in young people (16–<18 years) prevalent to Tx on 31/12/2019 by time since transplantation

Time since transplantation	N	Median FAS-eGFR (mL/min/1.73m^2)
3 months	12	55
1 year	25	70
3 years	33	65
5 years	30	71
≥7 years	57	68
Total (IQR)	**157**	**67 (52-83)**

FAS – Full Age Spectrum; IQR – interquartile range

Biochemical and blood pressure measures in young people

Table 8.24 shows attainment of biochemical and blood pressure measures for young people prevalent to dialysis and transplant on 31/12/2019 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 8.24 Attainment of biochemical and blood pressure measures in young people (16–<18 years) prevalent to RRT on 31/12/2019, by modality and care setting

	Dialysis			Tx		
Characteristic	Paediatric centres	Adult centres	All	Paediatric centres	Adult centres	All
N	36	12	48	154	17	171
Median (IQR) Hb (g/L)	118 (103-126)	117 (104-126)	117 (103-126)	122 (112-135)	122 (116-149)	122 (112-135)
% Hb <100g/L	16.7	9.1	14.9	11.3	0.0	10.2
Median (IQR) Ca (mmol/L)	2.4 (2.3-2.6)	2.4 (2.3-2.5)	2.4 (2.3-2.5)	2.4 (2.3-2.5)	2.3 (2.3-2.5)	2.4 (2.3-2.5)
% Ca in range	60.0	88.9	65.9	87.1	93.8	87.7
Median (IQR) Phos (mmol/L)	1.7 (1.2-2.0)	1.7 (1.3-2.3)	1.7 (1.3-2.1)	1.2 (1.0-1.3)	1.1 (1.0-1.4)	1.1 (1.0-1.3)
% phos in range	44.4	54.6	46.8	71.3	37.5	68.1
Median (IQR) bicarb (mmol/L)	25 (23-29)	24 (23-27)	25 (23-29)	24 (22-26)	24 (22-26)	24 (22-26)
% bicarb in range	54.3	66.7	56.8	72.1	86.7	73.5
Median (IQR) SBP (mmHg)	118 (113-128)	126 (117-139)	121 (113-130)	117 (108-122)	126 (118-135)	117 (108-125)
Median (IQR) DBP (mmHg)	76 (70-80)	80 (76-82)	77 (70-82)	71 (61-78)	74 (69-83)	71 (62-79)
% 'normal' BP range (<130/80 mmHg)	55.2	22.2	47.4	73.7	54.6	72.1
% high BP (≥140/90 mmHg)	10.3	22.2	13.2	9.3	18.2	10.1

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 23rd Annual Report

UK renal centre abbreviations

Adult renal centres

Abbreviation	City	Hospital
	ENGLAND	
Bham	Birmingham	Heartlands Hospital and 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
Wirral	Birkenhead	Arrowe Park Hospital

Adult renal centres Continued

Abbreviation	City	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
CC	conservative care
C. difficile	*Clostridium difficile*
Chol	cholesterol
CI	confidence interval
CKD	chronic kidney disease
Creat	creatinine
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

Prepared by Renal Association staff

Management team

Ron Cullen (chief executive officer)
Dr James Medcalf (medical director)
Professor Dorothea Nitsch (informatics and research director)
Dr Retha Steenkamp (head of operations)

Biostatisticians

Dr Anna Casula
Winnie Magadi
David Pitcher
Dr Shalini Santhakumaran
Esther Wong

Research

Dr Katharine Evans
Dr Barnaby Hole
Dr Lucy Plumb
Dr Manuela Savino

Business support

Jennifer Barwell
Sharece Charles
Sarah Crimp
Jodie Garrett
Stephanie Lock
Amy Robinson
Caitlin Sewell

Data managers

Fran Benoy-Deeney
Sarika Dahiya
Sarah Evans
Jacqueline Stokes
Jo Wilson

Informatics and operations

Andrew Atterton
Fiona Braddon
Dr Joel Collins
Tom Gray
Garry King
Shaun Mannings
Dr Andre Ortega Alban
George Swinnerton
Dr Tim Whitlock
Kate Whittingham

UK Renal Registry 23rd Annual Report

Data to 31/12/2019

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 68,000 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 Renal Association 2021

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