ISSN 2632-4326 (Online)

UK Kidney Association
UK Renal Registry

UK Renal Registry
27th Annual Report

Data to 31/12/2023

- Chronic kidney disease
- Incidence of KRT
- Prevalence of KRT
- Transplant
- In-centre haemodialysis
- Peritoneal dialysis
- Home haemodialysis
- Paediatrics

UK Renal Registry 27th Annual Report

Data to 31/12/2023

Suggested citation

UK Renal Registry (2025) UK Renal Registry 27th Annual Report – data to 31/12/2023, Bristol, UK.
Available from https://ukkidney.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 UK Kidney 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 UK Kidney Association.

Patient summary of the UKRR 27th Annual Report – adults

UK Renal Registry (2025) UK Renal Registry Summary of Annual Report – analyses of adult data to the end of 2023, Bristol, UK.
Available from https://ukkidney.org/audit-research/annual-report

Patient summary of the UKRR 27th Annual Report – children and young people

UK Renal Registry (2025) UK Renal Registry Summary of Annual report – analyses of paediatric data to the end of 2023, Bristol, UK.
Available from https://ukkidney.org/audit-research/annual-report

Contact information

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


ukka@ukkidney.org


www.ukkidney.org


@UKKidney

Foreword

Professor James Medcalf
Medical director, The UK Kidney Association

Welcome to the 27th UK Renal Registry Annual Report. This report includes people starting kidney replacement therapy (KRT) during the year 2023 and reports the number of people (and their treatment) as of December 2023.

Over the last ten years the incidence of KRT across the combined UK continues to slowly increase with time (158 people per million population (pmp), an absolute increase in the number of people of 2.6% since last year). Prevalence of KRT is also slowly rising – with a prevalence of 1342 pmp, an absolute increase in the number of people of 2.5% since last year. The growth in prevalent patients is in those with a functioning transplant and those receiving in-centre haemodialysis. Absolute growth is higher than pmp population growth because of the enlarging UK population.

In 2023 6.7% of people started KRT with a pre-emptive transplant – similar to 2022 (6.6%). This is still lower than the rates before 2020 (8.4-9%) which is disappointing, as is the proportion of people starting KRT on peritoneal dialysis (17.7%) which is a further fall since the higher proportion during the COVID19 pandemic and remains lower than pre-pandemic levels. However, fewer patients presented late (17.5% known to a renal centre less than 90 days before KRT start), and a higher proportion who started haemodialysis did so with definitive access (AV fistula or graft).

Finally – it is noteworthy that we can present information from an increasing number of centres about their non-KRT advanced CKD, including paediatric CKD for the first time. This is particularly true for centres sending daily data in a 'UKRDC' feed – where we will be more confident that the definitions are consistently applied (the data presented in this report has considerable variation in prevalence), and we are looking forward to presenting comparative information on KRT choices and pre-KRT transplant assessment in the near future.

As previous years – we should be collectively very proud of the fact that we consistently collect so much information to help kidney centres provide the best care they can to patients with advanced CKD. It is only possible with your continued support – so as always thank you all.

Professor James Medcalf

Medical director, The UK Kidney Association, July 2025

Contents

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

Introduction: The UK Renal Registry's 27th Annual Report

The UK Renal Registry (UKRR) collects and reports data annually on approximately 70,000 kidney patients on kidney replacement therapy (KRT) in the UK. The annual report is an audit of the care provided to these patients at each of the 67 adult and 13 paediatric centres against national standards, in particular, the UK Kidney Association's guidelines – ukkidney.org/health-professionals/guidelines/guidelines-commentaries.

The 27th Annual report includes patients incident and prevalent to KRT as well as those with CKD stages 4 and 5 by the end of 2023. The chapters are split by treatment modality (transplant, in-centre haemodialysis, peritoneal dialysis, home haemodialysis and CKD), 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 Integrated Care Board and health board level (appendix B) – ukkidney.org/audit-research/annual-report. Plain English summaries of the annual report have been developed in partnership with the UK Kidney Association's Patient Council and all graphs used in the report are available for use in presentations – ukkidney.org/audit-research/annual-report.

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 advanced CKD data are included to understand differences in the transition of patients onto both KRT and conservative non-dialysis pathways. Identifiable centre-specific analyses on the survival of KRT patients are published in the annual report. Although the UKRR has no statutory powers, the UKRR senior management team communicates survival outlier status with kidney 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 UK Kidney Association, who then takes action to ensure that the findings are properly investigated.

UK Kidney Association
UK Renal Registry

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 2023

Contents

Introduction

This is the fifth year the UK Renal Registry (UKRR) has published data in the annual report about patients with chronic kidney disease (CKD) outside the context of kidney replacement therapy (KRT) 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 kidney centres at the end of 2023 (figure 1.1). A '2023 prevalent CKD population' is described, comprising individuals who:

- were reported by an adult kidney centre as receiving treatment for CKD at the end of 2023, and
- had an eGFR of <30mL/min/1.73m^2 on their last recorded creatinine measurement.

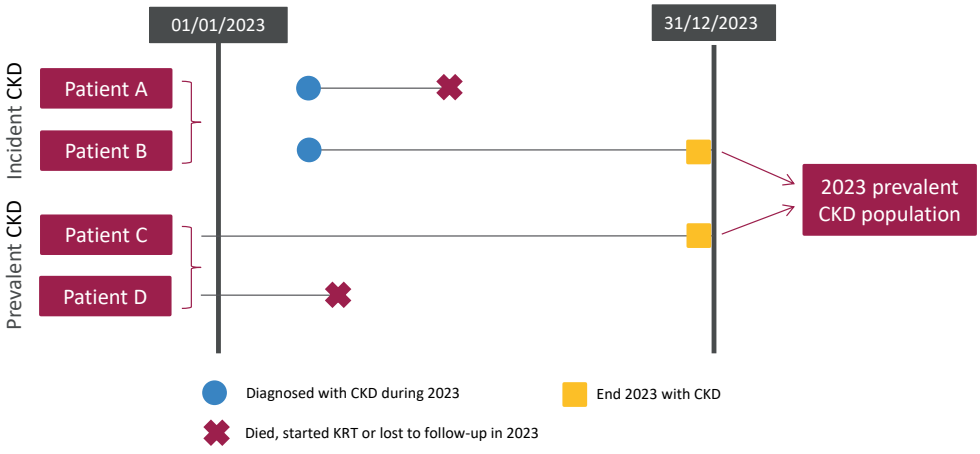

Figure 1.1 Pathways adult patients could follow to be included in the UK 2023 prevalent CKD population

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 15–29mL/min/1.73m^2). The eGFR was calculated with CKD-EPI 2009 equation without racial adjustment using their last recorded creatinine from the last 2 years. 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).

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 kidney centre, particularly those with earlier stages. Furthermore, not all kidney 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 kidney centres.

Consequently, this 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, kidney 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. In 2023 the UKRR received data from 24 of the 53 adult centres in England and Wales (six more than in 2022).

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 UK Kidney Association guidelines (ukkidney.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 kidney centres in 2023 is reported in this chapter (table 1.1). Audit measures in guidelines that have been archived are not included. Some audit measures cannot be reported because the completeness of the required data items is too low. However, data completeness is poor even for some of 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 ukkidney.org/audit-research/data-portals).

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

The UK Kidney 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 a 6 monthly haemoglobin level measurement (number next to the centre name in x-axis indicates the % missing)	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 KRT 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 KRT was reported by just 24 of the UK's adult kidney centres.
- The 2023 prevalent CKD population comprised 26,273 patients, with a median age of 76.8 years, compared to a median age of 60.0 years for those on KRT.
- CKD prevalence was 1,168 per million population (pmp) overall, but ranged from 76 to 2,794 pmp between centres. There were also substantial differences in the median 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 KRT population cannot be addressed until this is achieved.

Analyses

Stage and demographics of adult CKD patients

For the 24 adult kidney 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 KRT for the eventuality of kidney failure, and which represent active treatment for an individual who might otherwise have started KRT. 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 31/12/2023, including those on conservative care (CC) by stage and centre; completeness of proteinuria, number of CKD and KRT patients as a proportion of the adult catchment population

Centre	N with CKD	N on CC	Total	% stage G4	% stage G5	% with proteinuria data (either PCR or ACR)	Estimated catchment population (millions)	CKD 2023 crude rate (pmp)	KRT 2023 crude rate (pmp)
Bangor	12	0	12	58.3	41.7	25.0	0.16	76	1,380
Bham[1]	1,222	6	1,228	71.4	28.6	0.2	2.10	586	1,630
Camb	110	0	110	62.7	37.3	0.9	0.99	111	1,648
Cardff	989	35	1,024	77.0	23.1	40.9	1.16	885	1,581
Carlis	475	52	527	79.9	20.1	66.4	0.26	2,035	1,178
Clwyd	17	2	19	47.4	52.6	79.0	0.18	105	1,221
Derby	716	0	716	79.8	20.3	0.0	0.58	1,243	1,276
Glouc	1,162	2	1,164	87.9	12.1	0.1	0.53	2,211	1,064
L Guys	957	0	957	71.5	28.5	43.1	1.01	950	2,302
L Kings	412	0	412	43.0	57.0	23.5	0.94	436	1,471
L Rfree	2,346	347	2,693	74.3	25.7	59.1	1.27	2,113	1,942
Leic	4,146	0	4,146	83.3	16.7	62.3	2.18	1,903	1,294
Middlbr	594	0	594	69.2	30.8	0.0	0.82	725	1,185
Nottm	529	0	529	43.9	56.1	33.8	0.93	567	1,282
Oxford	1,523	0	1,523	75.1	25.0	60.7	1.54	989	1,384
Plymth	948	1	949	84.8	15.2	45.2	0.41	2,295	1,327
Ports	2,126	1	2,127	73.7	26.3	46.4	1.79	1,191	1,136
Prestn	2,798	26	2,824	81.8	18.2	62.1	1.27	2,222	1,130
Redng	443	0	443	57.1	42.9	25.3	0.74	596	1,338
Salford	760	14	774	87.2	12.8	64.9	1.19	652	1,154
Sheff	378	18	396	55.8	44.2	48.2	1.12	353	1,316
Swanse	2,048	54	2,102	84.1	15.9	45.7	0.75	2,794	1,197
Truro	818	51	869	85.4	14.6	56.2	0.37	2,380	1,282
Wrexm	129	6	135	72.6	27.4	33.3	0.21	646	1,564
Total	**25,658**	**615**	**26,273**	**77.3**	**22.7**	**45.9**	**22.49**	**1,168**	**1,413**

[1]The catchment population and 2023 crude rate for KRT reflect the combined Bham population (QEH and Heartlands kidney centres), but CKD patients were only reported from QEH (although the extracts include some Heartlands patients)
CC - conservative care
PCR - protein creatinine ratio
ACR - albumin creatinine ratio
QEH - Queen Elizabeth Hospital

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 31/12/2023 by centre

				Ethnicity					PRD completeness		
Centre	N with CKD	Median age (yrs)	% male	% White	% Asian	% Black	% Other	% missing	% all stages	% stage G4	% stage G5
Bangor	12	66.4	33.3	100.0	0.0	0.0	0.0	66.7	25.0	14.3	40.0
Bham	1,228	70.3	53.7	59.5	26.7	11.4	2.5	11.1	13.9	6.0	33.6
Camb	110	73.4	60.9	93.4	1.9	2.8	1.9	3.6	43.6	31.9	63.4
Cardff	1,024	74.6	58.8	93.2	4.0	1.7	1.2	35.8	71.5	66.9	86.9
Carlis	527	78.8	56.2	100.0	0.0	0.0	0.0	39.3	15.9	11.9	32.1
Clwyd	19	79.4	68.4	100.0	0.0	0.0	0.0	47.4	42.1	33.3	50.0
Derby	716	78.8	54.6	91.0	5.6	2.7	0.6	13.3	96.8	96.5	97.9
Glouc	1,164	79.3	57.9	95.0	2.0	1.7	1.3	7.2	48.5	46.8	61.0
L Guys	957	72.6	55.8	58.0	7.6	29.2	5.2	11.9	93.1	91.1	98.2
L Kings	412	68.8	61.4	41.1	8.2	47.2	3.6	31.6	5.6	5.1	6.0
L Rfree	2,693	76.7	56.8	55.5	17.9	12.5	14.2	11.4	41.3	37.4	52.7
Leic	4,146	78.1	54.4	77.6	17.5	3.4	1.6	27.3	55.6	53.8	64.4
Middlbr	594	73.0	57.6	94.5	3.0	0.9	1.7	20.9	25.3	19.0	39.3
Nottm	529	72.7	58.2	84.8	5.9	4.6	4.7	4.4	83.9	83.2	84.5
Oxford	1,523	75.1	60.7	85.6	7.8	3.4	3.2	19.6	20.7	16.5	33.4
Plymth	949	79.1	54.5	98.7	0.1	0.2	1.0	6.4	13.7	13.5	14.6
Ports	2,127	76.3	59.3	97.7	1.3	0.4	0.7	43.9	8.4	6.5	13.6
Prestn	2,824	78.4	54.6	89.6	7.4	2.0	1.0	51.8	3.4	2.8	6.0
Redng	443	75.5	64.6	67.4	13.5	2.5	16.7	44.7	73.1	55.7	96.3
Salford	774	75.1	56.7	83.7	10.5	4.4	1.4	35.8	8.1	7.7	11.1
Sheff	396	67.5	57.1	84.6	8.1	3.9	3.4	3.3	99.2	99.1	99.4
Swanse	2,102	79.3	54.3	98.3	0.7	0.6	0.4	42.9	34.6	31.9	49.3
Truro	869	79.6	57.3	99.3	0.5	0.1	0.1	0.5	22.7	18.3	48.0
Wrexm	135	78.2	60.0	100.0	0.0	0.0	0.0	63.0	21.5	14.3	40.5
Total	**26,273**	**76.8**	**56.5**	**81.5**	**9.3**	**5.7**	**3.5**	**26.6**	**36.8**	**33.4**	**48.5**

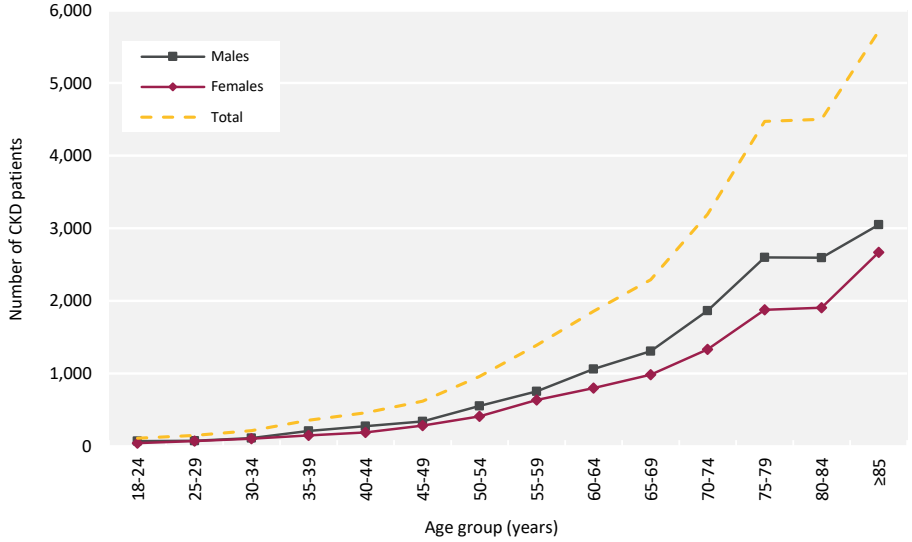

Figure 1.2 Number of adult patients prevalent to CKD stages G4 and 5 on 31/12/2023 by age group and sex

Blood pressure in adult CKD patients

Only 14 centres submitted sufficient blood pressure data for analysis. This was the seven from 2022 (Bham, Derby, Glouc, L Rfree, Plymth, Ports, Swansea) and a further seven (Bangor, Cardff, Nottm, Oxford, Redng, Sheff, Wrexm).

Table 1.4 Blood pressures in adult patients prevalent to CKD stages G4 and 5 on 31/12/2023 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	7629 (50.7)	142	75	3359 (44.0)	5180 (45.6)	140	75	2433 (47.0)	2449 (66.4)	145	75	926 (37.8)
Age group (yrs)												
18-29	115 (70.6)	135	84	62 (53.9)	82 (66.1)	136	82	47 (57.3)	33 (84.6)	134	85	15 (45.5)
30-39	218 (65.3)	136	85	105 (48.2)	147 (63.1)	133	85	75 (51.0)	71 (70.3)	140	84	30 (42.3)
40-49	431 (64.9)	137	83	210 (48.7)	272 (61.1)	136	82	146 (53.7)	159 (72.6)	142	85	64 (40.3)
50-59	844 (61.2)	139	81	401 (47.5)	520 (55.4)	138	80	259 (49.8)	324 (73.5)	142	81	142 (43.8)
60-64	648 (59.0)	142	77	294 (45.4)	413 (52.9)	139	77	201 (48.7)	235 (74.1)	146	76	93 (39.6)
65-69	765 (56.3)	142	76	331 (43.3)	523 (52.3)	140	76	248 (47.4)	242 (67.2)	148	75	83 (34.3)
70-74	993 (54.1)	141	74	444 (44.7)	688 (49.4)	140	74	324 (47.1)	305 (68.8)	145	75	120 (39.3)
75-79	1273 (49.6)	142	73	562 (44.1)	898 (44.8)	140	73	417 (46.4)	375 (66.4)	145	72	145 (38.7)
80-84	1192 (47.2)	145	71	482 (40.4)	879 (43.8)	144	71	366 (41.6)	313 (60.7)	147	70	116 (37.1)
≥85	1150 (36.9)	144	70	468 (40.7)	758 (31.2)	141	70	350 (46.2)	392 (57.1)	148	70	118 (30.1)
Sex												
Male	4408 (51.2)	141	75	2007 (45.5)	2955 (45.9)	140	75	1432 (48.5)	1453 (67.0)	144	74	575 (39.6)
Female	3221 (50.0)	143	75	1352 (42.0)	2225 (45.2)	141	75	1001 (45.0)	996 (65.6)	146	75	351 (35.2)

[1]% <140/90 mmHg of patients with complete blood pressure data
DBP - diastolic blood pressure; SBP - systolic blood pressure (both measured in mmHg)

Biochemistry parameters in adult CKD patients

The UK Kidney 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.

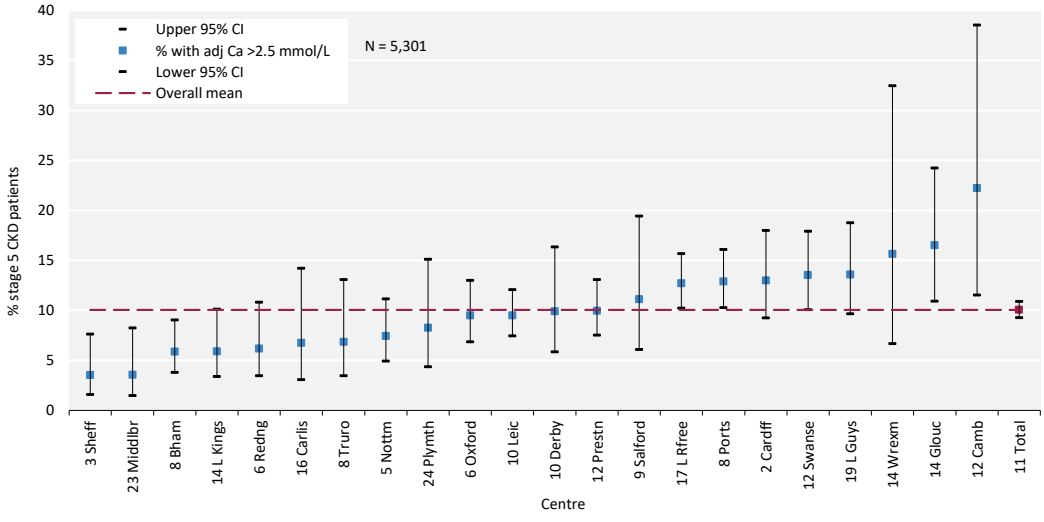

Figure 1.3 Percentage of adult patients prevalent to CKD stage G5 on 31/12/2023 with adjusted serum calcium (Ca) >2.5 mmol/L by centre
CI - confidence interval

Anaemia in adult CKD patients

The percentage of patients with haemoglobin (Hb) 100–120 g/L is presented overall and by CKD stage.

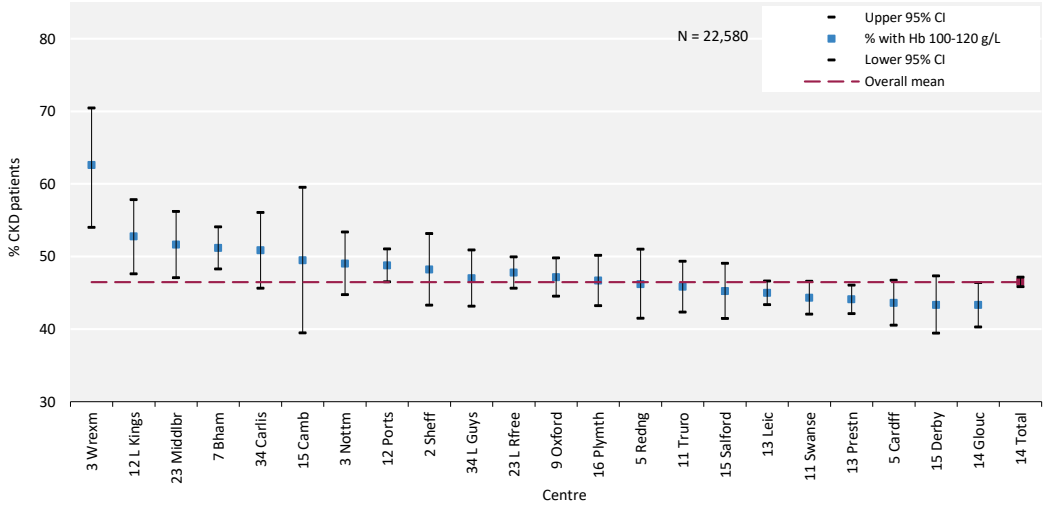

Figure 1.4 Percentage of adult patients prevalent to CKD stages G4 and 5 on 31/12/2023 with haemoglobin (Hb) 100–120 g/L by centre

CI - confidence interval

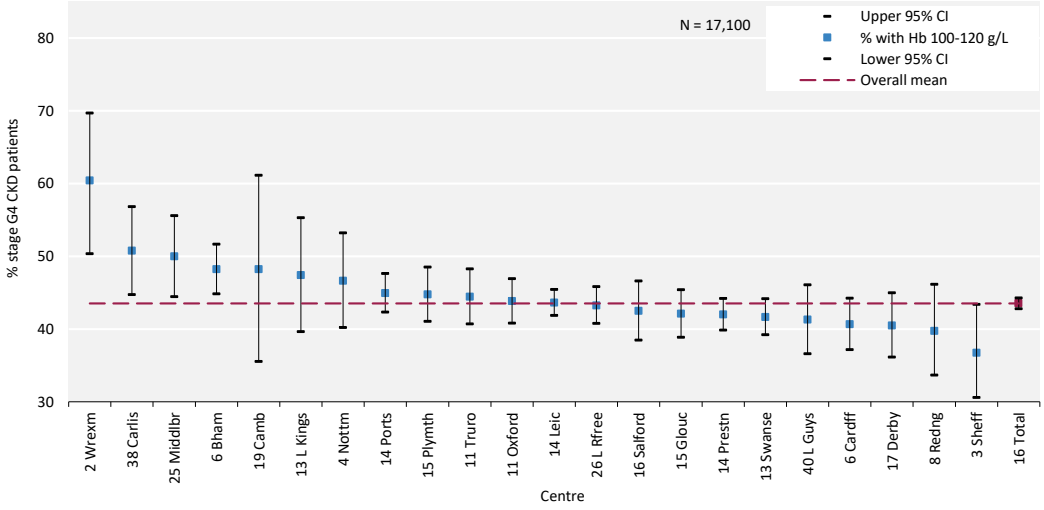

Figure 1.5 Percentage of adult patients prevalent to CKD stage G4 on 31/12/2023 with haemoglobin (Hb) 100–120 g/L by centre

CI - confidence interval

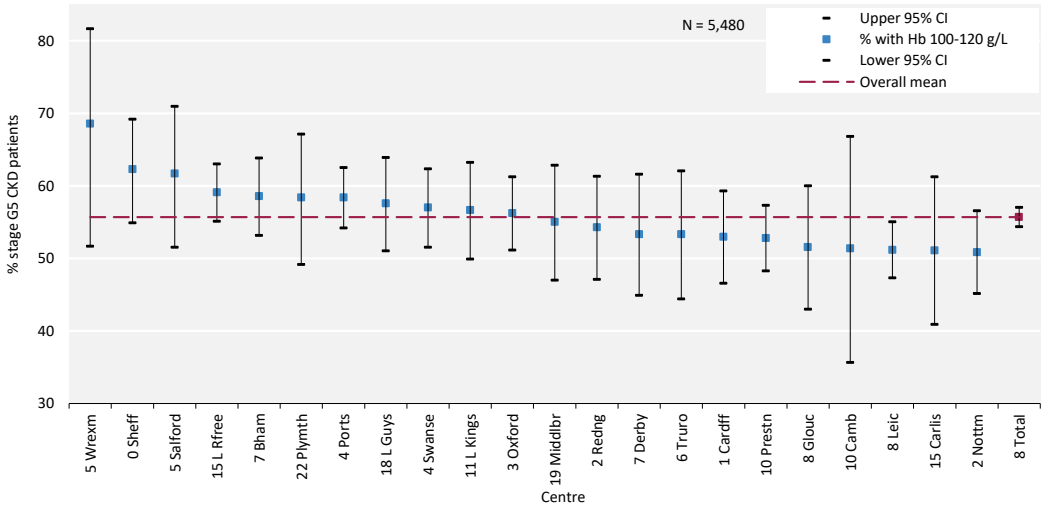

Figure 1.6 Percentage of adult patients prevalent to CKD stage G5 on 31/12/2023 with haemoglobin (Hb) 100-120 g/L by centre

CI - confidence interval

UK Kidney Association
UK Renal Registry

Chapter 2

Adults starting kidney replacement therapy (KRT) for end-stage kidney disease (ESKD) in the UK in 2023

Contents

Introduction

This chapter describes the population of patients who developed end-stage kidney disease (ESKD) and started kidney replacement therapy (KRT) in the UK in 2023 (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 kidney centre, were only included if their dialysis was subsequently recoded as being for ESKD, when they failed to recover native kidney function. Recoding is automatically applied at 90 days for individuals still on KRT (unless advised otherwise by the kidney 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 kidney function, died or withdrew from dialysis within the first 90 days of treatment are 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 kidney function are not included if they recovered before 90 days on dialysis.

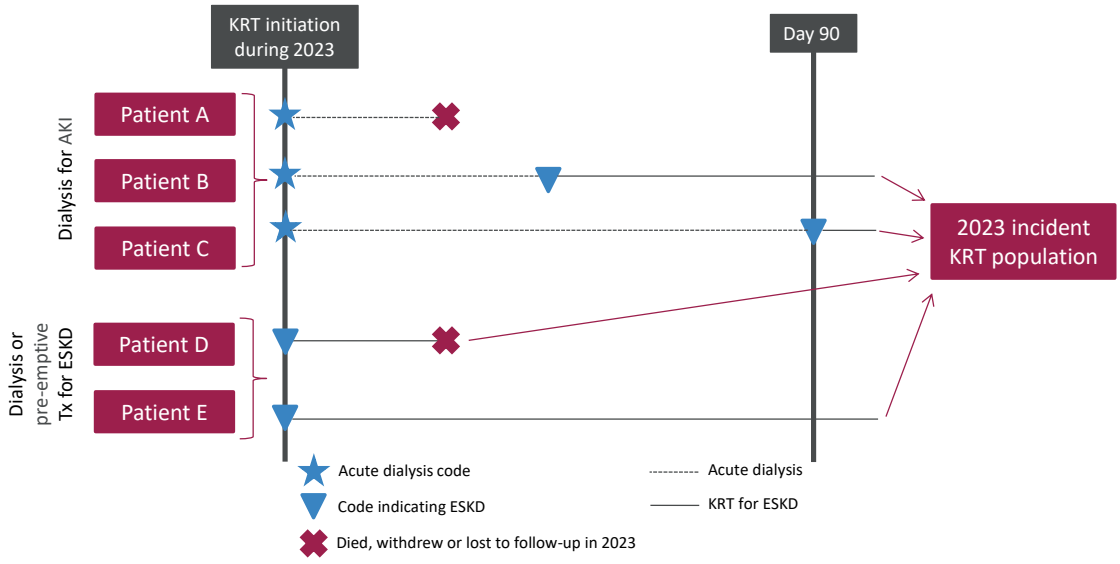

Figure 2.1 Example histories for patients starting KRT, illustrating the use of timeline codes to define dialysis as being 'acute' or for ESKD

Patients who recovered kidney function before 90 days on dialysis are not included in this chapter, whether they were coded as AKI or ESKD

Patients who followed patterns B–E received KRT for ESKD and are counted as 'incident to KRT' throughout this report. Patients who followed pattern A are not counted as 'incident to KRT' and do not feature in this chapter

Several analyses, including survival and cause of death, were undertaken on historic incident cohorts to allow sufficient follow-up time and numbers of patients. For most centres, dialysis access data were collected separately to the main UK Renal Registry (UKRR) quarterly data returns via the 2023 Multisite Dialysis Access Audit. For around a quarter of centres with complete data, dialysis access information could be derived from the quarterly return. In future years we hope that data quality will improve such that we can extend this to more centres.

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

- **Modality selection, pre-emptive transplantation and Tx wait-listing:** the percentage of patients starting on each KRT 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 kidney services within 90 days of starting KRT 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 2023 incident adult KRT population, including the incident number on KRT per million population (pmp). The inclusion of centre-specific reports on the survival of KRT 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 kidney centre data. Comorbidity data have been augmented using Hospital Episode Statistics (HES) for English kidney centres and Patient Episode Database for Wales (PEDW) for Welsh kidney centres.

The UK Kidney Association guidelines (ukkidney.org/health-professionals/guidelines/guidelines-commentaries) provide audit measures relevant to the care of patients incident to KRT and, where data permit, their attainment by UK kidney centres in 2023 is reported in this chapter (table 2.1). Audit measures in guidelines that have been archived are not included, and neither are guidelines which took effect after data collection.

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 UKRR is available through the UKRR data portal (ukkidney.org/audit-research/data-portals). 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.

Exeter was unable to submit patient level data for 2021 to 2023. Manchester was unable to submit patient level data for 2023. Aggregate numbers by modality were provided, enabling inclusion in Tables 2.2 and 2.3. Exeter and Manchester also submitted data to the 2023 Multisite Dialysis Access Audit allowing inclusion in Table 2.17 and Figures 2.16 and 2.17. Exeter and Manchester are excluded from all other analyses.

London Kings was unable to submit data for the last quarter of 2023. Therefore incident data for London Kings is for patients starting KRT between 1 January 2023 and 30 September 2023 only. For analyses involving follow up of patients to the end of 2023, the London Kings cohort was restricted so that the duration of follow up remained the same.

Some new dialysis patients were not submitted by Cambridge. This means that the incident dialysis patients, and total incident patients, are underestimated, while the percentage of pre-emptive transplants amongst incident patients is overestimated. The number of missing patients was unknown at the time of publication.

Table 2.1 The UK Kidney Association audit measures relevant to KRT incidence that are reported in this chapter

The UK Kidney Association guideline	Audit criteria	Related analysis/analyses
Planning, initiating and withdrawing KRT (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 KRT	Tables 2.6–2.8, figures 2.6–2.7
	Percentage of patients commencing KRT referred <3 months and <12 months before date of starting KRT	Tables 2.9–2.12, figure 2.8
	Proportion of patients on UK Tx waiting list at KRT initiation	Table 2.3
	Proportion of KRT patients transplanted pre-emptively from living and deceased donors	Table 2.3, figure 2.5 (partly addressed)
	Estimated glomerular filtration rate (eGFR) at start of KRT 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 2.22
Anaemia (2020)	Proportion of patients initiating KRT with haemoglobin <100 g/L not on erythropoiesis stimulating agent (ESA)	Table 2.13, figure 2.10-2.11 (ESA not included)
Chronic kidney disease (CKD) mineral bone disorder (2018)	Percentage of KRT patients with serum calcium above the normal reference range of 2.2–2.5 mmol/L	Table 2.14, figure 2.12
Vascular access (2023)	Access outcome for all new access in all patients at 3 and 12 months	Table 2.16 (partly addressed)
	Proportion of patients with each access/modality, of those starting kidney replacement therapy who were known to kidney services for at least 12 months	Table 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 KRT modality of PD patients at 1 year

Key findings

- 8,556 adult patients started KRT for ESKD in the UK in 2023, an increase of 2.6% from the previous year.
- KRT incidence in adults was 158 pmp.
- The median age of incident KRT patients was 63.2 years, but this was dependent on ethnicity (White 64.9 years, Asian 61.6 years and Black 55.5 years).
- 63.3% of incident KRT patients were male.
- Diabetes remained the most common identifiable primary renal disease (PRD), accounting for 30.6% of incident patients.
- By 90 days after KRT start 5.1% of patients had died or stopped treatment.
- In 2023 17.7% of patients started KRT on PD, compared to 19.0% in 2022. PD rates increased during the COVID-19 pandemic but are now lower than pre-pandemic levels.
- In 2023, 6.7% of patients started KRT with a transplant, higher than previous years and potentially signalling a recovery from COVID-19-related disruption.
- The mean eGFR at the start of KRT was 6.9 mL/min/1.73m^2 (HD 6.6 mL/min/1.73m^2, PD 7.5 mL/min/1.73m^2 and pre-emptive Tx 10.0 mL/min/1.73m^2). In 2022, the mean eGFR at the start of KRT was 6.9 mL/min/1.73m^2.
- Late presentation was 17.5% which is lower than the past two years.
- Of the 7,671 incident dialysis patients with dialysis access data, 49.2% started dialysis with definitive access (19.6% PD and 29.7% HD with an AVF or AVG), 33.7% with a TL and 17.1% with an NTL.
- A higher proportion of patients started haemodialysis with definitive access this year at 36.9% compared to 34.3% in 2022.
- Short-term (90 day) age-adjusted survival of incident KRT patients in a combined 2 year cohort (2021-2022) was 96.5%, which was similar to survival in the 2020-2021 cohort.
- 1 year after 90 day age-adjusted survival for incident KRT patients in a combined 2 year cohort (2021-2022) was 90.5% (unchanged from previous survival in the 2020-2021 cohort).
- There were 9 outlying centres in the funnel plot showing 1 year after 90 day case-mix-adjusted survival for incident KRT patients in a combined 4 year cohort (2019-2022): 2 centres below the lower 95% limit and 7 centres above the upper 95% limit. It is expected that 3 centres would be outside the limits by chance.
- Cause of death records from Civil Registration were used where the cause of death was missing in the UKRR data. This resulted in improved completeness and changes in proportions of the causes of death. The leading causes of death in the first 90 days in incident KRT patients were cardiac disease (20.9%) and infection (22.7%).

Analyses

Changes to the incident adult KRT population

For the 67 adult kidney centres, the number of incident patients on KRT was calculated as a proportion of the estimated centre catchment population (calculated as detailed in appendix A).

Table 2.2 Number of incident adult KRT patients by year and by centre; number of KRT patients as a proportion of the adult catchment population

Centre	N on KRT					Estimated catchment population (millions)	2023 crude rate (pmp)
	2019	2020	2021	2022	2023		
ENGLAND							
Bham	369	331	365	410	367	2.10	175
Bradfd	106	83	81	93	101	0.51	199
Brightn	153	143	131	104	157	1.08	145
Bristol	162	130	157	150	172	1.27	136
Camb	134	137	149	116	87	0.99	88
Carlis	40	34	43	36	45	0.26	174
Carsh	229	296	296	271	320	1.68	191
Colchr	40	39	38	40	47	0.30	158
Covnt	140	141	147	139	131	0.81	162
Derby	90	72	89	121	109	0.58	189
Donc	54	47	44	78	71	0.38	187
Dorset	91	87	79	94	98	0.75	131
Dudley	56	61	61	58	49	0.35	140
EssexMS	150	127	132	168	210	1.01	208
Exeter	160	107	157	134	150	0.99	152
Glouc	64	85	81	87	84	0.53	160
Hull	105	106	95	107	119	0.81	147
Ipswi	57	44	60	35	42	0.32	132
Kent	154	140	182	170	163	1.08	150
L Barts	309	322	284	292	348	1.62	215
L Guys	208	160	193	154	164	1.01	163
L Kings	186	159	217	203	157	0.94	166
L Rfree	266	231	282	249	265	1.27	208
L St.G	100	84	93	106	88	0.67	132
L West	392	364	418	391	390	2.03	192
Leeds	161	152	169	182	179	1.40	127
Leic	369	337	307	337	357	2.18	164
Liv UH	163	150	169	191	160	1.27	126
M RI	209	172	212	131	205	1.37	150
Middlbr	109	97	110	94	111	0.82	135
Newc	111	125	132	132	155	0.96	162
Norwch	104	101	103	123	75	0.71	106
Nottm	128	121	130	115	109	0.93	117
Oxford	202	203	193	220	221	1.54	143
Plymth	61	57	84	72	61	0.41	147
Ports	223	219	239	272	241	1.79	135
Prestn	155	165	198	187	198	1.27	156
Redng	115	100	109	146	132	0.74	178
Salford	171	173	142	195	198	1.19	167
Sheff	163	174	170	169	164	1.12	146
Shrew	66	45	62	52	63	0.42	149
Stevng	193	170	180	171	173	1.15	150
Stoke	103	121	139	135	121	0.75	162

Table 2.2 Continued

Centre	N on KRT					Estimated catchment population (millions)	2023 crude rate (pmp)
	2019	2020	2021	2022	2023		
Sund	88	68	74	80	76	0.54	140
Truro	56	45	69	66	58	0.37	159
Wirral	64	48	55	35	40	0.48	83
Wolve	94	110	129	119	139	0.55	251
York	58	47	50	76	46	0.49	93
N IRELAND							
Antrim	42	29	39	31	41	0.25	165
Belfast	74	78	102	91	82	0.54	152
Newry	30	31	40	22	34	0.24	143
Ulster	28	28	25	24	37	0.21	180
West NI	38	38	34	31	38	0.25	150
SCOTLAND							
Abrdn	39	62	55	57	69	0.50	138
Airdrie	76	57	74	65	86	0.47	184
D&Gall	19	21	14	21	11	0.12	91
Dundee	30	27	40	30	49	0.37	133
Edinb	81	78	87	100	88	0.85	104
Glasgw	199	178	212	203	189	1.38	137
Inverns	22	19	38	27	48	0.23	213
Klmarnk	45	58	46	51	57	0.29	195
Krkcldy	51	41	45	40	45	0.28	164
WALES							
Bangor	19	29	18	23	26	0.16	165
Cardff	165	135	153	196	202	1.16	175
Clwyd	28	26	30	36	41	0.18	226
Swanse	159	122	126	144	159	0.75	211
Wrexm	32	37	29	38	38	0.21	182
TOTALS							
England	6981	6530	7099	7106	7216	45.78	158
N Ireland	212	204	240	199	232	1.48	156
Scotland	562	541	611	594	642	4.48	143
Wales	403	349	356	437	466	2.46	190
UK	**8158**	**7624**	**8306**	**8336**	**8556**	**54.20**	**158**

Country KRT populations were calculated by summing the KRT patients from centres in each country. Estimated country populations were derived from publicly available sources (see appendix A for details on estimated catchment population by kidney centre).
Some new patients were not submitted by Cambridge, therefore recent incident numbers are underestimated.
Exeter was unable to submit 2021-2023 patient level data. Manchester was unable to submit 2023 data. Aggregate numbers for those years were submitted by the centres.
pmp – per million population
For Exeter 2020, Manchester 2022 and London Kings 2023, Q4 was not submitted so incidence is for 3 quarters only.

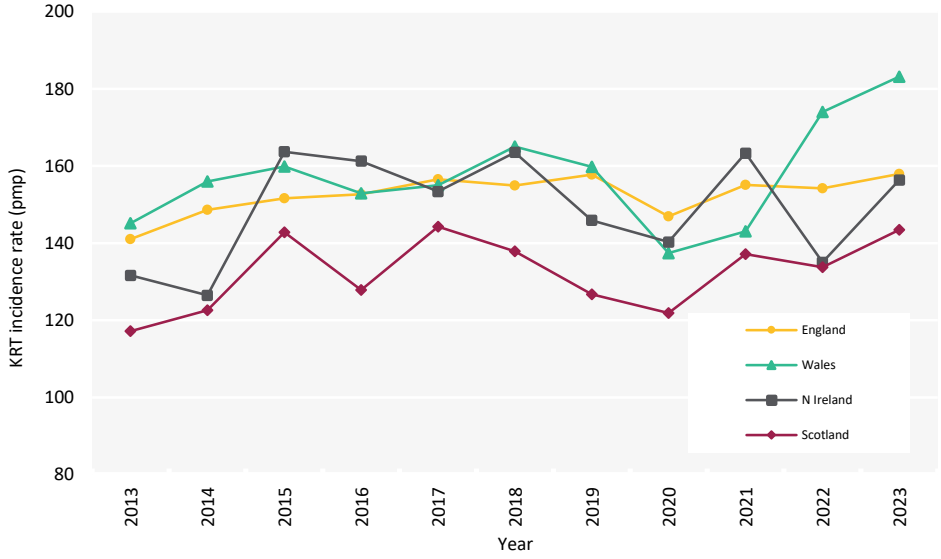

Figure 2.2 Adult KRT incidence rates by country between 2013 and 2023
pmp – per million population

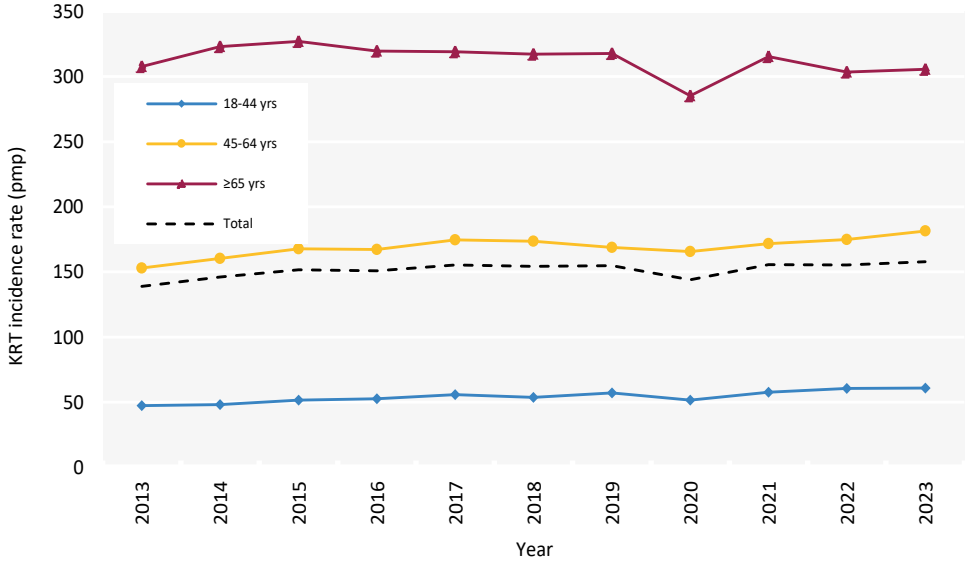

Figure 2.3 Adult KRT incidence rates by age group between 2013 and 2023
pmp – per million population

Demographics and start modality of incident adult KRT patients

The proportion of KRT 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 KRT in 2023 by centre

Centre	N on KRT	% on ICHD	% on PD	% on HHD	% on Tx	% pre-emptive listing/Tx	Median age (yrs)	% male	Ethnicity				
									% White	% Asian	% Black	% Other	% missing
ENGLAND													
Bham	367	74.9	20.2	0.0	4.9	16.1	64.3	61.0	59.4	26.3	10.6	3.7	4.6
Bradfd	101	84.2	9.9	0.0	5.9	18.8	63.0	57.4	45.0	46.0	3.0	6.0	1.0
Brightn	157	73.9	22.3	0.0	3.8	12.7	65.9	64.3	85.7	5.0	4.3	5.0	10.8
Bristol	172	77.9	14.5	0.6	7.0	18.0	61.1	69.2	80.1	5.8	11.1	2.9	0.6
Camb	87	46.0	11.5	0.0	42.5	52.9	55.9	63.2	83.9	9.2	4.6	2.3	0.0
Carlis	45	82.2	17.8	0.0	0.0	4.4	69.5	60.0	95.1	2.4	0.0	2.4	8.9
Carsh	320	80.6	15.3	0.3	3.8	11.9	64.2	61.3	65.2	18.5	11.5	4.9	10.3
Colchr	47	100.0	0.0	0.0	0.0	8.5	66.9	68.1	95.2	0.0	0.0	4.8	10.6
Covnt	131	72.5	20.6	1.5	5.3	17.6	63.8	64.1	78.1	14.8	3.9	3.1	2.3
Derby	109	69.7	26.6	0.0	3.7	17.4	64.0	56.9	76.5	17.6	2.4	3.5	22.0
Donc	71	80.3	15.5	0.0	4.2	18.3	66.8	66.2	91.5	5.6	0.0	2.8	0.0
Dorset	98	73.5	17.4	0.0	9.2	20.4	64.5	66.3	95.9	2.1	1.0	1.0	1.0
Dudley	49	73.5	24.5	0.0	2.0	12.2	68.0	61.2	75.5	20.4	4.1	0.0	0.0
EssexMS	210	71.4	28.1	0.0	0.5	7.1	66.6	67.1	82.3	3.8	8.6	5.4	11.4
Exeter	150	86.7	2.7	4.7	6.0								
Glouc	84	72.6	20.2	0.0	7.1	17.9	65.1	61.9	90.5	6.0	1.2	2.4	0.0
Hull	119	73.1	22.7	0.0	4.2	8.4	62.1	61.3	94.7	0.0	0.9	4.4	5.0
Ipswi	42	85.7	9.5	0.0	4.8	16.7	69.0	66.7	85.7	0.0	2.4	11.9	0.0
Kent	163	78.5	14.1	0.0	7.4	16.0	63.5	64.4	91.8	1.9	1.3	5.1	3.1
L Barts	348	67.5	25.6	0.0	6.9	18.7	60.9	57.2	26.5	43.4	21.8	8.3	6.6
L Guys	164	78.1	8.5	0.0	13.4	23.8	61.6	68.3	49.6	9.9	33.3	7.1	14.0
L Kings	157	79.6	16.6	0.0	3.8	14.0	61.0	63.7	45.9	11.5	37.8	4.7	5.7
L Rfree	265	73.2	18.1	0.4	8.3	24.9	60.6	61.5	41.5	16.1	21.4	21.0	6.4
L St.G	88	65.9	26.1	0.0	8.0	22.7	64.9	58.0	41.9	27.0	21.6	9.5	15.9
L West	390	74.4	19.2	0.0	6.4	18.7	62.9	65.6	30.8	42.3	17.9	9.0	0.0
Leeds	179	78.2	15.1	0.0	6.7	25.1	58.1	57.5	71.3	18.5	7.9	2.2	0.6
Leic	357	73.4	20.2	0.0	6.4	19.0	63.4	66.7	75.1	18.9	4.2	1.9	12.3
Liv UH	160	75.6	15.6	0.6	8.1	18.8	57.9	68.8	88.4	3.1	2.3	6.2	19.4
M RI	205	66.3	19.5	4.4	9.8								
Middlbr	111	91.9	0.9	0.0	7.2	15.3	63.6	64.9	91.7	4.6	1.9	1.9	2.7
Newc	155	76.1	16.8	0.0	7.1	27.7	59.6	61.3	90.3	5.2	1.9	2.6	0.6
Norwch	75	64.0	34.7	0.0	1.3	6.7	69.0	68.0	93.8	4.6	1.5	0.0	13.3
Nottm	109	66.1	28.4	0.0	5.5	21.1	62.9	67.9	80.2	5.7	5.7	8.5	2.8
Oxford	221	64.3	25.8	0.0	10.0	27.6	63.9	70.1	78.2	12.4	4.1	5.3	23.1
Plymth	61	63.9	18.0	3.3	14.8	27.9	68.2	62.3	94.9	1.7	1.7	1.7	3.3
Ports	241	73.4	17.8	1.2	7.5	19.5	64.5	64.3					34.4
Prestn	198	79.3	15.2	1.0	4.6	21.7	61.8	63.1	87.2	10.7	1.3	0.7	24.7
Redng	132	79.6	15.9	1.5	3.0	18.2	62.2	70.5	64.9	18.6	4.1	12.4	26.5
Salford	198	72.7	15.7	0.5	11.1	28.3	59.9	61.1	75.8	17.0	5.5	1.8	16.7
Sheff	164	83.5	13.4	0.6	2.4	8.5	64.4	65.2	83.1	8.1	5.0	3.8	2.4
Shrew	63	60.3	38.1	0.0	1.6	17.5	65.3	65.1	91.7	6.7	1.7	0.0	4.8
Stevng	173	82.1	13.3	1.2	3.5	15.0	61.9	68.2	64.1	19.6	7.2	9.2	11.6
Stoke	121	77.7	18.2	1.7	2.5	9.9	63.7	46.3	94.7	2.6	0.9	1.8	5.8
Sund	76	72.4	23.7	0.0	4.0	17.1	62.9	64.5	93.3	4.0	1.3	1.3	1.3
Truro	58	89.7	10.3	0.0	0.0	15.5	71.4	63.8	100.0	0.0	0.0	0.0	0.0
Wirral	40	72.5	20.0	0.0	7.5	20.0	67.1	52.5	92.5	5.0	2.5	0.0	0.0
Wolve	139	69.1	23.0	5.8	2.2	9.4	58.8	62.6	61.3	21.9	10.2	6.6	1.4

Table 2.3 Continued

Centre	N on KRT	% on ICHD	% on PD	% on HHD	% on Tx	% pre-emptive listing/Tx	Median age (yrs)	% male	Ethnicity				
									% White	% Asian	% Black	% Other	% missing
York	46	80.4	13.0	0.0	6.5	19.6	69.8	73.9	89.7	5.1	0.0	5.1	15.2
N IRELAND													
Antrim	41	75.6	14.6	0.0	9.8	19.5	63.4	63.4					34.1
Belfast	82	48.8	17.1	0.0	34.2	50.0	63.9	63.4	96.8	1.6	1.6	0.0	23.2
Newry	34	79.4	11.8	0.0	8.8	23.5	68.0	55.9	96.0	0.0	4.0	0.0	26.5
Ulster	37	86.5	2.7	0.0	10.8	16.2	69.2	67.6	94.4	2.8	2.8	0.0	2.7
West NI	38	79.0	10.5	0.0	10.5	21.1	62.7	50.0	100.0	0.0	0.0	0.0	23.7
SCOTLAND													
Abrdn	69	76.8	15.9	0.0	7.3	14.5	61.7	63.8					
Airdrie	86	86.1	9.3	0.0	4.7	17.4	62.7	65.1					
D&Gall	11	81.8	18.2	0.0	0.0	9.1	66.5	81.8					
Dundee	49	75.5	18.4	0.0	6.1	22.4	60.9	69.4					
Edinb	88	77.3	14.8	0.0	8.0	25.0	61.6	70.5					
Glasgw	189	78.3	12.2	0.0	9.5	24.9	64.8	61.4					
Inverns	48	81.3	8.3	0.0	10.4	10.4	65.8	58.3					
Klmarnk	57	70.2	22.8	3.5	3.5	17.5	61.2	54.4					
Krkcldy	45	91.1	6.7	0.0	2.2	8.9	62.0	71.1					
WALES													
Bangor	26	73.1	15.4	7.7	3.9	11.5	73.6	57.7					73.1
Cardff	202	78.7	11.4	1.0	8.9	16.8	62.9	59.9	92.7	2.7	0.7	4.0	25.7
Clwyd	41	70.7	24.4	4.9	0.0	7.3	65.6	61.0					31.7
Swanse	159	81.8	13.2	1.3	3.8	12.6	66.3	65.4	96.3	1.5	0.7	1.5	14.5
Wrexm	38	76.3	18.4	0.0	5.3	13.2	63.1	39.5	100.0	0.0	0.0	0.0	15.8
TOTALS													
England	7,216	74.7	18.6	0.4	6.3	18.2	62.9	63.5	70.4	15.6	8.8	5.2	9.0
N Ireland	232	69.0	12.5	0.0	18.5	30.6	65.8	60.8	97.2	1.1	1.7	0.0	22.4
Scotland	642	79.3	13.4	0.3	7.0	19.5	63.2	64.2					
Wales	466	78.5	14.0	1.7	5.8	13.9	65.3	60.1	95.2	2.0	0.6	2.3	24.2
UK	**8,556**	**75.1**	**17.7**	**0.5**	**6.7**	**18.4**	**63.2**	**63.3**	**72.4**	**14.5**	**8.2**	**4.9**	**10.3**

Blank cells - no data retuned 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.
Some new dialysis patients were not submitted by Cambridge, therefore the percentage starting on HD and PD is underestimated, while the percentage on Tx is overestimated.
Exeter and Manchester were unable to submit 2023 patient level data, aggregate numbers by modality were submitted and included in this table.
London Kings was unable to submit data for the last quarter of 2023 and no correction has been applied so their incident numbers are much smaller for 2023 compared to previous years.
UK ethnicity distribution and completeness do not include Scotland.

Table 2.4 Demographics, primary renal diseases (PRDs), referral time and start modality of adult patients incident to KRT in 2023 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	627	769	1,276	1,759	2,007	1,521	242	8,201	63.2
%	7.6	9.4	15.6	21.4	24.5	18.5	3.0		
Sex (%)									
Male	58.2	62.2	60.7	63.2	63.4	66.7	73.6	63.3	63.9
Female	41.8	37.8	39.3	36.8	36.6	33.3	26.4	36.7	61.9
Ethnicity (%)									
White	68.2	61.3	65.4	70.5	73.5	84.6	84.6	72.4	64.9
Asian	15.0	16.2	17.3	14.4	17.2	9.0	5.3	14.5	61.6
Black	9.6	14.8	11.8	9.5	5.6	3.4	7.2	8.2	55.5
Other	7.3	7.7	5.6	5.6	3.7	3.0	2.9	4.9	57.0
Missing	8.9	9.5	10.8	10.1	10.2	11.4	10.7	10.3	63.7
PRD (%)									
Diabetes	18.9	24.6	30.8	38.1	34.7	25.8	19.9	30.6	63.2
Glomerulonephritis	22.1	19.4	14.8	11.9	8.6	8.5	1.5	12.1	56.0
Hypertension	6.2	9.2	9.1	6.2	7.2	8.9	10.2	7.8	63.5
Polycystic kidney disease	3.6	9.5	12.3	8.3	4.9	3.9	1.9	6.8	57.6
Pyelonephritis	5.3	4.0	4.4	5.3	5.3	6.7	8.7	5.4	65.9
Renal vascular disease	0.7	0.9	1.6	2.5	6.0	8.2	11.7	4.2	73.4
Other	27.6	17.6	14.3	15.8	17.0	17.3	17.5	17.3	62.9
Uncertain aetiology	15.7	14.8	12.8	11.8	16.4	20.7	28.6	15.8	67.4
Missing	10.4	9.6	11.8	10.5	9.9	13.1	14.9	11.1	63.9
Referral time (%)									
<90 days	28.0	25.1	17.1	17.3	17.4	14.5	18.9	18.4	60.7
≥90 days	72.0	74.9	82.9	82.7	82.6	85.5	81.1	81.6	63.7
Missing	2.6	2.7	2.9	1.6	2.6	1.7	2.6	2.3	62.3
Start modality (%)									
ICHD	59.0	65.1	70.5	75.4	79.0	83.2	88.4	75.1	64.9
HHD	0.5	0.7	0.5	0.5	0.4	0.4	0.0	0.5	60.3
PD	24.6	22.9	19.0	17.0	15.8	15.6	11.6	17.7	60.1
Tx	15.9	11.3	10.0	7.1	4.7	0.9	0.0	6.7	52.2

Scotland was excluded from analysis of ethnicity and referral time as these two data items are not available from the Scottish Renal Registry

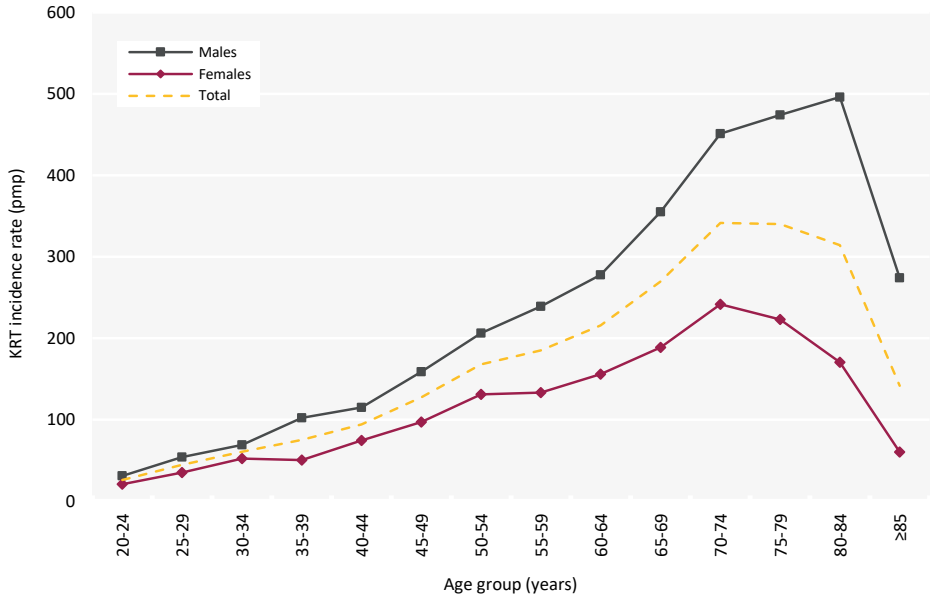

Figure 2.4 Incidence rates for adult patients starting KRT in 2023 by age group and sex
pmp – per million population

Table 2.5 Change in primary renal disease (PRD) of adult patients incident to KRT from 2014 to 2023

	Year of KRT start									
PRD	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Diabetes	26.6	27.6	28.0	29.0	30.1	30.7	30.7	31.1	29.6	30.6
Glomerulonephritis	13.2	13.6	13.4	13.9	13.1	13.1	12.3	13.4	12.5	12.1
Hypertension	6.4	6.7	6.3	6.6	6.9	7.5	7.1	6.9	7.3	7.8
Polycystic kidney disease	6.6	7.3	6.8	6.9	7.1	6.9	6.6	6.2	6.7	6.8
Pyelonephritis	5.7	5.7	5.9	5.6	5.1	5.4	5.4	4.8	5.1	5.4
Renal vascular disease	6.3	6.0	6.2	5.7	5.6	5.5	4.9	4.5	4.4	4.2
Other	17.0	16.6	16.8	16.6	16.9	16.4	17.6	17.3	17.7	17.3
Uncertain aetiology	18.3	16.5	16.5	15.7	15.1	14.4	15.4	15.8	16.6	15.8
Missing	1.7	2.6	3.1	5.2	4.0	5.9	7.4	9.8	10.7	11.1

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 and pre-emptive transplantation 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 KRT treatment in 2023. Please visit the UKRR data portal (ukkidney.org/audit-research/data-portals) to identify individual kidney centres.

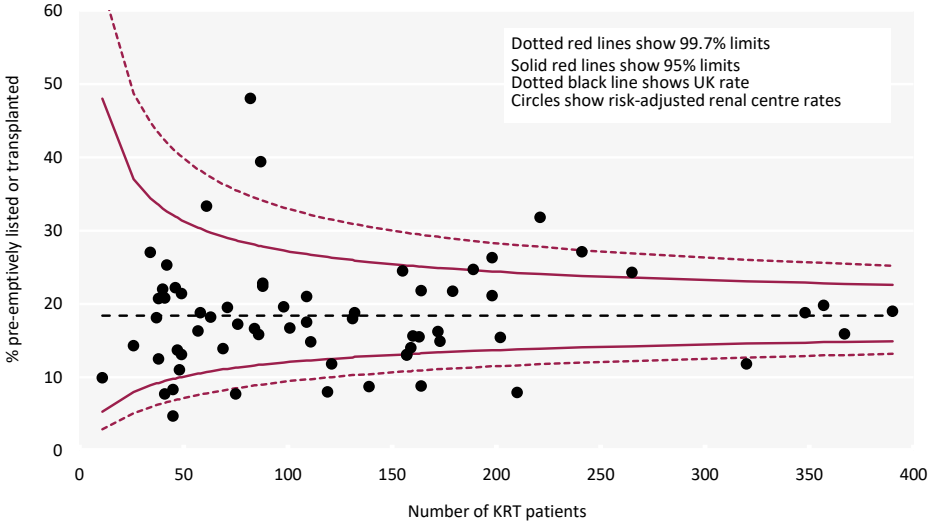

Figure 2.5 Transplant-status (listed or transplanted) at the start of KRT for adult patients incident to KRT in 2023 by centre
Analysis is adjusted for age, sex and PRD (diabetes versus non-diabetes)

Modality changes of incident adult KRT 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-KRT 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 (in-centre haemodialysis) at start and 90 days after start of KRT is shown at a UK level (table 2.6), but all HD patients are combined for other analyses.

Table 2.6 KRT modality at start and 90 days after start of KRT for incident adult KRT patients by year of start

KRT start year	% on ICHD	% on HHD	% on PD	% with Tx
Day 0 modality				
2018	71.7	0.4	19.5	8.4
2019	71.0	0.4	20.2	8.4
2020	71.9	0.4	21.8	6.0
2021	72.7	0.6	20.8	5.8
2022	74.1	0.4	19.0	6.5
2023	75.1	0.5	17.7	6.7
Day 90 modality				
Oct 2017 - Sep 2018	69.1	1.0	19.8	10.2
Oct 2018 - Sep 2019	68.3	1.0	20.8	9.9
Oct 2019 - Sep 2020	69.8	1.0	21.5	7.7
Oct 2020 - Sep 2021	70.4	1.1	21.4	7.1
Oct 2021 - Sep 2022	71.4	0.9	20.1	7.7
Oct 2022 - Sep 2023	72.9	0.9	18.3	7.9

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

Table 2.7 KRT modality at 90 days for adult patients incident to KRT between 01/10/2022 and 30/09/2023 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	6,892	69.3	18.1	7.1	1.5	4.1	73.3	19.2	7.5
N Ireland	236	62.3	11.9	21.6	2.1	2.1	65.0	12.4	22.6
Scotland	664	77.1	13.6	7.2	0.0	2.1	78.8	13.9	7.4
Wales	474	74.9	15.0	6.5	1.1	2.5	77.7	15.5	6.8
UK	**8,266**	**70.0**	**17.4**	**7.5**	**1.3**	**3.8**	**73.8**	**18.3**	**7.9**

[1]HD includes ICHD and HHD

[2]'Discontinued' is defined as people who stopped treatment without recovery of kidney function. Those who recovered function within 90 days were not included in the incident cohort

Table 2.8 Start and subsequent KRT modalities for adult patients incident to KRT in 2018 by time after start

			Time after start (%)			
Start modality	N	Later modality	90 days	1 yr	3 yrs	5 yrs
HD	5,826	HD	90.6	73.7	45.2	25.7
		PD	1.8	2.9	0.9	0.3
		Tx	1.3	5.4	13.6	17.5
		Other	0.9	2.3	2.3	2.5
		Died	5.4	15.7	38.0	54.0
PD	1,578	HD	5.5	17.3	21.3	16.7
		PD	89.4	59.9	21.9	6.5
		Tx	2.9	13.6	29.3	35.6
		Other	1.0	1.3	1.5	2.0
		Died	1.3	8.0	26.0	39.2
Tx	675	HD	1.3	1.3	2.5	2.7
		PD	0.0	0.3	0.1	0.4
		Tx	97.0	95.9	90.2	86.7
		Other	1.2	1.3	2.8	3.3
		Died	0.4	1.2	4.3	7.0

Shading indicates proportion of individuals maintained on their initial modality
HD included ICHD and HHD
Other is discontinued, recovered, moved away or currently transferring between centres
'Discontinued' is defined as people who stopped treatment without recovery of kidney function. Those who recovered function within 90 days were not included in the incident cohort.

The modality at one year after KRT initiation is shown in figure 2.6 for all KRT starters and in figure 2.7 for those starting on PD by centre, using incident patients starting KRT in 2022 to allow one year follow-up time.

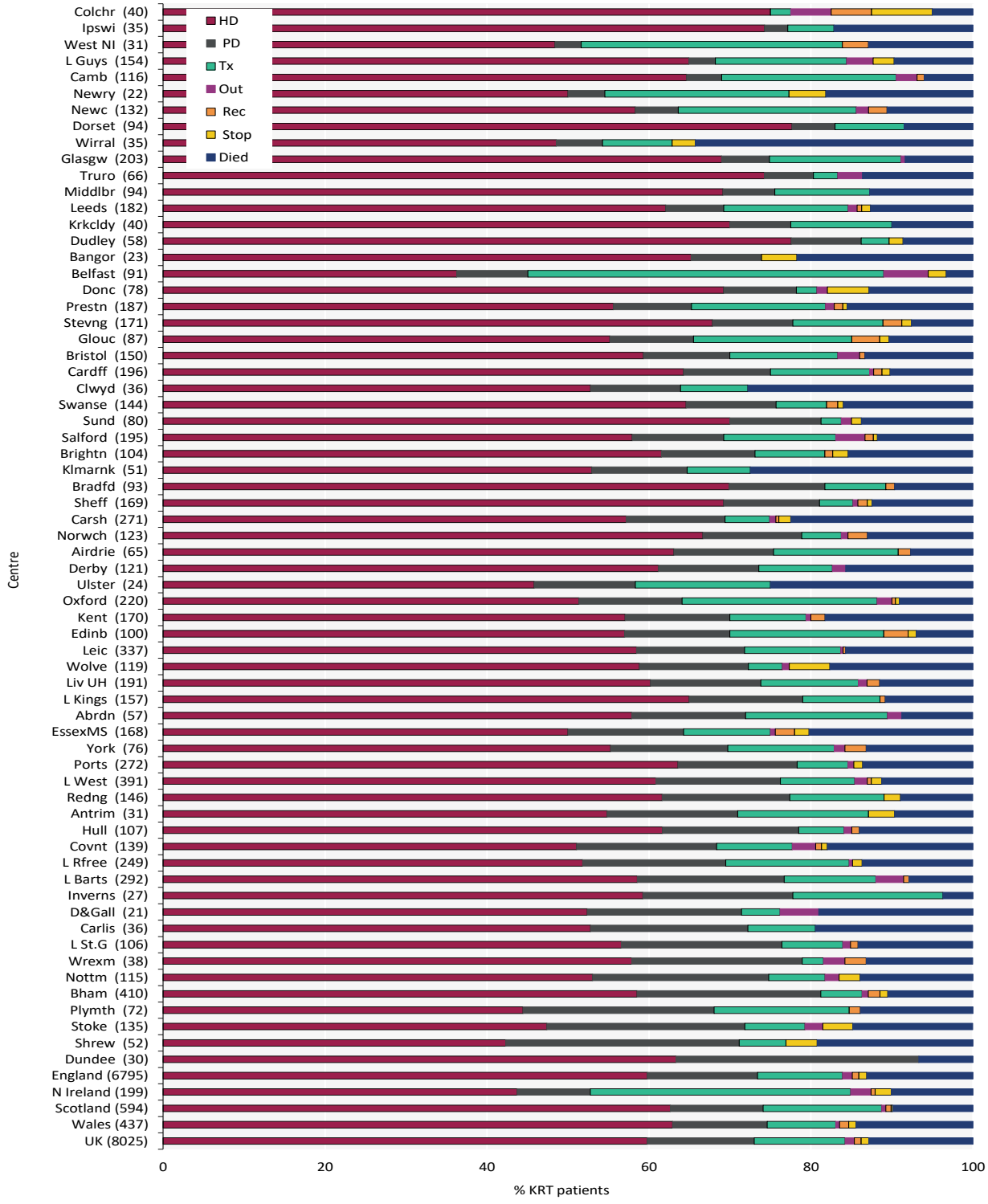

Figure 2.6 KRT modality at 1 year for incident adult KRT patients who started KRT in 2022 by centre

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

Centres are ordered by increasing use of PD at 1 year

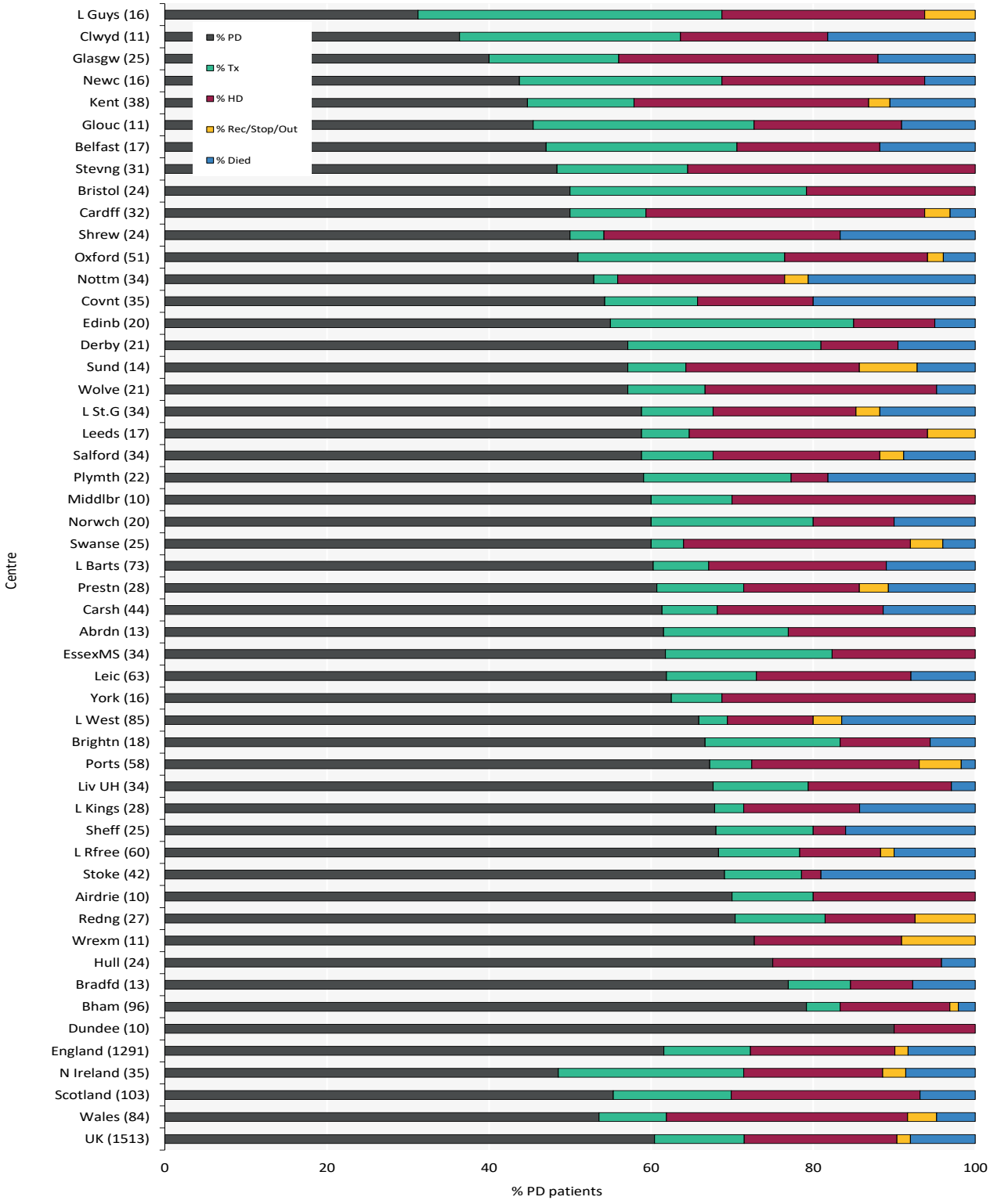

Figure 2.7 KRT modality at 1 year for incident adult PD patients who started KRT in 2022 by centre

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

Centres are ordered by increasing use of PD at 1 year

Late presentation to nephrology services of incident adult KRT patients

Late presentation to a nephrologist is defined as a patient being seen by the kidney service for the first time within 90 days of starting KRT and is used interchangeably with referral time in this report. Due to small numbers, a two year cohort (2022-2023) was used at a centre level to estimate late referral to a nephrologist and centres with a completeness of <70% were excluded. A seven year cohort was used to show national longitudinal trends (table 2.12).

Table 2.9 Referral times of incident adult KRT patients by centre 2022-2023, 2-year cohort

	N on KRT		N with referral data	% data completeness		% presenting <90 days before KRT start		% presenting <1 yr before KRT start
Centre	2022	2023		2022	2023	All PRDs	Non-diabetes PRDs	All PRDs
ENGLAND								
Bham	410	367	777	100.0	100.0	19.7	21.2	31.8
Bradfd	93	101	194	100.0	100.0	16.0	20.4	26.3
Brightn	104	157	261	100.0	100.0	16.1	18.6	27.6
Bristol	150	172	313	94.0	100.0	20.1	23.4	29.4
Camb	116	87	203	100.0	100.0	16.3	13.2	33.5
Carlis	36	45	78	100.0	93.3	24.4	29.5	33.3
Carsh	271	320	589	100.0	99.4	21.1	19.3	34.6
Colchr	40	47		5.0	2.1			
Covnt	139	131	267	100.0	97.7	18.4	23.6	32.2
Derby	121	109	230	100.0	100.0	15.7	21.5	26.1
Donc	78	71	147	97.4	100.0	15.0	15.9	25.2
Dorset	94	98	191	98.9	100.0	19.4	20.0	31.4
Dudley	58	49	107	100.0	100.0	15.9	18.8	27.1
EssexMS	168	210	365	96.4	96.7	23.6	28.6	37.3
Exeter								
Glouc	87	84	160	90.8	96.4	19.4	19.1	26.3
Hull	107	119	226	100.0	100.0	19.5	22.3	38.9
Ipswi	35	42	34	42.9	81.0	29.4		47.1
Kent	170	163	332	100.0	99.4	10.8	12.4	18.4
L Barts	292	348	619	97.3	96.3	37.3	43.0	50.9
L Guys	154	164	300	94.8	93.9	18.7	20.4	34.3
L Kings	203	157	353	98.0	98.1	17.6	24.1	26.6
L Rfree	249	265	493	99.6	92.5	13.0	12.6	25.6
L St.G	106	88	194	100.0	100.0	21.6	26.3	43.3
L West	391	390	781	100.0	100.0	21.4	27.1	37.5
Leeds	182	179	361	100.0	100.0	13.0	15.9	26.3
Leic	337	357	691	99.7	99.4	19.0	16.0	31.1
Liv UH	191	160	347	99.5	98.1	23.1	28.5	36.3
M RI	131		125	95.4		25.6		36.8
Middlbr	94	111	202	97.9	99.1	19.8	19.5	32.7
Newc	132	155	287	100.0	100.0	19.5	22.8	28.6
Norwch	123	75	172	92.7	77.3	33.1	37.8	45.9
Nottm	115	109	224	100.0	100.0	17.0	21.8	24.6
Oxford	220	221	434	100.0	96.8	13.6		25.8
Plymth	72	61	127	100.0	90.2	14.2	19.1	26.8
Ports	272	241	509	98.9	99.6	13.6		26.5
Prestn	187	198	385	100.0	100.0	15.3	16.7	27.8
Redng	146	132	277	99.3	100.0	17.3	21.2	31.4
Salford	195	198	393	100.0	100.0	14.8	20.0	22.6
Sheff	169	164	330	99.4	98.8	18.2	21.8	30.3
Shrew	52	63	115	100.0	100.0	13.0	17.4	20.0
Stevng	171	173	343	100.0	99.4	18.1	23.9	30.0

Table 2.9 Continued

Centre	N on KRT 2022	N on KRT 2023	N with referral data	% data completeness 2022	% data completeness 2023	% presenting <90 days before KRT start: All PRDs	% presenting <90 days before KRT start: Non-diabetes PRDs	% presenting <1 yr before KRT start: All PRDs
Stoke	135	121	241	90.4	98.3	29.9		38.2
Sund	80	76	156	100.0	100.0	17.3	21.2	34.6
Truro	66	58	124	100.0	100.0	12.1	14.3	22.6
Wirral	35	40	75	100.0	100.0	21.3	24.5	32.0
Wolve	119	139	251	96.6	97.8	21.5	27.8	32.3
York	76	46	122	100.0	100.0	16.4	20.2	30.3
N IRELAND								
Antrim	31	41	70	93.5	100.0	17.1	16.0	25.7
Belfast	91	82	146	75.8	93.9	10.3	11.1	17.8
Newry	22	34	54	95.5	97.1	16.7	17.5	29.6
Ulster	24	37	61	100.0	100.0	21.3	27.7	31.1
West NI	31	38	68	96.8	100.0	22.1	30.4	32.4
WALES								
Bangor	23	26	46	95.7	92.3	10.9	12.9	23.9
Cardff	196	202	398	100.0	100.0	11.6	14.3	20.4
Clwyd	36	41	76	97.2	100.0	14.5	15.7	25.0
Swanse	144	159	303	100.0	100.0	11.2	15.0	22.4
Wrexm	38	38	71	89.5	97.4	12.7	14.9	26.8
TOTALS								
England	6,972	6,861	13,523	97.9	97.6	19.2	21.6	31.5
N Ireland	199	232	399	86.9	97.4	16.0	18.8	25.3
Wales	437	466	894	98.6	99.4	11.7	14.6	22.1
E, W & NI	**7,608**	**7,559**	**14,816**	**97.7**	**97.7**	**18.6**	**21.0**	**30.8**

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

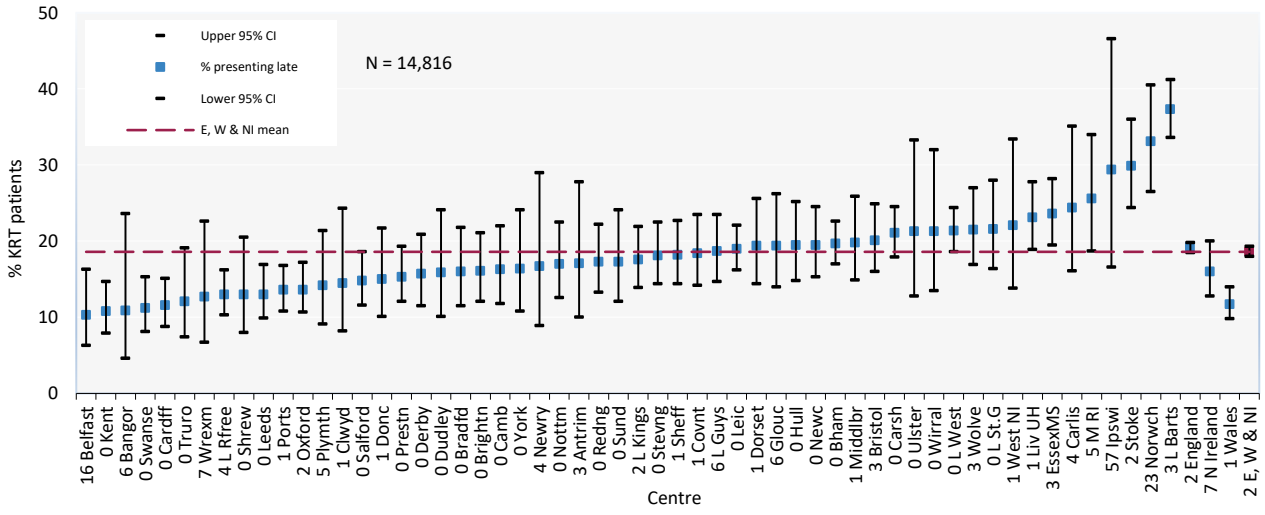

Figure 2.8 Percentage of incident adult KRT patients presenting late (<90 days) to a nephrologist 2022-2023, 2 year cohort

CI – confidence interval
If a centre had low referral completeness (<70%) for 1 of the 2 years, only a 1 year cohort was included in the analysis

Table 2.10 Characteristics of incident adult KRT patients by referral time 2022-2023, 2 year cohort

	Referral time	
Characteristic	<90 days	≥90 days
Median age (yrs)	61.1	63.8
% male	65.6	63.8
% starting on PD	10.2	20.8
% on PD at 90 days	12.0	20.0
Mean haemoglobin at KRT start (g/L)	94	100
Mean eGFR at KRT start (mL/min/1.73m2)[1]	6.0	7.1

[1]Data available for approximately 38% of patients. Geometric mean reported.
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 number of patients with no PRD data is shown on a separate line.

Table 2.11 Referral time of incident adult KRT patients by primary renal disease (PRD) 2022-2023, 2 year cohort

		Referral time			
		<90 days		≥90 days	
PRD	N with data	N	%	N	%
Diabetes	4,024	410	10.2	3,614	89.8
Glomerulonephritis	1,607	211	13.1	1,396	86.9
Hypertension	1,018	205	20.1	813	79.9
Polycystic kidney disease	884	35	4.0	849	96.0
Pyelonephritis	696	120	17.2	576	82.8
Renal vascular disease	542	76	14.0	466	86.0
Other	2,312	853	36.9	1,459	63.1
Uncertain aetiology	2,150	438	20.4	1,712	79.6
Total (with data)	**13,233**	**2,348**	**17.7**	**10,885**	**82.3**
Missing	1,583	414	26.2	1,169	73.8

Table 2.12 Referral time of incident adult KRT patients by year of start (restricted to centres reporting continuous data for 2017-2023)

	KRT start year (%)						
Referral time	2017	2018	2019	2020	2021	2022	2023
<90 days	16.5	15.3	15.5	16.0	18.3	18.4	17.5
3-6 mths	4.7	4.5	4.4	3.9	4.6	4.8	4.4
6-12 mths	7.0	7.5	7.8	7.7	6.8	7.5	8.1
≥12 mths	71.8	72.7	72.3	72.5	70.3	69.4	70.1

Start estimated glomerular filtration rate in incident adult KRT patients

Start eGFR was calculated using the CKD Epidemiology Collaboration method for incident KRT 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 (38% overall), (ii) if the date of KRT start is incorrect, the documented start eGFR may have been taken after the patient had started KRT.

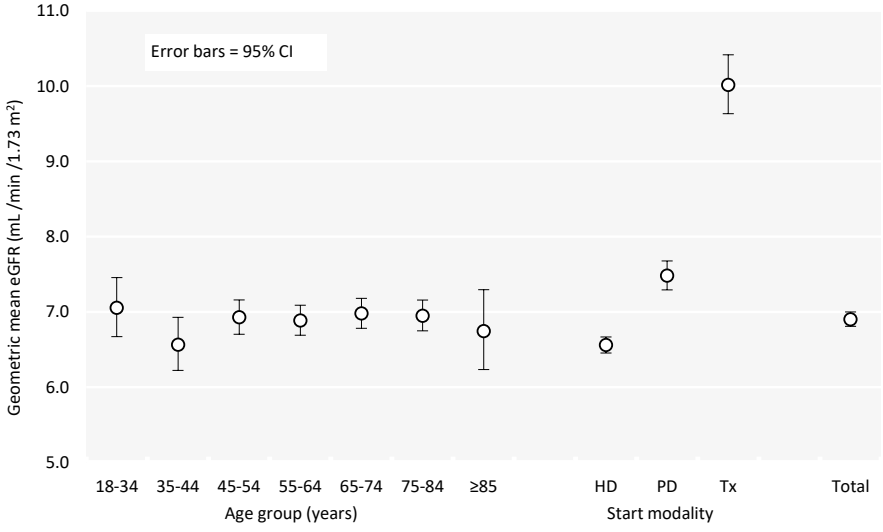

Figure 2.9 Geometric mean estimated glomerular filtration rates (eGFR) for adult patients incident to KRT in 2023 by age group and start modality

CI – confidence interval

Anaemia in incident adult KRT patients

The analyses of haemoglobin by modality and timing of presentation used haemoglobin measurements from after the start of KRT but still within the same quarter.

Table 2.13 Haemoglobin (Hb) data for adult patients incident to KRT in 2023 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								
Bham	95	40.6	110	108	91	97	87	98.6
Bradfd	100	50.0			98	101	90	97.0
Brightn	102	57.3		111	98	104	97	95.5
Bristol	103	69.8	116	106	102	104	102	98.3
Camb	102	53.9	103	100	99	102	96	89.7
Carlis	99	48.9			96	101	89	100.0
Carsh	96	40.8	109	106	94	97	92	98.1
Colchr	96	25.0			96			76.6
Covnt	98	44.9		102	96	98	95	97.0
Derby	103	55.6		107	100	104	92	99.1
Donc	93	40.0		110	89	94	87	98.6
Dorset	101	52.6	121	108	95	105	88	99.0
Dudley	98	47.9		109	93	98		98.0
EssexMS	97	43.5		108	93	99	89	98.6
Exeter								
Glouc	98	40.5		103	94	98	93	100.0
Hull	102	54.6		112	96	105	84	90.8
Ipswi	95	24.3			95	96		88.1
Kent	95	40.4	105	108	93	95	97	95.7
L Barts	96	39.9	108	103	92	95	98	98.6
L Guys	93	35.0	107	101	89	94	82	75.0
L Kings	96	38.1		106	92	97	92	88.5
L Rfree	104	59.9	107	106	103	104	101	99.6
L St.G	93	31.3		101	88	96	91	94.3
L West	101	53.7	113	101	101	102	100	80.3
Leeds	92	30.1	116	103	90	93	89	96.7
Leic	98	46.0	109	107	94	99	93	91.3
Liv UH	98	43.1	108	102	96	99	95	95.6
M RI								
Middlbr	99	49.6			99	99	100	100.0
Newc	97	44.5	120	107	91	100	86	100.0
Norwch	100	50.0		107	88	100	98	88.0
Nottm	96	43.1		105	93	96	95	100.0
Oxford	98	44.7	102	100	95	99	86	89.1
Plymth	95	41.0		105	92	97		100.0
Ports	100	51.9	111	109	96	100	97	99.2
Prestn	96	40.8		104	94	96	90	99.0
Redng	96	38.3		104	92	98	82	97.0
Salford	96	44.3		109	92	99	86	88.9
Sheff	94	37.3		112	91	97	87	98.2
Shrew	101	51.6		107	96	104	94	98.4
Stevng	95	35.7		103	94	96	93	97.1
Stoke	105	60.9		113	101	106	99	95.0
Sund	99	50.0		107	95	102	92	97.4
Truro	99	50.0			94	101		100.0

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	
Wirral	98	47.1			91	100		85.0
Wolve	94	36.3		103	91	96	85	97.1
York	94	44.2			90	98		93.5
N IRELAND								
Antrim	99	46.2			94	102		95.1
Belfast	101	52.5	108	104	97	101		97.6
Newry	99	50.0			94	104		94.1
Ulster	98	46.0			95	100		100.0
West NI	101	55.3			98	105	95	100.0
SCOTLAND								
Abrdn								55.1
Airdrie	99	49.4			94			89.5
D&Gall								81.8
Dundee	101	52.6			99			77.6
Edinb								48.9
Glasgw	92	34.2		107	91			82.0
Inverns								60.4
Klmarnk	93	34.0			92			87.7
Krkcldy								62.2
WALES								
Bangor	102	60.0			101	102		96.2
Cardff	99	49.8	115	106	97	100	88	99.5
Clwyd	96	39.0		115	93	97		100.0
Swanse	97	44.7		106	95	99	89	100.0
Wrexm	100	55.3			95	101		100.0
TOTALS								
England	98	45.4	108	106	94	99	92	94.7
N Ireland	100	50.4	110	113	96	101	90	97.4
Scotland	95	41.5		109	94			72.7
Wales	99	48.1	112	114	96	100	88	99.6
UK	**98**	**45.4**	**109**	**107**	**95**	**99**	**92**	**93.4**

Blank cells – no data returned by the centre, data completeness (including referral time) <70% or N<10

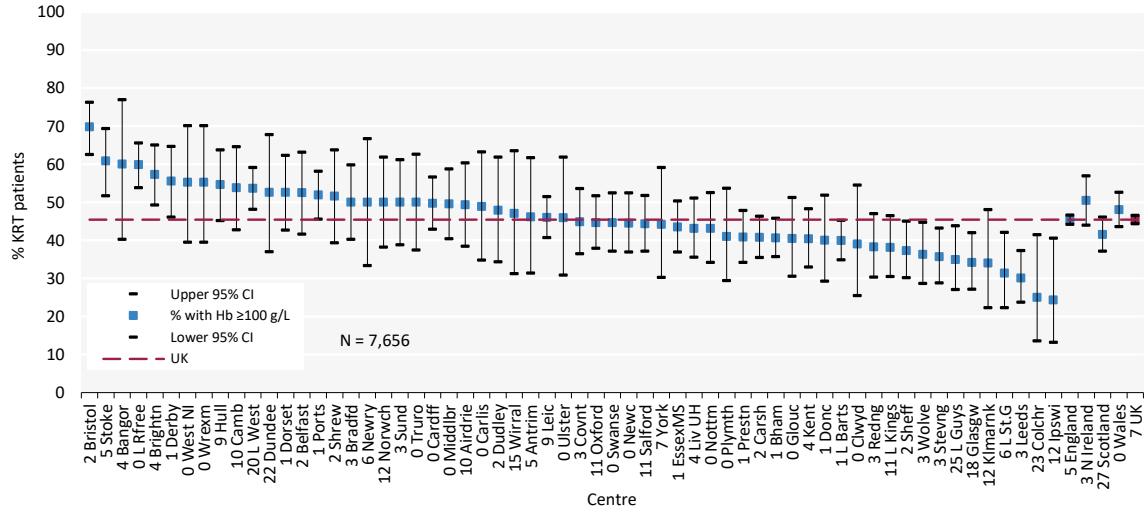

Figure 2.10 Percentage of adult patients incident to KRT in 2023 with haemoglobin (Hb) ≥100 g/L at start of KRT treatment by centre
CI – confidence interval

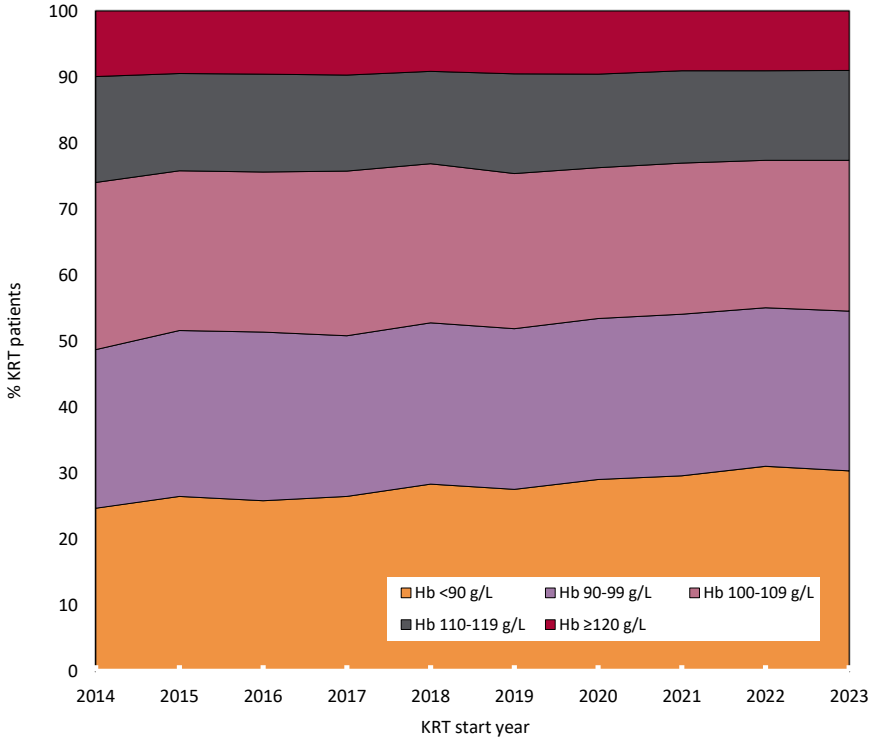

Figure 2.11 Distribution of haemoglobin (Hb) in incident adult KRT patients by year of start between 2014 and 2023

Biochemistry parameters in incident adult KRT patients

The latest UK Kidney Association guideline on CKD mineral bone disease contains only one audit measure, which applies to patients with CKD and patients on KRT. 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 KRT in 2023 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				
Bham	2.3	83.3	8.5	99.5
Bradfd	2.4	81.8	11.1	98.0
Brightn	2.3	85.9	8.3	99.4
Bristol	2.3	87.8	5.2	100.0
Camb	2.4	85.9	8.2	97.7
Carlis	2.3	64.4	11.1	100.0
Carsh	2.3	81.9	5.0	94.7
Colchr	2.3	88.1	9.5	89.4
Covnt	2.3	81.7	3.1	100.0
Derby	2.3	84.3	7.4	99.1
Donc	2.3	84.5	7.0	100.0
Dorset	2.4	86.7	10.2	100.0
Dudley	2.4	71.4	22.5	100.0
EssexMS	2.3	81.7	4.8	99.1
Exeter				
Glouc	2.4	83.3	6.0	100.0
Hull	2.4	81.2	12.0	98.3
Ipswi	2.3	82.5	7.5	95.2
Kent	2.4	80.9	9.9	99.4
L Barts	2.3	80.9	5.2	99.4
L Guys	2.4	92.6	4.9	74.4
L Kings	2.3	78.8	6.0	96.2
L Rfree	2.3	86.4	4.5	100.0
L St.G	2.4	92.8	4.8	94.3
L West	2.3	76.9	8.7	80.0
Leeds	2.3	78.8	5.6	100.0
Leic	2.3	80.1	7.3	95.8
Liv UH	2.4	82.8	10.2	98.1
M RI				
Middlbr	2.2	66.7	6.5	97.3
Newc	2.4	85.1	7.8	99.4
Norwch	2.3	84.9	1.5	88.0
Nottm	2.3	79.8	14.7	100.0
Oxford	2.2	56.0	3.2	97.7
Plymth	2.3	82.0	3.3	100.0
Ports	2.3	79.6	6.7	99.6
Prestn	2.3	79.3	6.1	100.0
Redng	2.3	82.6	3.0	100.0
Salford	2.4	74.2	13.2	91.9
Sheff	2.3	79.9	3.1	100.0
Shrew	2.4	80.3	14.8	96.8
Stevng	2.3	81.2	4.7	98.3
Stoke	2.4	78.4	16.2	91.7
Sund	2.3	72.4	9.2	100.0
Truro	2.4	84.5	8.6	100.0
Wirral	2.3	72.2	11.1	90.0

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
Wolve	2.4	75.9	11.0	98.6
York	2.4	80.4	17.4	100.0
N IRELAND				
Antrim	2.4	85.0	10.0	97.6
Belfast	2.3	82.9	6.1	100.0
Newry	2.4	84.9	9.1	97.1
Ulster	2.4	78.4	16.2	100.0
West NI	2.3	86.8	2.6	100.0
WALES				
Bangor	2.4	80.8	15.4	100.0
Cardff	2.3	81.7	7.9	100.0
Clwyd	2.3	92.7	4.9	100.0
Swanse	2.3	83.0	5.7	100.0
Wrexm	2.3	92.1	5.3	100.0
TOTALS				
England	2.3	80.4	7.4	96.4
N Ireland	2.3	83.5	8.3	99.1
Wales	2.3	83.9	7.1	100.0
E, W & NI	**2.3**	**80.8**	**7.4**	**96.8**

Ca - calcium

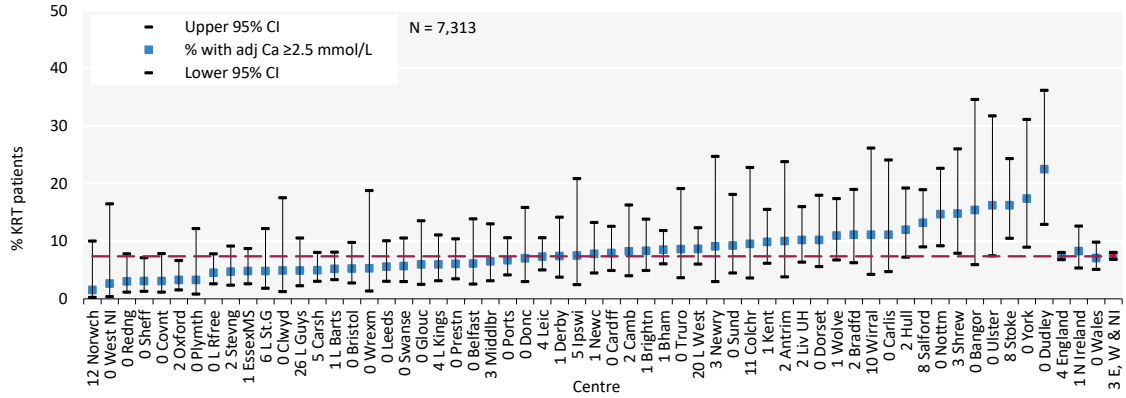

Figure 2.12 Percentage of adult patients incident to KRT in 2023 with adjusted calcium (Ca) above the normal range (>2.5 mmol/L) by centre
CI – confidence interval

Dialysis access in incident adult dialysis patients

Incident dialysis access data are primarily collected separately to the main UKRR quarterly data returns via the Multisite Dialysis Access Audit. In addition to the audit, some incident dialysis access data are collected through the dialysis sessions and access at start information in the quarterly returns. For more details please see Appendix A. Patients who did not start dialysis for the first time in 2023 based on UKRR quarterly data submissions were excluded. Data are not included in this section from any centres with <70% completeness for type of access at dialysis start.

Table 2.15 Demographics and characteristics of patients incident to dialysis in 2023 by first dialysis access type

Characteristic		HD – first dialysis access type				PD	Total
		N	AVF/AVG	TL	NTL	N	
Total							
N		6,170	2,275	2,582	1,313	1,501	7,671
%			36.9	41.8	21.3		
Age (%)	Median (yrs)	65	67	62	66	60	64
	IQR (yrs)	53,75	57,76	50,73	52,75	47,73	52,74
	<45 yrs	876	22.4	53.2	24.4	343	1,219
	45–54 yrs	893	35.5	46.2	18.3	247	1,140
	55–64 yrs	1,341	37.4	44.4	18.1	305	1,646
	65–74 yrs	1,561	39.5	37.7	22.8	328	1,889
	≥75 yrs	1,499	43.0	34.6	22.5	278	1,777
PRD (%)	Diabetes	1,728	36.8	45.3	17.9	364	2,092
	Glomerulonephritis	555	42.9	39.6	17.5	198	753
	Hypertension	416	39.7	41.6	18.8	111	527
	Polycystic kidney disease	276	59.8	30.4	9.8	118	394
	Pyelonephritis	285	40.0	38.2	21.8	58	343
	Renal vascular disease	245	39.6	33.1	27.3	53	298
	Other	934	23.2	43.6	33.2	169	1,103
	Uncertain aetiology	803	42.6	38.7	18.7	231	1,034
	Missing	928	32.4	44.6	23.0	199	1,127
Referral time (%)	<90 days	1,305	7.0	49.7	43.2	163	1,468
	90–179 days	241	13.7	66.0	20.3	61	302
	180–364 days	464	27.2	53.9	19.0	110	574
	≥365 days	3,617	50.1	35.9	14.0	1,075	4,692
	Missing	543	39.2	41.3	19.5	92	635
Sex (%)	Male	3,796	36.5	42.0	21.5	919	4,715
	Female	2,125	37.3	41.2	21.5	533	2,658
	Missing	249	39.0	45.0	16.1	49	298
Ethnicity (%)	White	3,507	39.1	40.0	20.9	897	4,404
	Asian	717	34.0	43.4	22.6	196	913
	Black	443	28.0	46.7	25.3	82	525
	Other	240	31.3	47.5	21.3	52	292
	Missing	1,263	36.5	43.2	20.3	274	1,537
eGFR at start[1]	Median	7	7	6	7	8	7
	IQR	5,8	6,8	5,8	4,9	6,9	5,9
Diabetes[2] (%)	Yes	2,095	37.5	43.4	19.1	451	2,546
	No	1,062	41.2	37.8	21.0	307	1,369
	Missing	3,013	34.9	42.2	22.9	743	3,756

[1]eGFR units are mL/min/1.73m^2

[2]Diabetes at start of dialysis as a comorbidity or PRD from the UKRR database

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 data are described in relation to age, PRD and timing of presentation. Dialysis access is best interpreted in the context of all patients starting KRT, so data were supplemented with pre-emptive Tx numbers.

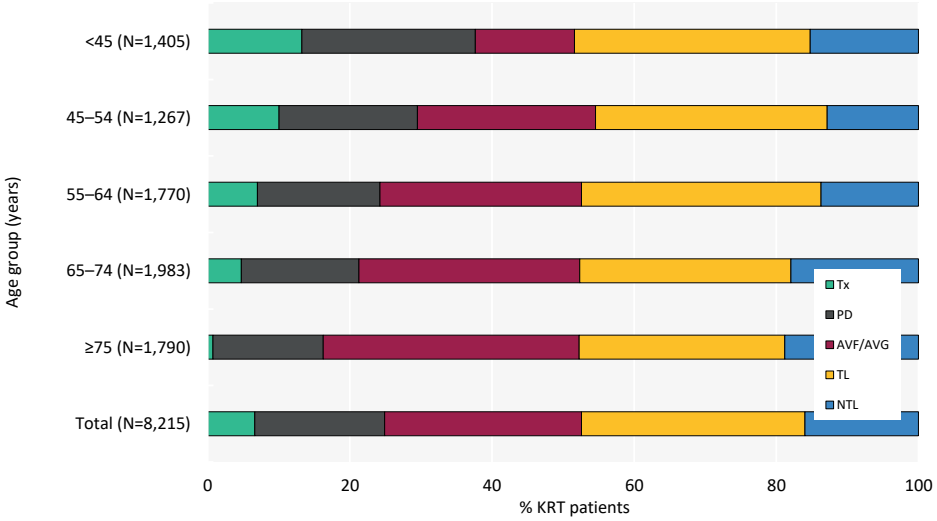

Figure 2.13 Dialysis access used for adult patients incident to KRT in 2023 by age group
AVF – arteriovenous fistula; AVG – arteriovenous graft; NTL – non-tunnelled line; TL – tunnelled line

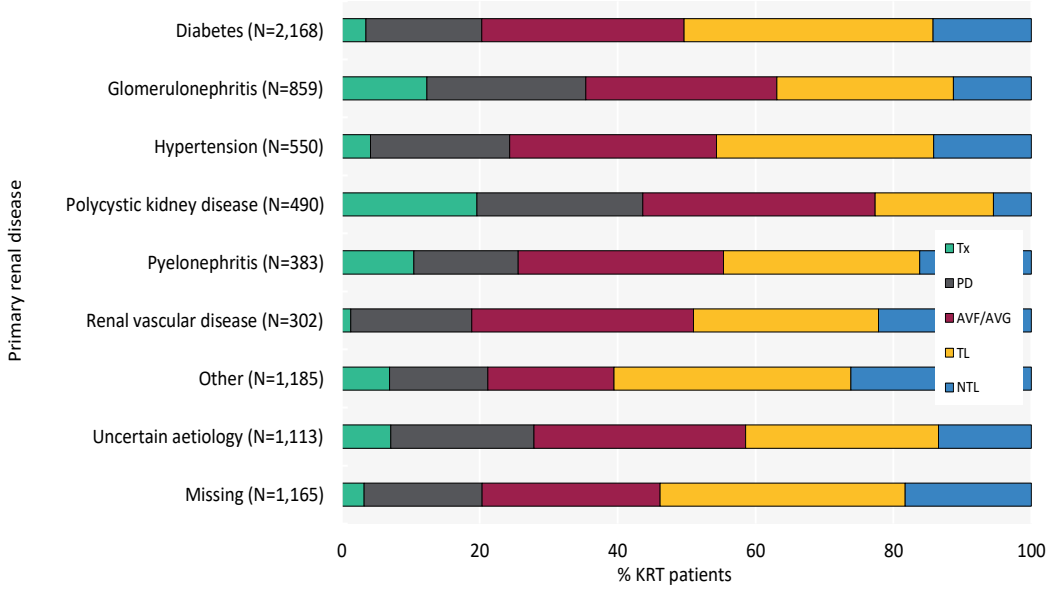

Figure 2.14 Dialysis access used for adult patients incident to KRT in 2023 by primary renal disease
AVF – arteriovenous fistula; AVG – arteriovenous graft; NTL – non-tunnelled line; TL – tunnelled line

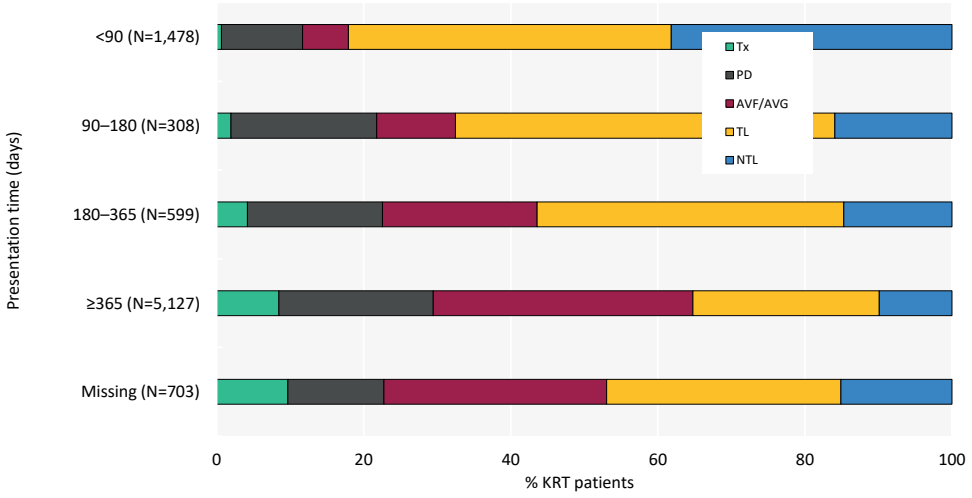

Figure 2.15 Dialysis access used for adult patients incident to KRT in 2023 by presentation time
AVF – arteriovenous fistula; AVG – arteriovenous graft; NTL – non-tunnelled line; TL – tunnelled line

The audit measures related to dialysis access for incident KRT patients have been updated following publication of the UK Kidney Association Vascular Access Guideline in 2023. Modality and access at 90 days and 1 year after KRT start are reported nationally in Table 2.16, but this is only possible for centres submitting adequate HD sessions data. The proportion of patients starting with each modality and access type is reported as previously, but split by those presenting before and after 365 days prior to KRT start in Table 2.17. This was changed from 90 days in concordance with the guideline.

Table 2.16 KRT modality and access at 90 days and 1 year after KRT start for 2022 incident HD patients

			Time after start (%)	
Access at start	N	Later modality	90 days	1 yr
AVF/AVG	965	HD access unknown	2.6	4.6
		HD - AVF/AVG	85.4	72.1
		HD - TL/NTL	5.9	6.8
		PD	0.1	0.5
		Tx	1.0	5.2
		Died	3.8	9.3
		Out/Rec/Stop	1.1	1.5
TL	1,133	HD access unknown	4.3	5.6
		HD - AVF/AVG	3.9	26.7
		HD - TL/NTL	84.7	45.1
		PD	1.9	2.6
		Tx	1.3	3.1
		Died	2.8	13.2
		Out/Rec/Stop	1.0	3.8
NTL	786	HD access unknown	3.2	3.4
		HD - AVF/AVG	4.7	16.3
		HD - TL/NTL	70.5	42.1
		PD	6.2	5.5
		Tx	0.1	2.0
		Died	13.1	26.3
		Out/Rec/Stop	2.2	4.3

Restricted to 28 centres that submitted adequate sessional data to determine access at 90 days and 1 year
Out - moved out of a centre but did not reappear in another centre; Rec - recovered kidney function (1 yr only, as patients recovering within 90 days were not included in the incident cohort); Stop - treatment withdrawal

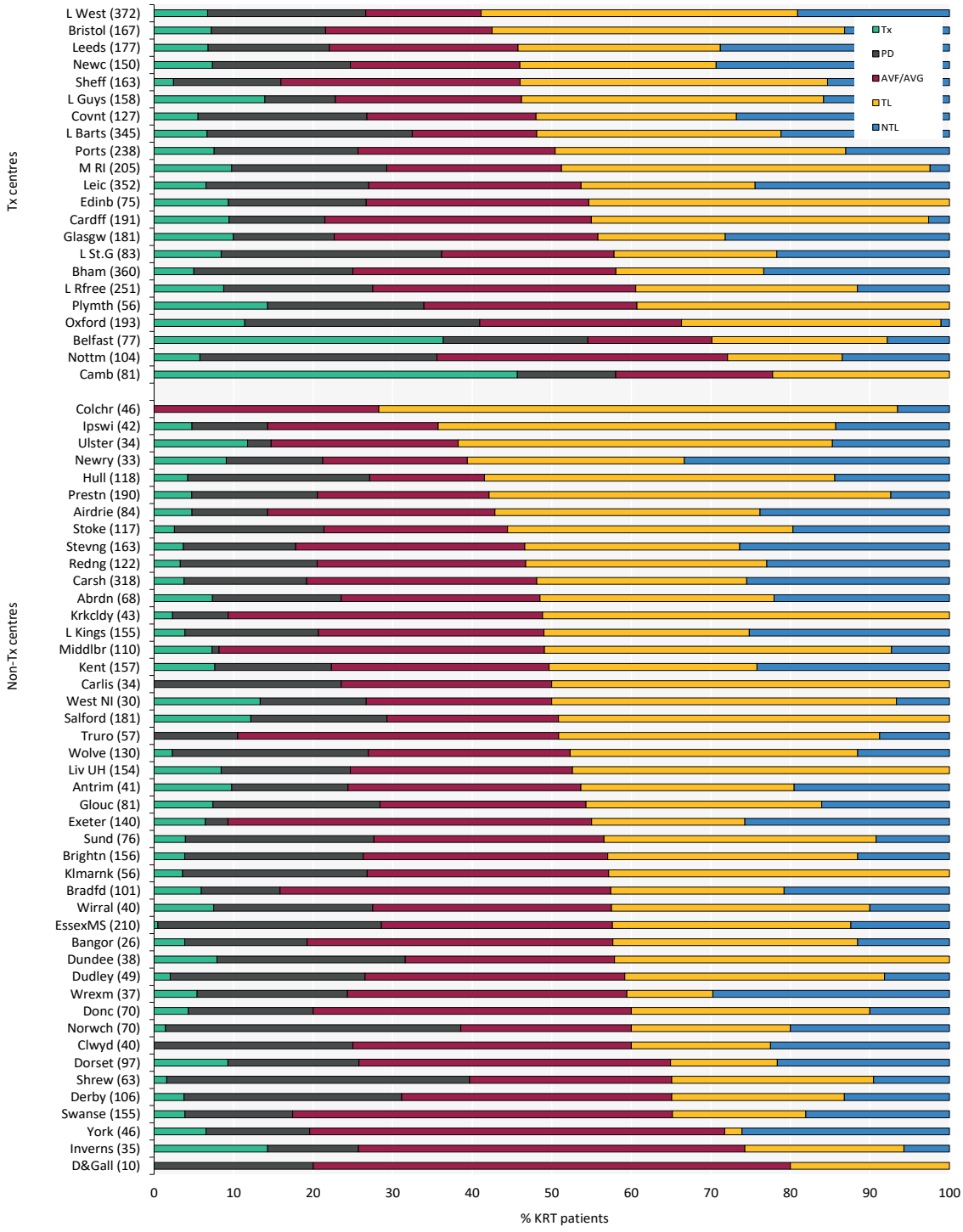

Figure 2.16 First dialysis access used for adult patients incident to KRT in 2023 by centre

Number of incident patients on KRT 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 2.17 Start modality and dialysis access used for adult patients incident to dialysis in 2023 by presentation before start of dialysis by centre

	Presenting ≥365 days (%)					Presenting <365 days (%)					Start modality (%)		
Centre	N	PD	AVF/ AVG	TL	NTL	N	PD	AVF/ AVG	TL	NTL	HD	PD	Tx
Antrim	28	14.3	42.9	32.1	10.7	9					75.6	14.6	9.8
Bangor	18	16.7	44.4	33.3	5.6	7					80.8	15.4	3.8
Belfast	40	32.5	30.0	32.5	5.0	9					45.5	18.2	36.4
Bham	231	24.2	43.7	15.2	16.9	111	14.4	16.2	28.8	40.5	75.0	20.0	5.0
Bradfd	67	13.4	49.3	25.4	11.9	28	3.6	32.1	17.9	46.4	84.2	9.9	5.9
Brightn	109	27.5	41.3	26.6	4.6	41	12.2	7.3	48.8	31.7	73.7	22.4	3.8
Bristol	102	21.6	31.4	36.3	10.8	53	3.8	5.7	69.8	20.8	78.4	14.4	7.2
Camb	32	18.8	43.8	37.5	0.0	12	33.3	16.7	50.0	0.0	42.0	12.3	45.7
Cardff	132	16.7	45.5	36.4	1.5	41	2.4	9.8	80.5	7.3	78.5	12.0	9.4
Carlis	22	36.4	36.4	27.3	0.0	12	0.0	8.3	91.7	0.0	76.5	23.5	0.0
Carsh	203	17.7	38.9	25.1	18.2	101	12.9	11.9	32.7	42.6	80.8	15.4	3.8
Clwyd	31	32.3	41.9	12.9	12.9	9					75.0	25.0	0.0
Colchr	0					1					100.0	0.0	0.0
Covnt	78	26.9	32.1	24.4	16.7	42	14.3	4.8	31.0	50.0	73.2	21.3	5.5
Derby	78	35.9	34.6	17.9	11.5	24	4.2	37.5	37.5	20.8	68.9	27.4	3.8
Donc	49	12.2	53.1	30.6	4.1	18	27.8	11.1	33.3	27.8	80.0	15.7	4.3
Dorset	60	23.3	56.7	6.7	13.3	28	7.1	14.3	32.1	46.4	74.2	16.5	9.3
Dudley	38	28.9	39.5	26.3	5.3	10	10.0	10.0	60.0	20.0	73.5	24.5	2.0
EssexMS	138	34.8	37.0	23.9	4.3	69	15.9	14.5	43.5	26.1	71.4	28.1	0.5
Exeter	100	10.0	60.0	17.0	13.0	39	5.1	10.3	25.6	59.0	90.7	2.9	6.4
Glouc	53	26.4	35.8	24.5	13.2	21	14.3	9.5	47.6	28.6	71.6	21.0	7.4
Hull	65	38.5	26.2	32.3	3.1	48	4.2	0.0	64.6	31.3	72.9	22.9	4.2
Ipswi	16	0.0	37.5	56.3	6.3	19	21.1	10.5	47.4	21.1	85.7	9.5	4.8
Kent	102	14.7	38.2	28.4	18.6	43	18.6	9.3	27.9	44.2	77.7	14.6	7.6
L Barts	141	21.3	28.4	33.3	17.0	180	32.8	7.2	32.8	27.2	67.5	25.8	6.7
L Guys	89	13.5	36.0	37.1	13.5	44	4.5	9.1	59.1	27.3	77.2	8.9	13.9
L Kings	109	21.1	37.6	24.8	16.5	37	8.1	5.4	35.1	51.4	79.4	16.8	3.9
L Rfree	161	24.8	46.0	21.7	7.5	60	10.0	10.0	53.3	26.7	72.5	18.7	8.8
L St.G	33	36.4	30.3	18.2	15.2	43	25.6	18.6	25.6	30.2	63.9	27.7	8.4
L West	217	25.8	20.7	37.3	16.1	130	13.8	6.9	51.5	27.7	73.4	19.9	6.7
Leeds	111	20.7	32.4	22.5	24.3	54	7.4	11.1	37.0	44.4	78.0	15.3	6.8
Leic	221	26.2	36.7	20.8	16.3	107	13.1	12.1	29.0	45.8	73.0	20.5	6.5
Liv UH	75	20.0	46.7	33.3	0.0	66	15.2	12.1	72.7	0.0	75.3	16.2	8.4
M RI	78	29.5	35.9	32.1	2.6	108	16.7	15.7	64.8	2.8	71.0	19.3	9.7
Middlbr	64	0.0	62.5	35.9	1.6	37	2.7	13.5	64.9	18.9	91.8	0.9	7.3
Newc	95	23.2	29.5	25.3	22.1	44	9.1	9.1	29.5	52.3	75.3	17.3	7.3
Newry	23	17.4	26.1	30.4	26.1	6					78.8	12.1	9.1
Norwch	33	51.5	27.3	15.2	6.1	21	28.6	14.3	23.8	33.3	61.4	37.1	1.4
Nottm	79	34.2	48.1	13.9	3.8	19	21.1	0.0	21.1	57.9	64.4	29.8	5.8
Oxford	126	34.1	34.1	30.2	1.6	44	29.5	13.6	56.8	0.0	59.1	29.5	11.4
Plymth	35	28.6	31.4	40.0	0.0	13	7.7	30.8	61.5	0.0	66.1	19.6	14.3
Ports	161	20.5	32.3	39.8	7.5	58	15.5	12.1	39.7	32.8	74.4	18.1	7.6
Prestn	124	17.7	32.3	46.8	3.2	57	14.0	1.8	66.7	17.5	79.5	15.8	4.7
Redng	78	19.2	38.5	28.2	14.1	40	15.0	5.0	37.5	42.5	79.5	17.2	3.3
Salford	111	23.4	30.6	45.9	0.0	48	10.4	10.4	79.2	0.0	70.7	17.1	12.2
Sheff	103	15.5	40.8	29.1	14.6	55	10.9	12.7	58.2	18.2	84.0	13.5	2.5
Shrew	48	43.8	33.3	16.7	6.3	14	21.4	0.0	57.1	21.4	60.3	38.1	1.6
Stevng	105	18.1	38.1	27.6	16.2	52	7.7	13.5	28.8	50.0	82.2	14.1	3.7
Stoke	67	23.9	34.3	34.3	7.5	47	12.8	8.5	40.4	38.3	78.6	18.8	2.6
Sund	50	30.0	40.0	30.0	0.0	23	13.0	8.7	47.8	30.4	72.4	23.7	3.9
Swanse	113	14.2	61.9	11.5	12.4	36	13.9	11.1	36.1	38.9	82.6	13.5	3.9
Truro	44	9.1	50.0	38.6	2.3	13	15.4	7.7	46.2	30.8	89.5	10.5	0.0
Ulster	19	0.0	36.8	47.4	15.8	11	9.1	9.1	63.6	18.2	85.3	2.9	11.8

Table 2.17 Continued

Centre	Presenting ≥365 days (%)					Presenting <365 days (%)					Start modality (%)		
	N	PD	AVF/ AVG	TL	NTL	N	PD	AVF/ AVG	TL	NTL	HD	PD	Tx
West NI	18	16.7	33.3	44.4	5.6	8					73.3	13.3	13.3
Wirral	24	29.2	45.8	20.8	4.2	13	7.7	7.7	61.5	23.1	72.5	20.0	7.5
Wolve	86	27.9	37.2	27.9	7.0	41	19.5	2.4	56.1	22.0	73.1	24.6	2.3
Wrexm	29	24.1	41.4	3.4	31.0	6					75.7	18.9	5.4
York	30	16.7	70.0	0.0	13.3	13	7.7	23.1	7.7	61.5	80.4	13.0	6.5
Total	**4,692**	**22.9**	**38.6**	**27.7**	**10.8**	**2,343**	**14.3**	**10.7**	**45.1**	**29.9**	**74.7**	**18.4**	**6.9**

Start modality breakdown includes patients with missing presentation time
Blank cells - referral data completeness < 70% or N<10; breakdown by access type not presented but these centres were included in the totals
AVF - arteriovenous fistula; AVG - arteriovenus graft; NTL - non-tunnelled line; TL - tunnelled line

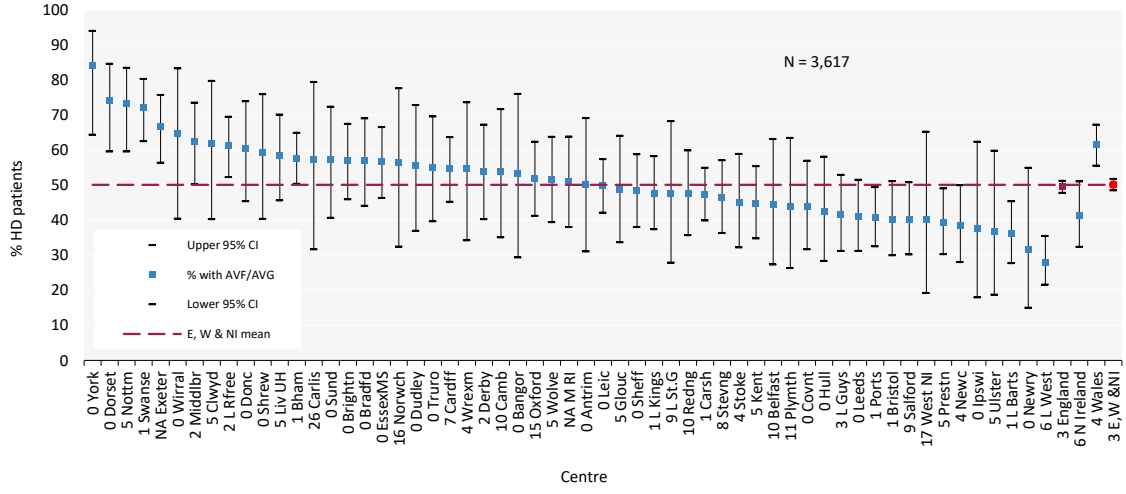

Figure 2.17 Percentage of adult patients incident to HD in 2023 who started dialysis using either an arteriovenous fistula (AVF) or an arteriovenous graft (AVG) by centre, excluding those presenting less than 365 days before KRT start

CI - confidence interval
Exeter and Manchester did not submit quarterly data so completeness could not be calculated.

Survival in incident adult KRT patients

The survival of patients who started KRT for ESKD is described, with primary focus on the one year incident to KRT in the 2022 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 KRT, but some countries define day 90 of KRT 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 2.18 90 days and 1 year after 90 days survival (adjusted to age 60 years) of incident adult KRT patients (2021-2022 2 year cohort) by country

Survival	England	N Ireland	Scotland	Wales	UK
Survival at 90 days (%)	96.4	98.5	96.9	96.7	96.5
95% CI	96.1-96.8	97.7-99.5	96.0-97.8	95.6-97.8	96.2-96.9
Survival 1 year after 90 days (%)	90.5	92.2	90.7	88.9	90.5
95% CI	90.0-91.1	89.9-94.5	89.1-92.3	86.7-91.1	90.0-91.0

CI – confidence interval

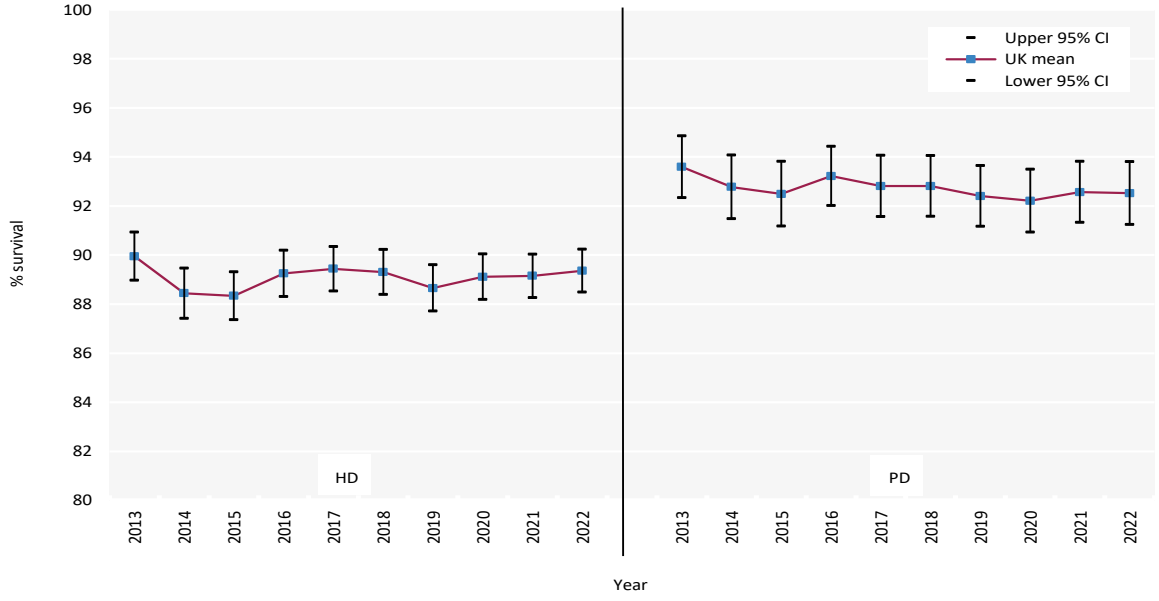

Figure 2.18 1 year after 90 days survival (adjusted to age 60 years) of incident adult KRT patients by start modality between 2013 and 2022
CI – confidence interval

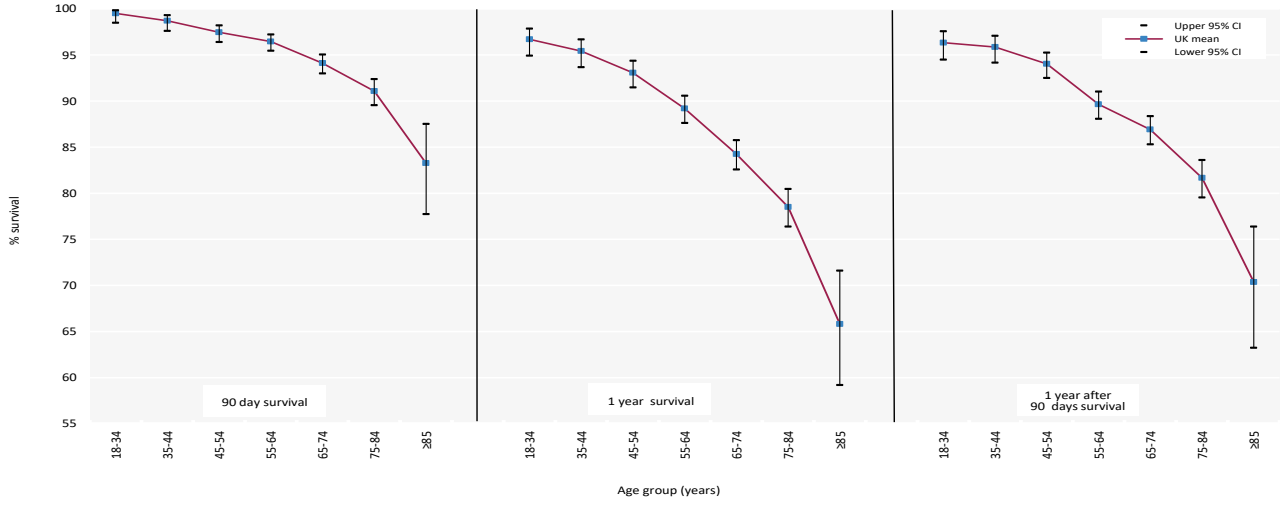

Figure 2.19 90 days, 1 year and 1 year after 90 days survival of incident adult KRT patients by age group (2022 cohort)
CI – confidence interval

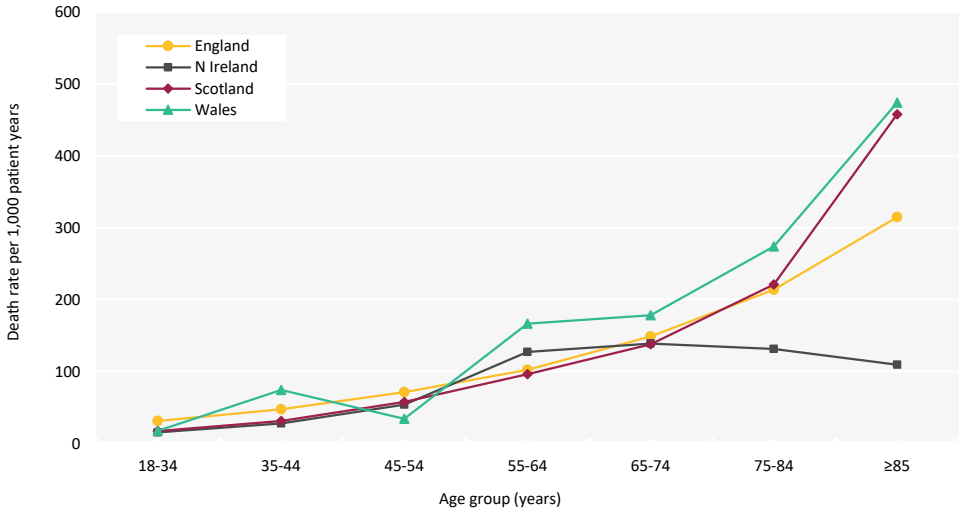

Figure 2.20 1 year after 90 days death rate per 1,000 incident KRT adult patient years by age group and country (2019-2022 4 year cohort)

A ten year rolling cohort was used to analyse the long term survival of incident patients from start of KRT (day 0), according to age at KRT 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 KRT by age group (figures 2.22 and 2.23).

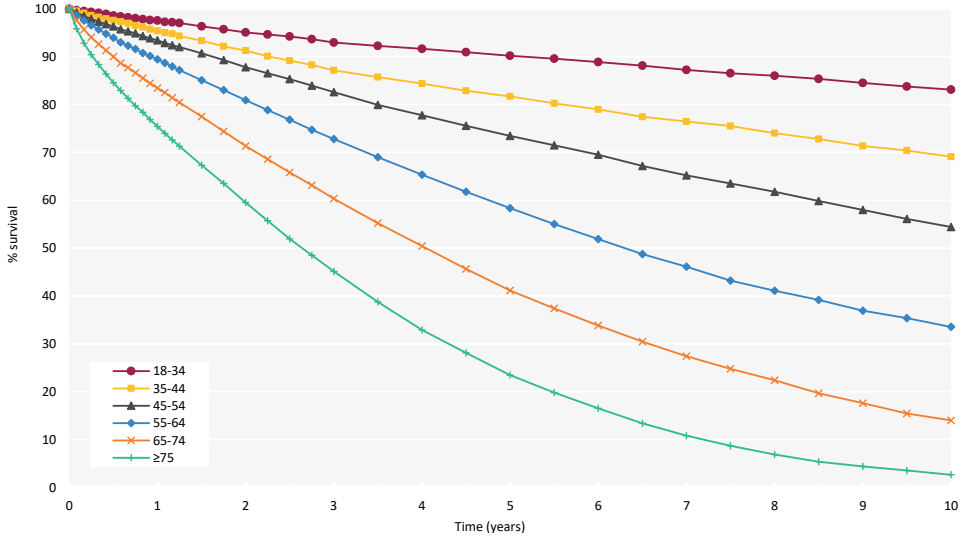

Figure 2.21 Survival (unadjusted) of incident adult KRT patients from day 0 by age group (2013-2022 10 year cohort)

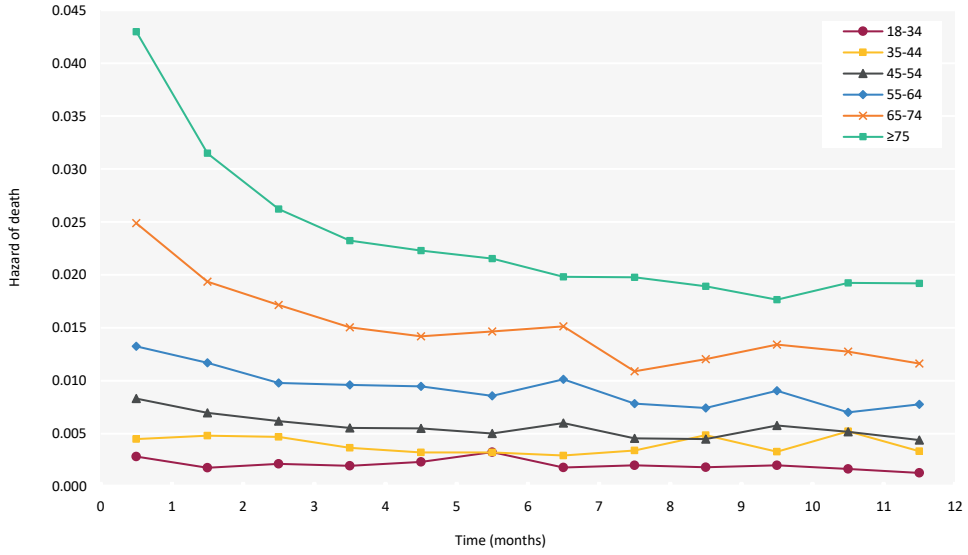

Figure 2.22 Monthly hazard of death (unadjusted) of incident adult KRT patients from day 0 to 1 year by age group (2013-2022 10 year cohort)

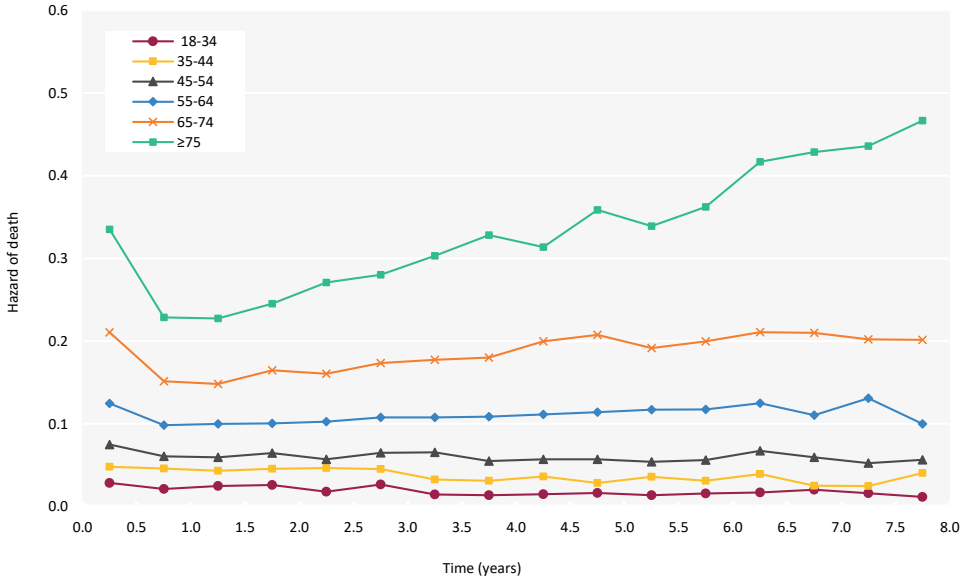

Figure 2.23 6 monthly hazard of death (unadjusted) of incident adult KRT patients from day 0 to 8 years by age group (2013-2022 10 year cohort)

Table 2.19 Survival (unadjusted) of incident adult KRT patients aged <65 years (2003-2022)

	Unadjusted survival (%)										95% CI for longest	
Cohort	1 yr	2 yr	3 yr	4 yr	5 yr	6 yr	7 yr	8 yr	9 yr	10 yr	survival	N
2022	92.5										91.6-93.2	4,345
2021	92.1	85.7									84.6-86.7	4,220
2020	92.2	84.9	79.0								77.7-80.2	4,138
2019	93.2	86.4	80.0	74.3							73.0-75.6	4,188
2018	92.9	86.9	80.1	74.8	70.1						68.6-71.4	4,253
2017	93.0	87.2	81.6	76.4	71.7	67.1					65.7-68.5	4,237
2016	92.9	87.5	82.1	77.2	71.4	66.5	62.2				60.7-63.7	4,008
2015	92.3	86.5	81.4	76.9	72.6	68.4	63.4	59.6			58.1-61.2	3,925
2014	92.8	86.8	81.4	77.0	73.4	69.3	65.1	61.4	58.0		56.3-59.6	3,666
2013	93.7	88.2	83.1	77.7	73.3	68.6	64.6	60.2	56.5	53.5	51.8-55.1	3,572
2012	93.1	87.4	81.9	76.8	72.6	68.6	64.9	60.9	57.5	54.0	52.3-55.6	3,515
2011	93.3	88.6	83.6	79.0	74.5	70.9	67.7	64.7	60.7	57.5	55.8-59.2	3,341
2010	92.3	86.6	81.7	77.4	72.8	69.6	66.4	62.5	59.6	56.7	54.9-58.3	3,364
2009	91.2	85.1	80.4	76.3	71.2	67.1	63.8	60.4	57.4	54.6	52.9-56.3	3,392
2008	91.5	86.0	81.2	76.9	73.2	69.6	65.7	62.4	59.5	56.6	54.9-58.3	3,453
2007	92.5	86.9	81.7	76.7	72.9	69.2	65.8	62.5	59.1	56.1	54.4-57.8	3,317
2006	90.6	85.0	80.0	75.5	71.8	67.9	63.8	60.9	57.8	55.1	53.4-56.9	3,151
2005	89.6	83.5	78.4	73.7	69.1	65.5	62.4	59.4	56.4	53.9	52.0-55.7	2,834
2004	89.6	83.3	78.0	72.5	67.8	64.1	60.9	57.1	54.6	53.0	51.0-54.9	2,538
2003	89.3	82.5	77.2	72.4	67.1	62.9	59.4	56.6	54.1	51.5	49.4-53.6	2,175

CI - confidence interval

Table 2.20 Survival (unadjusted) of incident adult KRT patients aged ≥65 years (2003-2022)

	Unadjusted survival (%)										95% CI for longest	
Cohort	1 yr	2 yr	3 yr	4 yr	5 yr	6 yr	7 yr	8 yr	9 yr	10 yr	survival	N
2022	80.8										79.5-82.0	3,838
2021	81.6	68.1									66.6-69.6	3,761
2020	79.4	65.0	52.6								50.9-54.2	3,671
2019	80.0	64.4	52.9	42.1							40.6-43.7	3,949
2018	79.3	65.3	51.8	41.8	32.5						31.0-34.0	3,823
2017	79.3	67.5	53.6	42.0	32.9	25.1					23.7-26.5	3,831
2016	80.1	65.3	52.9	40.4	30.9	24.1	18.4				17.2-19.7	3,757
2015	78.2	64.9	52.2	42.0	32.0	24.9	19.5	14.5			13.4-15.7	3,811
2014	78.5	64.2	52.2	41.3	32.8	26.2	19.8	15.4	11.6		10.6-12.7	3,588
2013	78.5	64.6	53.1	42.9	34.5	27.6	20.7	15.5	11.3	8.4	7.5-9.4	3,435
2012	77.2	65.1	54.2	44.0	35.4	27.6	21.8	17.1	13.3	10.7	9.6-11.8	3,326
2011	77.2	62.7	51.2	41.1	32.4	24.7	18.9	14.4	11.1	7.9	7.0-8.9	3,353
2010	76.0	63.0	51.1	41.8	32.1	25.4	19.6	14.5	11.3	8.3	7.4-9.3	3,282
2009	76.4	63.0	52.4	41.4	32.8	26.1	20.0	15.3	11.2	8.2	7.3-9.2	3,376
2008	74.6	61.0	49.7	40.3	32.0	25.6	20.4	16.1	12.1	9.0	8.0-10.0	3,180
2007	74.9	61.1	49.5	40.3	31.8	25.2	20.1	15.4	11.8	9.1	8.1-10.2	3,219
2006	72.0	58.1	46.8	37.1	28.8	22.9	17.4	13.2	10.5	8.3	7.4-9.4	3,111
2005	71.2	57.3	45.5	36.3	27.9	21.2	16.6	12.5	9.9	7.7	6.8-8.8	2,943
2004	68.9	53.9	42.2	33.8	26.6	20.8	16.1	12.8	9.7	7.4	6.4-8.5	2,598
2003	68.3	53.2	41.3	31.6	24.3	18.0	13.9	10.7	8.2	6.4	5.5-7.5	2,229

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 2.21). 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 2.21. Given there are 66 centres with data for age adjusted survival, it would be expected that three centres would fall outside the 95% (1 in 20) confidence limit, entirely by chance.

Table 2.21 1 year after 90 days adjusted survival (60 years, male and median comorbidity score) of incident adult KRT patients by centre (2019-2022 4 year cohort)

	Age adjusted survival				Case-mix adjusted survival[1]			
			Limits for funnel plot				Limits for funnel plot	
Centre	N on KRT	Adj 1 yr after 90 days survival (%)	Lower 95% limit	Upper 95% limit	N on KRT	Adj 1 yr after 90 days survival (%)	Lower 95% limit	Upper 95% limit
D&Gall	70	88.7	81.0	95.4				
Bangor	90	90.2	82.4	95.0	90	92.9	84.8	96.3
Inverns	101	95.0	83.0	94.8				
Ulster	104	89.8	83.1	94.8	97	89.0	85.1	96.2
Clwyd	107	86.9	83.2	94.7	107	88.9	85.6	96.1
Dundee	124	93.6	83.9	94.5				
Newry	129	87.1	84.0	94.4				
Wrexm	132	85.5	84.1	94.4	132	88.3	86.4	95.8
Carlis	137	87.7	84.2	94.3	136	89.8	86.5	95.8
Antrim	142	94.7	84.4	94.3				
West NI	142	91.5	84.4	94.3	138	90.4	86.6	95.8
Colchr	144	92.3	84.4	94.3	137	94.5	86.6	95.8
Krkcldy	166	94.1	84.9	94.1				
Klmarnk	180	88.8	85.2	93.9				
Wirral	182	89.5	85.2	93.9	182	92.6	87.5	95.4
Ipswi	186	89.5	85.3	93.9	179	91.2	87.5	95.5
York	194	88.6	85.4	93.8	194	90.8	87.7	95.4
Abrdn	201	90.3	85.5	93.8				
Donc	201	88.7	85.5	93.8	198	91.0	87.8	95.3
Truro	208	91.6	85.6	93.7	199	93.4	87.8	95.3
Shrew	223	86.1	85.8	93.7	221	89.1	88.1	95.2
Dudley	227	92.5	85.9	93.6	227	93.9	88.1	95.2
Plymth	240	88.7	86.0	93.6	240	91.7	88.3	95.1
Airdrie	261	90.7	86.2	93.4				
Glouc	287	91.0	86.4	93.3	276	92.6	88.6	95.0
Sund	299	86.4	86.5	93.3	297	89.8	88.8	94.9
Dorset	325	93.8	86.7	93.2	324	94.9	88.9	94.8
Bradfd	326	86.1	86.7	93.2	326	89.3	88.9	94.8
Edinb	330	91.5	86.7	93.2				
Belfast	332	94.4	86.8	93.2				
L St.G	354	90.6	86.9	93.1	339	92.2	89.0	94.8
Derby	358	92.9	86.9	93.1	358	94.4	89.1	94.7
Hull	381	91.0	87.0	93.0	381	93.0	89.2	94.6
Middlbr	390	92.6	87.1	93.0	389	94.1	89.3	94.6
Norwch	392	90.9	87.1	93.0	381	92.2	89.2	94.6
Wolve	411	87.5	87.2	92.9	411	90.8	89.4	94.6
Redng	444	94.5	87.3	92.8	443	95.6	89.5	94.5
Stoke	458	87.5	87.4	92.8	443	89.8	89.5	94.5
Newc	461	90.6	87.4	92.8	461	92.8	89.6	94.5
Nottm	482	87.5	87.5	92.7	482	90.8	89.6	94.4
Brightn	517	88.5	87.6	92.7	513	90.7	89.7	94.4

Table 2.21 Continued

Centre	Age adjusted survival				Case-mix adjusted survival[1]			
			Limits for funnel plot				Limits for funnel plot	
	N on KRT	Adj 1 yr after 90 days survival (%)	Lower 95% limit	Upper 95% limit	N on KRT	Adj 1 yr after 90 days survival (%)	Lower 95% limit	Upper 95% limit
Covnt	524	90.0	87.6	92.7	516	91.8	89.7	94.4
Camb	531	94.2	87.6	92.7	531	95.2	89.8	94.3
Swanse	535	88.6	87.6	92.6	535	91.2	89.8	94.3
EssexMS	537	91.4	87.6	92.6	526	93.4	89.8	94.4
Bristol	562	89.9	87.7	92.6	544	92.2	89.8	94.3
Kent	615	87.0	87.8	92.5	615	89.5	90.0	94.2
Cardff	616	88.3	87.8	92.5	616	90.4	90.0	94.2
Liv UH	624	90.7	87.9	92.5	611	93.2	90.0	94.2
Sheff	631	91.4	87.9	92.5	630	93.3	90.0	94.2
Salford	634	87.3	87.9	92.5	630	90.1	90.0	94.2
Leeds	639	91.7	87.9	92.5	639	93.4	90.0	94.2
Prestn	667	86.5	87.9	92.4	666	89.9	90.1	94.2
Stevng	686	93.0	88.0	92.4	677	94.5	90.1	94.1
L Guys	693	90.7	88.0	92.4	693	92.0	90.1	94.1
M RI	709	90.5	88.0	92.4	679	92.9	90.1	94.1
Glasgw	745	89.8	88.1	92.3				
L Kings	746	91.6	88.1	92.3	734	93.7	90.2	94.1
Oxford	782	92.7	88.2	92.3	774	94.3	90.3	94.0
Ports	884	89.3	88.3	92.2	868	91.7	90.4	94.0
Carsh	975	89.3	88.4	92.1	937	91.7	90.5	93.9
L Rfree	995	88.5	88.4	92.1	969	91.3	90.5	93.9
L Barts	1,191	93.8	88.6	92.0	1,140	95.0	90.7	93.8
Leic	1,278	90.6	88.7	91.9	1,261	92.4	90.8	93.7
Bham	1,406	92.0	88.8	91.9	1,385	93.7	90.9	93.7
L West	1,494	90.7	88.8	91.8	1,441	92.5	90.9	93.6

[1]Centres excluded if <85% comorbidity data were available – this included Belfast, Antrim, Newry and all Scottish kidney centres
[1]Survival adjusted to age 60 years, male and median comorbidity score
The Scottish Renal Registry reports survival adjusted for age, sex, primary renal disease and deprivation in its annual report https://www.publichealthscotland.scot/publications/scottish-renal-registry/scottish-renal-registry-annual-report-2024/

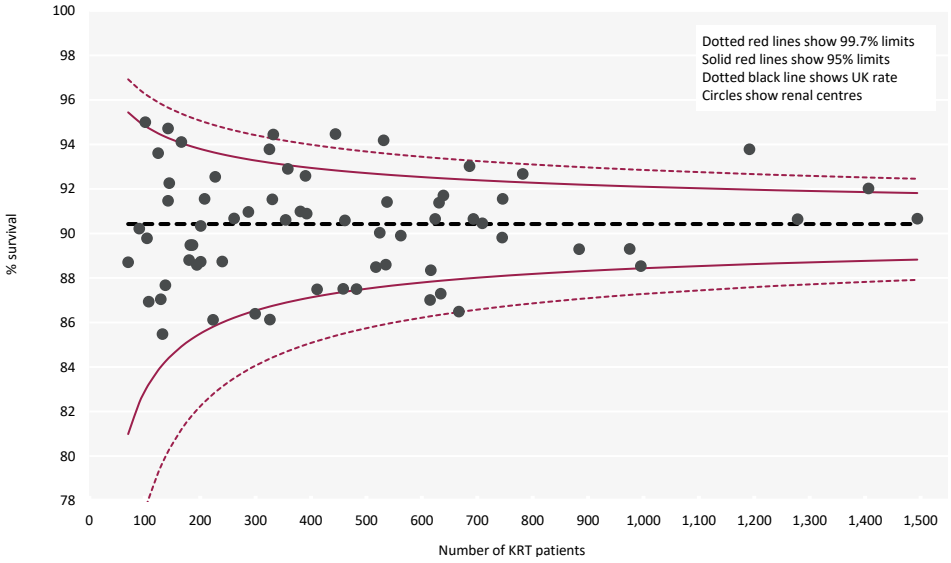

Figure 2.24 1 year after 90 days survival (adjusted to age 60 years) of incident adult KRT patients by centre (2019-2022 4 year cohort)

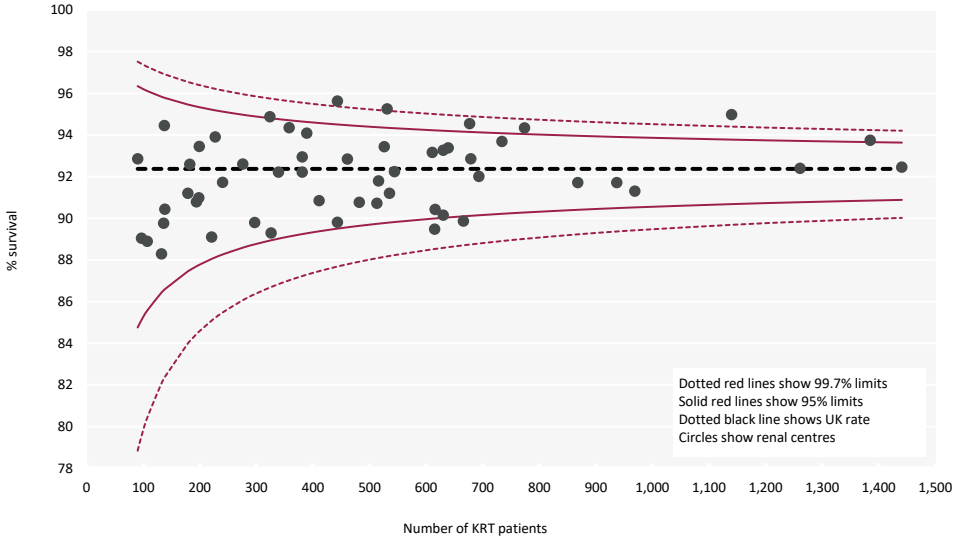

Figure 2.25 1 year after 90 days survival (adjusted to age 60 years, male and median comorbidity score) of incident adult KRT patients by centre (2019-2022 4 year cohort)

Cause of death in incident adult KRT patients

Cause of death was analysed in incident KRT patients using a four year incident cohort followed up for 90 days and 1 year after 90 days. The proportion of incident adult KRT 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. Where the cause of death was missing in the UKRR data, cause of death from Civil Registration records was used.

Table 2.22 Cause of death in the first 90 days and one year after 90 days in incident adult KRT patients by age group (2019-2022 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	302	20.9	23.8	19.8	625	19.5	22.2	18.1
Cerebrovascular disease	34	2.3	3.2	2.1	114	3.6	4.7	3.0
Infection	328	22.7	23.0	22.5	679	21.2	22.8	20.4
Malignancy	132	9.1	6.9	9.9	296	9.2	6.8	10.5
Treatment withdrawal	118	8.1	4.8	9.4	353	11.0	7.9	12.6
Other	463	32.0	33.3	31.5	954	29.8	30.3	29.5
Uncertain aetiology	71	4.9	5.3	4.8	184	5.7	5.3	6.0
Total (with data)	**1,448**	**100.0**	**100.0**	**100.0**	**3,205**	**100.0**	**100.0**	**100.0**
Missing	91	5.9	7.1	5.5	244	7.1	7.3	7.0

UK Kidney Association
UK Renal Registry

Chapter 3

Adults on kidney replacement therapy (KRT) in the UK at the end of 2023

Contents

Introduction

This chapter describes the population of adult patients with end-stage kidney disease (ESKD) who were on kidney replacement therapy (KRT) in the UK at the end of 2023 (figure 3.1). Patients may have started KRT prior to 2023 or during 2023. Three KRT modalities are available to patients with ESKD – haemodialysis (HD), peritoneal dialysis (PD) and kidney transplantation (Tx). HD may be undertaken in-centre (ICHD) or at home (HHD).

The size of the prevalent population on each KRT modality reflects uptake to the modality by new KRT 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 KRT or die.

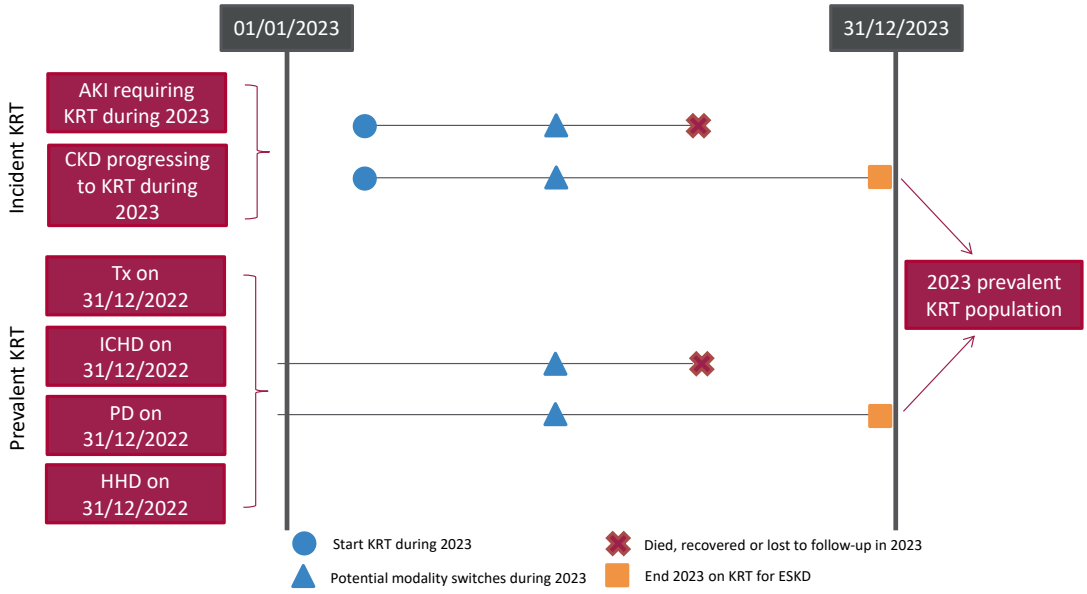

Figure 3.1 Pathways adult patients could follow to be included in the UK 2023 prevalent KRT population

Note that patients receiving dialysis for acute kidney injury (AKI) are only included in this chapter if they had a timeline or KRT modality code for chronic KRT at the end of 2023 or if they had been on KRT for ≥90 days and were on KRT at the end of 2023

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 2023 prevalent adult KRT population, including the number on KRT per million population (pmp). These analyses are performed annually to help clinicians and policy makers plan future KRT requirements in the UK. Variation in case-mix is also reported to aid understanding of how to improve equity of KRT provision in the UK.

The UK Kidney Association guidelines (ukkidney.org/health-professionals/guidelines/guidelines-commentaries) provide audit measures relevant to the care of patients on KRT, but these are treatment-specific – for further details see the guideline tables in each chapter.

Exeter and Manchester were unable to submit patient level data for 2023. Aggregate numbers by modality were provided, enabling inclusion in Tables 3.1 and 3.2. Exeter and Manchester are excluded from all other analyses.

London Kings moved to a new Trust IT system, and as a result data were not submitted for the final quarter of 2023. Data for London Kings presented in this chapter are for patients who were on KRT on 30th September 2023, rather than 31st December 2023.

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

Key findings

- 72,708 adult patients were receiving KRT for ESKD on 31/12/2023. This represents a 2.5% increase from 2022, in line with the 2-2.5% increase that was seen in the years before the pandemic.
- KRT prevalence was 1,342 per million population compared 1,322 per million population in 2022, an increase of 1.5%.
- The median age of KRT patients was 60.0 years (ICHD 65.6 years, HHD 55.9 years, PD 63.0 years and Tx 57.0 years). In 2010 the median age was 57.9 years (ICHD 66.8 years, HHD 52.4 years, PD 61.5 years and Tx 51.2 years).
- 61.4% of KRT patients were male.
- Tx continued as the most common treatment modality (56.3%) – ICHD comprised 36.6%, PD 5.1% and HHD 2.0% of the KRT population.
- The most common identifiable primary renal disease (PRD) was glomerulonephritis (19.5%), followed by diabetes (18.9%).
- There were 3 centres above the upper 95% limit and 1 centre below the lower 95% limit in the funnel plots showing 1 year age-, sex- and comorbidity-adjusted survival for patients prevalent to dialysis on 31/12/2022. It is expected that 3 centres would be outside the limits by chance.
- Cause of death records from Civil Registration were used where the cause of death was missing in the UKRR data. This resulted in improved completeness and changes in proportions of the causes of death. The leading cause of death was cardiac disease (23.3%) in younger patients (<65 years) and infections (20.1%) in patients ≥ 65 years.

Analyses

Changes to the prevalent adult KRT population

For the 67 adult kidney centres, the number of prevalent patients on KRT was calculated as a proportion of the estimated centre catchment population (calculated as detailed in appendix A).

Table 3.1 Number of prevalent adult KRT patients by year and by centre; number of KRT patients as a proportion of the catchment population

Centre	N on KRT					Estimated catchment population (millions)	2023 crude rate (pmp)
	2019	2020	2021	2022	2023		
ENGLAND							
Bham	3,312	3,261	3,303	3,389	3,417	2.10	1,630
Bradfd	733	725	736	781	824	0.51	1,623
Brightn	1,064	1,078	1,091	1,097	1,145	1.08	1,059
Bristol	1,487	1,476	1,497	1,525	1,522	1.27	1,201
Camb	1,456	1,511	1,628	1,660	1,629	0.99	1,648
Carlis	302	297	306	303	305	0.26	1,178
Carsh	1,782	1,851	1,907	1,940	2,001	1.68	1,192
Colchr	145	150	146	155	164	0.30	551
Covnt	1,082	1,109	1,129	1,130	1,158	0.81	1,436
Derby	654	675	691	717	735	0.58	1,276
Donc	342	341	341	380	387	0.38	1,018
Dorset	773	798	787	792	816	0.75	1,088
Dudley	366	374	403	383	368	0.35	1,048
EssexMS	852	885	895	891	974	1.01	963
Exeter	1,089	1,092	1,077	1,128	1,127	0.99	1,142
Glouc	531	522	545	557	560	0.53	1,064
Hull	904	913	917	934	959	0.81	1,181
Ipswi	428	426	422	395	397	0.32	1,248
Kent	1,140	1,144	1,192	1,221	1,240	1.08	1,143
L Barts	2,655	2,670	2,724	2,841	2,959	1.62	1,832
L Guys	2,322	2,318	2,326	2,312	2,318	1.01	2,302
L Kings	1,248	1,254	1,332	1,396	1,389	0.94	1,471
L Rfree	2,345	2,336	2,396	2,422	2,475	1.27	1,942
L St.G	852	854	872	855	878	0.67	1,313
L West	3,608	3,529	3,548	3,614	3,681	2.03	1,812
Leeds	1,727	1,753	1,785	1,840	1,906	1.40	1,357
Leic	2,580	2,621	2,634	2,722	2,820	2.18	1,294
Liv UH	1,483	1,446	1,462	1,478	1,503	1.27	1,186
M RI	2,048	1,986	2,071	2,108	2,258	1.37	1,654
Middlbr	953	946	958	956	971	0.82	1,185
Newc	1,172	1,197	1,225	1,246	1,287	0.96	1,345
Norwch	809	810	800	802	808	0.71	1,145
Nottm	1,217	1,208	1,217	1,208	1,195	0.93	1,282
Oxford	1,979	2,021	2,006	2,076	2,132	1.54	1,384
Plymth	535	542	543	544	549	0.41	1,327
Ports	1,882	1,900	1,943	2,000	2,030	1.79	1,136
Prestn	1,342	1,368	1,374	1,400	1,436	1.27	1,130
Redng	862	870	879	922	994	0.74	1,338
Salford	1,243	1,267	1,217	1,273	1,371	1.19	1,154
Sheff	1,491	1,495	1,501	1,487	1,478	1.12	1,316
Shrew	437	427	443	446	461	0.42	1,089
Stevng	963	980	1,023	1,069	1,117	1.15	968

Table 3.1 Continued

Centre	N on KRT 2019	2020	2021	2022	2023	Estimated catchment population (millions)	2023 crude rate (pmp)
Stoke	808	816	845	906	921	0.75	1,232
Sund	570	556	547	565	590	0.54	1,083
Truro	450	444	462	471	468	0.37	1,282
Wirral	417	417	416	403	387	0.48	803
Wolve	615	655	695	725	780	0.55	1,409
York	582	572	581	609	610	0.49	1,239
N IRELAND							
Antrim	285	287	295	306	311	0.25	1,252
Belfast	881	889	908	926	938	0.54	1,742
Newry	253	264	281	269	277	0.24	1,163
Ulster	185	201	203	209	210	0.21	1,022
West NI	328	351	339	355	357	0.25	1,410
SCOTLAND							
Abrdn	557	565	578	589	608	0.50	1,219
Airdrie	525	516	504	517	565	0.47	1,211
D&Gall	150	157	155	146	145	0.12	1,200
Dundee	447	425	403	388	384	0.37	1,043
Edinb	885	886	921	964	989	0.85	1,168
Glasgw	1,850	1,843	1,854	1,893	1,934	1.38	1,398
Inverns	283	272	276	280	310	0.23	1,374
Klmarnk	362	370	369	379	394	0.29	1,351
Krkcldy	295	289	291	285	288	0.28	1,047
WALES							
Bangor	201	216	217	220	218	0.16	1,380
Cardff	1,730	1,681	1,701	1,760	1,830	1.16	1,581
Clwyd	205	204	202	204	222	0.18	1,221
Swanse	869	850	852	848	901	0.75	1,197
Wrexm	310	322	303	307	327	0.21	1,564
TOTALS							
England	57,637	57,886	58,838	60,074	61,500	45.78	1,343
N Ireland	1,932	1,992	2,026	2,065	2,093	1.48	1,411
Scotland	5,354	5,323	5,351	5,441	5,617	4.48	1,255
Wales	3,315	3,273	3,275	3,339	3,498	2.46	1,423
UK	**68,238**	**68,474**	**69,490**	**70,919**	**72,708**	**54.20**	**1,342**

Country KRT populations were calculated by summing the KRT patients from centres in each country. Estimated country populations were derived from publicly available sources (see appendix A for details on estimated catchment population by kidney centre)
Exeter was unable to submit 2021 to 2023 patient level data, Manchester was unable to submit 2023 patient level data, but both provided aggregate numbers of patients on KRT at the end of each year, by treatment modality
pmp – per million population

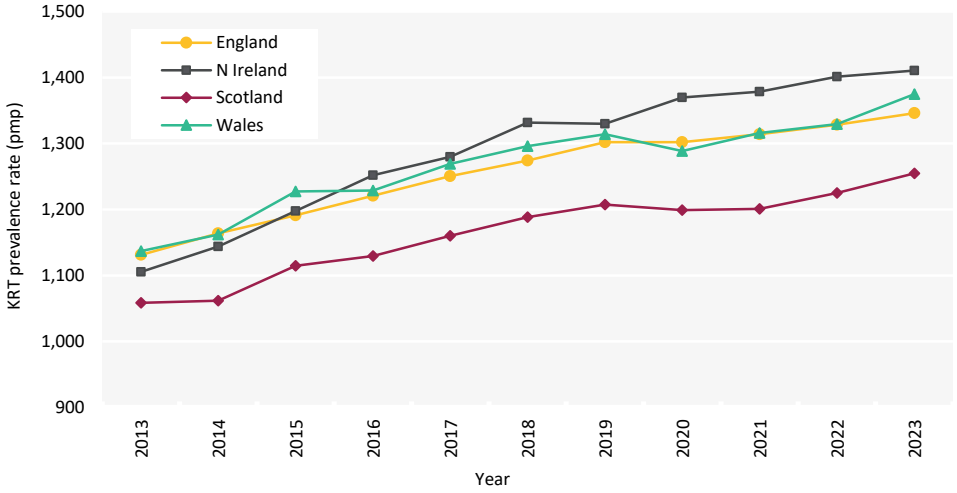

Figure 3.2 Adult KRT prevalence rates by country between 2013 and 2023
pmp – per million population

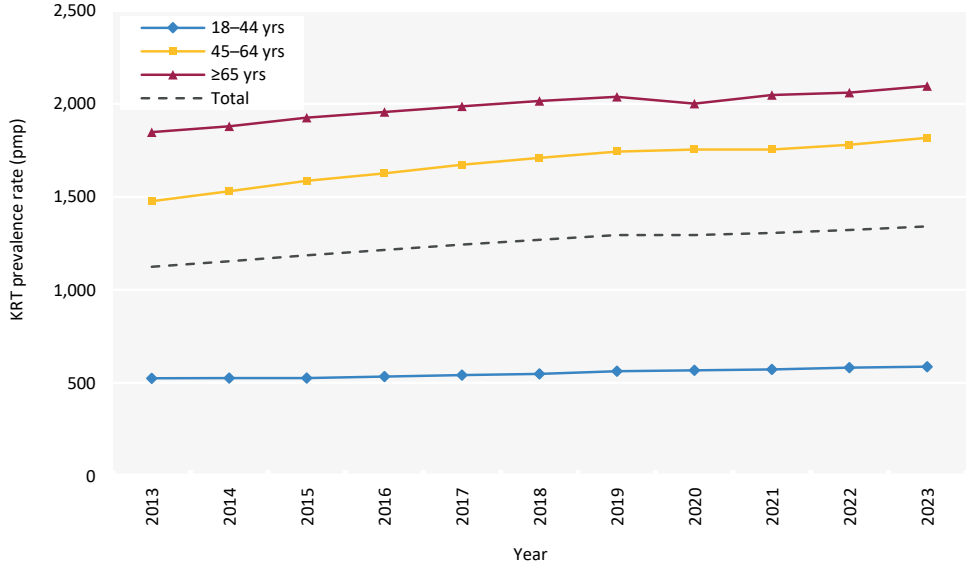

Figure 3.3 Adult KRT prevalence rates by age group between 2013 and 2023
pmp – per million population

Demographics and treatment modality of prevalent adult KRT patients

The proportion of KRT 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 KRT on 31/12/2023 by centre

								Ethnicity				
Centre	N on KRT	% on ICHD	% on PD	% on HHD	% with Tx	Median age (yrs)	% male	% White	% Asian	% Black	% Other	% missing
ENGLAND												
Bham	3,417	41.2	7.3	1.8	49.7	59.0	59.6	54.5	30.6	11.9	3.0	1.4
Bradfd	824	42.0	3.8	0.7	53.5	56.3	58.7	49.7	45.4	2.7	2.2	0.1
Brightn	1,145	39.7	5.5	3.0	51.9	61.4	61.1	88.5	6.2	2.5	2.7	3.2
Bristol	1,522	31.1	4.3	0.6	64.1	59.0	62.0	86.0	4.7	6.9	2.3	0.3
Camb	1,629	19.7	1.8	1.2	77.3	58.6	63.2	88.5	6.9	2.9	1.7	1.5
Carlis	305	35.1	6.9	2.3	55.7	60.6	60.3	96.7	2.7	0.7	0.0	1.6
Carsh	2,001	46.2	6.2	1.2	46.3	62.2	61.2	63.0	19.8	12.1	5.0	3.7
Colchr	164	100.0	0.0	0.0	0.0	69.5	64.6	92.9	0.6	1.9	4.5	5.5
Covnt	1,158	34.4	6.5	1.3	57.9	60.0	62.3	76.2	17.4	5.7	0.7	0.6
Derby	735	38.9	8.7	8.2	44.2	61.5	62.3	81.6	12.4	3.3	2.6	5.9
Donc	387	51.4	5.2	2.3	41.1	63.1	63.6	91.4	3.4	2.1	3.1	1.0
Dorset	816	40.6	3.3	1.7	54.4	64.5	62.5	94.5	2.8	0.7	2.0	0.0
Dudley	368	54.9	9.0	3.0	33.2	64.1	64.4	75.8	17.7	6.0	0.5	0.0
EssexMS	974	49.0	11.8	1.7	37.5	62.8	64.2	82.6	6.3	6.8	4.2	5.3
Exeter	1,127	43.0	6.2	1.5	49.2							
Glouc	560	38.9	6.1	0.5	54.5	63.0	60.7	90.2	4.7	2.1	3.0	0.2
Hull	959	39.8	5.6	1.8	52.8	59.6	63.3	95.2	1.7	1.4	1.7	1.3
Ipswi	397	36.3	3.8	0.0	59.9	64.1	62.5	81.2	2.3	3.8	12.7	0.8
Kent	1,240	38.5	4.6	1.6	55.3	60.5	61.0	91.0	3.4	2.1	3.5	1.5
L Barts	2,959	40.6	7.4	1.8	50.2	58.3	59.0	30.9	36.8	26.1	6.3	1.7
L Guys	2,318	29.8	1.9	1.6	66.7	57.4	59.8	55.9	10.3	28.4	5.3	2.5
L Kings	1,389	48.6	6.4	2.4	42.5	60.1	61.2	41.8	14.9	39.4	3.8	1.7
L Rfree	2,475	32.6	5.6	0.2	61.5	59.1	60.8	40.9	21.3	22.3	15.5	4.4
L St.G	878	35.5	6.5	0.6	57.4	60.8	57.4	40.3	25.6	24.7	9.4	4.2
L West	3,681	37.1	5.2	1.3	56.5	60.9	62.5	35.0	38.5	19.0	7.4	0.0
Leeds	1,906	33.9	2.9	1.4	61.8	58.0	60.8	74.6	17.6	5.9	1.9	0.3
Leic	2,820	37.6	5.7	1.5	55.2	60.7	61.4	72.2	20.1	5.7	2.0	4.9
Liv UH	1,503	36.0	3.7	4.1	56.2	58.8	62.7	90.0	3.4	3.3	3.3	4.8
M RI	2,258	26.0	4.5	3.8	65.7							
Middlbr	971	37.9	1.4	1.6	59.0	60.3	62.3	92.3	5.5	1.0	1.2	0.3
Newc	1,287	31.2	4.0	1.6	63.2	59.3	59.4	92.1	5.1	1.6	1.2	0.1
Norwch	808	39.1	7.2	1.1	52.6	63.7	62.3	96.0	1.8	1.3	0.9	4.6
Nottm	1,195	29.7	7.4	2.5	60.4	58.7	60.4	80.6	6.8	7.4	5.1	1.0
Oxford	2,132	24.0	4.0	1.1	70.9	58.9	61.2	78.1	12.0	5.8	4.0	7.3
Plymth	549	28.4	6.4	0.9	64.3	61.2	63.4	96.3	1.5	0.5	1.6	0.4
Ports	2,030	34.3	4.6	3.8	57.3	60.5	59.8	91.5	4.7	1.5	2.3	12.8
Prestn	1,436	36.8	3.9	2.7	56.6	59.7	61.0	82.7	15.4	1.0	0.9	3.6
Redng	994	37.5	5.2	1.7	55.5	60.6	64.1	61.9	23.8	5.7	8.6	10.1
Salford	1,371	36.4	7.0	2.3	54.3	59.1	62.1	75.9	17.5	4.0	2.5	2.6
Sheff	1,478	39.4	4.7	3.0	52.8	59.4	63.1	85.5	8.2	3.4	2.9	1.6
Shrew	461	37.3	11.9	9.5	41.2	62.3	64.9	90.0	4.0	2.2	3.8	2.0
Stevng	1,117	54.1	3.3	4.0	38.6	61.5	64.3	66.5	19.9	9.2	4.4	2.9
Stoke	921	36.6	9.7	3.8	49.9	60.0	61.7	89.0	6.1	2.5	2.4	3.9

Table 3.2 Continued

Centre	N on KRT	% on ICHD	% on PD	% on HHD	% with Tx	Median age (yrs)	% male	Ethnicity				
								% White	% Asian	% Black	% Other	% missing
Sund	590	39.0	6.1	2.5	52.4	60.8	59.3	95.1	3.1	0.8	1.0	0.0
Truro	468	40.6	2.8	1.9	54.7	62.1	60.7	98.1	0.9	0.2	0.9	0.0
Wirral	387	43.2	4.4	1.0	51.4	61.4	61.5	95.3	2.3	1.3	1.0	0.0
Wolve	780	52.2	7.8	5.5	34.5	60.5	60.4	57.8	28.0	10.1	4.1	0.1
York	610	33.8	4.4	3.0	58.9	61.6	62.6	96.0	1.5	0.3	2.2	2.0
N IRELAND												
Antrim	311	38.9	4.8	0.3	55.9	63.5	62.1	99.3	0.0	0.4	0.4	9.6
Belfast	938	14.7	2.5	0.9	82.0	58.9	60.4	96.8	2.3	0.3	0.6	4.7
Newry	277	28.2	2.9	0.7	68.2	61.3	61.4	97.3	1.2	1.2	0.4	7.2
Ulster	210	45.7	2.4	0.0	51.9	64.2	63.3	94.2	4.3	1.4	0.0	1.0
West NI	357	30.8	0.3	0.6	68.3	59.2	60.8	98.5	1.5	0.0	0.0	3.6
SCOTLAND												
Abrdn	608	33.9	3.5	0.5	62.2	58.0	58.6					
Airdrie	565	40.9	4.2	0.0	54.9	60.1	56.5					
D&Gall	145	31.0	5.5	0.7	62.8	62.0	64.8					
Dundee	384	37.0	6.0	1.0	56.0	61.4	61.5					
Edinb	989	30.0	3.0	0.8	66.1	59.3	64.7					
Glasgw	1,934	31.3	1.5	0.8	66.3	59.5	60.1					
Inverns	310	37.7	3.2	0.3	58.7	60.8	59.7					
Klmarnk	394	41.6	8.1	3.3	47.0	61.3	60.4					
Krkcldy	288	59.4	4.2	0.7	35.8	62.5	63.2					
WALES												
Bangor	218	31.2	4.6	10.1	54.1	61.4	63.3	97.8	0.0	0.5	1.6	15.6
Cardff	1,830	32.1	3.2	2.4	62.2	59.0	63.0	90.5	6.1	1.6	1.8	6.7
Clwyd	222	43.2	8.6	4.1	44.1	63.7	65.8	97.5	2.0	0.5	0.0	11.3
Swanse	901	48.3	4.8	3.9	43.1	62.7	61.4	96.3	2.3	0.5	0.9	2.9
Wrexm	327	36.4	6.4	2.4	54.7	59.3	62.1	96.2	1.3	1.0	1.6	4.3
TOTALS												
England	61,500	37.0	5.4	2.1	55.5	60.0	61.3	70.4	16.0	9.6	4.0	2.8
N Ireland	2,093	25.9	2.5	0.6	71.0	60.6	61.2	97.2	1.9	0.5	0.4	5.2
Scotland	5,617	35.2	3.4	0.9	60.5	60.1	60.7					
Wales	3,498	37.3	4.3	3.4	54.9	60.2	62.7	93.4	4.0	1.1	1.4	6.3
UK	**72,708**	**36.6**	**5.1**	**2.0**	**56.3**	**60.0**	**61.4**	**72.4**	**14.9**	**8.9**	**3.8**	**3.0**

Blank cells – no data returned by the centre or data completeness <70%
Breakdown by ethnicity is not shown for centres with <70% data completeness, but these centres were included in national averages
Exeter and Manchester were unable to submit 2023 patient level data, but provided aggregate numbers of patients on KRT at the end of 2023, by treatment modality
UK ethnicity distribution and completeness does not include Scotland

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 KRT 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 KRT on 31/12/2023 by age group

	Age group (yrs)								
Characteristic	18–34	35–44	45–54	55–64	65–74	75–84	≥85	Total	Median age (yrs)
Total									
N on KRT	5,289	8,070	12,512	17,590	14,855	9,295	1,712	69,323	60.0
% on KRT	7.6	11.6	18.0	25.4	21.4	13.4	2.5		
Sex (%)									
Male	7.5	11.6	17.7	25.4	21.5	13.6	2.7	61.4	60.3
Female	7.9	11.8	18.5	25.3	21.3	13.1	2.1	38.6	59.7
Ethnicity (%)									
White	7.6	11.2	17.2	25.3	21.4	14.6	2.7	72.9	60.6
Asian	8.6	13.5	20.2	21.8	23.9	10.2	1.7	14.7	58.7
Black	6.2	11.9	22.3	32.9	16.5	7.9	2.4	8.8	58.0
Other	10.2	16.5	20.6	25.7	16.9	8.4	1.8	3.7	56.0
Missing	6.8	10.1	16.2	24.0	24.3	16.3	2.3	8.2	62.2
PRD (%)									
Diabetes	2.7	8.8	17.5	28.0	26.6	14.0	2.3	18.9	62.5
Glomerulonephritis	8.9	14.9	20.4	26.5	18.6	9.6	1.2	19.5	57.3
Hypertension	3.6	9.3	19.0	27.3	20.6	16.4	3.8	6.5	61.5
Polycystic kidney disease	1.8	6.0	18.6	33.8	26.5	12.1	1.0	10.5	62.0
Pyelonephritis	7.7	13.5	19.5	25.5	18.7	12.4	2.8	7.3	58.5
Renal vascular disease	2.2	4.1	6.6	15.3	29.0	34.0	8.9	2.4	73.1
Other	17.2	15.5	17.4	20.3	17.2	10.5	1.9	18.2	55.0
Uncertain aetiology	6.8	11.9	17.8	22.8	20.5	16.4	3.8	16.6	61.0
Missing	9.1	10.3	14.3	22.0	21.7	18.7	4.0	3.5	62.6
Modality (%)									
ICHD	4.8	7.8	13.7	22.2	23.6	22.3	5.6	36.8	65.6
HHD	9.5	16.3	21.4	28.9	15.7	7.3	0.9	1.9	55.9
PD	7.8	10.4	15.4	20.3	22.6	20.0	3.4	5.1	63.0
Tx	9.4	14.1	21.0	27.8	20.1	7.2	0.4	56.1	57.0

Variation between centres in the proportion of patients prevalent to dialysis on 31/12/2023 and on home therapies is shown in figure 3.4 . Please visit the UKRR data portal (ukkidney.org/audit-research/data-portals) to identify individual kidney centres.

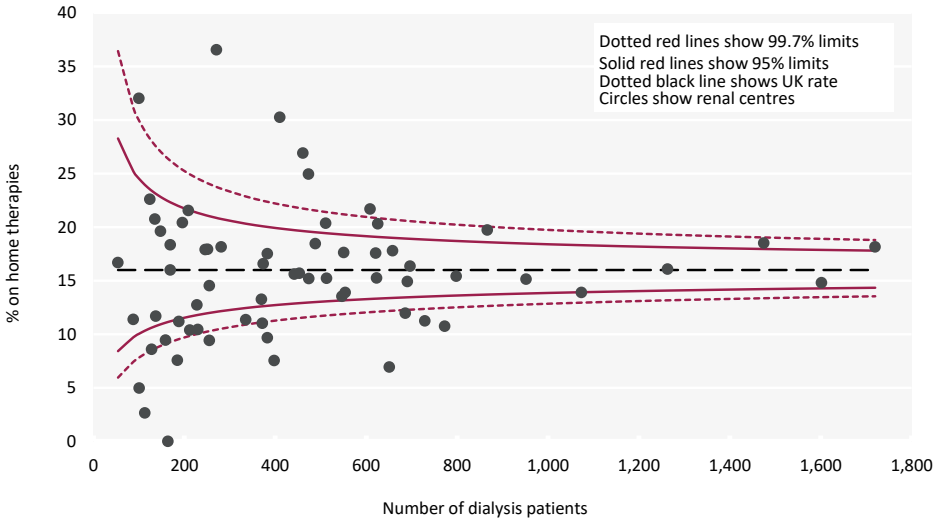

Figure 3.4 Percentage of adult patients prevalent to dialysis on 31/12/2023 on home therapies (PD and HHD) by centre

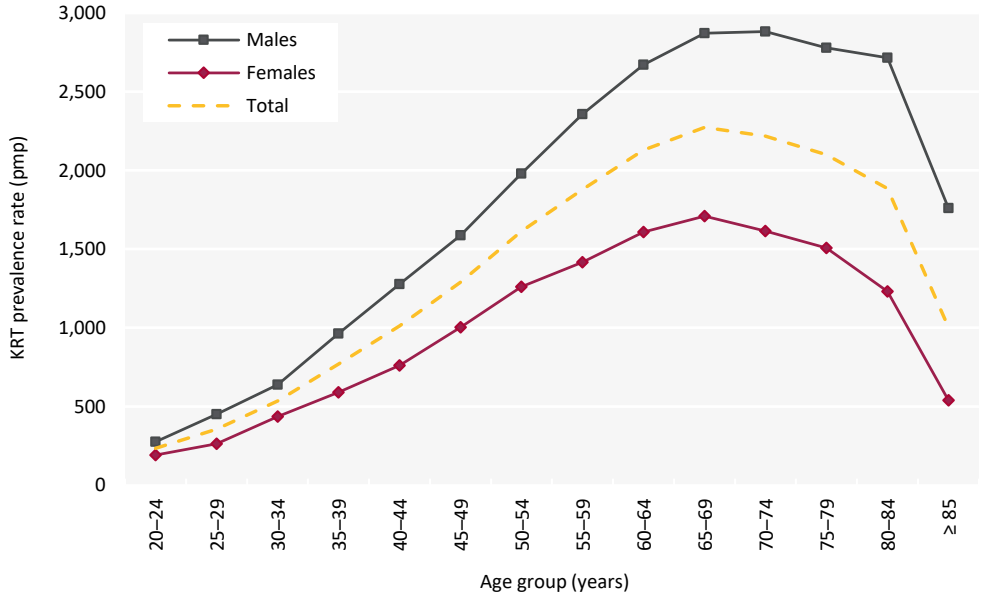

Figure 3.5 Prevalence rates for adult patients on KRT on 31/12/2023 by age group and sex
pmp – per million population

For each modality, the percentage of patients of each year of age is shown in figure 3.6.

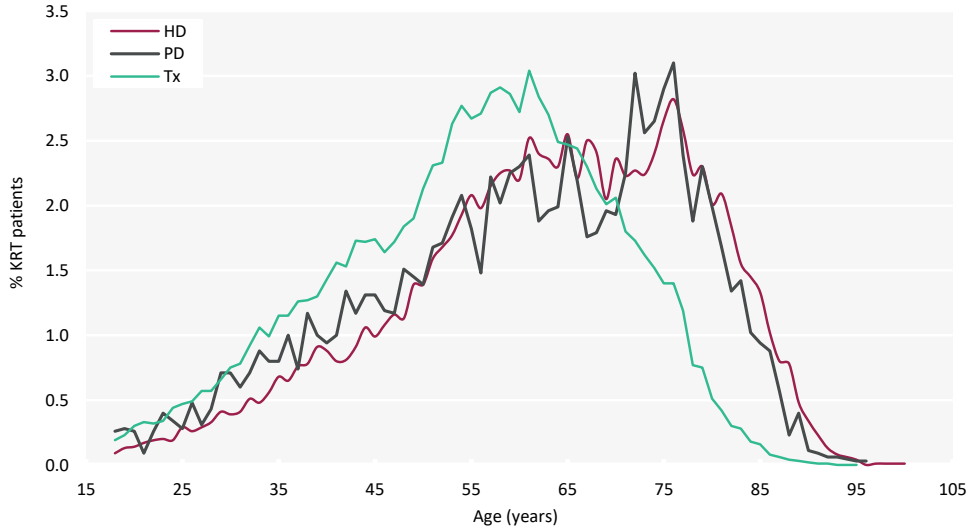

Figure 3.6 Age profile of adult patients prevalent to KRT on 31/12/2023 by KRT modality

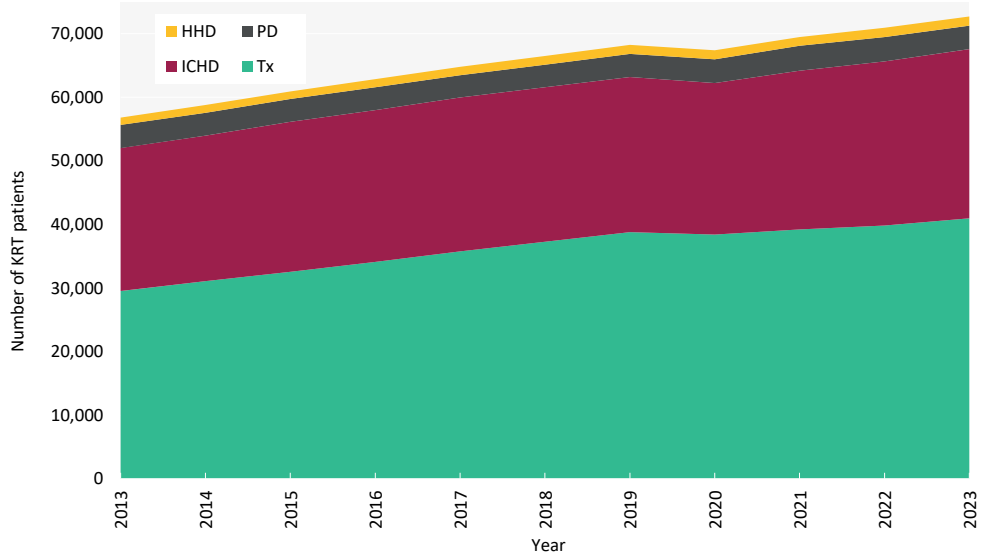

Figure 3.7 Growth in numbers of prevalent adult KRT patients by treatment modality between 2013 and 2023

Table 3.4 Change in adult KRT prevalence rates by modality between 2019 and 2023

	Prevalence (pmp)					% growth in prevalence				
Year	HD	PD	Dialysis	Tx	KRT	HD	PD	Dialysis	Tx	KRT
2019	490	69	559	736	1,295					
2020	477	71	548	726	1,274	-2.6	2.4	-2.0	-1.4	-1.7
2021	497	73	570	737	1,306	4.1	3.2	4.0	1.5	2.6
2022	509	71	580	742	1,322	2.5	-3.0	1.8	0.7	1.2
2023	518	68	586	756	1,342	1.8	-4.1	1.0	1.8	1.5
Average annual growth 2019-2023						**1.4**	**-0.3**	**1.2**	**0.7**	**0.9**

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 2014 and 2023, in particular the increase in diabetes.

Table 3.5 Treatment modality of adult patients prevalent to KRT on 31/12/2023 by primary renal disease (PRD)

PRD	N on KRT	% KRT population	Modality (%)		
			HD	PD	Tx
Diabetes	12,659	18.9	57.7	6.2	36.1
Glomerulonephritis	13,045	19.5	27.2	4.3	68.5
Hypertension	4,339	6.5	46.6	5.7	47.7
Polycystic kidney disease	7,002	10.5	22.4	3.7	73.9
Pyelonephritis	4,907	7.3	32.3	3.8	63.9
Renal vascular disease	1,613	2.4	62.4	8.6	29.0
Other	12,186	18.2	35.1	4.1	60.7
Uncertain aetiology	11,128	16.6	36.7	5.3	58.0
Total (with data)	**66,879**	**100.0**	**38.0**	**4.9**	**57.1**
Missing	2,444	3.5	60.6	10.4	29.1

Table 3.6 Change in primary renal disease (PRD) of adult patients prevalent to KRT between 2014 and 2023

PRD	Year									
	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Diabetes	16.7	17.2	17.5	17.9	18.3	18.6	18.7	18.8	18.7	18.9
Glomerulonephritis	19.2	19.2	19.3	19.4	19.4	19.4	19.5	19.5	19.6	19.5
Hypertension	6.2	6.2	6.2	6.2	6.2	6.4	6.4	6.3	6.4	6.5
Polycystic kidney disease	10.1	10.2	10.2	10.3	10.3	10.4	10.5	10.4	10.4	10.5
Pyelonephritis	8.6	8.4	8.3	8.2	7.9	7.8	7.7	7.5	7.4	7.3
Renal vascular disease	3.2	3.1	3.1	3.0	2.9	2.8	2.7	2.6	2.5	2.4
Other	16.6	16.7	17.0	17.1	17.3	17.5	17.7	18.0	18.2	18.2
Uncertain aetiology	19.4	18.9	18.5	17.9	17.5	17.1	16.9	16.8	16.7	16.6
Missing	0.9	1.0	1.0	1.2	1.3	1.6	1.9	2.6	3.1	3.5

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 KRT 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).

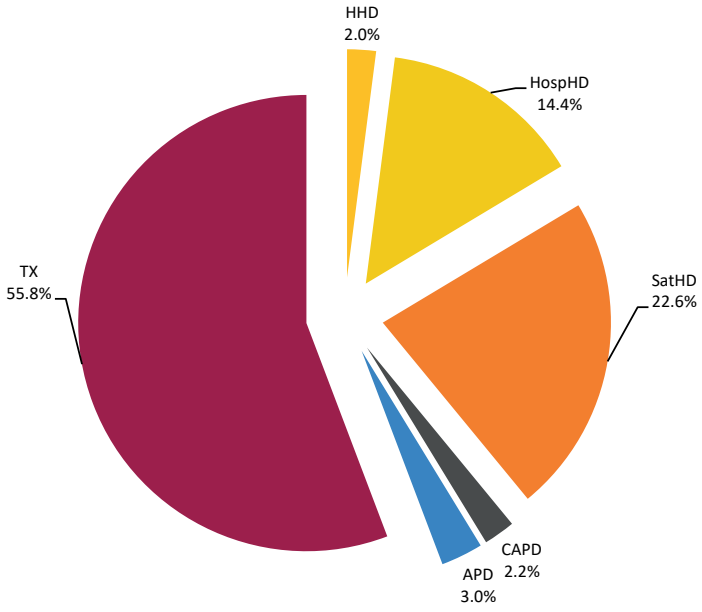

Figure 3.8 Detailed treatment modality of adult patients prevalent to KRT on 31/12/2023

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

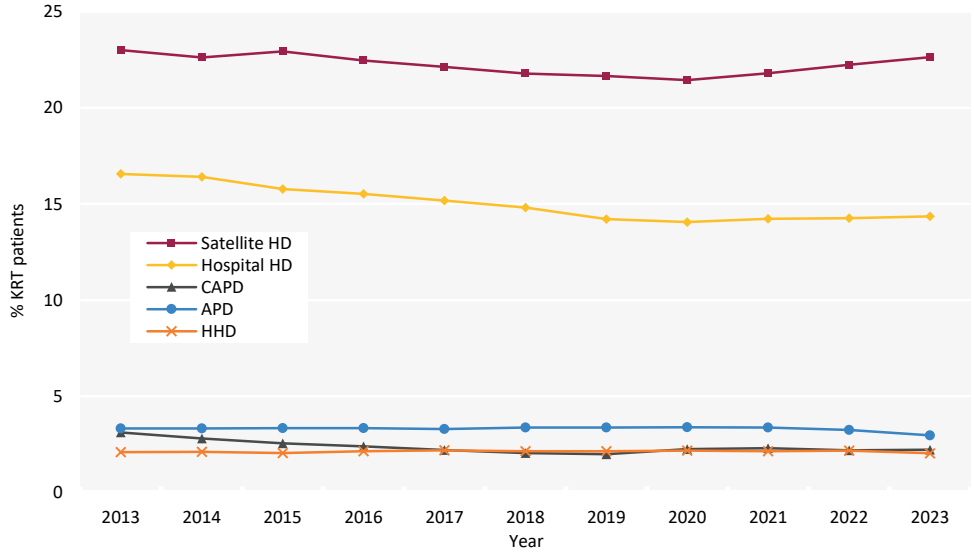

Figure 3.9 Detailed dialysis modality changes in prevalent adult KRT patients between 2013 and 2023

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 31/12/2023 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										
Bham	1,720	35.4	4.6	85.5	3.6	28.0	53.8	14.5	2.0	12.4
Bradfd	383	43.3	15.5	91.9	1.6	79.9	10.4	8.1	3.4	4.7
Brightn	551	35.0	3.8	88.6	6.2	40.5	41.9	11.4	8.2	3.3
Bristol	547	32.8	5.8	88.1	1.7	17.0	69.5	11.9	8.0	3.8
Camb	370	28.6	0.4	92.2	5.4	38.7	48.1	7.8	4.9	3.0
Carlis	135	31.9	6.3	84.4	5.2	54.8	24.4	15.6	2.2	13.3
Carsh	1,074	34.2	4.4	88.4	2.2	20.2	65.9	11.6	3.5	8.2
Colchr	164	21.9	1.0	100.0	0.0	67.7	32.3	0.0	0.0	0.0
Covnt	488	41.9	10.3	84.6	3.1	32.0	49.6	15.4	7.8	7.6
Derby	410	32.7	5.8	84.4	14.6	63.2	6.6	15.6	12.4	2.9
Donc	228	40.2	4.0	91.2	4.0	57.9	29.4	8.8	1.3	7.5
Dorset	372	34.2	9.9	92.7	3.8	25.8	63.2	7.3	2.4	4.0
Dudley	246	38.5	4.2	86.6	4.5	17.9	64.2	13.4	10.2	3.3
EssexMS	609	31.9	4.2	81.1	2.8	71.6	6.7	18.9	3.8	14.8
Exeter	572									
Glouc	255	37.1	6.7	86.7	1.2	73.3	12.2	13.3	2.0	11.4
Hull	453	24.0	4.8	88.1	3.8	39.7	44.6	11.9	10.4	1.6
Ipswi	159	21.8	1.0	90.6	0.0	84.3	6.3	9.4	5.7	1.9
Kent	554	30.2	3.3	89.7	3.6	32.9	53.3	10.3	8.8	1.4
L Barts	1,475	38.8	7.7	85.1	3.6	36.6	44.9	14.9	4.5	10.4
L Guys	773	30.4	3.6	94.2	4.9	14.5	74.8	5.8	1.6	4.3
L Kings	798	30.5	3.9	88.9	4.3	13.0	71.6	11.2	3.6	7.5
L Rfree	952	32.1	8.8	85.5	0.6	3.8	81.1	14.5	5.3	9.2
L St.G	374	40.8	8.9	84.8	1.3	17.4	66.0	15.2	2.9	12.3
L West	1,602	48.1	13.0	88.1	2.9	16.9	68.3	11.9	11.0	0.9
Leeds	729	42.0	14.9	92.3	3.6	13.0	75.7	7.7	2.3	5.4
Leic	1,263	40.1	8.2	87.3	3.4	14.7	69.2	12.7	3.5	9.2
Liv UH	658	27.9	6.0	91.6	9.4	18.4	63.8	8.4	1.7	6.7
M RI	775									
Middlbr	398	35.1	7.9	96.5	4.0	31.7	60.8	3.5	3.3	0.3
Newc	474	36.4	13.6	89.2	4.4	59.7	25.1	10.8	1.9	8.9
Norwch	383	17.7	0.8	84.9	2.4	15.9	66.6	15.1	11.0	4.2
Nottm	473	32.1	8.3	81.4	6.3	27.5	47.6	18.6	18.0	0.6
Oxford	621	42.8	10.8	86.3	3.9	34.5	48.0	13.7	5.2	8.5
Plymth	196	50.6	12.4	82.1	2.6	76.5	3.1	17.9	5.1	12.8
Ports	867	31.3	11.5	89.2	8.9	14.3	66.0	10.8	5.8	5.1
Prestn	623	38.6	12.5	91.0	6.3	16.5	68.2	9.0	5.9	3.1
Redng	442	44.1	6.6	88.2	3.9	31.7	52.7	11.8	10.6	0.9
Salford	626	47.6	20.4	84.7	5.0	24.0	55.8	15.3	6.2	9.1
Sheff	697	30.4	7.3	90.0	6.3	49.8	33.9	10.0	3.3	6.7
Shrew	271	26.6	6.3	79.7	16.2	34.3	29.2	20.3	4.4	15.9
Stevng	686	33.2	7.6	94.6	6.6	23.3	64.7	5.4	2.9	2.5
Stoke	461	28.0	8.1	80.7	7.6	48.2	25.0	19.3	2.2	17.1
Sund	281	30.7	7.6	87.2	5.3	48.0	33.8	12.8	3.6	9.3
Truro	212	31.4	9.5	93.9	4.3	44.3	45.3	6.1	2.8	3.3
Wirral	188	33.3	12.6	91.0	2.1	34.6	54.3	9.0	1.1	8.0
Wolve	511	25.6	4.0	88.1	8.4	76.5	3.1	11.9	3.3	8.2
York	251	44.0	11.1	89.2	7.2	29.5	52.6	10.8	5.6	5.2
N IRELAND[1]										
Antrim	137	14.9	2.2	89.1	0.7	88.3	0.0	11.0	2.9	7.3
Belfast	169	24.4	5.7	86.4	4.7	81.7	0.0	13.6	0.6	12.4
Newry	88	38.7	1.8	90.9	2.3	88.6	0.0	9.1	3.4	3.4

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
Ulster	101	29.0	1.4	95.1	0.0	95.1	0.0	5.0	0.0	3.0
West NI	113	20.4	1.6	99.1	1.8	97.4	0.0	0.9	0.0	0.0
SCOTLAND[2]										
Abrdn	230	30.9	9.2	90.9	1.3	89.6	0.0	9.1	4.4	2.6
Airdrie	255	36.2	17.2	90.6	0.0	90.6	0.0	9.4	5.1	4.3
D&Gall	54	40.9	6.3	85.2	1.9	83.3	0.0	14.8	0.0	14.8
Dundee	169	43.0	2.2	86.4	2.4	84.0	0.0	13.6	4.1	8.3
Edinb	335	38.4	11.4	91.0	2.4	88.7	0.0	9.0	3.3	5.7
Glasgw	651	49.5	13.9	95.6	2.5	93.1	0.0	4.5	1.1	3.4
Inverns	128	26.9	10.5	92.2	0.8	91.4	0.0	7.8	4.7	3.1
Klmarnk	209	33.3	3.1	84.7	6.2	78.5	0.0	15.3	3.4	12.0
Krkcldy	185	31.9	10.6	93.5	1.1	92.4	0.0	6.5	1.6	4.3
WALES										
Bangor	100	33.3	3.4	90.0	22.0	56.0	12.0	10.0	3.0	7.0
Cardff	691	27.5	4.8	91.5	6.4	12.0	73.1	8.5	3.2	5.4
Clwyd	124	23.6	4.3	84.7	7.3	77.4	0.0	15.3	12.1	3.2
Swanse	513	27.1	3.9	91.6	6.8	48.3	36.5	8.4	3.7	4.7
Wrexm	148	22.7	5.5	85.8	5.4	46.0	34.5	14.2	0.0	14.2
TOTALS										
England	26,003	35.6	7.7	88.0	4.5	31.0	52.6	12.0	5.2	6.8
N Ireland	608	24.2	2.7	91.5	2.1	89.3	0.0	8.6	1.3	6.1
Scotland	2,216	39.4	10.8	91.5	2.2	89.3	0.0	8.5	2.9	5.3
Wales	1,576	26.9	4.4	90.4	7.5	35.0	47.9	9.6	3.7	5.9
UK	**30,403**	**35.3**	**7.7**	**88.4**	**4.4**	**36.6**	**47.4**	**11.6**	**4.9**	**6.6**

Blank cells – no data returned by the centre

[1]There were no satellite units in Northern Ireland

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

APD – automated PD; CAPD – continuous ambulatory PD

The proportion of patients on HHD versus satellite HD is shown in figure 3.10, with the remaining patients on hospital HD.

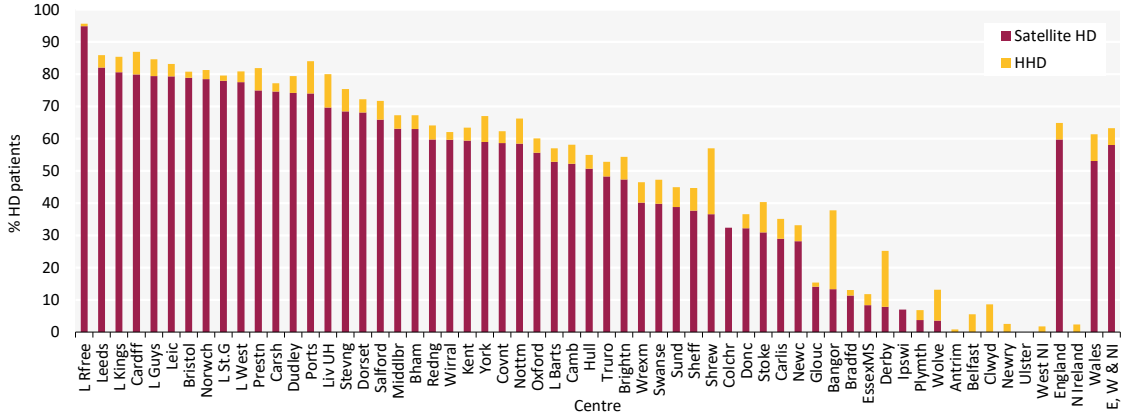

Figure 3.10 Adult patients prevalent to HD on 31/12/2023 treated with satellite HD or HHD by centre

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 31/12/2022 and followed-up for one year in 2023. 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 31/12/2022 by centre

	Age-adjusted survival				Case-mix adjusted survival[1]			
Centre	N on dialysis	1 yr (%)	Lower 95% limit	Upper 95% limit	N on dialysis	1 yr (%)	Lower 95% limit	Upper 95% limit
D&Gall	56	86.5	76.0	93.9				
Newry	93	82.5	79.1	92.8	91	83.9	83.6	95.6
Clwyd	94	91.0	79.2	92.8	94	93.2	83.7	95.6
Inverns	98	87.9	79.4	92.7				
Bangor	105	84.8	79.7	92.6	104	89.8	84.2	95.4
Ulster	117	88.7	80.2	92.4	110	89.1	84.5	95.4
Wrexm	127	88.6	80.5	92.2	127	91.7	85.1	95.1
West NI	129	87.9	80.6	92.2	116	85.6	84.7	95.3
Carlis	133	78.2	80.7	92.1	129	84.0	85.1	95.1
Colchr	145	84.7	81.1	92.0	141	89.8	85.4	95.0
Antrim	147	89.8	81.1	92.0				
Ipswi	149	87.8	81.2	91.9	141	91.6	85.4	95.0
Dundee	158	87.9	81.4	91.8				
Krkcldy	170	84.6	81.6	91.7				
Klmarnk	176	88.3	81.8	91.6				
Plymth	190	85.2	82.0	91.5	190	89.9	86.4	94.6
Truro	199	83.7	82.1	91.4	190	89.1	86.4	94.6
Belfast	201	87.4	82.2	91.4				
Abrdn	204	86.2	82.2	91.4				
Donc	207	86.8	82.3	91.4	204	90.4	86.6	94.5
Wirral	213	83.0	82.4	91.3	213	88.9	86.8	94.5
Airdrie	220	86.7	82.4	91.3				
York	237	90.0	82.7	91.1	237	92.6	87.0	94.3
Glouc	239	82.1	82.7	91.1	230	87.4	87.0	94.4
Dudley	247	83.8	82.8	91.1	247	88.0	87.1	94.3
Shrew	255	89.4	82.9	91.0	253	92.5	87.2	94.2
Sund	262	87.9	82.9	91.0	261	92.0	87.3	94.2
Edinb	329	88.9	83.5	90.7				
Bradfd	332	90.0	83.5	90.7	332	93.1	87.8	93.9
Dorset	345	90.4	83.6	90.6	345	93.2	87.9	93.9
Middlbr	356	85.8	83.7	90.6	355	90.1	87.9	93.9
Norwch	360	90.4	83.7	90.5	354	92.8	87.9	93.9
L St.G	363	90.6	83.7	90.5	353	94.0	87.9	93.9
Redng	374	89.2	83.8	90.5	373	92.6	88.0	93.8
Derby	390	86.3	83.8	90.4	389	90.4	88.1	93.8
Camb	392	89.9	83.9	90.4	391	92.6	88.1	93.8
Hull	399	84.6	83.9	90.4	399	88.6	88.2	93.7
Newc	405	85.2	83.9	90.4	405	90.3	88.2	93.7
Covnt	444	88.1	84.1	90.3	436	91.0	88.3	93.7
Stoke	450	85.7	84.1	90.3	437	89.8	88.3	93.6
Swanse	453	87.2	84.1	90.3	453	91.2	88.4	93.6
Wolve	457	89.8	84.2	90.2	456	92.8	88.4	93.6
Nottm	476	86.7	84.2	90.2	476	91.2	88.5	93.6
Brightn	486	87.9	84.3	90.2	479	91.3	88.5	93.6
EssexMS	511	88.2	84.4	90.1	506	91.6	88.6	93.5
Salford	518	87.6	84.4	90.1	516	91.9	88.6	93.5
Oxford	518	85.9	84.4	90.1	509	90.9	88.6	93.5
Bristol	531	84.6	84.4	90.1	517	89.7	88.6	93.5
Kent	544	84.9	84.5	90.0	544	89.0	88.7	93.4
Prestn	564	83.5	84.5	90.0	564	89.3	88.7	93.4
Stevng	613	89.1	84.6	89.9	602	92.6	88.8	93.3
Glasgw	618	83.7	84.7	89.9				
Cardff	621	86.3	84.7	89.9	620	90.1	88.9	93.3
Liv UH	625	85.9	84.7	89.9	615	91.1	88.9	93.3

Table 3.8 Continued

Centre	Age-adjusted survival				Case-mix adjusted survival[1]			
	N on dialysis	1 yr (%)	Lower 95% limit	Upper 95% limit	N on dialysis	1 yr (%)	Lower 95% limit	Upper 95% limit
Leeds	641	91.0	84.7	89.9	639	93.9	88.9	93.3
Sheff	676	85.7	84.8	89.8	676	89.7	89.0	93.2
M RI	676	89.4	84.8	89.8	657	92.9	88.9	93.3
L Guys	778	89.6	85.0	89.7	777	92.7	89.2	93.1
Ports	789	86.7	85.0	89.6	774	91.3	89.2	93.1
L Kings	795	89.5	85.0	89.6	782	93.0	89.2	93.1
L Rfree	907	87.7	85.2	89.5	890	91.7	89.3	93.0
Carsh	988	86.6	85.3	89.4	958	90.2	89.4	93.0
Leic	1,169	87.4	85.5	89.3	1,156	91.0	89.6	92.8
L Barts	1,361	90.8	85.6	89.2	1,319	93.7	89.7	92.8
L West	1,457	88.7	85.7	89.1	1,403	92.3	89.8	92.7
Bham	1,693	88.1	85.8	89.0	1,670	91.8	89.9	92.6

Centres are ordered by increasing number of patients

[1]Centres excluded if <85% comorbidity data were available – this included Belfast and Antrim in Northern Ireland and all Scottish kidney centres

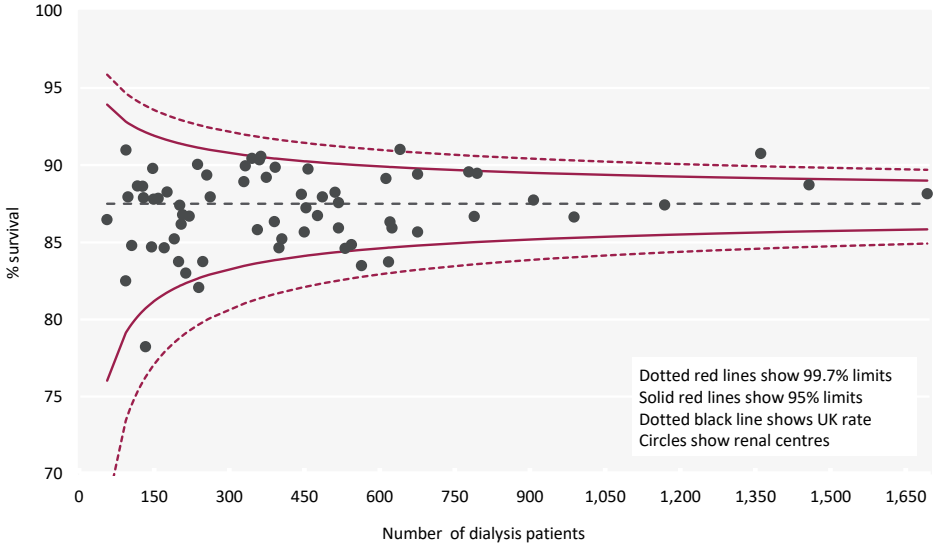

Figure 3.11 1 year survival (adjusted to age 60 years) of adult patients prevalent to dialysis on 31/12/2022 by centre

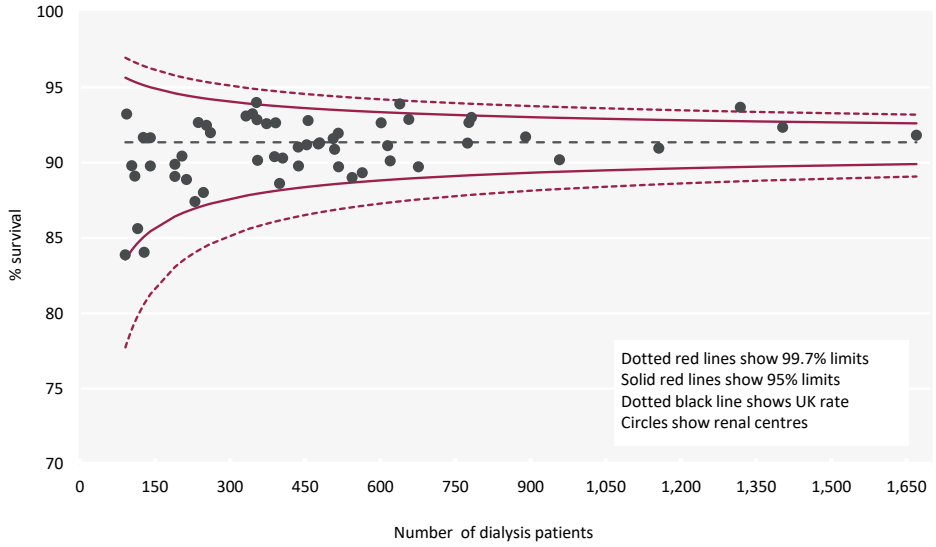

Figure 3.12 1 year survival (adjusted to 60 years, male and median comorbidity score) of adult patients prevalent to dialysis on 31/12/2022 by centre

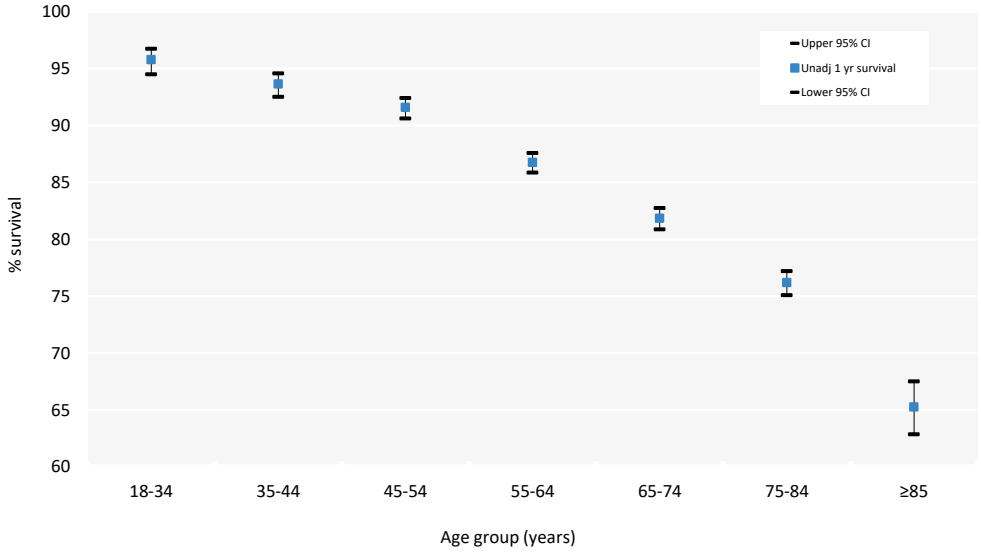

Figure 3.13 1 year survival (unadjusted) of adult patients prevalent to dialysis on 31/12/2022 by age group
CI – confidence interval

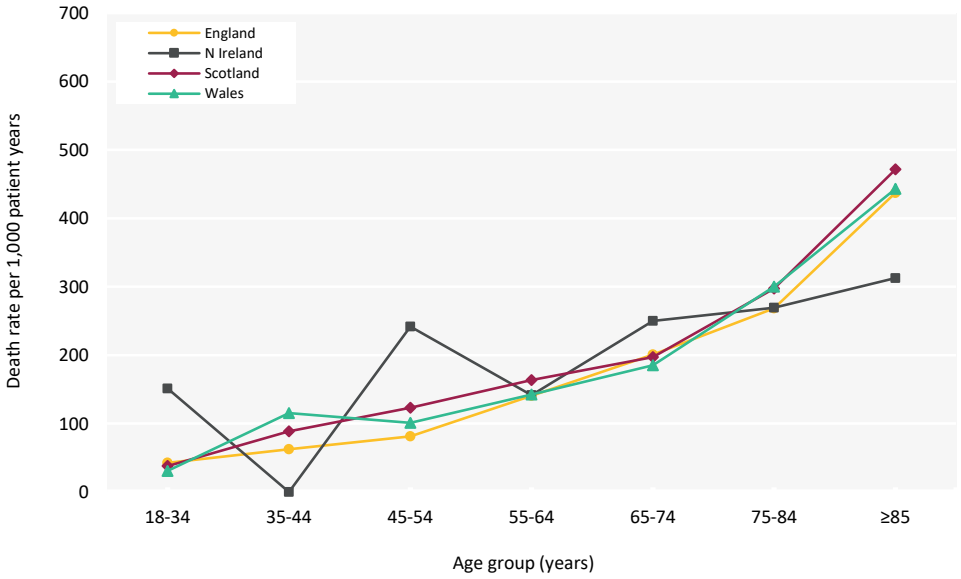

Figure 3.14 1 year death rate per 1,000 patient years for adult patients prevalent to dialysis on 31/12/2022 by country and age group

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

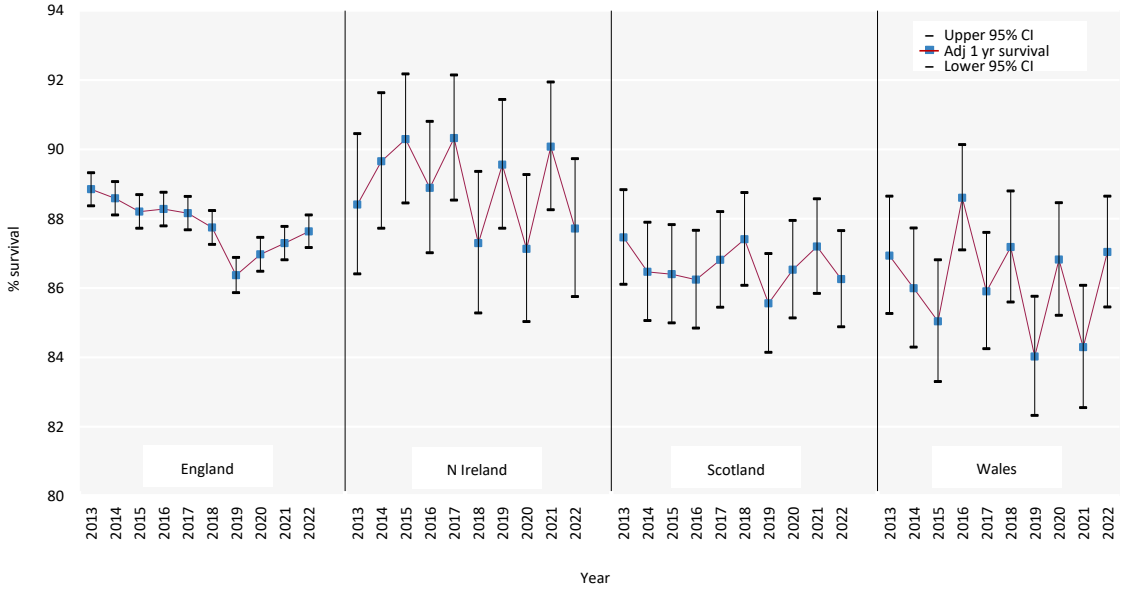

Figure 3.15 1 year survival (adjusted to age 60 years) for prevalent adult dialysis patients by country between 2013 and 2022
CI – confidence interval

The relative risk of death by age group for prevalent KRT 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 KRT on 31/12/2022 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-2023 (thousands)	UK deaths in 2023	Death rate per 1,000 population	Expected number of deaths in UKRR population	UKRR deaths in 2023	UKRR death rate per 1,000 prevalent KRT patients	Relative risk of death in 2023	Relative risk of death 1998-2001 cohort
20-24	4,098	1,531	0.4	0	6	6	17.0	41.1
25-29	4,428	2,064	0.5	1	19	12	26.7	41.8
30-34	4,700	3,194	0.7	2	43	18	25.7	31.2
35-39	4,637	4,837	1.0	4	78	23	21.9	26.0
40-44	4,446	6,978	1.6	7	119	28	17.6	22.6
45-49	4,043	9,432	2.3	12	176	35	15.0	19.0
50-54	4,523	15,922	3.5	25	285	40	11.4	12.8
55-59	4,625	23,778	5.1	42	523	64	12.4	10.1
60-64	4,182	32,670	7.8	65	652	78	10.0	10.4
65-69	3,490	43,080	12.3	89	740	103	8.3	7.9
70-74	3,120	61,503	19.7	124	907	144	7.3	7.2
75-79	2,843	91,195	32.1	165	1,039	203	6.3	5.3
80-84	1,763	104,640	59.3	173	763	262	4.4	4.0
≥85	1,707	256,310	150.1	206	559	408	2.7	3.0
Total	**52,605**	**657,134**	**12.5**	**914**	**5,909**	**92**	**6.5**	**7.7**

Cause of death in adult KRT patients

Cause of death was analysed in prevalent patients receiving KRT on 31/12/2022 and followed-up for one year in 2023. The proportion of KRT 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. Where the cause of death was missing in the UKRR data, cause of death from Civil Registration records was used.

Table 3.10 Cause of death in adult patients prevalent to KRT on 31/12/2022 followed-up in 2023 by age group

	KRT all ages		KRT <65 yrs		KRT ≥65 yrs	
Cause of death	N	%	N	%	N	%
Cardiac disease	1,054	19.2	407	23.3	647	17.3
Cerebrovascular disease	193	3.5	86	4.9	107	2.9
Infection	1,039	18.9	287	16.4	752	20.1
Malignancy	480	8.7	157	9.0	323	8.6
Treatment withdrawal	480	8.7	104	6.0	376	10.0
Other	1,733	31.5	535	30.6	1,198	32.0
Uncertain aetiology	517	9.4	171	9.8	346	9.2
Total (with data)	**5,496**	**100.0**	**1,747**	**100.0**	**3,749**	**100.0**
Missing	630	10.3	232	11.7	398	9.6

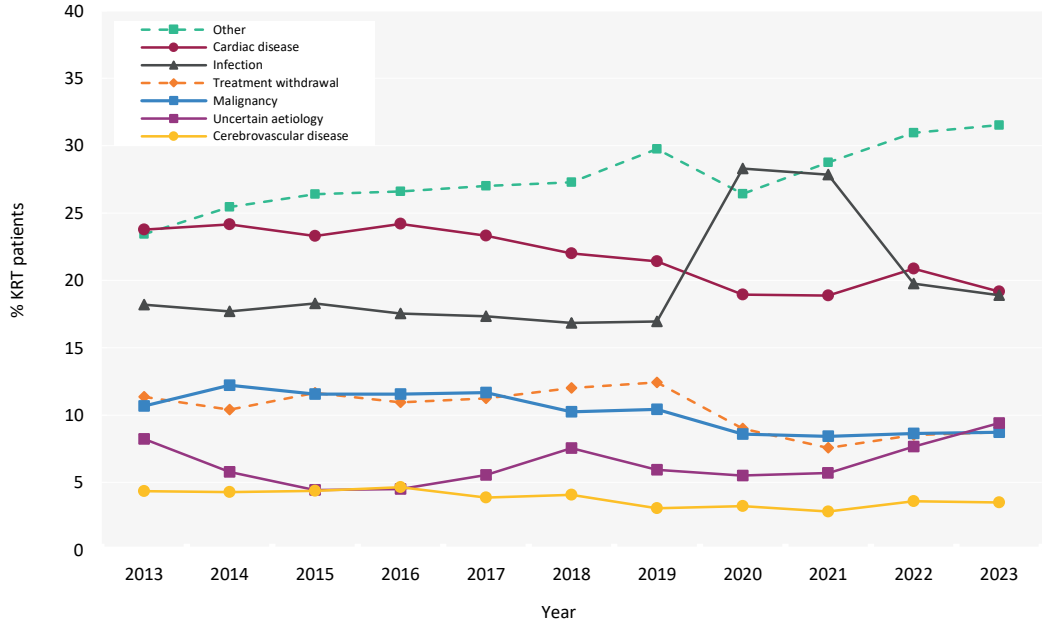

Figure 3.16 Cause of death between 2013 and 2023 for adult patients prevalent to KRT at the beginning of the year

UK Kidney Association
UK Renal Registry

Chapter 4

Adults with a kidney transplant (Tx) in the UK at the end of 2023

Contents

Introduction

This chapter describes the population of patients with end-stage kidney disease (ESKD) who had a functioning kidney transplant (Tx) in the UK at the end of 2023 (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 kidney replacement therapy (KRT).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.

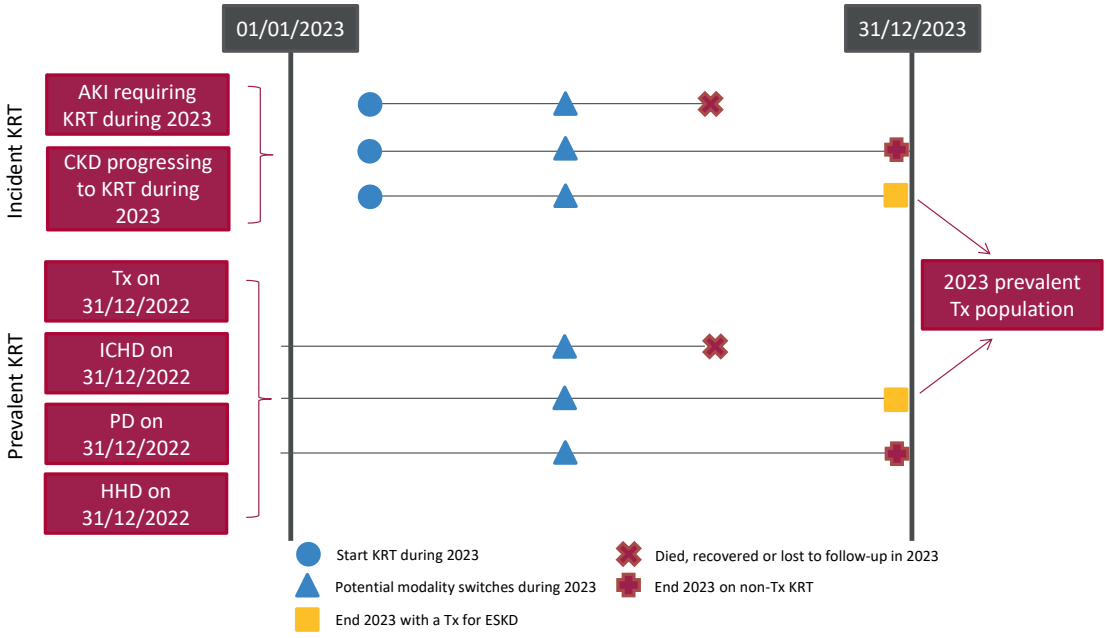

Figure 4.1 Pathways adult patients could follow to be included in the UK 2023 prevalent Tx population

Note that patients receiving dialysis for acute kidney injury (AKI) are only included in this chapter if they had a timeline or KRT modality code for Tx at the end of 2023 or if they had been on KRT for ≥90 days and were on Tx at the end of 2023
AKI – acute kidney injury; CKD – chronic kidney disease; HHD – home haemodialysis; ICHD – in-centre haemodialysis; PD – peritoneal dialysis; Tx - Transplantation

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 UK Kidney 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 2023 prevalent adult Tx population is described, including the number transplanted per million population (pmp).

The UK Kidney Association guidelines (ukkidney.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 kidney centres in 2023 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 (ukkidney.org/audit-research/data-portals). 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 kidney 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 UK Kidney Association audit measures relevant to Tx that are reported in this chapter

The UK Kidney 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 4.9, figures 4.13–4.14 (proteinuria was not adequately collected)
	Proportion of patients achieving dyslipidaemia targets	Table 4.9
	Incidence of hyperparathyroidism	Table 4.9
	Prevalence of anaemia	Table 4.9, figures 4.11–4.12
Anaemia (2020)	Treatment guidelines for anaemia in kidney Tx patients should be similar to those for CKD patients not on dialysis	Table 4.9, figures 4.11–4.12

In 2023, 23 of the 67 adult kidney 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 kidney 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.

Exeter and Manchester were unable to submit patient level data for 2023. Aggregate numbers by modality were provided, enabling inclusion in Tables 4.6 and 4.7. Exeter and Manchester are excluded from all other analyses, except where historical cohorts were used.

London Kings moved to a new Trust IT system, and as a result data were not submitted for the final quarter of 2023. For charts and tables in this chapter that use the December 2023 prevalent cohort, the data for London Kings are for patients who were on KRT as at 30th September 2023, rather than 31st December 2023.

Key findings

- 40,958 adult patients had a kidney Tx for ESKD in the UK on 31/12/2023, which represented 56.3% of the KRT population.
- The median age of kidney Tx patients was 57.0 years and 60.8% were male.
- There was a 5% increase in overall kidney Tx performed in 2023 compared to 2022, with a increase in kidney Tx from LKDs by 8%, DCDs by 11% and a 3% decrease in DBDs. Transplant activity has not yet recovered to pre-pandemic levels.
- The median eGFR for kidney Tx patients 1 year after transplantation, for transplants occurring in 2022, was 57.5 mL/min/1.73m^2 from LKD, 50.1 mL/min/1.73m^2 from DBD and 45.6 mL/min/1.73m^2 from DCD.
- 16.9% of kidney Tx patients had eGFR <30 mL/min/1.73m^2.
- The median decline in eGFR slope beyond the first year after transplantation was 0.9 mL/min/1.73m^2/year.
- Cause of death records from Civil Registration were used where the cause of death was missing in the UKRR data. This resulted in improved completeness and changes in proportions of causes of death. The leading cause of death for Tx patients was infection at 21.7%.

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, 2020-2023 calendar years

Organ	2020	2021	2022	2023	% change 2022-2023
Kidney DBD[1]	1,220	1,208	1,185	1,148	-3
Kidney DCD[2]	683	845	1020	1128	11
Kidney LKD	588	801	863	932	8
Kidney and liver[3]	5	9	6	11	-
Kidney and heart	0	2	0	0	-
Kidney and pancreas[4]	97	111	120	143	19
Kidney and pancreas islets[5]	4	7	5	8	-
Small bowel (inc kidney)	0	0	0	0	-
Total kidney Tx	**2,597**	**2,983**	**3,199**	**3,370**	**5**

[1] Includes en bloc kidney transplants (2 in 2021 and 2 in 2023) and double kidney transplants (10 in 2021, 12 in 2022 and 17 in 2023)

[2] Includes en bloc kidney transplants (5 in 2021, 3 in 2022 and 2 in 2023) and double kidney transplants (18 in 2021, 14 in 2022 and 18 in 2023)

[3] Includes DCD transplants (1 in 2022 and 3 in 2023)

[4] Includes DCD transplants (31 in 2021, 41 in 2022 and 61 in 2023)

[5] Includes DCD transplants (2 in 2021, 1 in 2022 and 5 in 2023)

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 KRT start, is shown for patients incident to KRT in 2020, adjusted by sex, age and primary renal disease (PRD) (figure 4.2). The analysis for LKD transplantation only is shown separately (figure 4.3). Centres can be identified in the funnel plots using the number of patients in the centre in table 4.3.

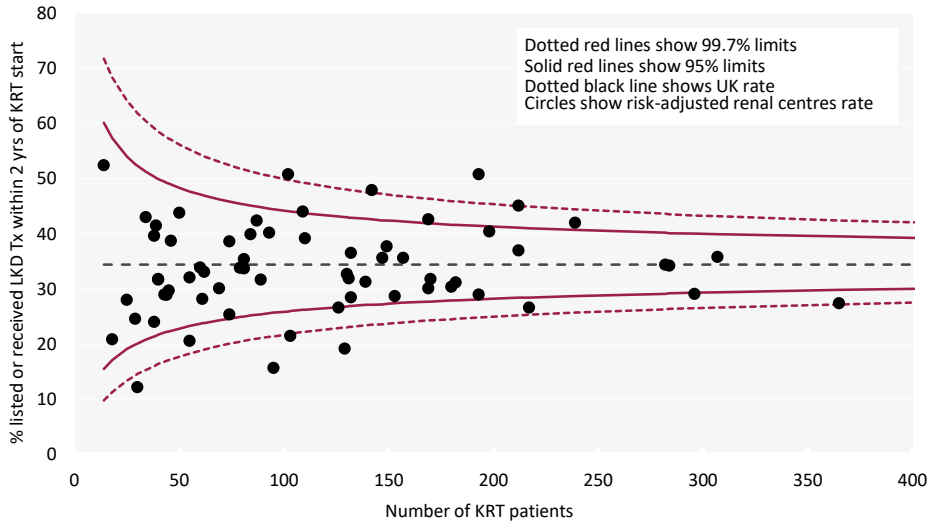

Figure 4.2 Percentage of adult patients incident to KRT in 2021 (analysis adjusted by age, sex, PRD) who were waitlisted or received a living kidney donor (LKD) Tx within 2 years of KRT start by centre

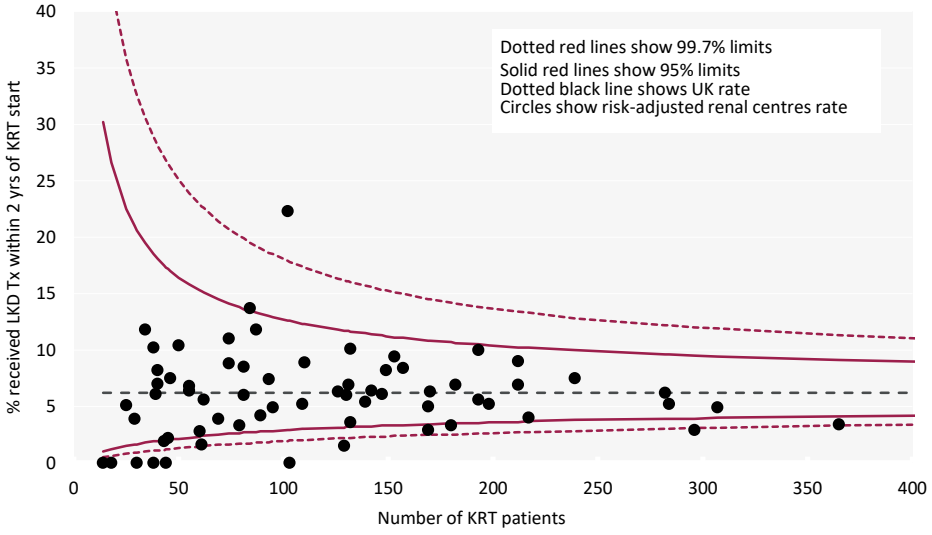

Figure 4.3 Percentage of adult patients incident to KRT in 2021 (analysis adjusted by age, sex, PRD) who received a living kidney donor (LKD) Tx within 2 years of KRT start by centre

Table 4.3 Percentage of adult patients incident to KRT in 2021 who were waitlisted or received a living kidney donor (LKD) Tx within 2 years of KRT start adjusted by age, sex and primary renal disease by centre

		Listing/LKD Tx by 2 years from KRT start			LKD Tx by 2 years from KRT start		
			Limits for funnel plot			Limits for funnel plot	
Centre	N on KRT	Adjusted percentage	Lower 95% limit	Upper 95% limit	Adjusted percentage	Lower 95% limit	Upper 95% limit
TX CENTRES							
Belfast	102	50.8	25.9	44.1	22.3	2.9	12.6
Bham	365	27.4	29.8	39.5	3.4	4.1	9.1
Bristol	157	35.6	27.5	42.2	8.4	3.3	11.1
Camb	149	37.7	27.3	42.4	8.2	3.3	11.2
Cardff	153	28.7	27.4	42.3	9.4	3.3	11.1
Covnt	147	35.6	27.2	42.4	6.1	3.3	11.3
Edinb	87	42.4	25.3	44.9	11.8	2.7	13.3
Glasgw	212	45.1	28.4	41.1	9	3.6	10.2
L Barts	284	34.2	29.2	40.1	5.2	3.9	9.6
L Guys	193	29	28.1	41.4	5.6	3.5	10.5
L Rfree	282	34.4	29.1	40.2	6.2	3.9	9.6
L St.G	93	40.2	25.6	44.5	7.4	2.8	13
L West	418	40	30.1	39.1	6.4	4.2	8.9
Leeds	169	42.6	27.7	41.9	5	3.4	10.8
Leic	307	35.8	29.4	39.9	4.9	4	9.4
Liv UH	169	30.1	27.7	41.9	2.9	3.4	10.8
M RI	212	37	28.4	41.1	6.9	3.6	10.2
Newc	132	36.5	26.9	42.9	10.1	3.2	11.6
Nottm	130	32.7	26.8	43	6	3.2	11.7
Oxford	193	50.8	28.1	41.4	10	3.5	10.5
Plymth	84	39.9	25.2	45.1	13.7	2.7	13.5
Ports	239	42	28.7	40.7	7.5	3.8	10
Sheff	170	31.8	27.7	41.9	6.3	3.4	10.8
DIALYSIS CENTRES							
Abrdn	55	32.1	23.3	47.6	6.8	2.2	15.8
Airdrie	74	38.6	24.6	45.8	11	2.6	14.1
Antrim	39	41.5	21.5	50.1	6.1	1.9	18.3
Bangor	18	20.9	17.1	57.3	0	1.2	26.6
Bradfd	81	35.4	25	45.3	6	2.7	13.6
Brightn	131	31.9	26.9	42.9	6.9	3.2	11.7
Carlis	43	29	22.1	49.4	1.9	2	17.5
Carsh	296	29.1	29.3	40	2.9	3.9	9.5
Clwyd	30	12.2	20.1	52.3	0	1.6	20.6
Colchr	38	24	21.4	50.3	0	1.9	18.5
D&Gall	14	52.4	15.5	60.1	0	1	30.2
Derby	89	31.7	25.4	44.8	4.2	2.8	13.2
Donc	44	28.9	22.2	49.2	0	2	17.3
Dorset	79	33.8	24.9	45.4	3.3	2.6	13.8
Dudley	61	28.2	23.8	47	1.6	2.4	15.2
Dundee	40	31.7	21.7	49.9	7	1.9	18.1
EssexMS	132	28.5	26.9	42.9	3.6	3.2	11.6
Exeter							
Glouc	81	33.7	25	45.3	8.5	2.7	13.6
Hull	95	15.7	25.7	44.4	4.9	2.8	12.9
Inverns	38	39.6	21.4	50.3	10.2	1.9	18.5
Ipswi	60	33.9	23.7	47.1	2.8	2.3	15.3
Kent	182	31.2	27.9	41.6	6.9	3.5	10.6
Klmarnk	46	38.7	22.4	48.9	7.5	2.1	17
Krkcldy	45	29.7	22.3	49.1	2.2	2	17.2
L Kings	217	26.6	28.4	41	4	3.7	10.2

Table 4.3 Continued

Centre	N on KRT	Listing/LKD Tx by 2 years from KRT start			LKD Tx by 2 years from KRT start		
			Limits for funnel plot			Limits for funnel plot	
		Adjusted percentage	Lower 95% limit	Upper 95% limit	Adjusted percentage	Lower 95% limit	Upper 95% limit
Middlbr	110	39.2	26.2	43.7	8.9	3	12.3
Newry	40	31.8	21.7	49.9	8.2	1.9	18.1
Norwch	103	21.5	26	44	0	2.9	12.6
Prestn	198	40.4	28.2	41.3	5.2	3.6	10.4
Redng	109	44	26.2	43.8	5.2	3	12.3
Salford	142	47.9	27.1	42.6	6.4	3.2	11.4
Shrew	62	33.1	23.8	46.9	5.6	2.4	15.1
Stevng	180	30.4	27.9	41.6	3.3	3.5	10.7
Stoke	139	31.3	27.1	42.7	5.4	3.2	11.5
Sund	74	25.4	24.6	45.8	8.8	2.6	14.1
Swanse	126	26.6	26.7	43.1	6.3	3.1	11.8
Truro	69	30.1	24.3	46.2	3.9	2.5	14.5
Ulster	25	28	19.1	54	5.1	1.5	22.5
West NI	34	43	20.8	51.2	11.8	1.8	19.5
Wirral	55	20.6	23.3	47.6	6.4	2.2	15.8
Wolve	129	19.2	26.8	43	1.5	3.1	11.7
Wrexm	29	24.6	19.9	52.6	3.9	1.6	21
York	50	43.8	22.8	48.3	10.4	2.1	16.4

LKD - Living kidney donor

Early kidney Tx outcomes

Kidney Tx recipient outcome data from NHSBT were reported against the Tx centre rather than the referring centre (table 4.4). Note that the survival rates were risk-adjusted and used financial year cohorts as per NHSBT methodology (see table footnote).

Table 4.4 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	93	97	81	89	98	100	94	89
Belfast	N/A	N/A	82	85	99	100	90	90
Bristol	97	96	85	81	97	100	95	95
Camb	95	97	87	86	99	100	95	91
Cardff	94	98	89	87	100	98	89	93
Covnt	94	96	N/A	N/A	97	100	93	89
Edin	97	98	89	92	99	98	96	99
Glasgw	94	95	86	83	99	98	93	94
L Barts	95	93	82	82	96	98	92	88
L Guy's	97	98	88	87	100	99	96	94
L Rfree	97	97	87	93	99	100	92	96
L St.G	95	96	83	88	99	99	94	96
L West	94	96	N/A	N/A	99	100	N/A	N/A
Leeds	96	96	83	85	98	100	95	98
Leic	98	96	90	80	100	100	88	90
Liv UH	94	94	86	83	100	100	90	91
M RI	94	93	87	84	98	97	94	92
Newc	97	97	81	82	99	99	98	94
Nottm	97	93	90	85	100	100	95	100
Oxford	96	96	89	87	99	99	95	95
Plymth	89	93	N/A	N/A	N/A	N/A	N/A	N/A
Ports	96	96	93	88	98	99	96	94
Sheff	96	94	N/A	N/A	100	100	N/A	N/A
UK total	**95**	**96**	**86**	**85**	**99**	**99**	**94**	**93**

Cohorts for survival rate estimation: 1 year survival: 1/4/2019-31/03/2023; 5 year survival: 1/4/2015-31/3/2019; 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 better 5 year survival than 1 year survival

Centres have been omitted where less than 75% of the data was reported

[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 (https://nhsbtdbe.blob.core.windows.net/umbraco-assets-corp/34295/nhsbt-kidney-transplantation-report-2324.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 2016-2022) was 97.0%.

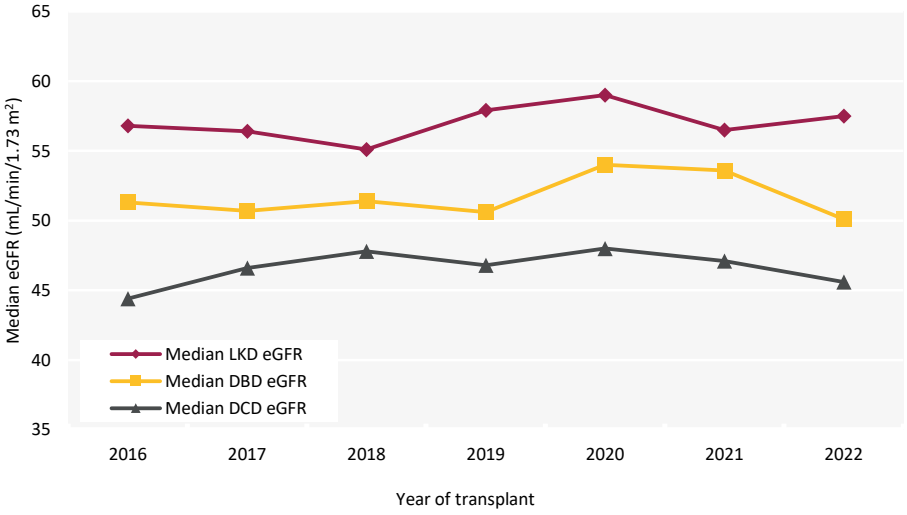

Figure 4.4 Median estimated glomerular filtration rate (eGFR) for kidney Tx at 1 year by donor type and year of transplantation between 2016 and 2022

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

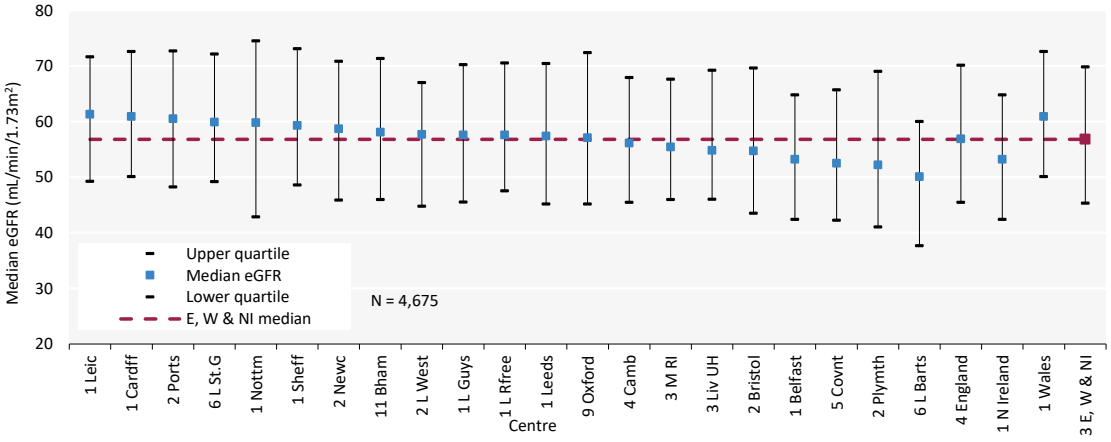

Figure 4.5 Median estimated glomerular filtration rate (eGFR) at 1 year post-living kidney donor (LKD) Tx by transplanting centre for transplantation that occured between 2016 and 2022

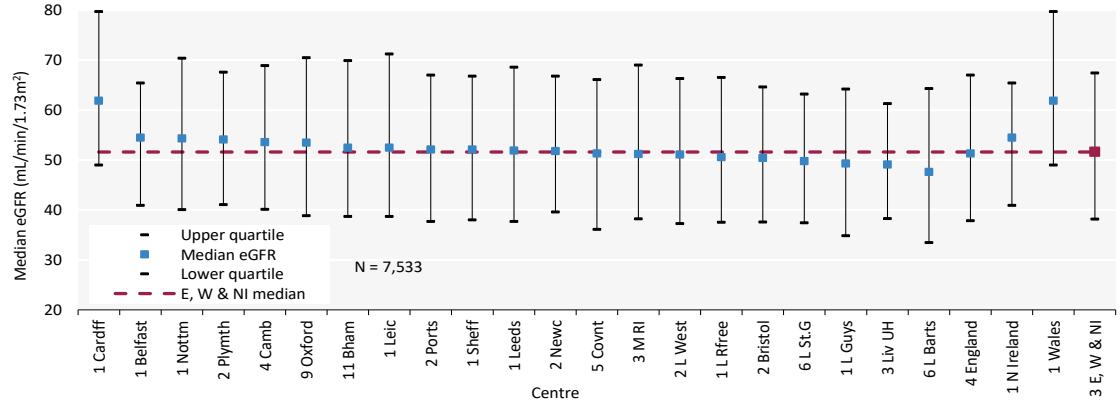

Figure 4.6 Median estimated glomerular filtration rate (eGFR) at 1 year post-donor after brain death (DBD) Tx by transplanting centre for transplantation that occured between 2016 and 2022

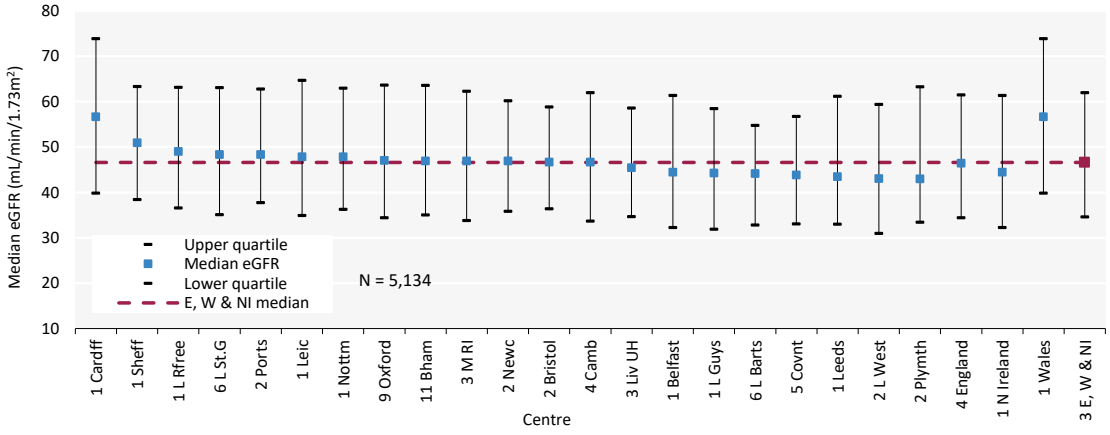

Figure 4.7 Median estimated glomerular filtration rate (eGFR) at 1 year post-donor after circulatory death (DCD) Tx by transplanting centre for transplantation that occured between 2016 and 2022

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 4.5 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 31/12/2023

		Data completeness (%)						
Centre	N with Tx	eGFR	Blood pressure	Haemoglobin	Total cholesterol	Adjusted calcium	Phosphate	PTH
TX CENTRES								
Bham	1,648	92.9	84.3	92.5	87.6	92.5	92.4	2.0
Belfast	757	98.9	95.1	98.8	99.2	97.8	97.6	24.0
Bristol	951	99.2	86.3	99.1	92.2	98.7	98.4	98.0
Camb	1,206	93.2	0.0	93.0	84.0	87.7	87.2	86.8
Cardff	1,099	97.7	94.5	97.9	55.3	97.6	97.6	15.7
Covnt	650	90.5	68.3	90.0	61.7	89.9	32.9	26.8
L Barts	1,435	95.1	0.2	95.1	55.4	94.8	94.8	92.8
L Guys	1,487	89.2	0.0	66.1	45.9	63.7	63.9	29.3
L Rfree	1,485	96.0	83.2	95.8	67.8	93.3	93.2	76.5
L St.G	486	97.1	79.6	96.3	73.5	89.5	89.5	67.7
L West	2,028	91.4	0.0	91.5	37.4	91.3	91.3	47.5
Leeds	1,150	98.8	88.1	98.4	94.5	97.1	91.9	36.3
Leic	1,518	95.3	2.5	94.9	93.3	93.9	93.5	46.3
Liv UH M RI	819	95.2	1.6	95.1	72.0	93.9	94.4	1.1
Newc	790	97.1	88.6	97.0	78.5	96.8	96.7	65.8
Nottm	704	99.4	94.9	99.3	79.0	98.4	97.3	83.5
Oxford	1,460	70.1	58.8	96.2	43.2	95.9	95.8	38.5
Plymth	335	96.1	91.6	96.1	80.6	94.0	93.7	69.3
Ports	1,133	91.1	11.9	90.4	45.8	89.4	83.1	40.0
Sheff	765	96.0	85.9	96.0	39.4	95.4	95.4	20.0
DIALYSIS CENTRES								
Antrim	172	98.3	39.0	97.7	100.0	97.1	97.1	39.5
Bangor	114	95.6	38.6	94.7	99.1	94.7	94.7	23.7
Bradfd	431	99.3	1.9	99.1	92.3	97.5	94.9	80.5
Brightn	577	98.1	21.7	97.9	84.1	96.4	95.8	60.7
Carlis	164	81.1	0.0	80.5	45.7	80.5	80.5	36.6
Carsh	897	73.8	3.7	73.8	44.2	72.6	72.4	32.7
Clwyd	95	96.8	17.9	96.8	99.0	96.8	96.8	93.7
Derby	316	98.1	92.4	97.8	95.3	97.2	97.2	94.9
Donc	147	99.3	97.3	99.3	95.9	98.6	98.6	37.4
Dorset	433	87.8	17.1	86.8	75.8	83.4	71.1	58.2
Dudley	121	98.4	23.1	96.7	90.1	98.4	85.1	90.9
EssexMS Exeter	357	96.1	0.0	95.5	67.0	90.2	83.5	18.8
Glouc	301	95.7	58.8	95.4	64.5	92.0	89.0	44.5
Hull	497	98.0	2.4	97.2	51.5	93.0	93.0	25.0
Ipswi	234	95.7	30.3	93.2	69.2	91.0	89.7	58.6
Kent	662	98.9	93.5	98.8	64.4	97.9	98.0	6.5
L Kings	568	93.5	0.0	93.7	58.5	93.1	93.1	58.5
Middlbr	554	86.6	0.0	85.7	49.6	83.9	82.7	12.5
Newry	181	97.8	85.6	97.8	100.0	96.7	96.7	2.2

Table 4.5 Continued

Centre	N with Tx	Data completeness (%)						
		eGFR	Blood pressure	Haemoglobin	Total cholesterol	Adjusted calcium	Phosphate	PTH
Norwch	423	93.6	0.0	92.0	92.2	87.0	86.8	27.0
Prestn	795	95.4	0.4	94.0	72.5	90.7	88.8	17.5
Redng	540	98.5	74.3	98.3	85.7	98.0	97.8	56.5
Salford	725	97.8	0.0	97.8	97.0	97.2	97.1	0.1
Shrew	187	91.4	37.4	90.9	85.6	88.8	88.2	20.3
Stevng	416	96.6	82.2	95.9	37.7	93.3	91.8	18.5
Stoke	450	97.8	1.6	97.8	97.8	97.8	97.6	61.8
Sund	298	99.3	0.0	99.0	85.6	99.0	99.3	89.9
Swanse	377	98.9	95.2	98.1	65.8	97.9	97.9	80.9
Truro	255	99.2	0.0	99.2	85.5	98.8	98.8	77.3
Ulster	109	99.1	88.1	99.1	100.0	99.1	99.1	77.1
West NI	234	98.3	75.6	96.6	98.7	96.6	96.6	88.9
Wirral	193	95.9	3.6	95.9	79.8	68.9	77.2	9.3
Wolve	260	98.5	46.5	97.7	85.8	97.7	68.1	70.0
Wrexm	175	97.1	76.0	97.1	99.4	97.1	97.1	100.0
York	350	98.6	49.4	98.9	68.0	94.3	93.4	30.6
TOTALS								
England	31,201	93.2	36.5	93.0	68.7	91.3	89.0	46.2
N Ireland	1,453	98.6	83.6	98.2	99.4	97.5	97.4	37.6
Wales	1,860	97.7	85.6	97.6	66.5	97.4	97.4	41.3
E, W & NI	**34,514**	**93.6**	**41.1**	**93.4**	**69.8**	**91.9**	**89.8**	**45.6**

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

For the 66 adult kidney centres, the number of prevalent patients with a Tx was calculated as both a proportion of the prevalent patients on KRT and as a proportion of the estimated centre catchment population (calculated as detailed in appendix A).

Table 4.6 Number of prevalent adult Tx patients and proportion of adult KRT patients with a Tx by year and by centre; number of Tx patients as a proportion of the catchment population

	N with Tx					% with Tx					Estimated catchment population (millions)	2023 crude rate (pmp)
Centre	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023		
TX CENTRES												
Belfast	692	720	742	758	769	78.6	81.0	81.7	81.9	82.0	0.54	1,428
Bham	1,630	1,603	1,608	1,626	1,697	49.2	49.2	48.7	48.0	49.7	2.10	810
Bristol	939	928	925	957	975	63.2	62.9	61.8	62.8	64.1	1.27	769
Camb	1,109	1,183	1,217	1,246	1,259	76.2	78.3	74.8	75.1	77.3	0.99	1,273
Cardff	1,083	1,068	1,061	1,087	1,139	62.6	63.5	62.4	61.8	62.2	1.16	984
Covnt	624	641	657	660	670	57.7	57.8	58.2	58.4	57.9	0.81	831
Edinb	547	564	603	630	654	61.8	63.7	65.5	65.4	66.1	0.85	772
Glasgw	1,212	1,238	1,242	1,235	1,283	65.5	67.2	67.0	65.2	66.3	1.38	928
L Barts	1,378	1,339	1,358	1,409	1,484	51.9	50.2	49.9	49.6	50.2	1.62	919
L Guys	1,550	1,513	1,482	1,514	1,545	66.8	65.3	63.7	65.5	66.7	1.01	1,534
L Rfree	1,427	1,425	1,467	1,493	1,523	60.9	61.0	61.2	61.6	61.5	1.27	1,195
L St.G	502	480	488	485	504	58.9	56.2	56.0	56.7	57.4	0.67	754
L West	2,043	2,023	2,006	2,056	2,079	56.6	57.3	56.5	56.9	56.5	2.03	1,023
Leeds	1,082	1,118	1,137	1,154	1,177	62.7	63.8	63.7	62.7	61.8	1.40	838
Leic	1,442	1,494	1,447	1,486	1,557	55.9	57.0	54.9	54.6	55.2	2.18	714
Liv UH	842	806	800	804	845	56.8	55.7	54.7	54.4	56.2	1.27	667
M RI	1,399	1,327	1,381	1,393	1,483	68.3	66.8	66.7	66.1	65.7	1.37	1,086
Newc	765	781	799	808	813	65.3	65.3	65.2	64.9	63.2	0.96	850
Nottm	751	732	723	723	722	61.7	60.6	59.4	59.9	60.4	0.93	774
Oxford	1,441	1,461	1,461	1,497	1,511	72.8	72.3	72.8	72.1	70.9	1.54	981
Plymth	360	359	345	336	353	67.3	66.2	63.5	61.8	64.3	0.41	854
Ports	1,133	1,108	1,117	1,141	1,163	60.2	58.3	57.5	57.1	57.3	1.79	651
Sheff	835	805	804	775	781	56.0	53.9	53.6	52.1	52.8	1.12	695
DIALYSIS CENTRES												
Abrdn	343	350	369	371	378	61.6	62.0	63.8	63.0	62.2	0.50	758
Airdrie	297	295	285	290	310	56.6	57.2	56.6	56.1	54.9	0.47	664
Antrim	145	161	160	170	174	50.9	56.1	54.2	55.6	56.0	0.25	700
Bangor	106	107	108	112	118	52.7	49.5	49.8	50.9	54.1	0.16	747
Bradfd	413	417	417	423	441	56.3	57.5	56.7	54.2	53.5	0.51	869
Brightn	545	556	568	583	594	51.2	51.6	52.1	53.1	51.9	1.08	549
Carlis	156	152	159	163	170	51.7	51.2	52.0	53.8	55.7	0.26	656
Carsh	835	844	864	900	927	46.9	45.6	45.3	46.4	46.3	1.68	552
Clwyd	104	107	102	97	98	50.7	52.5	50.5	47.6	44.1	0.18	539
D&Gall	89	91	94	89	91	59.3	58.0	60.7	61.0	62.8	0.12	753
Derby	296	299	307	305	325	45.3	44.3	44.4	42.5	44.2	0.58	564
Donc	132	140	148	156	159	38.6	41.1	43.4	41.1	41.1	0.38	418
Dorset	436	449	446	432	444	56.4	56.3	56.7	54.6	54.4	0.75	592
Dudley	111	124	130	127	122	30.3	33.2	32.3	33.2	33.2	0.35	347
Dundee	257	250	236	228	215	57.5	58.8	58.6	58.8	56.0	0.37	584
EssexMS	329	350	355	353	365	38.6	39.6	39.7	39.6	37.5	1.01	361
Exeter	541	535	512	541	555	49.7	49.0	47.5	48.0	49.2	0.99	562
Glouc	269	266	282	294	305	50.7	51.0	51.7	52.8	54.5	0.53	579
Hull	498	498	492	503	506	55.1	54.6	53.7	53.9	52.8	0.81	623
Inverns	171	170	171	178	182	60.4	62.5	62.0	63.6	58.7	0.23	807
Ipswi	240	255	248	242	238	56.1	59.9	58.8	61.3	60.0	0.32	748
Kent	650	639	644	651	686	57.0	55.9	54.0	53.3	55.3	1.08	632
Klmarnk	185	183	183	190	185	51.1	49.5	49.6	50.1	47.0	0.29	634
Krkcldy	143	136	120	110	103	48.5	47.1	41.2	38.6	35.8	0.28	375
L Kings	525	513	529	554	591	42.1	40.9	39.7	39.7	42.6	0.94	626
Middlbr	558	573	571	569	573	58.6	60.6	59.6	59.5	59.0	0.82	699
Newry	162	173	179	179	189	64.0	65.5	63.7	66.5	68.2	0.24	794
Norwch	454	460	450	448	425	56.1	56.8	56.3	55.9	52.6	0.71	602

Table 4.6 Continued

Centre	N with Tx					% with Tx					Estimated catchment population (millions)	2023 crude rate (pmp)
	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023		
Prestn	745	772	778	792	813	55.5	56.4	56.6	56.6	56.6	1.27	640
Redng	483	501	513	516	552	56.0	57.6	58.4	56.0	55.5	0.74	743
Salford	687	689	688	699	745	55.3	54.4	56.5	54.9	54.3	1.19	627
Shrew	151	166	173	187	190	34.6	38.9	39.1	41.9	41.2	0.42	449
Stevng	383	380	410	418	431	39.8	38.8	40.1	39.1	38.6	1.15	374
Stoke	439	430	433	452	460	54.3	52.7	51.2	49.9	50.0	0.75	615
Sund	280	296	285	290	309	49.1	53.2	52.1	51.3	52.4	0.54	567
Swanse	358	353	359	365	388	41.2	41.5	42.1	43.0	43.1	0.75	516
Truro	261	259	251	254	256	58.0	58.3	54.3	53.9	54.7	0.37	701
Ulster	81	102	102	105	109	43.8	50.8	50.3	50.2	51.9	0.21	531
West NI	207	224	226	240	244	63.1	63.8	66.7	67.6	68.4	0.25	964
Wirral	184	198	199	189	199	44.1	47.5	47.8	46.9	51.4	0.48	413
Wolve	229	239	246	248	269	37.2	36.5	35.4	34.2	34.5	0.55	486
Wrexm	174	177	181	178	179	56.1	55.0	59.7	58.0	54.7	0.21	856
York	349	338	348	351	359	60.0	59.1	59.9	57.6	58.9	0.49	729
TOTALS												
England	32,431	32,464	32,668	33,203	34,150	56.3	56.1	55.5	55.3	55.5	45.78	746
N Ireland	1,287	1,380	1,409	1,452	1,485	66.6	69.3	69.6	70.3	71.0	1.48	1,001
Scotland	3,244	3,277	3,303	3,321	3,401	60.6	61.6	61.7	61.0	60.6	4.48	760
Wales	1,825	1,812	1,811	1,839	1,922	55.1	55.4	55.3	55.1	55.0	2.46	782
UK	**38,787**	**38,933**	**39,191**	**39,815**	**40,958**	**56.8**	**56.9**	**56.4**	**56.1**	**56.3**	**54.20**	**756**

Country Tx populations were calculated by summing the Tx patients from centres in each country. Estimated country populations were derived from publicly available sources (see appendix A for details on estimated catchment population by kidney centre)
Exeter was unable to submit 2021 to 2023 patient level data, Manchester was unable to submit 2023 patient level data, but both provided aggregate numbers of patients on KRT at the end of each year by treatment modality
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 patients at each centre with no ethnicity data is shown separately.

Table 4.7 Demographics of adult patients prevalent to Tx on 31/12/2023 by centre

						Ethnicity				
Centre	N on KRT	N with Tx	% with Tx	Median age (yrs)	% male	% White	% Asian	% Black	% Other	% missing
TX CENTRES										
Belfast	938	769	82.0	57.1	61.0	97.1	2.0	0.3	0.5	4.6
Bham	3,417	1,697	49.7	54.3	57.8	58.3	29.8	8.2	3.7	0.4
Bristol	1,522	975	64.1	57.0	60.3	88.3	4.4	5.0	2.3	0.3
Camb	1,629	1,259	77.3	56.5	62.6	88.2	7.3	2.9	1.6	0.4
Cardff	1,830	1,139	62.2	56.5	63.8	91.9	5.5	1.1	1.6	3.4
Covnt	1,158	670	57.9	56.0	61.2	76.7	17.5	5.4	0.5	0.3
Edinb	989	654	66.1	57.2	64.4					
Glasgw	1,934	1,283	66.3	57.1	58.6					
L Barts	2,959	1,484	50.2	54.5	59.2	37.5	35.6	20.4	6.5	0.7
L Guys	2,318	1,545	66.7	54.9	60.5	63.0	10.7	21.0	5.4	0.9
L Rfree	2,475	1,523	61.5	56.7	61.1	44.0	22.8	19.0	14.2	3.3
L St.G	878	504	57.4	57.3	54.6	46.6	23.8	19.7	9.9	3.4
L West	3,681	2,079	56.5	58.4	62.5	40.5	36.2	15.6	7.7	0.0
Leeds	1,906	1,177	61.8	56.0	60.0	78.1	15.1	4.9	1.9	0.2
Leic	2,820	1,557	55.2	58.1	57.6	72.6	20.3	5.0	2.0	1.4
Liv UH	1,503	845	56.2	56.3	63.2	91.6	2.8	3.5	2.2	1.7
M RI	2,258	1,483	65.7							
Newc	1,287	813	63.2	57.0	58.6	93.4	4.8	1.0	0.9	0.1
Nottm	1,195	722	60.4	55.8	59.0	84.9	5.6	5.0	4.6	0.1
Oxford	2,132	1,511	70.9	56.7	61.0	79.8	11.5	4.8	3.9	4.8
Plymth	549	353	64.3	58.2	64.6	96.3	1.1	0.6	2.0	0.3
Ports	2,030	1,163	57.3	58.0	57.4	92.6	4.4	1.0	2.0	4.9
Sheff	1,478	781	52.8	57.0	63.1	87.8	6.7	2.3	3.1	1.0
DIALYSIS CENTRES										
Abrdn	608	378	62.2	54.5	59.3					
Airdrie	565	310	54.9	56.2	57.4					
Antrim	311	174	55.9	58.6	62.1	99.4	0.0	0.6	0.0	7.5
Bangor	218	118	54.1	57.0	64.4	99.1	0.0	0.0	0.9	6.8
Bradfd	824	441	53.5	53.0	59.4	51.3	45.4	2.3	1.1	0.0
Brightn	1,145	594	51.9	58.1	60.8	89.8	5.8	2.1	2.4	1.4
Carlis	305	170	55.7	58.8	64.1	95.8	4.2	0.0	0.0	1.2
Carsh	2,001	927	46.3	59.1	62.2	67.8	19.5	9.1	3.6	0.4
Clwyd	222	98	44.1	58.5	66.3	97.9	2.1	0.0	0.0	3.1
Colchr	164	0								
D&Gall	145	91	62.8	58.4	63.7					
Derby	735	325	44.2	59.0	61.5	83.9	10.2	2.8	3.1	0.6
Donc	387	159	41.1	57.0	65.4	94.3	2.5	1.3	1.9	0.6
Dorset	816	444	54.4	61.1	60.4	95.5	2.5	0.5	1.6	0.0
Dudley	368	122	33.2	57.5	66.4	80.3	14.8	3.3	1.6	0.0
Dundee	384	215	56.0	58.2	59.1					
EssexMS	974	365	37.5	57.7	61.9	85.1	7.2	5.0	2.8	0.6
Exeter	1,127	555	49.2							
Glouc	560	305	54.5	60.0	58.0	90.8	4.9	2.0	2.3	0.3
Hull	959	506	52.8	56.9	64.8	96.2	1.4	1.0	1.4	0.6
Inverns	310	182	58.7	57.6	57.7					
Ipswi	397	238	59.9	59.8	61.8	81.9	2.5	3.8	11.8	0.0
Kent	1,240	686	55.3	57.1	58.6	91.1	3.8	1.8	3.4	0.3

Table 4.7 Continued

Centre	N on KRT	N with Tx	% with Tx	Median age (yrs)	% male	Ethnicity				
						% White	% Asian	% Black	% Other	% missing
Klmarnk	394	185	47.0	58.0	57.3					
Krkcldy	288	103	35.8	58.5	62.1					
L Kings	1,389	591	42.5	58.0	63.3	46.0	18.5	31.8	3.7	0.3
Middlbr	971	573	59.0	58.5	60.6	94.1	4.5	0.4	1.1	0.0
Newry	277	189	68.2	57.7	63.0	97.8	1.1	0.6	0.6	3.2
Norwch	808	425	52.6	59.0	59.8	96.5	1.7	1.2	0.7	0.2
Prestn	1,436	813	56.6	57.8	60.3	83.6	14.5	0.9	1.0	0.1
Redng	994	552	55.5	59.2	64.3	62.8	24.8	5.4	7.0	6.5
Salford	1,371	745	54.3	58.0	61.1	80.5	15.0	2.4	2.0	0.8
Shrew	461	190	41.2	57.5	62.1	91.5	3.2	2.1	3.2	0.5
Stevng	1,117	431	38.6	57.1	67.3	67.4	20.8	7.9	4.0	0.5
Stoke	921	460	49.9	55.0	63.3	89.7	6.7	2.0	1.6	2.6
Sund	590	309	52.4	57.6	59.6	94.2	3.9	1.0	1.0	0.0
Swanse	901	388	43.1	57.5	61.3	96.1	2.9	0.3	0.8	0.5
Truro	468	256	54.7	57.6	58.2	98.1	0.4	0.0	1.6	0.0
Ulster	210	109	51.9	58.6	63.3	92.7	4.6	2.8	0.0	0.0
West NI	357	244	68.3	56.0	62.7	98.3	1.7	0.0	0.0	1.6
Wirral	387	199	51.4	58.4	60.8	94.5	3.0	0.5	2.0	0.0
Wolve	780	269	34.5	57.0	56.9	63.6	26.4	7.8	2.2	0.0
Wrexm	327	179	54.7	55.7	65.9	95.5	1.7	0.6	2.3	1.7
York	610	359	58.9	58.8	64.4	95.8	1.7	0.3	2.2	0.3
TOTALS										
England	61,500	34,150	55.5	57.0	60.7	73.6	15.1	7.5	3.8	1.2
N Ireland	2,093	1,485	71.0	57.3	61.8	97.3	1.8	0.5	0.4	3.9
Scotland	5,617	3,401	60.5	57.0	59.8					
Wales	3,498	1,922	54.9	56.8	63.7	93.8	4.1	0.8	1.3	2.9
UK	**72,708**	**40,958**	**56.3**	**57.0**	**60.8**	**75.6**	**14.0**	**6.9**	**3.6**	**1.4**

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
Exeter and Manchester were unable to submit 2023 patient level data but provided aggregate numbers of patients on KRT at the end of 2023 by treatment modality
UK ethnicity distribution and completeness does not include Scotland

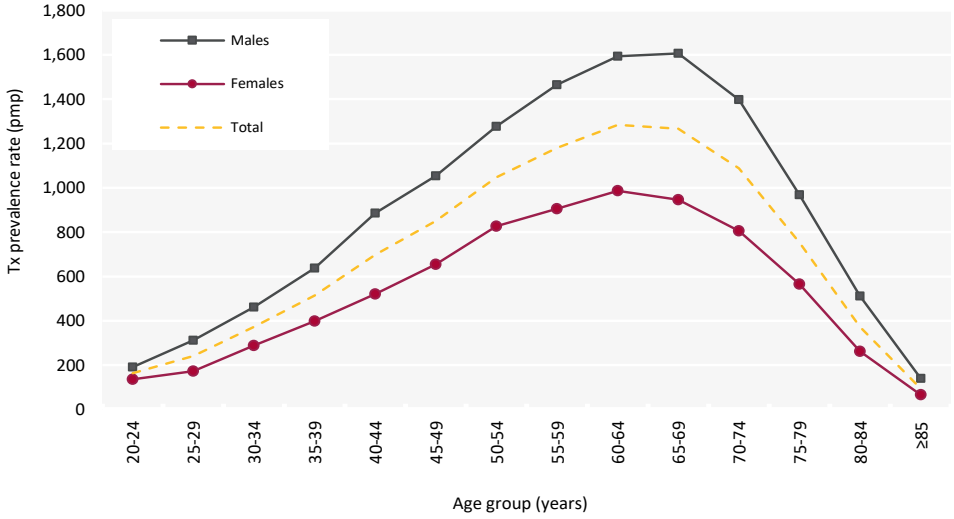

Figure 4.8 Adult Tx prevalence rate on 31/12/2023 by age group and sex
pmp – per million population

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 4.8). 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 4.8 Primary renal diseases (PRDs) of adult patients incident to Tx in 2023 and adult patients prevalent to Tx on 31/12/2023

	Incident Tx		Prevalent Tx	
PRD	N	%	N	%
Diabetes	505	17.6	4,485	11.9
Glomerulonephritis	637	22.1	8,837	23.5
Hypertension	216	7.5	1,971	5.2
Polycystic kidney disease	349	12.1	5,101	13.6
Pyelonephritis	161	5.6	3,108	8.3
Renal vascular disease	55	1.9	464	1.2
Other	526	18.3	7,300	19.4
Uncertain aetiology	428	14.9	6,353	16.9
Total (with data)	**2,877**	**100.0**	**37,619**	**100.0**
Missing	137	4.5	710	1.9

Graft function and anaemia in prevalent adult kidney Tx patients

Accepting the limitations of interpreting eGFR in the post-Tx population, four centre-specific analyses are presented: median eGFR, the percentage of patients with eGFR <30 mL/min/1.73m², and the proportion of patients achieving an adequate haemoglobin level (defined as a haemoglobin ≥100 g/L) separately for those with eGFR <30 mL/min/1.73m² and those with eGFR ≥30mL/min/1.73m².

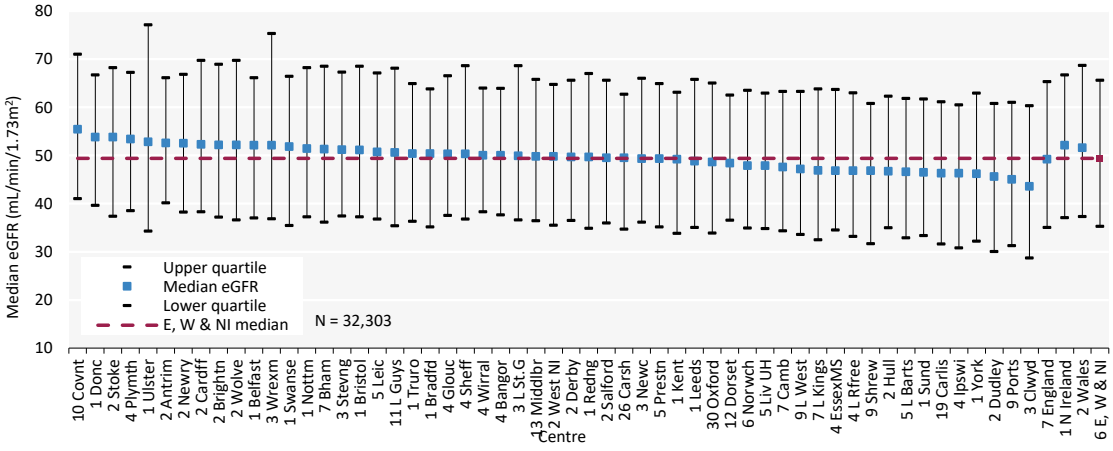

Figure 4.9 Median estimated glomerular filtration rate (eGFR) in adult patients prevalent to Tx on 31/12/2023 by centre

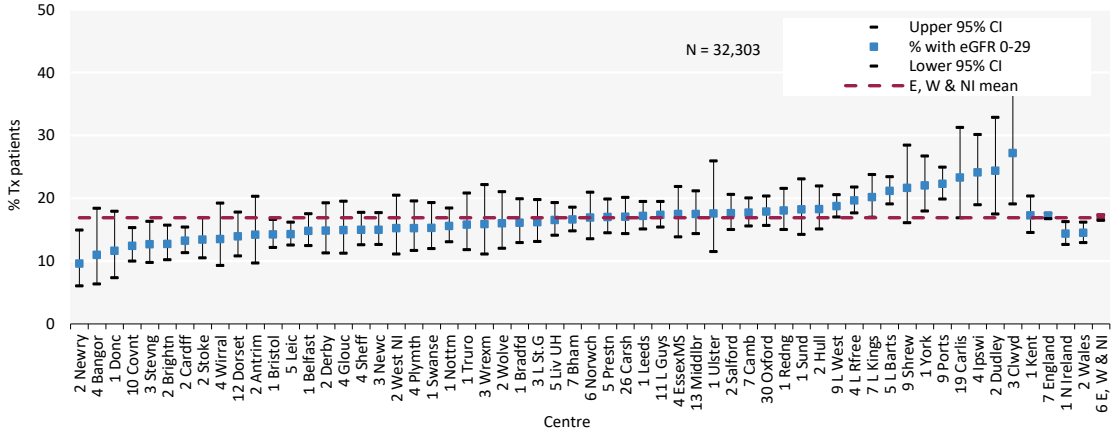

Figure 4.10 Percentage of adult patients prevalent to Tx on 31/12/2023 with an estimated glomerular filtration rate (eGFR) <30mL/min/1.73m² by centre
CI – confidence interval

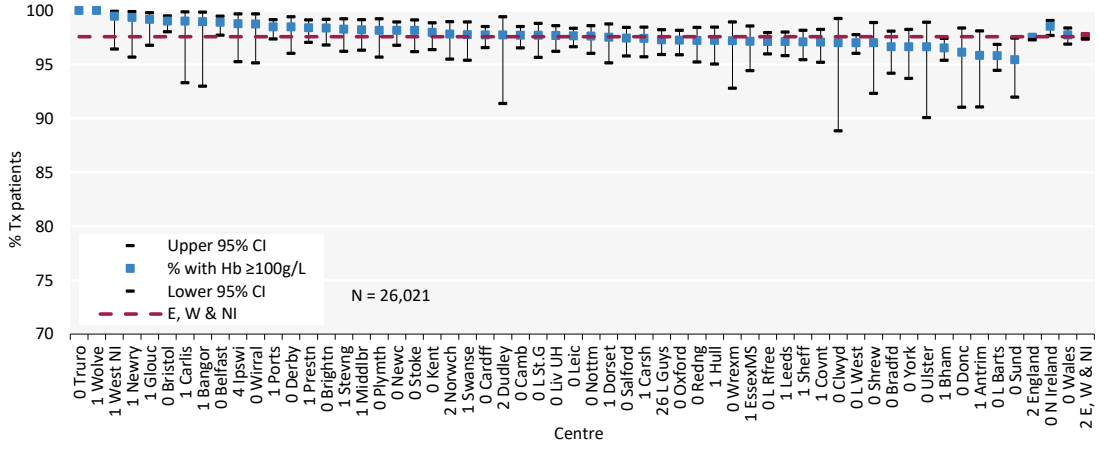

Figure 4.11 Percentage of adult patients prevalent to Tx on 31/12/2023 with an estimated glomerular filtration rate (eGFR) ≥30mL/min/1.73m^2 achieving haemoglobin (Hb) ≥100g/L by centre
CI – confidence interval

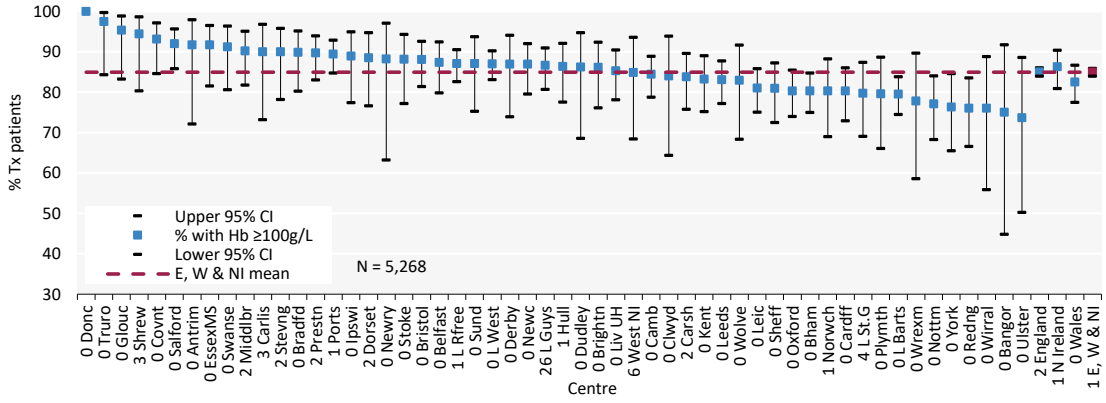

Figure 4.12 Percentage of adult patients prevalent to Tx on 31/12/2023 with an estimated glomerular filtration rate (eGFR) <30mL/min/1.73m^2 achieving haemoglobin (Hb) ≥100g/L by centre
CI – confidence interval

Blood pressure in prevalent adult kidney Tx patients

Blood pressure data completeness was variable (table 4.5) 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.

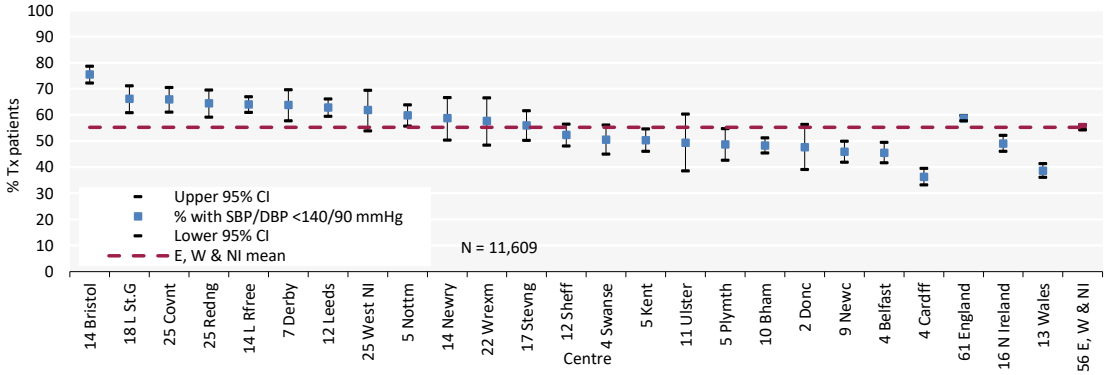

Figure 4.13 Percentage of adult patients prevalent to Tx on 31/12/2023 with estimated glomerular filtration rate (eGFR) ≥30 mL/min/1.73m^2 achieving blood pressure of <140/90 mmHg by centre
CI – confidence interval; DBP – diastolic blood pressure; SBP – systolic blood pressure

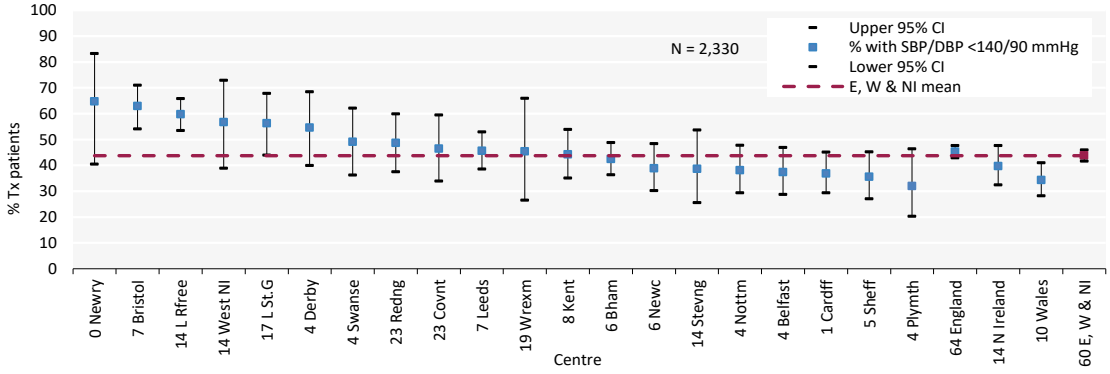

Figure 4.14 Percentage of adult patients prevalent to Tx on 31/12/2023 with estimated glomerular filtration rate (eGFR) <30 mL/min/1.73m^2 achieving blood pressure of <140/90 mmHg by centre
CI – confidence interval; DBP – diastolic blood pressure; SBP – systolic blood pressure

Biochemistry parameters in prevalent adult kidney Tx patients

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

Table 4.9 Estimated glomerular filtration rate (eGFR), blood pressure and biochemical parameters in adult patients prevalent to Tx on 31/12/2023 compared with adult patients prevalent to dialysis on 31/12/2023 by CKD stage

	Tx CKD stage (eGFR)				
Characteristic	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)	Prevalent dialysis Stage 5D
N	10,367	16,064	4,541	811	22,357
%	32.6	50.5	14.3	2.6	
eGFR (mL/min/1.73m²)					
mean ± SD	76.7 ± 13.1	45.0 ± 8.4	23.6 ± 4.2	11.6 ± 2.5	
median	73.7	45.0	24.2	12.0	
SBP (mmHg)					
mean ± SD	135 ± 17	138 ± 18	140 ± 19	145 ± 21	137 ± 25
% ≥140 mmHg	35.5	41.7	47.5	57.8	43.0
DBP (mmHg)					
mean ± SD	80 ± 10	80 ± 11	79 ± 12	81 ± 12	71 ± 15
% ≥90 mmHg	17.5	18.0	17.8	22.6	12.1
Total cholesterol (mmol/L)					
mean ± SD	4.4 ± 1.1	4.4 ± 1.1	4.4 ± 1.2	4.4 ± 1.2	3.8 ± 1.1
% ≥4.0 mmol/L	63.0	63.0	61.5	62.4	39.4
Haemoglobin (g/L)					
mean ± SD	138 ± 16	129 ± 17	117 ± 16	106 ± 16	110 ± 14
% <100 g/L	1.2	3.2	12.2	31.2	21.0
Phosphate (mmol/L)					
mean ± SD	0.9 ± 0.2	1.0 ± 0.2	1.1 ± 0.2	1.4 ± 0.4	1.7 ± 0.5
% >1.7 mmol/L	0.1	0.2	1.7	20.4	44.4
Adjusted Ca (mmol/L)					
mean ± SD	2.4 ± 0.1	2.4 ± 0.1	2.4 ± 0.1	2.3 ± 0.2	2.3 ± 0.2
% >2.5 mmol/L	26.4	27.1	20.9	13.3	14.8
% <2.2 mmol/L	1.7	2.2	5.3	16.3	17.0
PTH (pmol/L)					
median	8.5	10.2	15.9	30.8	36.7
% >72 pmol/L	0.4	0.9	3.0	15.8	20.7

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 01/01/2013 and 31/12/2021 were considered for inclusion in the analysis. 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 4.10 Differences in median estimated glomerular filtration rate (eGFR) slope between demographic subgroups of adult patients who received their first kidney Tx between 01/01/2013 and 31/12/2021

Characteristic	N	Median slope	Lower quartile	Upper quartile
Age at Tx (yrs)				
<40	4,717	-1.44	-4.74	0.72
40-55	8,455	-0.80	-3.12	1.03
>55	6,906	-0.74	-3.14	1.07
Ethnicity				
White	13,934	-0.82	-3.19	0.97
Asian	2,947	-1.16	-3.84	0.89
Black	1,630	-1.45	-4.33	0.86
Other	664	-1.02	-4.13	0.83
Sex				
Male	12,394	-0.68	-3.13	1.14
Female	7,684	-1.26	-3.95	0.68
Diabetes				
No Diabetes	16,245	-0.80	-3.22	1.01
Diabetes	3,482	-1.48	-4.35	0.79
Tx donor				
Deceased	14,170	-0.91	-3.48	1.03
Living	5,908	-0.90	-3.28	0.88
Year of Tx				
2013	2,398	-1.08	-3.09	0.35
2014	2,330	-0.94	-2.91	0.50
2015	2,317	-0.83	-2.88	0.57
2016	2,396	-0.93	-3.24	0.74
2017	2,557	-0.88	-3.33	0.91
2018	2,501	-0.73	-3.28	1.39
2019	2,301	-0.86	-3.76	1.49
2020	1,600	-0.92	-4.18	2.26
2021	1,678	-0.90	-6.63	3.94
Status of Tx patients at end of follow-up				
Died	2,390	-1.35	-4.11	0.95
Graft failed	1,906	-6.02	-11.33	-2.92
Re-transplanted	79	-3.07	-6.65	-1.09
Graft functioning	15,782	-0.51	-2.57	1.17
Total	**20,078**	**-0.90**	**-3.43**	**0.98**

Survival of adult kidney Tx patients

Survival of incident and prevalent KRT patients is described in detail in chapters 2 and 3, respectively. Survival of incident Tx patients is reported in table 4.4. NHSBT reports the survival of Tx recipients.

Cause of death in adult kidney Tx patients

Cause of death was analysed in patients prevalent to KRT on 31/12/2022 and followed-up for one year in 2023, with comparisons between Tx and dialysis presented in table 4.11. The proportion of KRT 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. Where the cause of death was missing in the UKRR data, cause of death from Civil Registration records was used.

Table 4.11 Cause of death in adult patients prevalent to KRT on 31/12/2022 followed-up in 2023 by modality

	All modalities		Dialysis		Tx	
Cause of death	N	%	N	%	N	%
Cardiac disease	1,054	19.2	868	20.1	186	15.7
Cerebrovascular disease	193	3.5	147	3.4	46	3.9
Infection	1,039	18.9	782	18.1	257	21.7
Malignancy	480	8.7	262	6.1	218	18.4
Treatment withdrawal	480	8.7	458	10.6	22	1.9
Other	1,733	31.5	1,408	32.7	325	27.4
Uncertain aetiology	517	9.4	387	9.0	130	11.0
Total (with data)	**5,496**	**100.0**	**4,312**	**100.0**	**1,184**	**100.0**
Missing	630	10.3	472	9.9	158	11.8

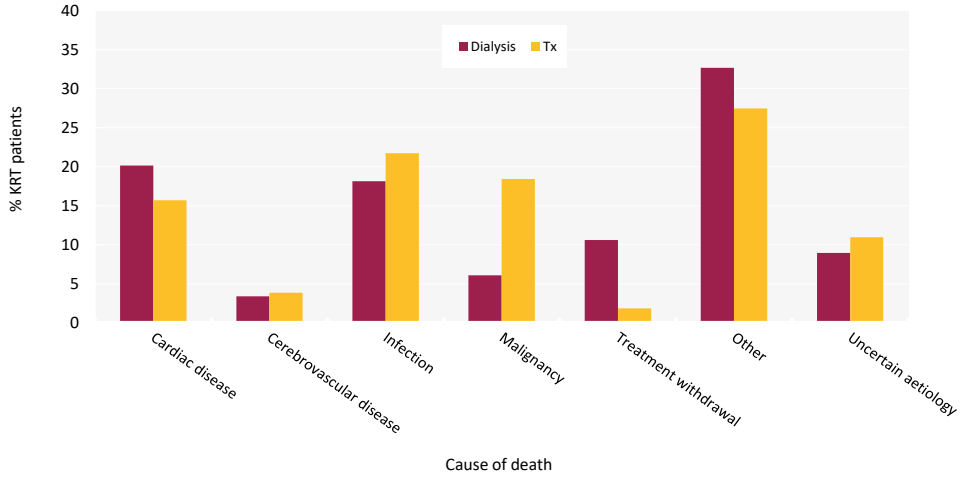

Figure 4.15 Cause of death for adult patients prevalent to KRT on 31/12/2022 followed-up in 2023 by modality

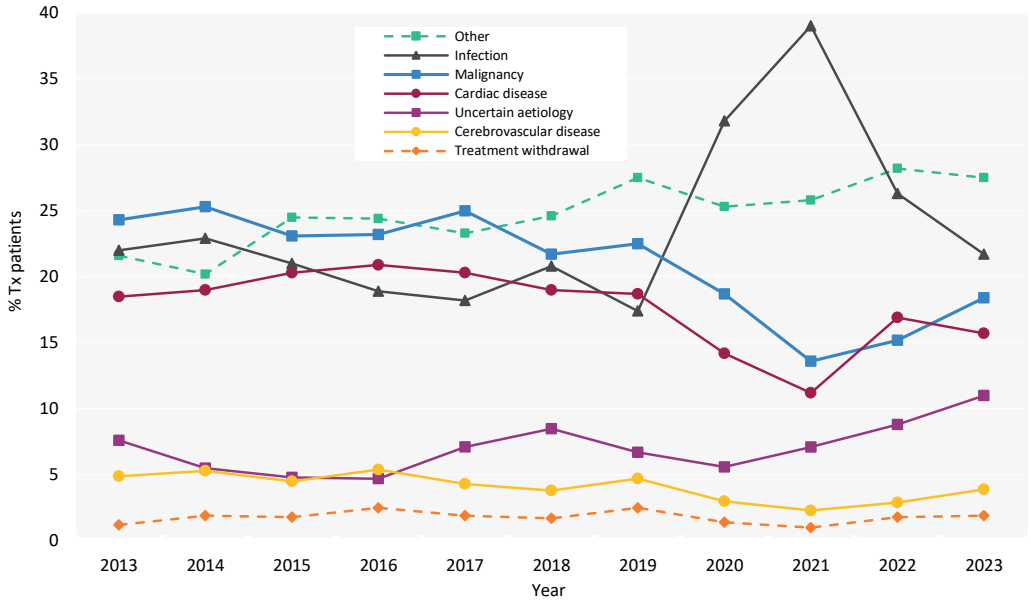

Figure 4.16 Cause of death between 2013 and 2023 for adult patients prevalent to Tx at the beginning of the year

UK Kidney Association
UK Renal Registry

Chapter 5

Adults on in-centre haemodialysis (ICHD) in the UK at the end of 2023

Contents

Introduction

This chapter describes the population of adult patients with end-stage kidney disease (ESKD) who were receiving regular in-centre haemodialysis (ICHD) in the UK at the end of 2023 (figure 5.1). This population comprises patients who were on ICHD at the end of 2022 and remained on ICHD throughout 2023, as well as patients who commenced/re-commenced ICHD in 2023. This latter group includes both incident kidney replacement therapy (KRT) patients who ended 2023 on ICHD and prevalent KRT patients who switched to ICHD from home haemodialysis (HHD), peritoneal dialysis (PD), or a transplant (Tx) in 2023. 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 KRT, 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.

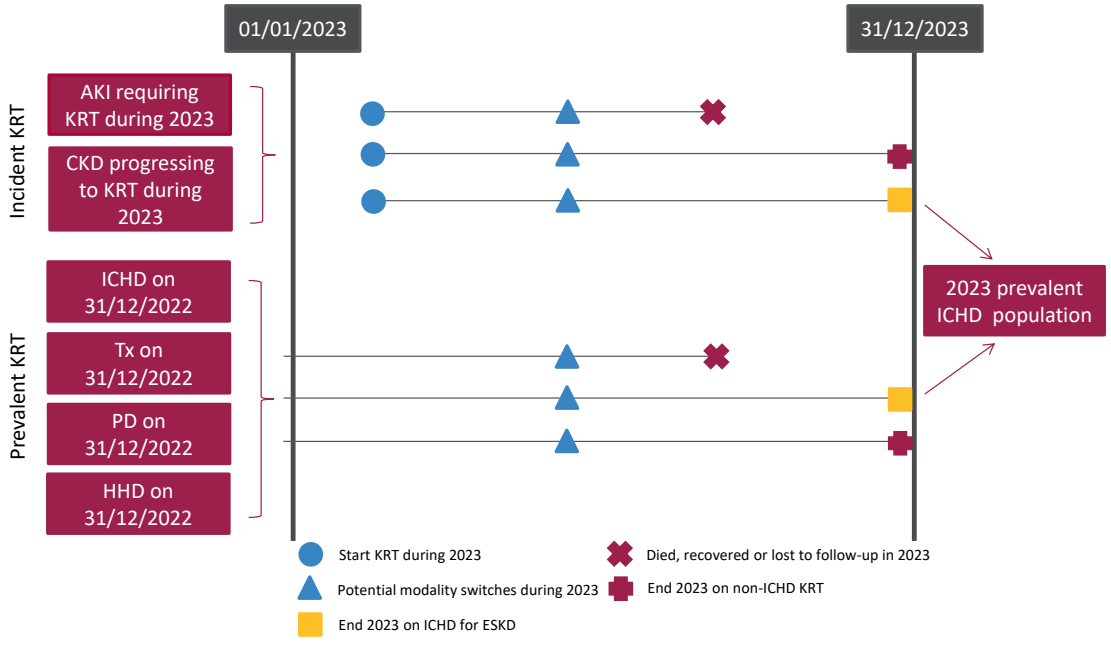

Figure 5.1 Pathways adult patients could follow to be included in the UK 2023 prevalent ICHD population

Note that patients receiving dialysis for acute kidney injury (AKI) are only included in this chapter if they had a timeline or KRT modality code for chronic ICHD at the end of 2023 or if they had been on KRT for ≥90 days and were on ICHD at the end of 2023

CKD – chronic kidney disease

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 UK Kidney 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 kidney 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 the UK Health Security Agency (UKHSA) – methicillin-resistant *Staphylococcus aureus* (MRSA), methicillin-sensitive *Staphylococcus aureus (MSSA), Escherichia coli* bacteraemia and *Clostridium difficile* - will be added to the UKRR data portal (ukkidney.org/audit-research/data-portals) as new data become available.

Rationale for analyses

The analyses begin with a description of the 2023 prevalent adult ICHD population, including the number on ICHD per million population (pmp), dialysis duration and frequency.

The UK Kidney Association guidelines (ukkidney.org/health-professionals/guidelines/guidelines-commentaries) provide audit measures relevant to the care of patients on ICHD, and the guidelines available during 2023 were used for this audit. Where data permit, attainment of these measures by UK kidney centres in 2023 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 (ukkidney.org/audit-research/data-portals). 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 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.

Exeter was unable to submit patient level data for 2021-2023. Manchester Royal Infirmary was unable to submit patient level data for 2023. Both centres provided aggregate numbers by modality, and by vascular access type as part of the 2023 Multisite Dialysis Access Audit, enabling inclusion in tables 5.2 and 5.3, and figure 5.16. Exeter and Manchester are excluded from all other analyses.

London Kings moved to a new Trust IT system, and as a result data were not submitted for the final quarter of 2023. Data for London Kings presented in this chapter are for patients receiving ICHD on 30th September 2023, rather than 31st December 2023.

Table 5.1 The UK Kidney Association audit measures relevant to ICHD that are reported in this chapter

The UK Kidney 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 (2020)	Proportion of patients who are not iron replete with a serum ferritin <200 µg/L	Table 5.8, figure 5.13
	Proportion of patients with haemoglobin 100–120 g/L	Table 5.8, figure 5.14
Vascular access (2023)	Amongst all patients receiving haemodialysis for at least 3 months, the proportion dialysing with each access type	Figure 5.16 (partly addressed)
Commentary on the NICE Guideline on Renal Replacement Therapy and Conservative Management (2020)	Number of patients withdrawing from ICHD as a proportion of all deaths on ICHD	Table 5.9, figure 5.17

AVF – arteriovenous fistula; AVG – arteriovenous graft

Key findings

- 26,613 adult patients were receiving ICHD for ESKD in the UK on 31/12/2023, which represented 36.6% of the KRT population. The number of people on ICHD has increased by 3.0% since 2022.
- The median age of ICHD patients was 65.6 years, and 62.3% were male.
- 80.6% of ICHD patients achieved a dialysis adequacy of URR >65%. This has been declining since 2020.
- 89.9% of ICHD patients had dialysis 3 times a week and a further 1.4% had dialysis more frequently than this.
- 63.0% of ICHD patients had dialysis for 4-5 hours per session compared to 63.5% last year (2022), 66.6% in 2021, 66.4% in 2020 and 70.9% in 2019.
- The median adjusted calcium for ICHD patients was 2.3 mmol/L and 8.9% were above the target range 2.2-2.5 mmol/L.
- The median pre-dialysis bicarbonate for ICHD patients was 23 mmol/L and 82.7% were within the target range 18-26 mmol/L.
- The median pre-dialysis potassium for ICHD patients was 4.8 mmol/L and 5.7% had a pre-dialysis potassium of >6 mmol/L.
- The median haemoglobin and ferritin for ICHD patients was 111 g/L and 533 µg/L, respectively.
- 21.4% of ICHD patients had a haemoglobin <100 g/L and 21.5% had a haemoglobin >120 g/L.
- Cause of death records from Civil Registration were used where the cause of death was missing in the UKRR data. This resulted in improved completeness and changes in proportions of the causes of death. The leading cause of death in patients under 65 years was cardiac disease at 25.5%, with infection accounting for 15.8% of deaths. In those older than 65 years, the leading cause of death was infection (18.9%) and cardiac disease (17.7%).

Analyses

Changes to the prevalent adult ICHD population

For the 67 adult kidney centres, the number of prevalent patients on ICHD was calculated as both a proportion of the prevalent patients on KRT 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 KRT 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)	2023 crude rate (pmp)
Centre	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023		
ENGLAND												
Bham	1,349	1,314	1,348	1,416	1,407	40.7	40.3	40.8	41.8	41.2	2.10	671
Bradfd	280	276	275	309	346	38.2	38.1	37.4	39.6	42.0	0.51	682
Brightn	432	426	425	423	454	40.6	39.5	39.0	38.6	39.7	1.08	420
Bristol	469	463	477	491	473	31.5	31.4	31.9	32.2	31.1	1.27	373
Camb	287	276	358	363	321	19.7	18.3	22.0	21.9	19.7	0.99	325
Carlis	111	111	114	106	107	36.8	37.4	37.3	35.0	35.1	0.26	413
Carsh	840	858	883	886	925	47.1	46.4	46.3	45.7	46.2	1.68	551
Colchr	145	150	146	155	164	100.0	100.0	100.0	100.0	100.0	0.30	551
Covnt	357	365	371	372	398	33.0	32.9	32.9	32.9	34.4	0.81	494
Derby	238	244	262	291	286	36.4	36.1	37.9	40.6	38.9	0.58	497
Donc	180	177	175	200	199	52.6	51.9	51.3	52.6	51.4	0.38	524
Dorset	289	299	304	327	331	37.4	37.5	38.6	41.3	40.6	0.75	441
Dudley	207	209	223	212	202	56.6	55.9	55.3	55.4	54.9	0.35	575
EssexMS	414	423	427	433	477	48.6	47.8	47.7	48.6	49.0	1.01	472
Exeter	443	454	476	496	485	40.7	41.6	44.2	44.0	43.0	0.99	491
Glouc	228	222	223	231	218	42.9	42.5	40.9	41.5	38.9	0.53	414
Hull	350	351	361	358	382	38.7	38.4	39.4	38.3	39.8	0.81	471
Ipswi	142	135	138	131	144	33.2	31.7	32.7	33.2	36.3	0.32	453
Kent	420	425	458	475	477	36.8	37.2	38.4	38.9	38.5	1.08	440
L Barts	1,029	1,041	1,087	1,151	1,202	38.8	39.0	39.9	40.5	40.6	1.62	744
L Guys	674	693	733	714	690	29.0	29.9	31.5	30.9	29.8	1.01	685
L Kings	611	618	671	701	675	49.0	49.3	50.4	50.2	48.6	0.94	715
L Rfree	742	722	747	773	808	31.6	30.9	31.2	31.9	32.6	1.27	634
L St.G	301	320	325	304	312	35.3	37.5	37.3	35.6	35.5	0.67	467
L West	1,381	1,271	1,292	1,323	1,365	38.3	36.0	36.4	36.6	37.1	2.03	672
Leeds	552	549	580	610	647	32.0	31.3	32.5	33.2	33.9	1.40	461
Leic	958	957	1,001	1,037	1,060	37.1	36.5	38.0	38.1	37.6	2.18	486
Liv UH	530	523	549	558	541	35.7	36.2	37.6	37.8	36.0	1.27	427
M RI	498	504	510	542	588	24.3	25.4	24.6	25.7	26.0	1.37	431
Middlbr	344	327	350	344	368	36.1	34.6	36.5	36.0	37.9	0.82	449
Newc	329	355	350	376	402	28.1	29.7	28.6	30.2	31.2	0.96	420
Norwch	295	290	292	304	316	36.5	35.8	36.5	37.9	39.1	0.71	448
Nottm	359	349	363	361	355	29.5	28.9	29.8	29.9	29.7	0.93	381
Oxford	455	475	460	478	512	23.0	23.5	22.9	23.0	24.0	1.54	332
Plymth	126	146	161	160	156	23.6	26.9	29.7	29.4	28.4	0.41	377
Ports	592	608	651	674	696	31.5	32.0	33.5	33.7	34.3	1.79	390
Prestn	505	499	499	511	528	37.6	36.5	36.3	36.5	36.8	1.27	415
Redng	315	300	307	337	373	36.5	34.5	34.9	36.6	37.5	0.74	502
Salford	395	432	414	450	499	31.8	34.1	34.0	35.3	36.4	1.19	420
Sheff	541	552	561	576	583	36.3	36.9	37.4	38.7	39.4	1.12	519
Shrew	204	174	183	172	172	46.7	40.7	41.3	38.6	37.3	0.42	406
Stevng	507	543	535	572	604	52.6	55.4	52.3	53.5	54.1	1.15	523

Table 5.2 Continued

Centre	N on ICHD					% on ICHD					Estimated catchment population (millions)	2023 crude rate (pmp)
	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023		
Stoke	267	252	264	318	337	33.0	30.9	31.2	35.1	36.6	0.75	451
Sund	252	219	215	228	230	44.2	39.4	39.3	40.4	39.0	0.54	422
Truro	164	158	184	198	190	36.4	35.6	39.8	42.0	40.6	0.37	520
Wirral	207	194	191	192	167	49.6	46.5	45.9	47.6	43.2	0.48	347
Wolve	304	326	347	376	407	49.4	49.8	49.9	51.9	52.2	0.55	735
York	184	192	189	196	206	31.6	33.6	32.5	32.2	33.8	0.49	418
N IRELAND												
Antrim	117	110	115	115	121	41.1	38.3	39.0	37.6	38.9	0.25	487
Belfast	158	144	131	139	138	17.9	16.2	14.4	15.0	14.7	0.54	256
Newry	78	78	86	77	78	30.8	29.5	30.6	28.6	28.2	0.24	328
Ulster	96	96	98	99	96	51.9	47.8	48.3	47.4	45.7	0.21	467
West NI	106	118	105	107	110	32.3	33.6	31.0	30.1	30.8	0.25	435
SCOTLAND												
Abrdn	190	192	188	188	206	34.1	34.0	32.5	31.9	33.9	0.50	413
Airdrie	207	192	191	202	231	39.4	37.2	37.9	39.1	40.9	0.47	495
D&Gall	51	56	53	48	45	34.0	35.7	34.2	32.9	31.0	0.12	372
Dundee	162	156	145	135	142	36.2	36.7	36.0	34.8	37.0	0.37	386
Edinb	296	287	279	287	297	33.4	32.4	30.3	29.8	30.0	0.85	351
Glasgw	575	549	564	611	606	31.1	29.8	30.4	32.3	31.3	1.38	438
Inverns	93	92	94	87	117	32.9	33.8	34.1	31.1	37.7	0.23	519
Klmarnk	139	146	137	146	164	38.4	39.5	37.1	38.5	41.6	0.29	562
Krkcldy	138	145	163	160	171	46.8	50.2	56.0	56.1	59.4	0.28	622
WALES												
Bangor	66	78	76	76	68	32.8	36.1	35.0	34.5	31.2	0.16	430
Cardff	551	512	531	571	588	31.8	30.5	31.2	32.4	32.1	1.16	508
Clwyd	86	78	84	85	96	42.0	38.2	41.6	41.7	43.2	0.18	528
Swanse	389	394	404	392	435	44.8	46.4	47.4	46.2	48.3	0.75	578
Wrexm	106	114	103	106	119	34.2	35.4	34.0	34.5	36.4	0.21	569
TOTALS												
England	20,802	20,767	21,455	22,211	22,785	36.1	35.9	36.5	37.0	37.0	45.78	498
N Ireland	555	546	535	537	543	28.7	27.4	26.4	26.0	25.9	1.48	366
Scotland	1,851	1,815	1,814	1,864	1,979	34.6	34.1	33.9	34.3	35.2	4.48	442
Wales	1,198	1,176	1,198	1,230	1,306	36.1	35.9	36.6	36.8	37.3	2.46	531
UK	**24,406**	**24,304**	**25,002**	**25,842**	**26,613**	**35.8**	**35.5**	**36.0**	**36.4**	**36.6**	**54.20**	**491**

Country ICHD populations were calculated by summing the ICHD patients from centres in each country. Estimated country populations were derived from publicly available sources (see appendix A for details on estimated catchment population by kidney centre)
Some new patients, mainly on HD, were not submitted by Cambridge, therefore their prevalent ICHD number is slightly underestimated
Exeter was unable to submit 2021 to 2023 patient level data, Manchester was unable to submit 2023 patient level data, but both provided aggregate numbers of patients on KRT at the end of each year, by treatment modality
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 31/12/2023 by centre

Centre	N on KRT	N on ICHD	% on ICHD	Median age (yrs)	% male	Ethnicity				
						% White	% Asian	% Black	% Other	% missing
ENGLAND										
Bham	3,417	1,407	41.2	65.5	61.1	49.1	32.6	15.8	2.5	2.1
Bradfd	824	346	42.0	62.5	58.7	45.5	47.5	3.5	3.5	0.3
Brightn	1,145	454	39.7	67.8	61.0	86.4	6.8	3.3	3.5	5.7
Bristol	1,522	473	31.1	62.1	66.4	80.9	5.3	11.4	2.3	0.2
Camb	1,629	321	19.7	72.7	64.8	90.7	4.3	3.0	2.0	5.9
Carlis	305	107	35.1	64.5	54.2	98.1	0.0	1.9	0.0	2.8
Carsh	2,001	925	46.2	65.9	60.0	56.9	20.5	15.8	6.8	7.1
Colchr	164	164	100.0	69.5	64.6	92.9	0.6	1.9	4.5	5.5
Covnt	1,158	398	34.4	69.5	65.6	73.6	18.5	6.9	1.0	1.0
Derby	735	286	38.9	67.0	62.6	74.6	17.9	4.4	3.2	11.9
Donc	387	199	51.4	69.0	62.3	88.3	4.6	3.1	4.1	1.5
Dorset	816	331	40.6	70.0	64.4	93.1	3.0	1.2	2.7	0.0
Dudley	368	202	54.9	70.3	63.4	73.3	18.8	7.9	0.0	0.0
EssexMS	974	477	49.0	67.0	65.8	81.4	5.2	7.7	5.7	7.8
Exeter	1,127	485	43.0							
Glouc	560	218	38.9	70.3	64.7	89.4	3.7	2.8	4.1	0.0
Hull	959	382	39.8	63.8	61.0	94.4	2.1	1.6	1.9	2.1
Ipswi	397	144	36.3	70.4	64.6	81.0	2.1	3.5	13.4	1.4
Kent	1,240	477	38.5	66.4	62.5	91.1	3.0	2.2	3.7	3.6
L Barts	2,959	1,202	40.6	62.8	59.2	22.7	38.4	32.9	6.0	2.6
L Guys	2,318	690	29.8	63.5	59.1	39.4	9.4	46.2	5.1	5.8
L Kings	1,389	675	48.6	63.0	59.7	37.5	12.3	46.3	3.8	2.8
L Rfree	2,475	808	32.6	64.3	60.3	35.8	17.9	29.1	17.2	6.4
L St.G	878	312	35.5	65.6	59.6	28.2	28.5	34.9	8.4	4.5
L West	3,681	1,365	37.1	64.7	63.3	26.5	42.3	23.9	7.3	0.0
Leeds	1,906	647	33.9	62.7	62.6	67.8	22.6	7.6	2.0	0.3
Leic	2,820	1,060	37.6	65.0	66.5	69.3	21.5	7.3	2.0	9.1
Liv UH	1,503	541	36.0	64.4	62.5	87.4	4.6	3.2	4.8	7.6
M RI	2,258	588	26.0							
Middlbr	971	368	37.9	64.7	65.8	89.9	7.4	1.6	1.1	0.5
Newc	1,287	402	31.2	65.0	61.9	90.0	5.2	3.0	1.7	0.0
Norwch	808	316	39.1	70.7	63.9	95.8	1.4	1.8	1.1	9.8
Nottm	1,195	355	29.7	65.6	62.0	71.3	10.0	12.9	5.7	1.7
Oxford	2,132	512	24.0	66.2	61.1	72.0	13.2	9.9	4.9	12.9
Plymth	549	156	28.4	68.2	61.5	96.8	1.3	0.6	1.3	0.6
Ports	2,030	696	34.3	66.9	63.6	88.9	5.4	2.6	3.1	22.1
Prestn	1,436	528	36.8	64.8	62.9	80.0	17.9	1.0	1.0	8.0
Redng	994	373	37.5	66.0	64.3	59.4	22.6	6.2	11.8	13.4
Salford	1,371	499	36.4	60.8	66.5	66.5	23.7	6.5	3.4	4.4
Sheff	1,478	583	39.4	64.6	65.4	81.9	10.7	4.8	2.6	2.6
Shrew	461	172	37.3	70.3	67.4	89.3	5.3	2.4	3.0	1.7
Stevng	1,117	604	54.1	65.8	62.4	65.5	19.8	9.9	4.9	4.6
Stoke	921	337	36.6	67.9	58.8	88.2	5.3	3.1	3.4	4.5
Sund	590	230	39.0	67.5	60.4	96.1	2.2	0.9	0.9	0.0
Truro	468	190	40.6	70.2	65.8	97.9	1.6	0.5	0.0	0.0
Wirral	387	167	43.2	64.9	61.7	95.8	1.8	2.4	0.0	0.0
Wolve	780	407	52.2	64.4	61.4	52.0	31.3	11.1	5.7	0.2

Table 5.3 Continued

Centre	N on KRT	N on ICHD	% on ICHD	Median age (yrs)	% male	Ethnicity				
						% White	% Asian	% Black	% Other	% missing
York	610	206	33.8	71.8	57.8	96.4	1.5	0.0	2.0	4.4
N IRELAND										
Antrim	311	121	38.9	71.5	62.8	99.1	0.0	0.0	0.9	9.9
Belfast	938	138	14.7	66.3	58.0	94.0	4.5	0.8	0.8	3.6
Newry	277	78	28.2	71.4	59.0	95.5	1.5	3.0	0.0	15.4
Ulster	210	96	45.7	74.7	63.5	96.9	3.1	0.0	0.0	0.0
West NI	357	110	30.8	69.3	58.2	100.0	0.0	0.0	0.0	8.2
SCOTLAND										
Abrdn	608	206	33.9	66.0	58.3					
Airdrie	565	231	40.9	64.5	55.8					
D&Gall	145	45	31.0	68.0	73.3					
Dundee	384	142	37.0	65.8	63.4					
Edinb	989	297	30.0	64.6	65.7					
Glasgw	1,934	606	31.3	65.8	62.5					
Inverns	310	117	37.7	68.0	61.5					
Klmarnk	394	164	41.6	64.5	65.2					
Krkcldy	288	171	59.4	66.7	63.7					
WALES										
Bangor	218	68	31.2	71.8	63.2	94.1	0.0	2.0	3.9	25.0
Cardff	1,830	588	32.1	65.4	62.4	86.7	8.1	2.5	2.7	12.1
Clwyd	222	96	43.2	68.7	61.5	97.6	1.2	1.2	0.0	14.6
Swanse	901	435	48.3	69.4	60.7	96.6	1.7	0.5	1.2	4.6
Wrexm	327	119	36.4	66.4	58.8	98.2	0.0	0.9	0.9	6.7
TOTALS										
England	61,500	22,785	37.0	65.4	62.4	65.1	17.6	12.9	4.4	4.6
N Ireland	2,093	543	25.9	71.1	60.2	97.0	2.0	0.6	0.4	7.0
Scotland	5,617	1,979	35.2	65.7	62.4					
Wales	3,498	1,306	37.3	67.1	61.5	92.3	4.3	1.5	1.9	10.0
UK	**72,708**	**26,613**	**36.6**	**65.6**	**62.3**	**67.2**	**16.5**	**12.1**	**4.2**	**5.0**

Blank cells – no data returned by the centre or data completeness <70%
Breakdown by ethnicity is not shown for centres with <70% data completeness, but these centres were included in national averages
Some new patients, mainly on HD, were not submitted by Cambridge, therefore their prevalent ICHD number is slightly underestimated
Exeter and Manchester were unable to submit patient level data but provided aggregate numbers of patients on KRT at the end of 2023 by treatment modality
UK ethnicity distribution and completeness does not include Scotland

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 31/12/2023

PRD	N on ICHD	% ICHD population	Age <65 yrs		Age ≥65 yrs		M/F ratio
			N	%	N	%	
Diabetes	7,118	29.5	3,398	29.0	3,720	30.0	1.7
Glomerulonephritis	3,220	13.4	1,896	16.2	1,324	10.7	2.0
Hypertension	1,934	8.0	984	8.4	950	7.7	2.5
Polycystic kidney disease	1,435	6.0	785	6.7	650	5.2	1.0
Pyelonephritis	1,475	6.1	670	5.7	805	6.5	1.6
Renal vascular disease	994	4.1	193	1.6	801	6.5	1.7
Other	4,033	16.7	2,140	18.2	1,893	15.3	1.3
Uncertain aetiology	3,905	16.2	1,661	14.2	2,244	18.1	1.6
Total (with data)	**24,114**	**100.0**	**11,727**	**100.0**	**12,387**	**100.0**	
Missing	1,426	5.6	666	5.4	760	5.8	1.8

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.

Table 5.5 Median urea reduction ratio (URR) and distribution of session frequency and time for adult patients prevalent to ICHD on 31/12/2023 using end of third quarter data (30/09/2023)

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											
Bham	78	91.9	12.9	85.6	1.5	24.0	75.9	0.1	99.6	99.7	98.7
Bradfd	72	79.3	11.8	88.2	0.0	23.7	76.3	0.0	100.0	100.0	100.0
Brightn	74	89.9	6.0	94.0	0.0	14.6	85.4	0.0	98.5	100.0	100.0
Bristol	71	75.1	0.0	100.0	0.0	25.9	73.9	0.2	99.8	100.0	99.8
Camb			5.6	91.7	2.8	44.9	55.1	0.0	0.0	97.9	97.4
Carlis	68	60.2	12.5	87.5	0.0	31.0	69.0	0.0	98.8	100.0	100.0
Carsh			4.4	95.3	0.4	6.7	93.3	0.0	53.0	99.9	95.9
Colchr	76	86.2	5.8	94.2	0.0	24.7	75.3	0.0	99.3	100.0	100.0
Covnt			12.6	85.1	2.3	35.9	64.1	0.0	58.8	97.0	94.2
Derby	76	88.6	3.8	95.8	0.4				86.6	99.6	8.3
Donc	74	77.1	3.7	95.7	0.5	31.8	68.2	0.0	97.8	100.0	100.0
Dorset	75	86.8	4.2	95.4	0.3	14.0	84.6	1.4	90.8	100.0	100.0
Dudley	73	75.5	4.1	94.8	1.0	13.1	86.3	0.5	100.0	97.5	97.3
EssexMS	71	74.4	23.3	76.2	0.5	59.8	40.2	0.0	97.0	97.9	97.3
Exeter											
Glouc	74	87.2	10.7	87.3	2.0				100.0	100.0	0.0
Hull	77	89.7							100.0	2.3	2.1
Ipswi	70	71.1	14.7	84.5	0.8	14.7	85.3	0.0	81.8	99.2	99.1
Kent	68	63.2	4.7	94.1	1.2	85.3	14.8	0.0	89.8	100.0	100.0
L Barts			7.3	92.4	0.3	73.1	26.9	0.0	0.0	99.8	99.8
L Guys	74	86.8							99.2	0.0	0.0
L Kings	72	81.2	5.5	94.5	0.0	53.9	44.8	1.3	99.8	99.9	99.8
L Rfree			17.5	82.1	0.4	65.9	34.1	0.0	0.0	98.7	98.4
L St.G			4.0	95.3	0.7	21.1	78.9	0.0	5.9	97.9	84.1
L West	74	84.2	23.1	76.3	0.6	38.7	61.2	0.1	92.7	94.6	92.7

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
Leeds	73	81.5	5.5	93.7	0.9	32.3	67.7	0.0	100.0	99.7	100.0
Leic	73	81.0	3.9	95.7	0.4	16.0	80.2	3.9	99.4	99.8	99.8
Liv UH M RI			1.4	95.2	3.4	9.2	90.6	0.2	0.0	99.2	99.0
Middlbr	71	73.5	2.7	97.0	0.3	34.3	63.3	2.4	96.6	100.0	76.6
Newc	72	79.8	13.7	84.9	1.3	53.5	46.5	0.0	100.0	100.0	100.0
Norwch	72	79.1	4.7	94.2	1.1	54.6	45.4	0.0	81.6	92.6	92.2
Nottm	74	90.2	1.5	94.6	3.9	12.2	86.9	0.9	95.9	99.4	100.0
Oxford			16.4	82.7	0.9				0.0	99.3	0.0
Plymth	71	75.9	3.5	96.5	0.0				98.6	97.9	0.7
Ports			9.8	89.6	0.6	49.2	50.8	0.0	0.0	98.6	98.4
Prestn			20.1	79.0	0.8				0.0	99.2	33.3
Redng	72	80.9	3.9	96.1	0.0	24.8	75.2	0.0	99.4	99.7	96.6
Salford			1.6	82.0	16.4	29.7	70.1	0.3	68.7	100.0	98.1
Sheff	70	71.9	7.7	90.7	1.7	86.8	13.2	0.0	99.6	99.1	99.0
Shrew	74	90.9	1.2	94.5	4.3	14.9	85.1	0.0	98.7	98.8	98.7
Stevng	73	79.7	10.4	86.7	2.9	38.0	62.0	0.0	99.6	99.8	99.8
Stoke	74	84.9	13.5	82.2	4.3	23.0	77.0	0.0	79.0	99.4	100.0
Sund	74	86.4	2.8	93.0	4.2	27.8	72.2	0.0	100.0	100.0	97.5
Truro	71	81.3	4.5	95.5	0.0				98.2	100.0	0.0
Wirral			9.6	88.0	2.4	30.1	69.9	0.0	0.0	97.1	96.7
Wolve	73	82.9	3.5	96.5	0.0				98.6	99.5	67.4
York	77	92.5	2.1	97.3	0.5	19.4	80.6	0.0	100.0	97.4	99.5
N IRELAND											
Antrim	70	66.0	0.9	98.1	0.9	17.0	83.0	0.0	94.3	100.0	100.0
Belfast	72	79.5	2.4	95.1	2.4	13.7	85.5	0.9	99.2	99.2	99.2
Newry	75	92.2	18.8	81.2	0.0	55.4	35.7	8.9	91.1	100.0	100.0
Ulster	68	62.3	3.7	95.1	1.2	23.4	76.6	0.0	98.7	98.8	98.7
West NI	70	68.2	6.3	89.6	4.2	50.0	50.0	0.0	98.8	100.0	100.0
SCOTLAND											
Abrdn	71	78.9							98.9		
Airdrie	68	65.8							99.5		
D&Gall	71	78.1							100.0		
Dundee	73	83.0							94.9		
Edinb	71	84.7							98.9		
Glasgw	68	65.0							98.5		
Inverns	70	70.7							92.0		
Klmarnk	70	74.8							98.0		
Krkcldy	71	74.4							100.0		
WALES											
Bangor	73	80.0	0.0	95.6	4.4	46.2	47.7	6.2	100.0	100.0	100.0
Cardff	73	84.8							99.5	0.0	0.0
Clwyd	71	84.3							100.0	0.0	0.0
Swanse	74	83.2	4.3	94.4	1.3	42.5	57.5	0.0	99.7	99.0	98.9
Wrexm	74	79.8	0.9	98.1	0.9	26.9	73.1	0.0	99.1	99.1	99.1
TOTALS											
England	73	81.7	8.9	89.7	1.4	36.6	63.0	0.4	71.5	94.3	84.8
N Ireland	71	72.6	5.5	92.7	1.9	28.5	70.1	1.4	96.9	99.6	99.6
Scotland	70	72.9							98.2		
Wales	74	83.6	3.1	95.3	1.6	39.9	59.4	0.8	99.6	46.1	44.9
UK	**73**	**80.6**	**8.6**	**89.9**	**1.4**	**36.5**	**63.0**	**0.5**	**75.8**	**91.8**	**82.7**

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

UK National averages for session frequency and time do not include Scotland

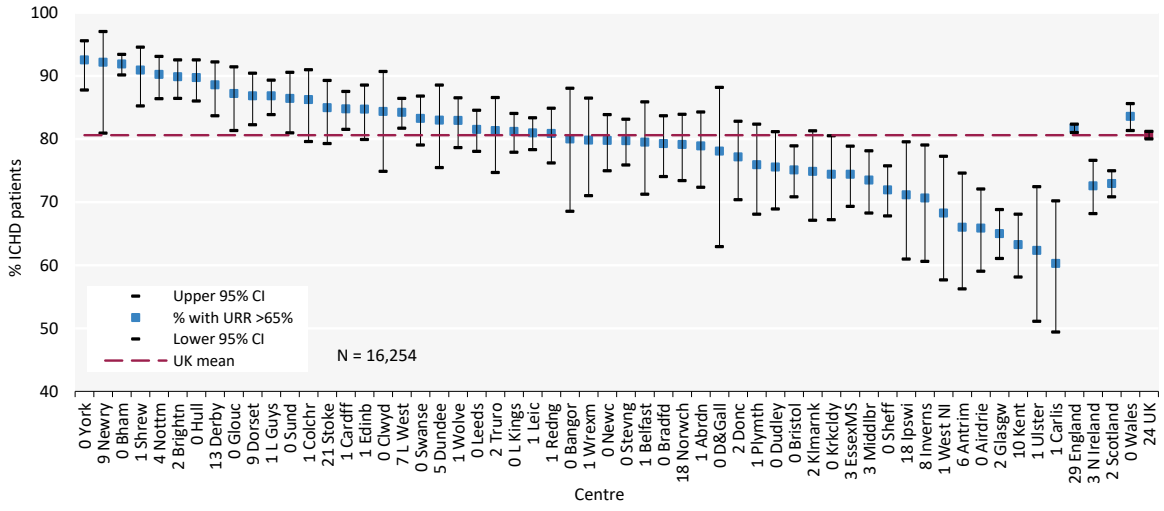

Figure 5.2 Percentage of adult patients prevalent to ICHD on 31/12/2023 with urea reduction ratio (URR) >65% by centre
CI – confidence interval

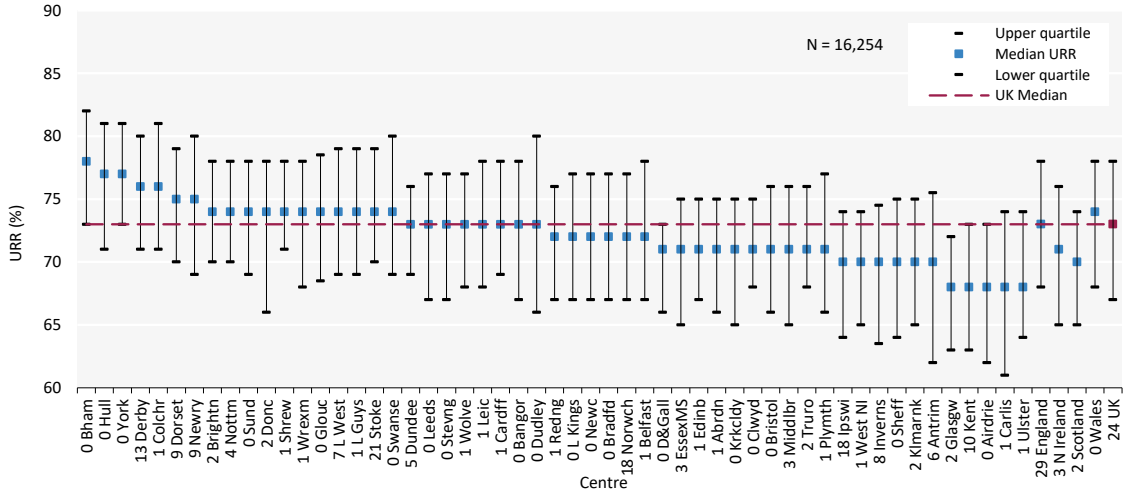

Figure 5.3 Median urea reduction ratio (URR) achieved in adult patients prevalent to ICHD on 31/12/2023 by centre

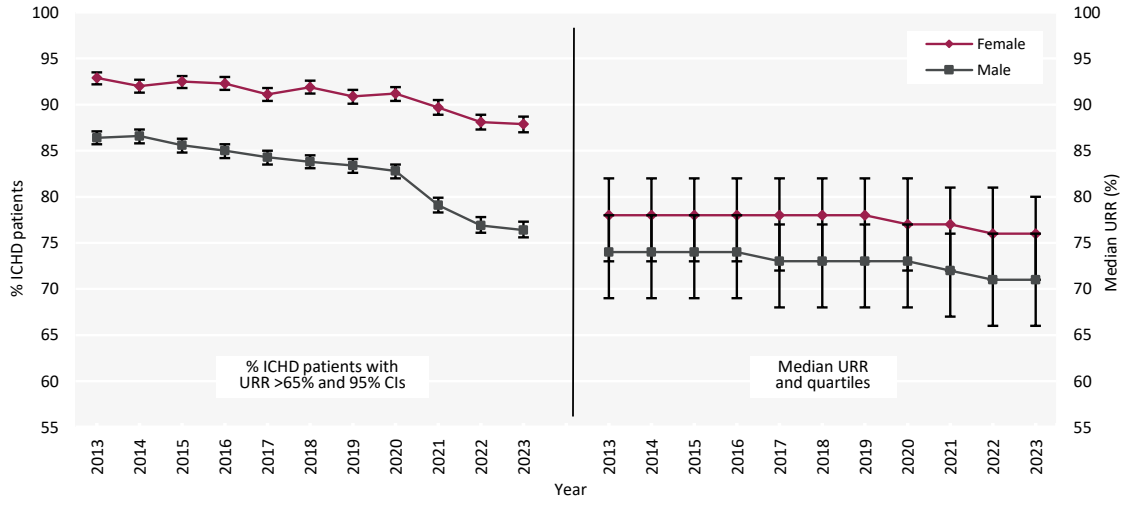

Figure 5.4 Change in the percentage of prevalent adult ICHD patients with urea reduction ratio (URR) >65% and the median URR by sex between 2013 and 2023
CI – confidence interval

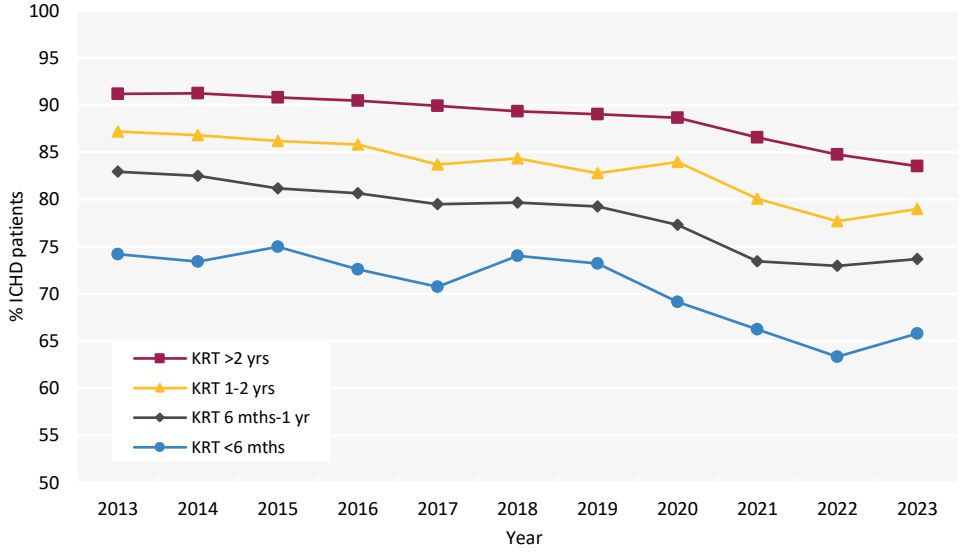

Figure 5.5 Percentage of prevalent adult ICHD patients achieving urea reduction ratio (URR) >65% by time on KRT between 2013 and 2023

Biochemistry parameters in prevalent adult ICHD patients

The UK Kidney 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 31/12/2023 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				
Bham	2.3	78.7	7.8	99.6
Bradfd	2.4	80.3	13.3	99.4
Brightn	2.3	83.3	7.3	100.0
Bristol	2.4	89.9	8.9	100.0
Camb	2.3	82.5	7.6	97.4
Carlis	2.3	79.4	4.4	100.0
Carsh	2.3	75.6	6.9	99.3
Colchr	2.3	77.4	5.8	100.0
Covnt	2.3	78.7	7.6	98.3
Derby	2.4	86.5	4.9	100.0
Donc	2.4	85.0	8.3	100.0
Dorset	2.3	79.6	7.8	100.0
Dudley	2.4	77.0	18.7	100.0
EssexMS	2.3	78.9	10.0	99.8
Exeter				
Glouc	2.4	87.2	8.7	100.0
Hull	2.4	77.6	16.7	100.0
Ipswi	2.3	75.4	11.2	99.3
Kent	2.4	75.5	17.9	99.8
L Barts	2.3	81.3	9.1	100.0
L Guys	2.4	81.3	11.6	86.3
L Kings	2.3	76.9	4.3	99.9
L Rfree	2.3	80.7	5.8	99.7
L St.G	2.4	69.3	17.0	97.5
L West	2.3	75.6	10.2	88.9
Leeds	2.3	81.6	5.1	100.0
Leic	2.3	75.9	8.8	99.9
Liv UH	2.4	81.6	14.1	99.0
M RI				
Middlbr	2.3	79.1	3.2	100.0
Newc	2.3	74.6	11.2	100.0
Norwch	2.3	88.2	6.5	84.5
Nottm	2.4	84.6	10.0	100.0
Oxford	2.2	63.7	2.5	100.0
Plymth	2.3	72.5	9.4	97.9
Ports	2.3	76.8	9.5	100.0
Prestn	2.3	81.8	7.9	100.0
Redng	2.3	80.7	5.1	99.7
Salford	2.4	78.1	12.6	100.0
Sheff	2.3	74.8	4.8	99.3
Shrew	2.4	73.0	22.1	100.0
Stoke	2.4	82.8	12.9	85.9
Sund	2.3	78.9	7.8	100.0
Truro	2.4	90.3	7.4	100.0
Wirral	2.3	73.0	9.0	75.8
Wolve	2.3	78.5	13.3	99.7
York	2.3	83.3	5.2	100.0
N IRELAND				
Antrim	2.4	90.8	7.3	100.0
Belfast	2.3	75.2	12.4	100.0
Newry	2.3	63.9	6.9	100.0
Ulster	2.4	87.4	9.2	100.0
West NI	2.4	90.8	9.2	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
WALES				
Bangor	2.4	87.7	4.6	100.0
Cardff	2.4	83.9	11.3	100.0
Clwyd	2.3	83.9	5.8	100.0
Swanse	2.3	85.5	5.9	99.8
Wrexm	2.3	87.0	6.5	99.1
TOTALS				
England	2.3	79.1	8.9	98.0
N Ireland	2.4	82.3	9.2	100.0
Wales	2.4	84.9	8.3	99.8
E, W & NI	**2.3**	**79.5**	**8.9**	**98.1**

Blank cells = No data returned by the centre or data completeness <70%

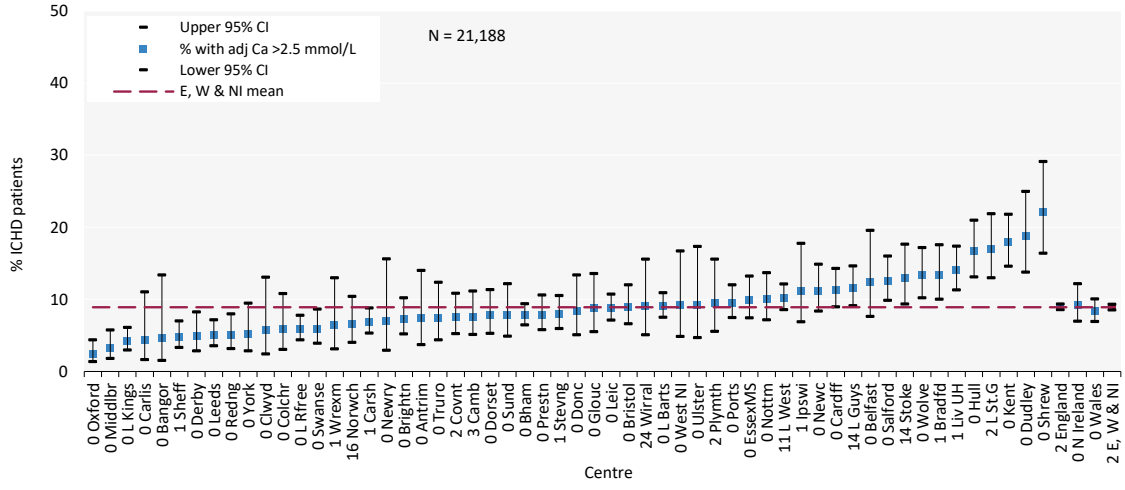

Figure 5.6 Percentage of adult patients prevalent to ICHD on 31/12/2023 with adjusted calcium (Ca) above the target range (>2.5 mmol/L) by centre
CI – confidence interval

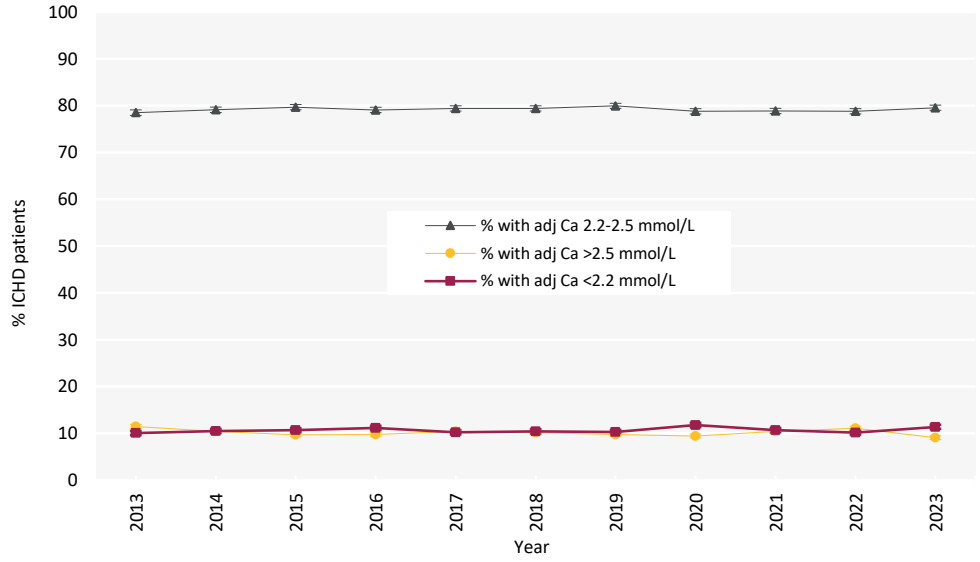

Figure 5.7 Change in percentage of prevalent adult ICHD patients within, above and below the target range for adjusted calcium (Ca 2.2–2.5 mmol/L) between 2013 and 2023

Table 5.7 Median pre-dialysis potassium and bicarbonate and percentage attaining target ranges in adult patients prevalent to ICHD on 31/12/2023 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 completeness	Median (mmoI/L)	% <18 mmol/L	% 18–26 mmol/L	% >26 mmol/L	% data completeness
ENGLAND										
Bham					50.8	22	6.0	89.6	4.4	99.6
Bradfd	4.9	7.9	82.5	9.5	99.4	23	4.9	83.8	11.3	97.5
Brightn					0.0	24	3.3	82.3	14.4	100.0
Bristol	4.5	30.7	66.1	3.2	100.0	24	1.8	87.6	10.6	100.0
Camb	4.8	6.5	89.2	4.3	98.4					14.2
Carlis					0.0	20	13.0	83.7	3.3	100.0
Carsh					0.0					22.1
Colchr	4.8	6.5	91.0	2.6	100.0	22	3.2	95.5	1.3	100.0
Covnt					0.0	25	0.6	66.9	32.6	98.3
Derby	4.6	14.7	83.5	1.9	100.0	22	3.0	94.7	2.3	100.0
Donc	4.7	9.4	84.4	6.1	100.0	24	6.7	77.2	16.1	100.0
Dorset	4.8	8.1	89.0	2.9	100.0	23	1.6	90.3	8.1	100.0
Dudley	4.8	9.1	84.0	7.0	100.0					49.7
EssexMS	4.9	11.1	82.5	6.4	99.8	23	2.4	81.4	16.2	99.3
Exeter										
Glouc					0.0	23	2.1	90.3	7.7	100.0
Hull	4.8	8.6	85.1	6.3	100.0	24	0.9	88.2	10.9	100.0
Ipswi					0.0	22	10.5	79.9	9.7	99.3
Kent	4.6	27.1	69.7	3.2	99.8	22	5.7	89.5	4.8	99.8
L Barts	4.6	23.9	71.6	4.5	100.0	23	3.6	84.0	12.4	100.0
L Guys	4.6	24.6	71.6	3.8	92.2	24	1.5	85.3	13.1	86.3
L Kings					0.0	20	11.3	88.0	0.8	99.7
L Rfree	5.0	14.3	78.2	7.6	99.7	22	5.3	91.0	3.7	96.5
L St.G					0.0					0.0
L West					0.0					56.3
Leeds	5.1	3.2	89.9	6.9	100.0	22	2.4	92.1	5.6	100.0
Leic	4.9	7.8	84.8	7.4	99.9	24	2.3	78.9	18.9	99.9

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
Liv UH					0.0	26	1.0	55.3	43.8	99.0
M RI										
Middlbr	4.7	20.1	74.3	5.6	100.0	29	0.6	14.8	84.7	100.0
Newc					0.0	23	1.9	85.8	12.3	100.0
Norwch	5.3	4.1	83.0	12.9	93.5	23	5.4	85.4	9.2	82.4
Nottm	4.6	32.0	66.2	1.8	100.0	23	2.7	84.5	12.8	99.1
Oxford	4.9	8.7	85.3	6.0	100.0	23	4.9	82.9	12.3	100.0
Plymth	5.0	10.9	80.4	8.7	97.9	19	23.7	74.8	1.5	92.9
Ports	5.0	7.2	86.0	6.9	100.0	23	3.6	84.7	11.7	99.8
Prestn	5.0	7.2	88.4	4.3	100.0	23	2.5	87.0	10.5	100.0
Redng	4.7	14.2	82.5	3.3	98.5	22	3.3	93.5	3.3	99.7
Salford	4.7	16.8	79.2	4.0	100.0	25	1.1	72.6	26.3	100.0
Sheff	4.8	11.3	82.4	6.3	99.3	23	3.3	86.8	9.8	99.3
Shrew					0.0	22	6.8	90.8	2.5	100.0
Stoke					0.0	25	1.6	78.0	20.5	85.5
Sund					0.0	22	6.0	92.2	1.8	100.0
Truro	4.8	8.0	87.4	4.6	100.0	27	1.1	39.4	59.4	100.0
Wirral					0.0	24	1.9	80.7	17.4	96.3
Wolve	4.9	9.2	85.3	5.4	99.7	21.5	7.3	88.9	3.8	99.7
York	5.2	2.1	84.3	13.6	100.0	22	2.6	90.1	7.3	100.0
N IRELAND										
Antrim	4.7	13.8	80.7	5.5	100.0	25	0.0	75.2	24.8	100.0
Belfast	5.0	5.0	84.3	10.7	100.0	21	7.4	91.7	0.8	100.0
Newry	5.0	12.5	79.2	8.3	100.0	23	6.9	80.6	12.5	100.0
Ulster	4.9	5.8	87.4	6.9	100.0	21	6.9	93.1	0.0	100.0
West NI	4.8	9.2	85.7	5.1	100.0	23	1.0	98.0	1.0	100.0
WALES										
Bangor	4.6	16.9	80.0	3.1	100.0	25	0.0	86.2	13.9	100.0
Cardff	4.9	7.9	84.6	7.5	100.0	23	1.1	87.8	11.1	98.9
Clwyd	4.9	11.5	85.1	3.5	100.0	24	0.0	88.5	11.5	100.0
Swanse	4.9	9.2	84.7	6.1	99.8	23	3.1	88.3	8.7	99.5
Wrexm	4.7	12.0	83.3	4.6	99.1	25	0.0	79.6	20.4	99.1
TOTALS										
England	4.8	13.5	80.9	5.6	63.7	23	4.2	82.2	13.6	89.4
N Ireland	4.8	9.0	83.6	7.4	100.0	23	4.3	87.9	7.8	100.0
Wales	4.9	9.4	84.3	6.3	99.8	24	1.5	87.2	11.3	99.3
E, W & NI	**4.8**	**13.0**	**81.3**	**5.7**	**66.5**	**23**	**4.0**	**82.7**	**13.3**	**90.2**

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

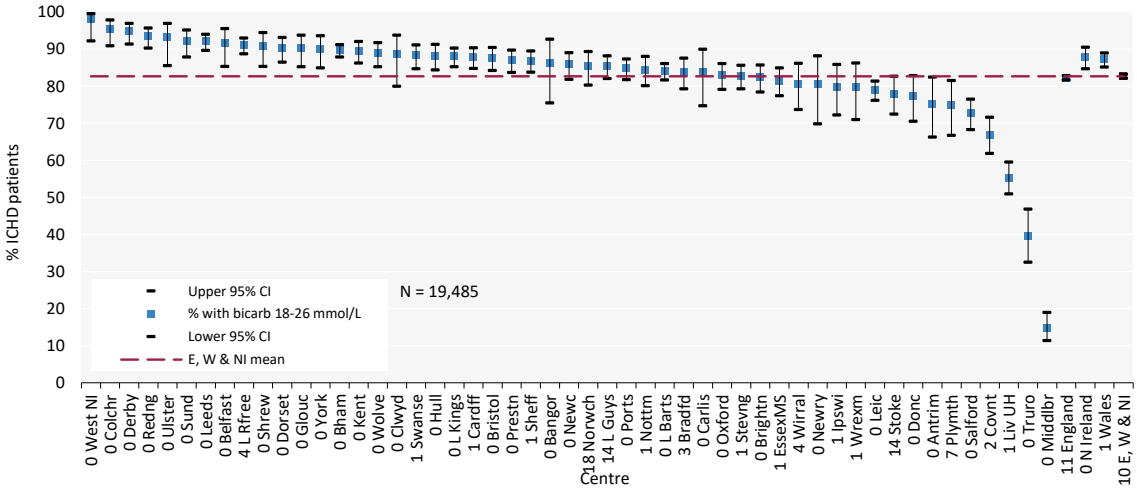

Figure 5.8 Percentage of adult patients prevalent to ICHD on 31/12/2023 with pre-dialysis bicarbonate (bicarb) within the target range (18-26 mmol/L) by centre
CI – confidence interval
Bicarb - bicarbonate

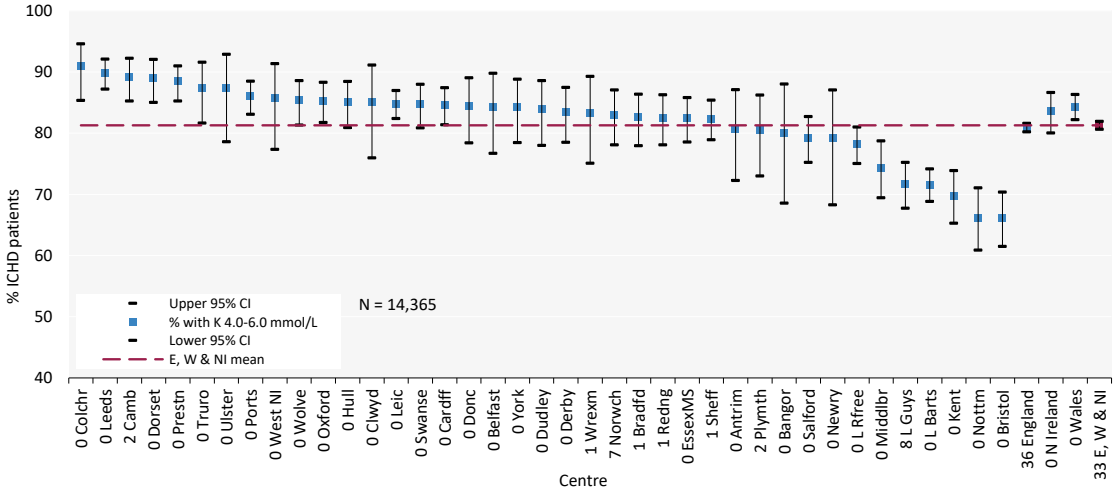

Figure 5.9 Percentage of adult patients prevalent to ICHD on 31/12/2023 with pre-dialysis potassium (K) within the target range (4.0-6.0 mmol/L) by centre
CI – confidence interval
K - Potassium

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

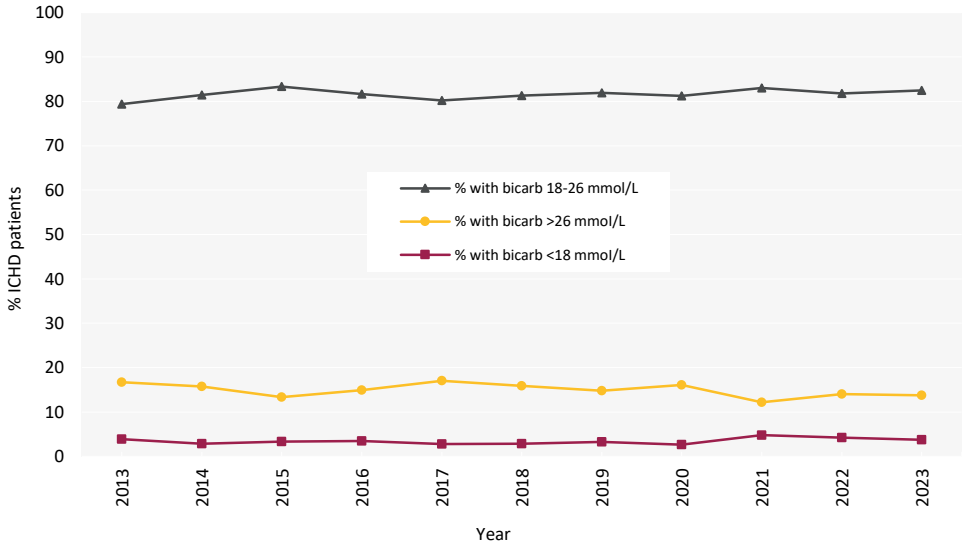

Figure 5.10 Change in percentage of prevalent adult ICHD patients within, above and below the target range for pre-dialysis bicarbonate (bicarb 18-26 mmol/L) between 2013 and 2023

Anaemia in prevalent adult ICHD patients

UK Kidney Association anaemia guidelines recommend a target haemoglobin of 100-120 g/L. Data regarding target and median haemoglobin and ferritin levels attained are presented in table 5.8.

Table 5.8 Median haemoglobin and ferritin and percentage attaining target ranges in adult patients prevalent to ICHD on 31/12/2023 by centre

	Haemoglobin				Ferritin		
Centre	Median (g/L)	% <100 g/L	% >120 g/L	% data completeness	Median (µg/L)	% <200 µg/L	% data completeness
ENGLAND							
Bham	110	24.1	18.2	99.6	551	14.4	99.6
Bradfd	116	18.4	37.7	99.7	575	8.2	100.0
Brightn	112	19.1	22.9	100.0	465	9.6	98.6
Bristol	114	4.8	31.2	100.0	533	4.6	99.3
Camb	114	15.3	27.3	96.5	463	9.0	71.1
Carlis	112	25.0	22.8	100.0	603	5.4	100.0
Carsh	109	25.7	20.5	99.6	542	6.6	99.6
Colchr	109	21.3	13.5	100.0	471	15.5	100.0
Covnt	108	22.5	12.9	98.3	462	17.7	98.3
Derby	114	10.9	31.6	100.0	642	5.7	99.6
Donc	111	27.2	27.8	100.0	482	7.8	100.0
Dorset	114	10.7	29.4	100.0	707	3.9	100.0
Dudley	111	19.9	17.2	99.5	227	41.7	100.0
EssexMS	109	21.1	16.4	99.5	483	14.7	99.8
Exeter							
Glouc	109	22.6	19.5	100.0	448	17.9	97.4
Hull	113	19.5	24.7	100.0	652	4.6	100.0
Ipswi	110	25.4	11.2	99.3	400	25.6	98.5
Kent	111	22.2	23.9	99.8	832	7.9	98.4
L Barts	108	28.2	16.9	100.0	694	5.1	100.0
L Guys	110	18.7	18.3	86.3	527	10.1	90.8
L Kings	111	20.4	21.8	99.9	486	11.9	99.9
L Rfree	111	18.6	22.8	99.7	497	15.9	99.5
L St.G	110	21.9	22.2	95.1	675	4.5	94.7
L West	112	16.3	21.2	94.6	398	16.8	94.4
Leeds	110	19.4	18.7	100.0	388	20.4	99.8
Leic	111	20.5	26.5	99.9	472	11.1	99.9
Liv UH	113	19.4	24.2	99.0	500	12.1	98.6
M RI							
Middlbr	113	16.8	25.7	100.0	840	5.9	99.7
Newc	110	23.0	21.3	100.0	637	8.2	100.0
Norwch	107	26.3	15.7	87.9	405	19.2	96.9
Nottm	108	26.0	10.6	100.0	379	22.7	100.0
Oxford	109	26.7	19.8	100.0	662	3.8	99.1
Plymth	114	20.3	29.0	97.9	410	18.1	97.9
Ports	107	31.6	14.5	100.0	364	25.0	99.1
Prestn	112	19.0	27.5	100.0	695	9.3	100.0
Redng	108	28.9	14.0	99.7	592	8.0	99.7
Salford	112	21.9	27.9	100.0	449	18.9	99.6
Sheff	109	31.3	20.1	98.9	451	7.9	99.8
Shrew	111	19.6	25.8	100.0	506	4.9	100.0
Stevng	108	20.4	12.8	100.0	628	4.2	99.5
Stoke	115	15.0	34.2	87.5	607	8.5	83.2
Sund	111	15.6	17.4	100.0	616	5.0	100.0
Truro	109	23.4	19.4	100.0	498	7.7	96.6
Wirral	110	20.1	15.6	95.7	565	8.5	95.0

Table 5.8 Continued

Centre	Haemoglobin				Ferritin		
	Median (g/L)	% <100 g/L	% >120 g/L	% data completeness	Median (µg/L)	% <200 µg/L	% data completeness
Wolve	109	27.7	16.8	99.7	632	10.6	99.7
York	108	23.0	14.7	100.0	399	9.9	100.0
N IRELAND							
Antrim	105	29.4	13.8	100.0	604	5.5	100.0
Belfast	112	16.7	31.7	99.2	507	13.2	100.0
Newry	108	22.2	16.7	100.0	467	4.2	100.0
Ulster	111	18.4	24.1	100.0	653	2.3	100.0
West NI	115	14.3	26.5	100.0	724	3.1	100.0
SCOTLAND							
Abrdn	107	26.3	15.8	100.0			
Airdrie	111	25.0	18.3	99.5			
D&Gall	116	11.6	23.3	100.0			
Dundee	113	21.3	21.3	93.9			
Edinb	114	17.2	30.4	97.2			
Glasgw	111	24.0	24.6	98.1			
Inverns	110	22.1	14.7	88.8			
Klmarnk	112	27.7	24.8	96.6			
Krkcldy	114	13.8	27.7	100.0			
WALES							
Bangor	111	20.0	13.8	100.0	716	0.0	100.0
Cardff	111	18.5	23.8	100.0	558	10.4	100.0
Clwyd	112	23.0	31.0	100.0	855	11.5	100.0
Swanse	110	17.8	22.6	99.8	524	14.5	99.8
Wrexm	108	22.2	18.5	99.1	717	8.3	99.1
TOTALS							
England	110	21.5	21.2	98.5	527	11.6	98.1
N Ireland	110	20.2	23.0	99.8	596	6.2	100.0
Scotland	112	22.1	23.3	97.6			
Wales	111	19.0	22.9	99.8	587	11.1	99.8
UK	**111**	**21.4**	**21.5**	**98.5**	**533**	**11.5**	**98.2**

Blank cells – no data returned by the centre or data completeness <70%
UK National average for ferritin does not include Scotland

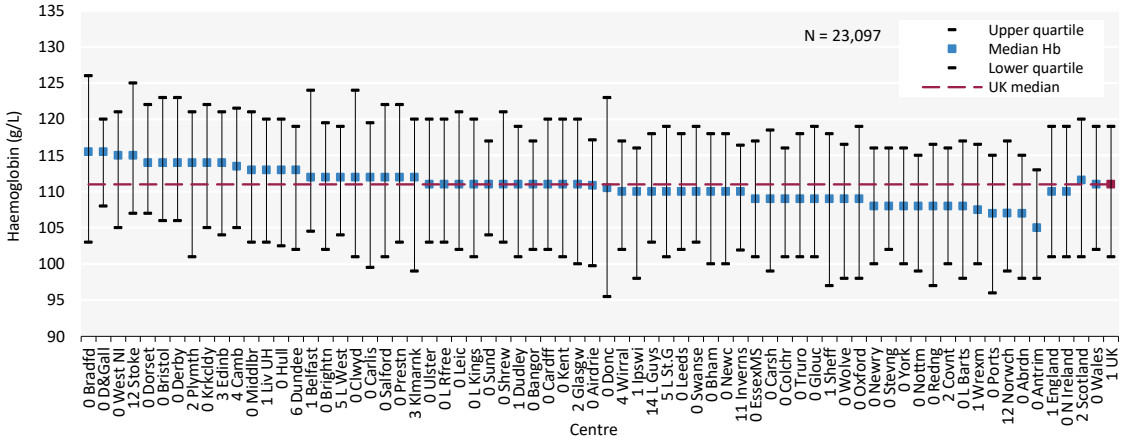

Figure 5.11 Median haemoglobin (Hb) in adult patients prevalent to ICHD on 31/12/2023 by centre

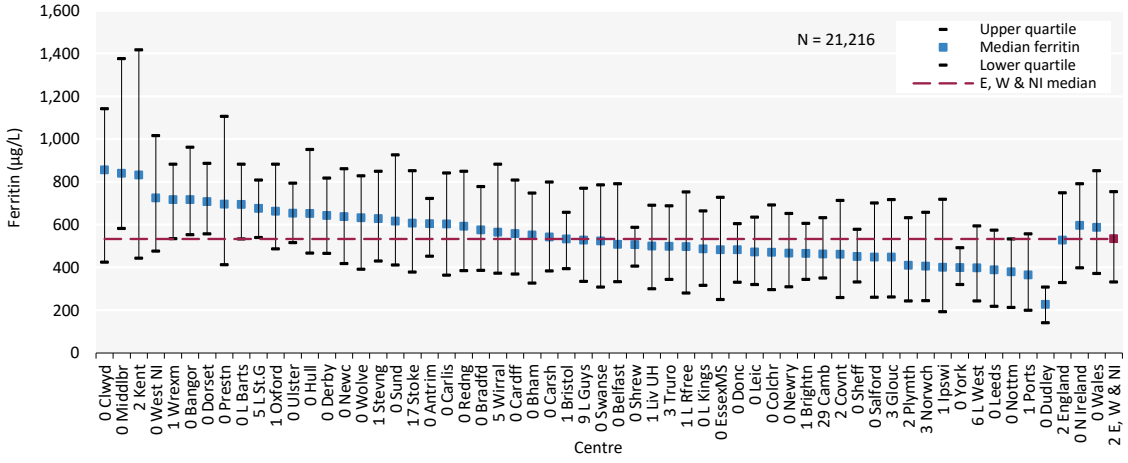

Figure 5.12 Median ferritin in adult patients prevalent to ICHD on 31/12/2023 by centre

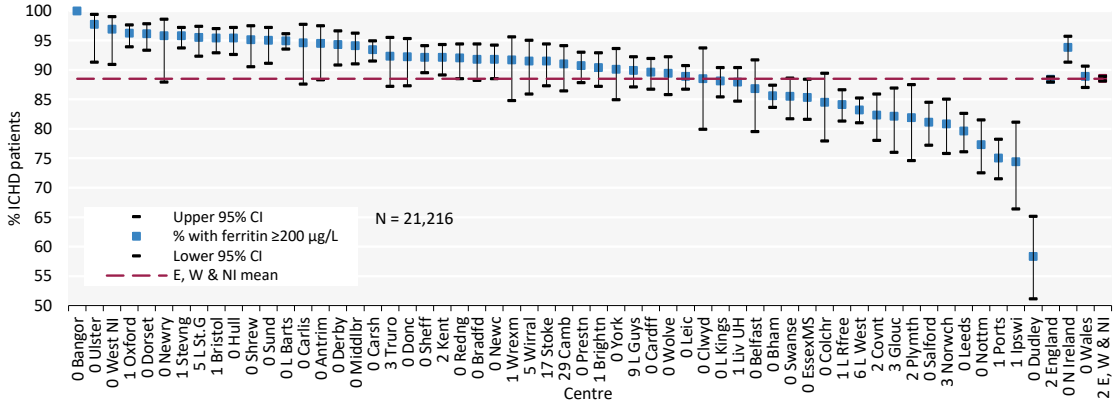

Figure 5.13 Percentage of adult patients prevalent to ICHD on 31/12/2023 with ferritin ≥200 µg/L by centre
CI – confidence interval

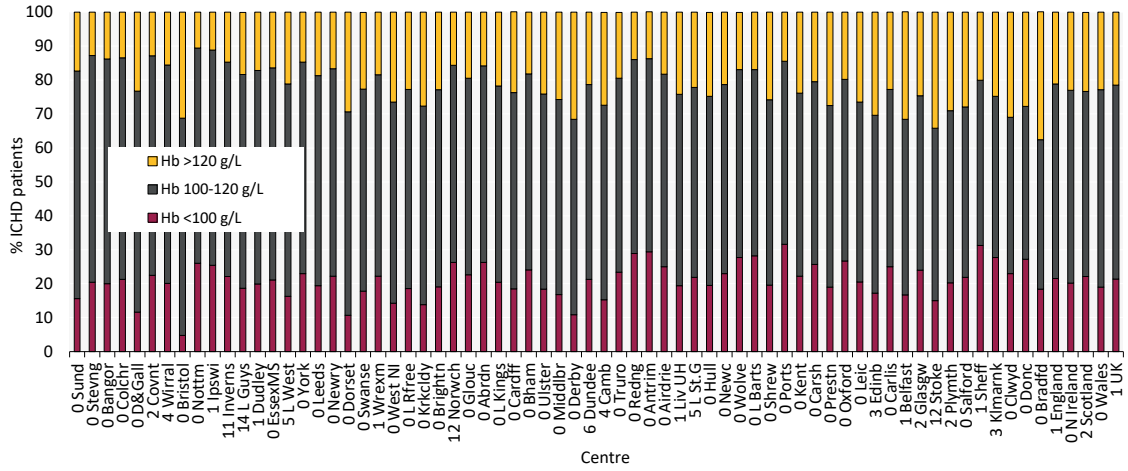

Figure 5.14 Distribution of haemoglobin (Hb) in adult patients prevalent to ICHD on 31/12/2023 by centre

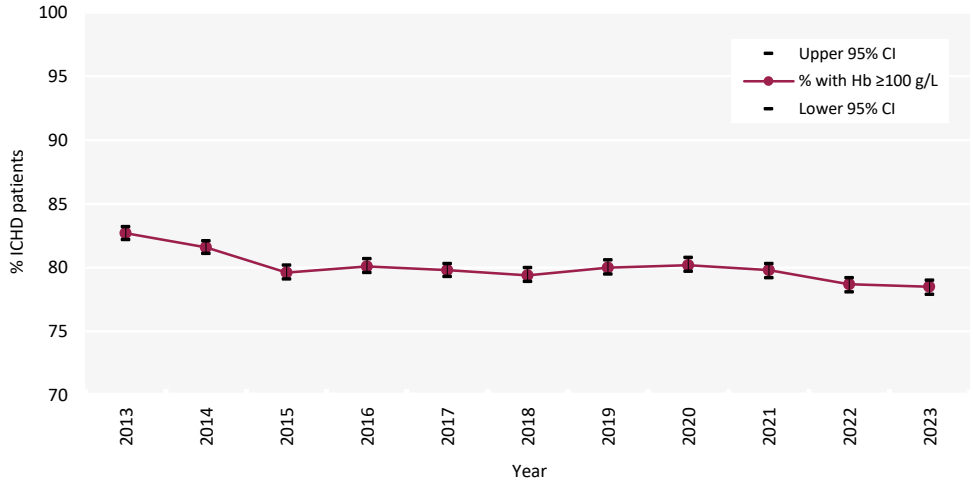

Figure 5.15 Percentage of prevalent adult ICHD patients with haemoglobin (Hb) ≥100 g/L between 2013 and 2023
CI – confidence interval

Dialysis access in prevalent adult dialysis patients

The type of prevalent dialysis access is presented in figure 5.16 for the 61 centres that returned vascular access data on ≥70% of their prevalent dialysis patients. Rates of PD may impact the types of vascular access used for ICHD and this is reflected in the combined audit measures for dialysis access

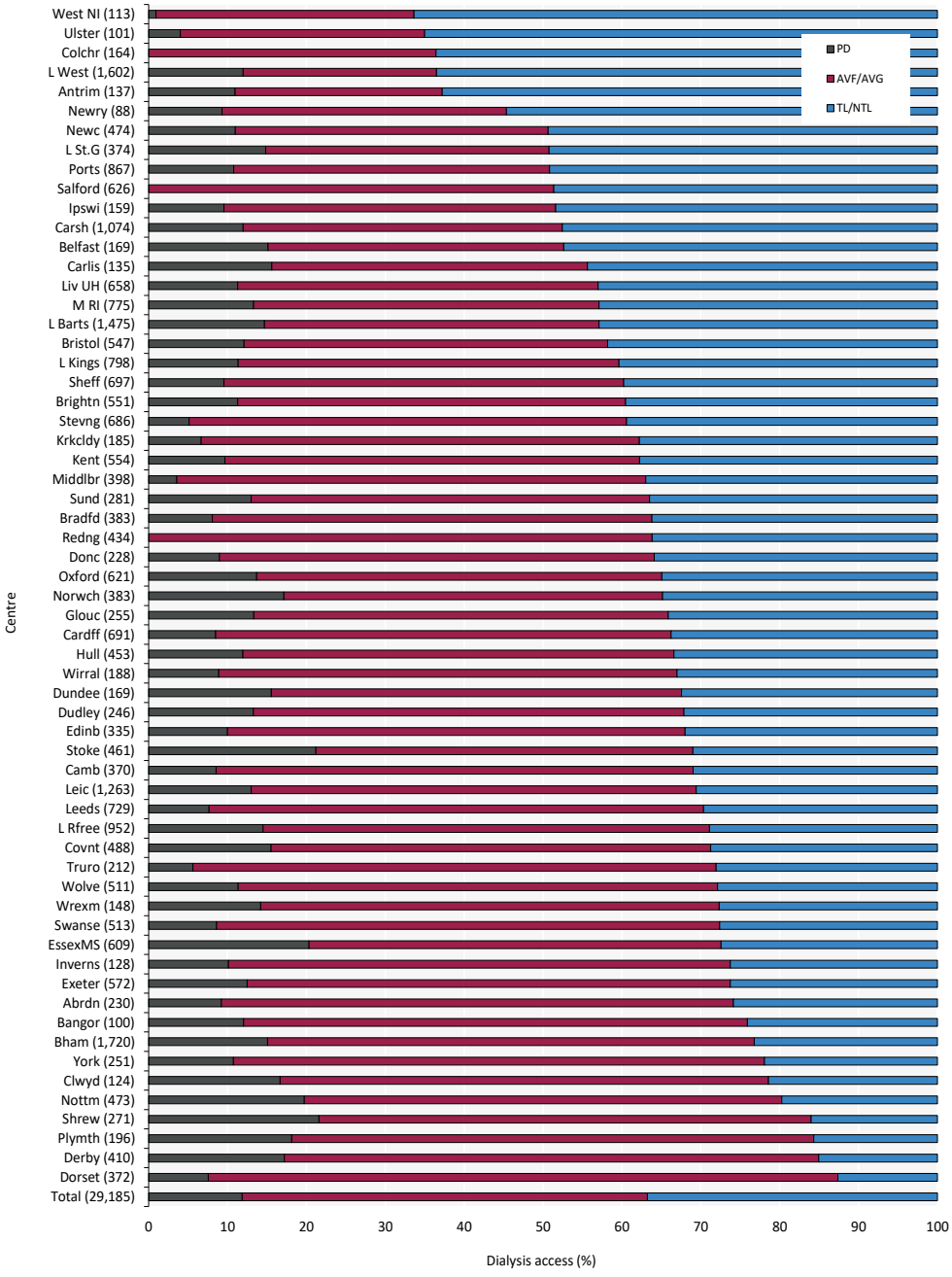

Figure 5.16 Dialysis access in adult patients prevalent to dialysis on 31/12/2023 by centre

Number of patients on dialysis in a centre in brackets (centres with <70% access data for the prevalent dialysis population were excluded)

For Reading, a prevalent date of 30/9/2023 was used due to poor data quality in the final quarter

Data for the four excluded Scottish centres (Kilmnarnock, Glasgow, Airdrie, Dumfries and Galloway) using alternative time points are published by the Scottish Renal Registry https://www.publichealthscotland.scot/publications/scottish-renal-registry/scottish-renal-registry-annual-report-2024/

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

Cause of death in adult ICHD patients

Cause of death was analysed in prevalent patients receiving ICHD on 31/12/2022 and followed-up for one year in 2023. 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. Where the cause of death was missing in UKRR data, cause of death from Civil Registration records was used. Further detail on the survival of prevalent KRT patients is in chapter 3.

Table 5.9 Cause of death in adult patients prevalent to ICHD on 31/12/2022 followed-up in 2023 by age group

	ICHD all ages		ICHD < 65 years		ICHD ≥ 65 years	
Cause of death	*N*	%	*N*	%	*N*	%
Cardiac disease	750	20.0	282	25.5	468	17.7
Cerebrovascular disease	124	3.3	56	5.1	68	2.6
Infection	675	18.0	175	15.8	500	18.9
Malignancy	233	6.2	55	5.0	178	6.7
Treatment withdrawal	409	10.9	87	7.9	322	12.2
Other	1,216	32.4	346	31.3	870	32.9
Uncertain aetiology	344	9.2	106	9.6	238	9.0
Total (with data)	**3,751**	**100.0**	**1,107**	**100.0**	**2,644**	**100.0**
Missing	429	10.3	149	11.9	280	9.6

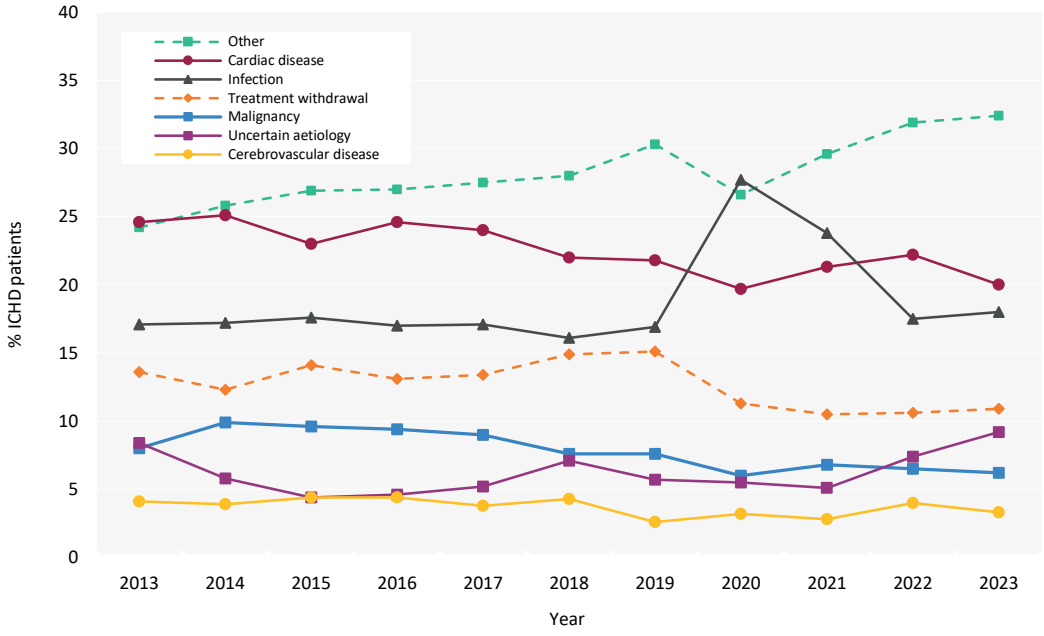

Figure 5.17 Cause of death between 2013 and 2023 for adult patients prevalent to ICHD at the beginning of the year

UK Kidney Association
UK Renal Registry

Chapter 6

Adults on peritoneal dialysis (PD) in the UK at the end of 2023

Contents

Introduction

This chapter describes the population of adult patients with end-stage kidney disease (ESKD) who were receiving regular peritoneal dialysis (PD) in the UK at the end of 2023 (figure 6.1). This population comprises patients who were on PD at the end of 2022 and remained on PD throughout 2023, as well as patients who commenced/re-commenced PD in 2023. This latter group includes both incident kidney replacement therapy (KRT) patients who ended 2023 on PD and prevalent KRT patients who switched to PD from in-centre haemodialysis (ICHD), home haemodialysis (HHD) or a transplant (Tx) in 2023. 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 KRT, 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.

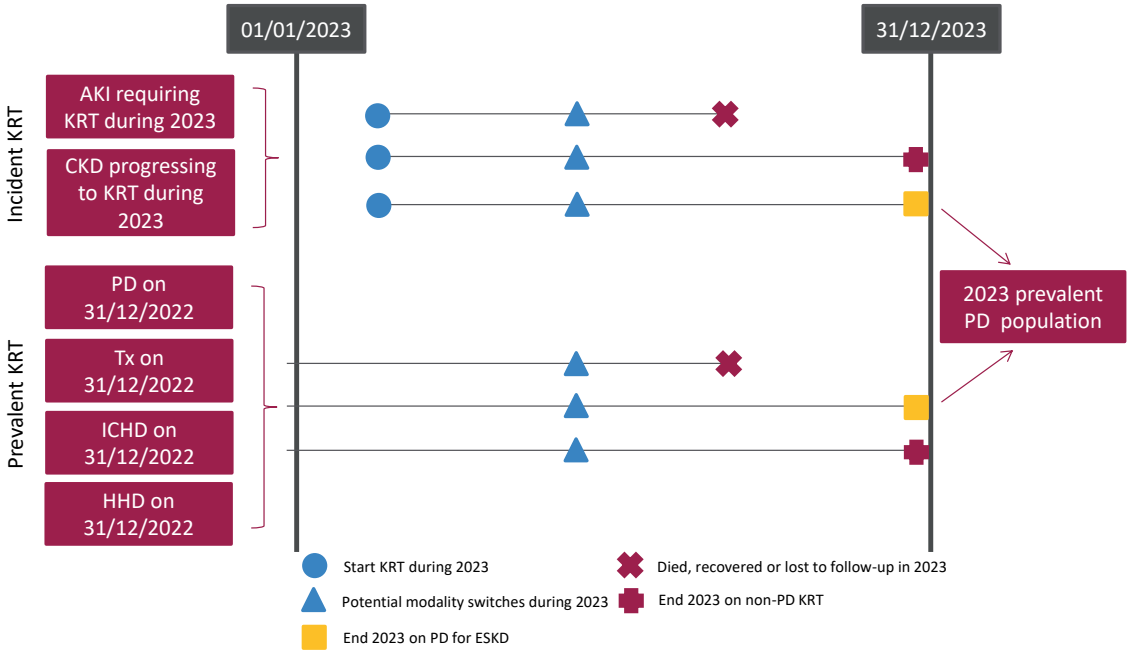

Figure 6.1 Pathways adult patients could follow to be included in the UK 2023 prevalent PD population

Note that patients receiving dialysis for acute kidney injury (AKI) are only included in this chapter if they had a timeline or KRT modality code for chronic PD at the end of 2023 or if they had been on KRT for ≥90 days and were on PD at the end of 2023
CKD – chronic kidney disease

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 UK Kidney 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 in this chapter. The four infections subject to mandatory reporting to the UK Health Security Agency (UKHSA) - methicillin-resistant *Staphylococcus aureus* (MRSA), methicillin-sensitive *Staphylococcus aureus* (MSSA), *Escherichia coli* bacteraemia and *Clostridium difficile* - will be added to the UKRR data portal (ukkidney.org/audit-research/data-portals) as new data become available.

Rationale for analyses

The analyses begin with a description of the 2023 prevalent adult PD population, including the number on PD per million population (pmp).

The UK Kidney Association guidelines (ukkidney.org/health-professionals/guidelines/guidelines-commentaries) provide audit measures relevant to the care of patients on PD, and the guidelines available during 2023 were used for this audit. Where data permit, attainment of these measures by UK kidney centres in 2023 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 (ukkidney.org/audit-research/data-portals). 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 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 kidney 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.

Exeter and Manchester were unable to submit patient level data for 2023. Aggregate numbers by modality were provided, enabling inclusion in Tables 6.2 and 6.3. Exeter and Manchester are excluded from all other analyses.

London Kings moved to a new Trust IT system, and as a result data were not submitted for the final quarter of 2023. Data for London Kings presented in this chapter are for patients receiving PD on 30th September 2023, rather than 31st December 2023.

Table 6.1 The UK Kidney Association audit measures relevant to PD that are reported in this chapter

The UK Kidney 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 (2020)	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)
Commentary on the NICE Guideline on Renal Replacement Therapy and Conservative Management (2020)	Number of patients withdrawing from PD as a proportion of all deaths on PD	Table 6.8, figure 6.13

ESA – erythropoiesis stimulating agent

Key findings

- 3,686 adult patients were receiving PD for ESKD in the UK on 31/12/2023, compared to 3,804 in 2022, which represented 5.1% of the KRT population.
- The median age of PD patients was 63.0 years and 60.4% 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 25 mmol/L and 76.4% were within the target range of 22–30 mmol/L.
- The median haemoglobin for PD patients was 111 g/L and 10.1% had a ferritin <100 µg/L.
- The PD peritonitis rate in 2023 (England only) was 0.35/1 PD patient-year.
- Cause of death records from Civil Registration were used where the cause of death was missing in the UKRR data. This has resulted in improved completeness and changes in proportions of causes of death. The leading cause of death was cardiac disease in both younger patients and those ≥65 years at 17.4% and 21.8% respectively. Treatment withdrawal accounted for 9.4% of deaths in those ≥65 years, and infection around 16% in younger and 21% in older patients.

Analyses

Changes to the prevalent adult PD population

For the 67 adult kidney centres, the number of prevalent patients on PD was calculated as both a proportion of the prevalent patients on KRT 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 KRT 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)	2023 crude rate (pmp)
Centre	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023		
ENGLAND												
Bham	257	268	276	280	250	7.8	8.2	8.4	8.3	7.3	2.10	119
Bradfd	34	26	37	40	31	4.6	3.6	5.0	5.1	3.8	0.51	61
Brightn	55	65	68	56	63	5.2	6.0	6.2	5.1	5.5	1.08	58
Bristol	63	68	77	62	65	4.2	4.6	5.1	4.1	4.3	1.27	51
Camb	28	26	29	28	29	1.9	1.7	1.8	1.7	1.8	0.99	29
Carlis	35	32	30	28	21	11.6	10.8	9.8	9.2	6.9	0.26	81
Carsh	72	121	132	128	125	4.0	6.5	6.9	6.6	6.2	1.68	74
Colchr	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.30	0
Covnt	81	83	80	80	75	7.5	7.5	7.1	7.1	6.5	0.81	93
Derby	62	69	67	59	64	9.5	10.2	9.7	8.2	8.7	0.58	111
Donc	25	19	13	15	20	7.3	5.6	3.8	3.9	5.2	0.38	53
Dorset	33	34	23	19	27	4.3	4.3	2.9	2.4	3.3	0.75	36
Dudley	36	32	40	30	33	9.8	8.6	9.9	7.8	9.0	0.35	94
EssexMS	85	83	92	82	115	10.0	9.4	10.3	9.2	11.8	1.01	114
Exeter	84	84	73	75	70	7.7	7.7	6.8	6.6	6.2	0.99	71
Glouc	31	30	36	30	34	5.8	5.7	6.6	5.4	6.1	0.53	65
Hull	49	57	52	56	54	5.4	6.2	5.7	6.0	5.6	0.81	67
Ipswi	42	33	34	22	15	9.8	7.7	8.1	5.6	3.8	0.32	47
Kent	50	62	72	74	57	4.4	5.4	6.0	6.1	4.6	1.08	53
L Barts	228	265	254	234	220	8.6	9.9	9.3	8.2	7.4	1.62	136
L Guys	53	64	70	47	45	2.3	2.8	3.0	2.0	1.9	1.01	45
L Kings	95	101	98	102	89	7.6	8.1	7.4	7.3	6.4	0.94	94
L Rfree	165	179	172	147	138	7.0	7.7	7.2	6.1	5.6	1.27	108
L St.G	43	48	53	61	57	5.0	5.6	6.1	7.1	6.5	0.67	85
L West	155	200	214	196	190	4.3	5.7	6.0	5.4	5.2	2.03	94
Leeds	67	64	52	54	56	3.9	3.7	2.9	2.9	2.9	1.40	40
Leic	126	120	138	151	160	4.9	4.6	5.2	5.5	5.7	2.18	73
Liv UH	57	57	56	60	55	3.8	3.9	3.8	4.1	3.7	1.27	43
M RI	76	84	96	91	101	3.7	4.2	4.6	4.3	4.5	1.37	74
Middlbr	32	28	20	23	14	3.4	3.0	2.1	2.4	1.4	0.82	17
Newc	59	46	58	43	51	5.0	3.8	4.7	3.5	4.0	0.96	53
Norwch	46	47	48	40	58	5.7	5.8	6.0	5.0	7.2	0.71	82
Nottm	76	95	103	94	88	6.2	7.9	8.5	7.8	7.4	0.93	94
Oxford	58	68	66	75	85	2.9	3.4	3.3	3.6	4.0	1.54	55
Plymth	42	33	34	45	35	7.9	6.1	6.3	8.3	6.4	0.41	85
Ports	87	101	90	107	94	4.6	5.3	4.6	5.4	4.6	1.79	53
Prestn	43	50	55	57	56	3.2	3.7	4.0	4.1	3.9	1.27	44
Redng	56	61	50	55	52	6.5	7.0	5.7	6.0	5.2	0.74	70
Salford	120	106	84	93	96	9.7	8.4	6.9	7.3	7.0	1.19	81
Sheff	60	77	80	82	70	4.0	5.2	5.3	5.5	4.7	1.12	62
Shrew	55	51	50	47	55	12.6	11.9	11.3	10.5	11.9	0.42	130
Stevng	37	25	37	43	37	3.8	2.6	3.6	4.0	3.3	1.15	32

Table 6.2 Continued

Centre	N on PD					% on PD					Estimated catchment population (millions)	2023 crude rate (pmp)
	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023		
Stoke	71	95	107	107	89	8.8	11.6	12.7	11.8	9.7	0.75	119
Sund	26	32	37	36	36	4.6	5.8	6.8	6.4	6.1	0.54	66
Truro	21	23	22	16	13	4.7	5.2	4.8	3.4	2.8	0.37	36
Wirral	18	18	20	16	17	4.3	4.3	4.8	4.0	4.4	0.48	35
Wolve	49	59	64	58	61	8.0	9.0	9.2	8.0	7.8	0.55	110
York	33	24	27	40	27	5.7	4.2	4.6	6.6	4.4	0.49	55
N IRELAND												
Antrim	19	12	18	20	15	6.7	4.2	6.1	6.5	4.8	0.25	60
Belfast	18	15	27	22	23	2.0	1.7	3.0	2.4	2.5	0.54	43
Newry	11	9	13	10	8	4.3	3.4	4.6	3.7	2.9	0.24	34
Ulster	8	3	3	5	5	4.3	1.5	1.5	2.4	2.4	0.21	24
West NI	14	7	6	7	1	4.3	2.0	1.8	2.0	0.3	0.25	4
SCOTLAND												
Abrdn	21	21	19	27	21	3.8	3.7	3.3	4.6	3.5	0.50	42
Airdrie	21	29	28	25	24	4.0	5.6	5.6	4.8	4.2	0.47	51
D&Gall	8	9	7	8	8	5.3	5.7	4.5	5.5	5.5	0.12	66
Dundee	21	13	16	20	23	4.7	3.1	4.0	5.2	6.0	0.37	62
Edinb	40	32	32	38	30	4.5	3.6	3.5	3.9	3.0	0.85	35
Glasgw	45	45	38	36	29	2.4	2.4	2.0	1.9	1.5	1.38	21
Inverns	12	7	9	12	10	4.2	2.6	3.3	4.3	3.2	0.23	44
Klmarnk	24	27	33	31	32	6.6	7.3	8.9	8.2	8.1	0.29	110
Krkcldy	12	5	6	12	12	4.1	1.7	2.1	4.2	4.2	0.28	44
WALES												
Bangor	14	18	12	10	10	7.0	8.3	5.5	4.5	4.6	0.16	63
Cardff	63	67	58	53	59	3.6	4.0	3.4	3.0	3.2	1.16	51
Clwyd	13	13	11	12	19	6.3	6.4	5.4	5.9	8.6	0.18	105
Swanse	77	59	49	52	43	8.9	6.9	5.8	6.1	4.8	0.75	57
Wrexm	23	24	16	20	21	7.4	7.5	5.3	6.5	6.4	0.21	100
TOTALS												
England	3176	3,413	3,486	3,384	3,293	5.5	5.9	5.9	5.6	5.4	45.78	72
N Ireland	70	46	67	64	52	3.6	2.3	3.3	3.1	2.5	1.48	35
Scotland	204	188	188	209	189	3.8	3.5	3.5	3.8	3.4	4.48	42
Wales	190	181	146	147	152	5.7	5.5	4.5	4.4	4.3	2.46	62
UK	**3640**	**3,828**	**3,887**	**3,804**	**3,686**	**5.3**	**5.6**	**5.6**	**5.4**	**5.1**	**54.20**	**68**

Country PD populations were calculated by summing the PD patients from centres in each country. Estimated country populations were derived from publicly available sources (see appendix A for details on estimated catchment population by kidney centre)
Exeter was unable to submit 2021 to 2023 patient level data, Manchester was unable to submit 2023 patient level data, but provided aggregate numbers of patients on KRT at the end of each year, by treatment modality
pmp – per million population

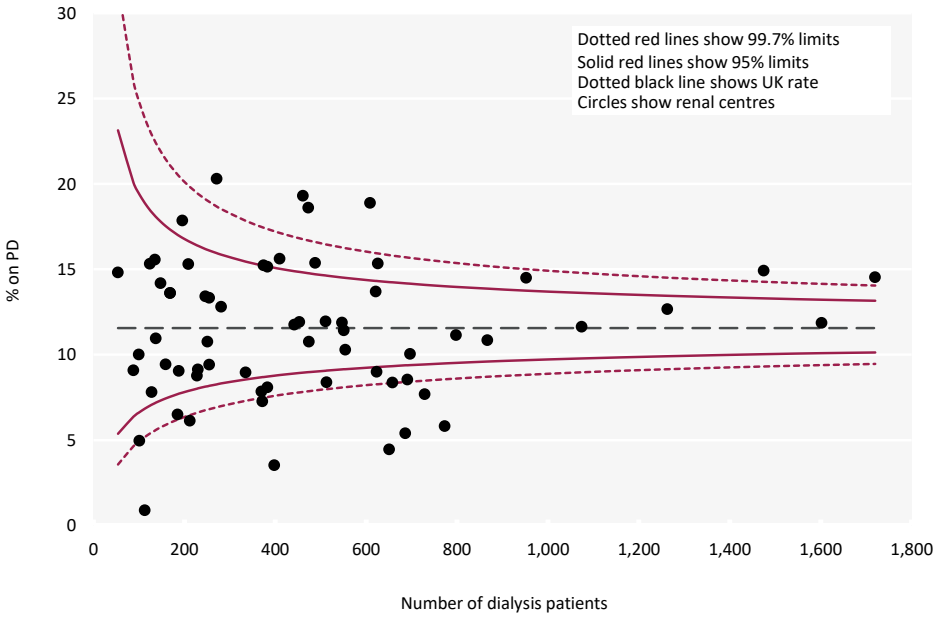

Figure 6.2a Percentage of adult patients prevalent to dialysis on 31/12/2023 who were on PD by centre

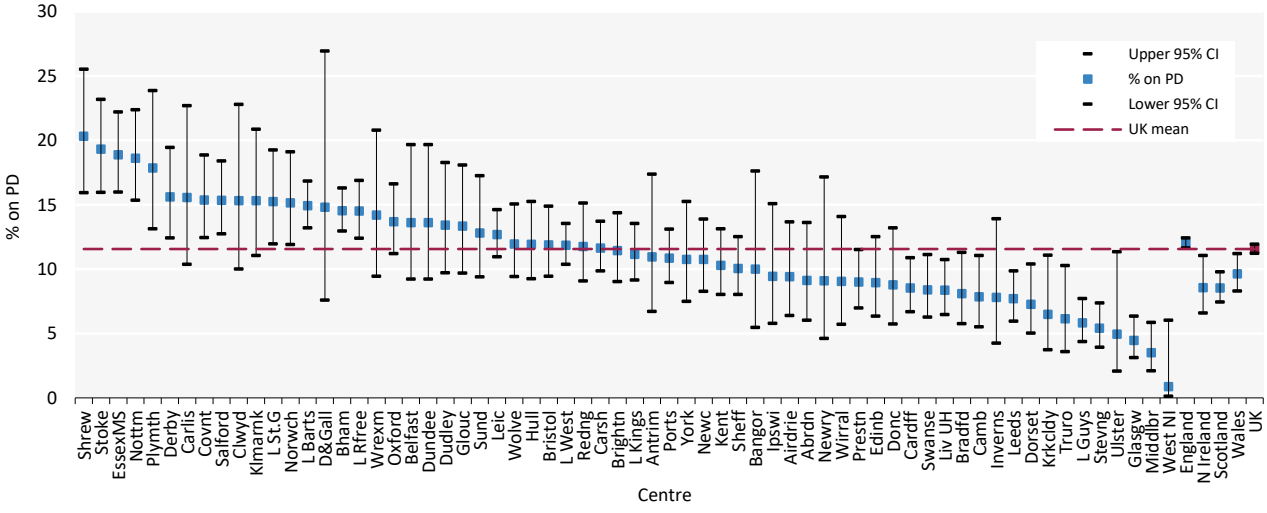

Figure 6.2b Percentage of adult patients prevalent to dialysis on 31/12/2023 who were on PD by centre
CI - confidence interval

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 31/12/2023 by centre

Centre	N on KRT	N on PD	% on PD	Median age (yrs)	% male	Ethnicity				
						% White	% Asian	% Black	% Other	% missing
ENGLAND										
Bham	3,417	250	7.3	62.6	60.8	55.2	29.0	14.9	0.8	3.6
Bradfd	824	31	3.8	60.8	48.4	67.7	29.0	0.0	3.2	0.0
Brightn	1,145	63	5.5	69.0	66.7	90.0	6.7	1.7	1.7	4.8
Bristol	1,522	65	4.3	66.5	61.5	87.5	6.3	3.1	3.1	1.5
Camb	1,629	29	1.8	61.0	72.4	79.3	17.2	0.0	3.4	0.0
Carlis	305	21	6.9	68.1	57.1	95.2	4.8	0.0	0.0	0.0
Carsh	2,001	125	6.2	63.6	60.8	66.9	19.0	9.9	4.1	3.2
Colchr	164	0	0.0							
Covnt	1,158	75	6.5	63.6	56.0	83.8	12.2	2.7	1.4	1.3
Derby	735	64	8.7	65.5	60.9	94.8	5.2	0.0	0.0	9.4
Donc	387	20	5.2	53.4	65.0	95.0	0.0	0.0	5.0	0.0
Dorset	816	27	3.3	61.7	59.3	96.3	3.7	0.0	0.0	0.0
Dudley	368	33	9.0	57.5	60.6	66.7	27.3	6.1	0.0	0.0
EssexMS	974	115	11.8	70.0	61.7	78.6	7.8	10.7	2.9	10.4
Exeter	1,127	70	6.2							
Glouc	560	34	6.1	64.8	61.8	88.2	8.8	0.0	2.9	0.0
Hull	959	54	5.6	61.1	61.1	96.2	1.9	0.0	1.9	1.9
Ipswi	397	15	3.8	77.0	53.3	71.4	0.0	7.1	21.4	6.7
Kent	1,240	57	4.6	59.9	75.4	89.5	1.8	7.0	1.8	0.0
L Barts	2,959	220	7.4	61.2	58.6	28.0	40.8	26.1	5.2	4.1
L Guys	2,318	45	1.9	58.3	51.1	50.0	19.0	19.0	11.9	6.7
L Kings	1,389	89	6.4	61.2	58.4	42.5	12.6	40.2	4.6	2.2
L Rfree	2,475	138	5.6	63.6	60.9	36.4	24.2	18.2	21.2	4.3
L St.G	878	57	6.5	63.4	68.4	47.1	27.5	13.7	11.8	10.5
L West	3,681	190	5.2	67.3	57.4	36.3	39.5	16.8	7.4	0.0
Leeds	1,906	56	2.9	57.7	55.4	76.4	16.4	7.3	0.0	1.8
Leic	2,820	160	5.7	64.5	58.8	84.0	10.4	2.1	3.5	10.0
Liv UH	1,503	55	3.7	54.6	69.1	83.7	7.0	4.7	4.7	21.8
M RI	2,258	101	4.5							
Middlbr	971	14	1.4	58.5	57.1	92.3	0.0	7.7	0.0	7.1
Newc	1,287	51	4.0	55.7	58.8	86.3	11.8	0.0	2.0	0.0
Norwch	808	58	7.2	67.1	74.1	92.5	5.7	0.0	1.9	8.6
Nottm	1,195	88	7.4	59.7	72.7	79.5	7.2	4.8	8.4	5.7
Oxford	2,132	85	4.0	64.4	68.2	80.9	16.2	1.5	1.5	20.0
Plymth	549	35	6.4	67.0	60.0	94.3	5.7	0.0	0.0	0.0
Ports	2,030	94	4.6	64.5	55.3					39.4
Prestn	1,436	56	3.9	61.2	53.6	88.0	10.0	2.0	0.0	10.7
Redng	994	52	5.2	58.0	61.5	72.5	20.0	2.5	5.0	23.1
Salford	1,371	96	7.0	60.5	46.9	84.4	11.1	2.2	2.2	6.3
Sheff	1,478	70	4.7	65.5	55.7	88.6	7.1	2.9	1.4	0.0
Shrew	461	55	11.9	64.6	65.5	92.2	2.0	3.9	2.0	7.3
Stevng	1,117	37	3.3	61.6	64.9	69.4	11.1	16.7	2.8	2.7
Stoke	921	89	9.7	64.9	60.7	86.4	8.6	2.5	2.5	9.0
Sund	590	36	6.1	62.3	55.6	94.4	2.8	0.0	2.8	0.0
Truro	468	13	2.8	52.9	38.5	100.0	0.0	0.0	0.0	0.0
Wirral	387	17	4.4	68.3	64.7	100.0	0.0	0.0	0.0	0.0
Wolve	780	61	7.8	60.5	59.0	62.3	21.3	16.4	0.0	0.0

Table 6.3 Continued

Centre	N on KRT	N on PD	% on PD	Median age (yrs)	% male	Ethnicity				
						% White	% Asian	% Black	% Other	% missing
York	610	27	4.4	59.5	70.4	96.0	0.0	0.0	4.0	7.4
N IRELAND										
Antrim	311	15	4.8	77.0	53.3					33.3
Belfast	938	23	2.5	65.4	56.5	100.0	0.0	0.0	0.0	17.4
Newry	277	8	2.9	75.6	50.0	100.0	0.0	0.0	0.0	25.0
Ulster	210	5	2.4	63.2	60.0					40.0
West NI	357	1	0.3	86.2	0.0	100.0	0.0	0.0	0.0	0.0
SCOTLAND										
Abrdn	608	21	3.5	61.2	57.1					
Airdrie	565	24	4.2	72.0	50.0					
D&Gall	145	8	5.5	69.4	37.5					
Dundee	384	23	6.0	67.1	69.6					
Edinb	989	30	3.0	60.8	60.0					
Glasgw	1,934	29	1.5	60.8	72.4					
Inverns	310	10	3.2	62.1	70.0					
Klmarnk	394	32	8.1	61.4	46.9					
Krkcldy	288	12	4.2	50.5	66.7					
WALES										
Bangor	218	10	4.6	74.1	40.0					50.0
Cardff	1,830	59	3.2	65.7	50.8	95.9	2.0	2.0	0.0	16.9
Clwyd	222	19	8.6	66.3	84.2					31.6
Swanse	901	43	4.8	63.4	72.1	97.5	2.5	0.0	0.0	7.0
Wrexm	327	21	6.4	57.3	57.1	89.5	5.3	5.3	0.0	9.5
TOTALS										
England	61,500	3,293	5.4	62.8	60.5	69.9	16.6	9.3	4.1	6.3
N Ireland	2,093	52	2.5	75.4	53.8	97.4	2.6	0.0	0.0	25.0
Scotland	5,617	189	3.4	62.8	59.3					
Wales	3,498	152	4.3	64.1	61.2	95.2	3.2	1.6	0.0	17.1
UK	**72,708**	**3,686**	**5.1**	**63.0**	**60.4**	**71.3**	**15.9**	**8.9**	**3.9**	**7.1**

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
Exeter and Manchester were unable to submit 2023 patient level data, but provided aggregate numbers of patients on KRT at the end of 2023, by treatment modality
UK ethnicity distribution and completeness does not include Scotland

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 31/12/2023

PRD	N on PD	% PD population	Age <65 yrs N	Age <65 yrs %	Age ≥65 yrs N	Age ≥65 yrs %	M/F ratio
Diabetes	783	24.0	409	23.0	374	25.2	1.7
Glomerulonephritis	555	17.0	397	22.4	158	10.6	1.7
Hypertension	248	7.6	120	6.8	128	8.6	2.5
Polycystic kidney disease	260	8.0	174	9.8	86	5.8	1.0
Pyelonephritis	185	5.7	90	5.1	95	6.4	1.2
Renal vascular disease	139	4.3	33	1.9	106	7.1	2.0
Other	501	15.4	298	16.8	203	13.7	1.1
Uncertain aetiology	591	18.1	254	14.3	337	22.7	1.5
Total (with data)	**3,262**	**100.0**	**1,775**	**100.0**	**1,487**	**100.0**	
Missing	253	7.2	121	6.4	132	8.2	1.5

Biochemistry parameters in prevalent adult PD patients

The UK Kidney Association guideline on chronic kidney disease (CKD) mineral bone disease contains only one audit measure, which is the percentage of patients with adjusted calcium above the target range. The UK Kidney 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 31/12/2023 by centre

Centre	Adjusted calcium: Median (mmoI/L)	% 2.2-2.5 mmoI/L	% >2.5 mmoI/L	% data completeness	Bicarbonate: Median (mmoI/L)	% <22 (mmoI/L)	% 22-30 (mmoI/L)	% >30 (mmoI/L)	% data completeness
ENGLAND									
Bham	2.4	79.2	11.1	98.7	21	61.7	38.3	0.0	76.4
Bradfd	2.5	76.7	20.0	100.0	27	6.7	86.7	6.7	100.0
Brightn	2.4	75.5	14.3	100.0	24	24.5	73.5	2.0	100.0
Bristol	2.4	86.3	11.8	100.0	24	19.6	78.4	2.0	100.0
Camb	2.4	69.2	23.1	100.0	26	3.9	88.5	7.7	100.0
Carlis	2.3	81.0	9.5	100.0	23	14.3	76.2	9.5	100.0
Carsh	2.3	78.1	8.6	99.1					0.0
Colchr									
Covnt	2.3	79.6	10.2	80.3	25	10.0	88.0	2.0	82.0
Derby	2.4	86.4	10.2	98.3	23	28.3	71.7	0.0	100.0
Donc	2.4	73.3	6.7	100.0	24	26.7	73.3	0.0	100.0
Dorset	2.4	81.8	13.6	100.0	21	59.1	40.9	0.0	100.0
Dudley	2.4	76.7	23.3	100.0	26	0.0	100.0	0.0	100.0
EssexMS	2.4	90.4	5.3	99.0	26	7.5	91.5	1.1	99.0
Exeter									
Glouc	2.4	70.0	26.7	100.0	24	30.0	70.0	0.0	100.0
Hull	2.4	85.4	12.2	100.0	24	7.3	92.7	0.0	100.0
Ipswi	2.3	91.7	0.0	85.7	22	50.0	50.0	0.0	85.7
Kent	2.4	77.8	20.4	100.0	27	7.7	88.5	3.9	96.3
L Barts	2.4	81.9	9.8	99.5	26	9.9	85.9	4.2	99.0
L Guys	2.4	64.9	32.4	94.9	25	16.2	81.1	2.7	94.9
L Kings	2.3	79.7	6.8	92.5	23	42.5	57.5	0.0	91.3
L Rfree	2.4	75.9	16.4	99.2	25	18.1	79.3	2.6	99.2
L St.G	2.4	67.4	22.5	92.5					0.0

Table 6.5 Continued

Centre	Adjusted calcium				Bicarbonate				
	Median (mmoI/L)	% 2.2-2.5 mmoI/L	% >2.5 mmoI/L	% data completeness	Median (mmoI/L)	% <22 (mmoI/L)	% 22-30 (mmoI/L)	% >30 (mmoI/L)	% data completeness
L West				33.7					30.1
Leeds	2.4	91.3	6.5	100.0	27	4.4	84.8	10.9	100.0
Leic	2.4	78.3	14.7	100.0	24	12.4	84.5	3.1	100.0
Liv UH	2.4	85.0	15.0	97.6	26	5.0	95.0	0.0	97.6
M RI									
Middlbr	2.3	70.0	0.0	90.9	27	10.0	90.0	0.0	90.9
Newc	2.4	71.8	25.6	97.5	25	12.8	87.2	0.0	97.5
Norwch	2.4	83.0	14.9	97.9	23	32.6	67.4	0.0	95.8
Nottm	2.4	90.1	7.4	100.0					37.0
Oxford	2.2	63.6	6.1	100.0	23	32.3	64.5	3.2	93.9
Plymth	2.3	84.4	6.3	100.0	22	46.7	53.3	0.0	93.8
Ports	2.4	88.8	6.3	100.0	24	17.7	81.0	1.3	98.8
Prestn	2.4	79.2	6.3	96.0	26	8.5	87.2	4.3	94.0
Redng	2.4	79.6	11.4	100.0	25	15.9	84.1	0.0	100.0
Salford	2.4	79.3	16.1	100.0	27	9.3	81.4	9.3	98.9
Sheff	2.3	77.8	6.4	96.9	24	28.6	68.3	3.2	96.9
Shrew	2.4	85.1	14.9	100.0	24	29.8	70.2	0.0	100.0
Stoke	2.5	73.5	26.5	100.0	27	4.8	86.8	8.4	100.0
Sund	2.4	70.0	20.0	100.0					0.0
Truro	2.4	80.0	20.0	100.0					90.0
Wirral	2.4	66.7	26.7	100.0	27	6.7	80.0	13.3	100.0
Wolve	2.4	78.0	14.0	100.0	24	30.0	70.0	0.0	100.0
York	2.4	92.0	8.0	100.0	26	4.0	84.0	12.0	100.0
N IRELAND									
Antrim	2.4	92.3	7.7	100.0	26	7.7	92.3	0.0	100.0
Belfast	2.4	83.3	16.7	100.0	27	0.0	94.4	5.6	100.0
Newry				100.0					100.0
Ulster				100.0					100.0
West NI				100.0					100.0
WALES									
Bangor				100.0					100.0
Cardff	2.4	77.4	15.1	100.0	24	22.7	70.5	6.8	83.0
Clwyd	2.35	93.8	6.3	100.0	24	25.0	75.0	0.0	100.0
Swanse	2.4	65.8	21.1	97.4	25	5.3	89.5	5.3	97.4
Wrexm	2.4	77.8	16.7	100.0	27	5.6	83.3	11.1	100.0
TOTALS									
England	2.4	79.5	13.1	94.3	25	21.3	75.9	2.8	83.0
N Ireland	2.4	88.9	8.9	100.0	26	6.7	88.9	4.4	100.0
Wales	2.4	76.1	16.4	99.3	25	13.6	80.8	5.6	92.6
E, W & NI	**2.4**	**79.4**	**13.2**	**94.6**	**25**	**20.6**	**76.4**	**3.0**	**83.7**

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

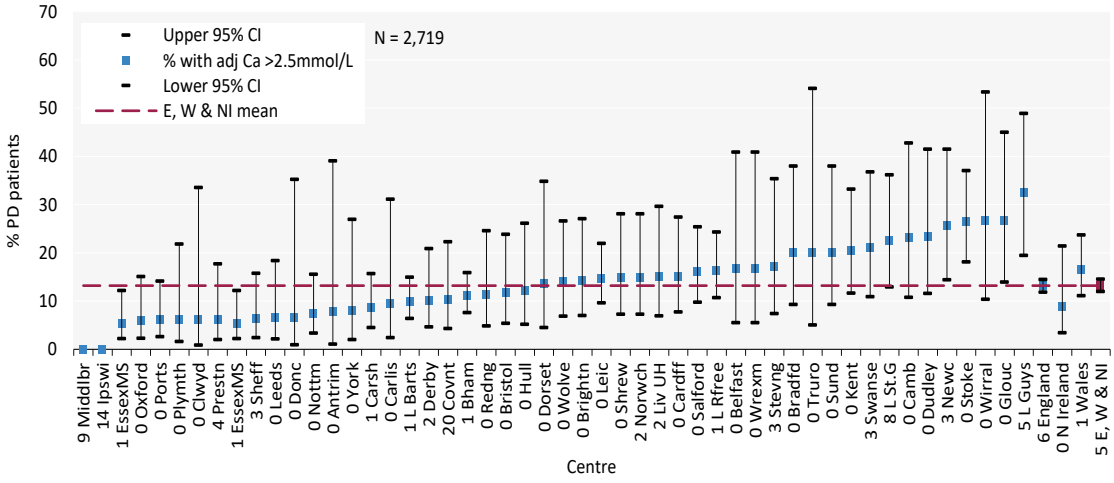

Figure 6.3 Percentage of adult patients prevalent to PD on 31/12/2023 with adjusted calcium (Ca) above the target range (>2.5 mmol/L) by centre
CI – confidence interval

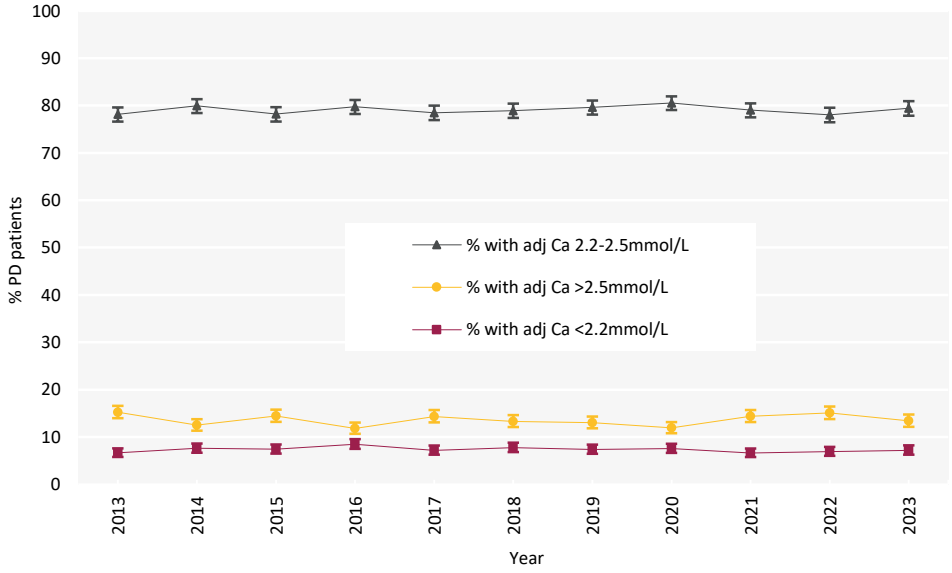

Figure 6.4 Change in percentage of prevalent adult PD patients within, above and below the target range for adjusted calcium (Ca 2.2–2.5 mmol/L) between 2013 and 2023

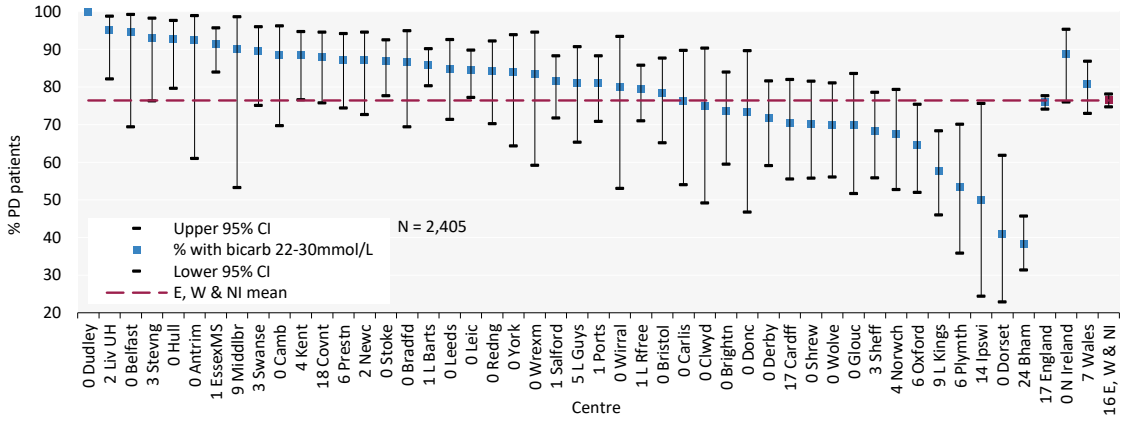

Figure 6.5 Percentage of adult patients prevalent to PD on 31/12/2023 with bicarbonate (bicarb) within the target range (22–30 mmol/L) by centre

CI – confidence interval

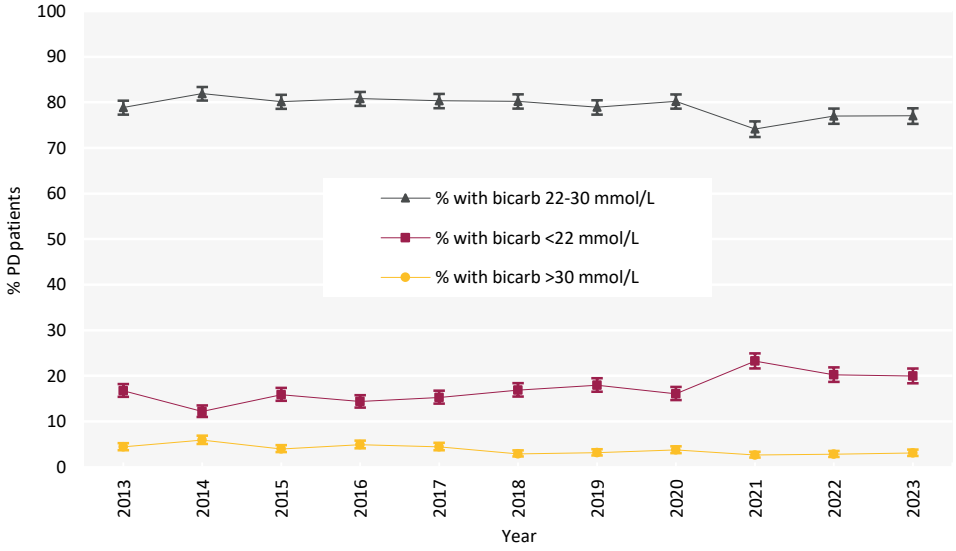

Figure 6.6 Percentage of prevalent adult PD patients within, above and below the target range for bicarbonate (bicarb 22–30 mmol/L) between 2013 and 2023

Anaemia in prevalent adult PD patients

UK Kidney Association anaemia guidelines recommend a target haemoglobin of 100-120 g/L. Data regarding target and median haemoglobin and ferritin levels attained are presented in table 6.6.

Table 6.6 Median haemoglobin and ferritin and percentage attaining target ranges in adult patients prevalent to PD on 31/12/2023 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							
Bham	108	27.3	15.9	99.1	360	6.6	98.7
Bradfd	118	10.0	40.0	100.0	357	3.3	100.0
Brightn	108	16.3	22.4	100.0	331	4.2	98.0
Bristol	111	11.8	21.6	100.0	230	13.7	100.0
Camb	110	15.4	19.2	100.0	345	0.0	100.0
Carlis	119	9.5	42.9	100.0	240	9.5	100.0
Carsh	107	26.7	13.3	99.1	307	4.7	100.0
Colchr							
Covnt	111	26.0	26.0	82.0	192	32.7	85.3
Derby	115	13.3	38.3	100.0	424	3.4	98.3
Donc	109	26.7	6.7	100.0	279	0.0	100.0
Dorset	113	9.1	9.1	100.0	364	4.5	100.0
Dudley	112	16.7	23.3	100.0	123	43.3	100.0
EssexMS	111	18.1	21.3	99.0	280	25.5	99.0
Exeter							
Glouc	108	23.3	13.3	100.0	236	10.3	96.7
Hull	109	29.3	7.3	100.0	556	4.9	100.0
Ipswi	111	16.7	8.3	85.7	412	8.3	85.7
Kent	111	20.4	27.8	100.0	421	3.9	94.4
L Barts	111	24.9	27.5	99.5	262	22.1	93.3
L Guys	110	24.3	16.2	94.9	423	8.1	94.9
L Kings	111	15.4	23.1	97.5	250	13.0	96.3
L Rfree	115	12.9	31.0	99.2	588	4.3	98.3
L St.G	106	32.0	16.0	94.3	416	4.2	90.6
L West				34.3			25.9
Leeds	108	26.1	15.2	100.0	444	6.5	100.0
Leic	111	22.5	27.1	100.0	283	12.4	100.0
Liv UH	110	22.5	15.0	97.6	387	10.0	97.6
M RI							
Middlbr	115	10.0	40.0	90.9			63.6
Newc	112	15.4	28.2	97.5	578	5.3	95.0
Norwch	115	12.8	36.2	97.9	373	14.6	100.0
Nottm	106	29.6	13.6	100.0	492	7.4	100.0
Oxford	109	19.7	19.7	100.0	398	0.0	92.4
Plymth	117	15.6	37.5	100.0	241	9.4	100.0
Ports	114	11.3	23.8	100.0	488	7.7	97.5
Prestn	109	28.6	26.5	98.0	425	4.1	98.0
Redng	114	13.6	22.7	100.0	415	4.5	100.0
Salford	110	23.0	19.5	100.0	458	5.7	100.0
Sheff	113	19.0	30.2	96.9	631	3.2	95.4
Shrew	113	21.3	23.4	100.0	288	14.9	100.0
Stevng	105	41.4	17.2	96.7	560	6.9	96.7
Stoke	112	14.5	26.5	100.0	407	1.2	100.0
Sund	114	23.3	30.0	100.0	418	0.0	80.0
Truro	105	40.0	10.0	100.0			90.0
Wirral	108	26.7	6.7	100.0	514	0.0	100.0
Wolve	114	28.0	28.0	100.0	206	20.0	100.0
York	106	40.0	16.0	100.0	324	8.3	96.0
N IRELAND							
Antrim	111	0.0	7.7	100.0	465	0.0	100.0
Belfast	113	22.2	38.9	100.0	364	16.7	100.0
Newry				100.0			100.0
Ulster				100.0			100.0

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
West NI				100.0			100.0
SCOTLAND							
Abrdn	114	21.1	21.1	100.0			
Airdrie	110	28.6	14.3	100.0			
D&Gall				100.0			
Dundee	108	22.7	27.3	100.0			
Edinb				0.0			
Glasgw	115	12.0	20.0	100.0			
Inverns				100.0			
Klmarnk	107	33.3	18.5	100.0			
Krkcldy				0.0			
WALES							
Bangor				100.0			100.0
Cardff	113	20.8	30.2	100.0	206	30.6	92.5
Clwyd	110	18.8	25.0	100.0	368	6.3	100.0
Swanse	115	15.8	34.2	97.4	247	23.5	87.2
Wrexm	111	22.2	22.2	100.0	485	0.0	100.0
TOTALS							
England	110	21.7	22.6	94.7	365	9.6	92.7
N Ireland	111	8.9	22.2	100.0	407	8.9	100.0
Scotland	111	22.9	19.1	77.1			
Wales	114	18.7	31.3	99.3	302	19.8	93.3
UK	**111**	**21.4**	**22.8**	**94.0**	**364**	**10.1**	**92.9**

Blank cells – no data returned by the centre or <10 patients in the centre or data completeness <70%
Ferritin total for UK represents E, W and NI only

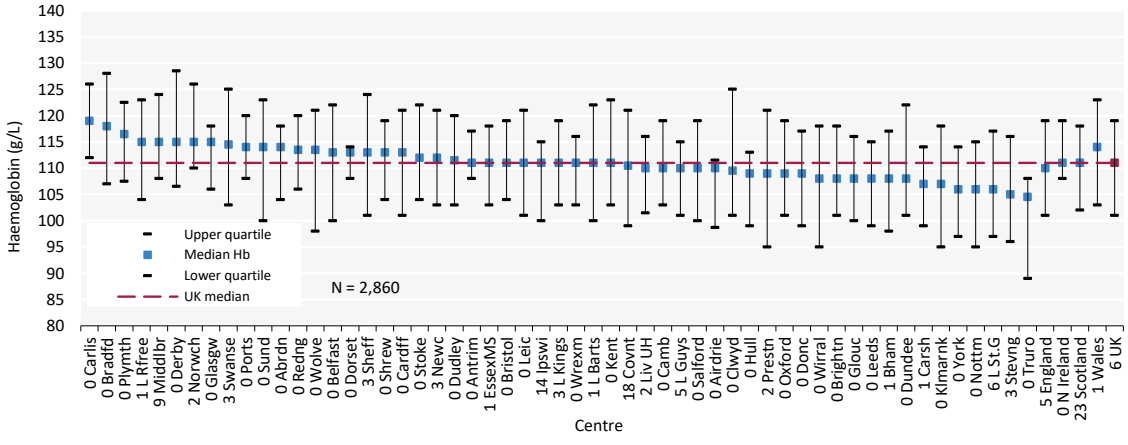

Figure 6.7 Median haemoglobin (Hb) in adult patients prevalent to PD on 31/12/2023 by centre

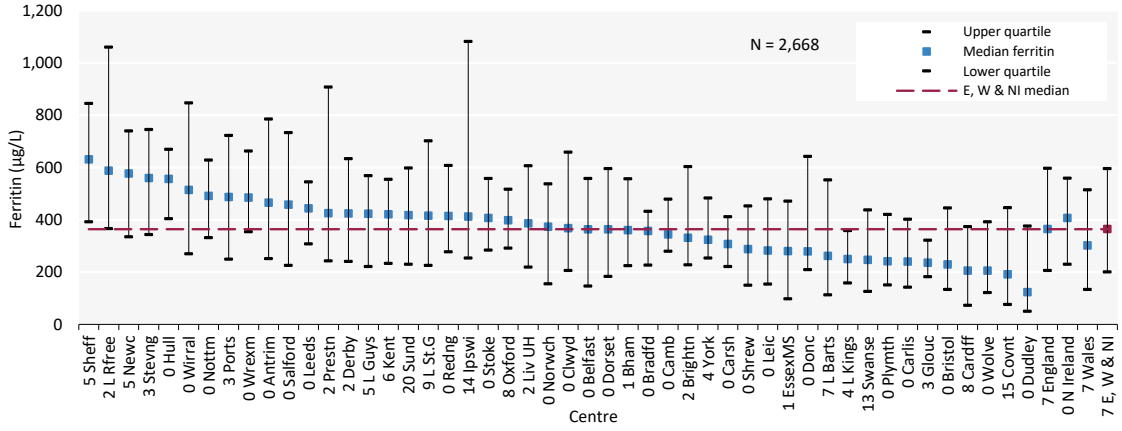

Figure 6.8 Median ferritin in adult patients prevalent to PD on 31/12/2023 by centre

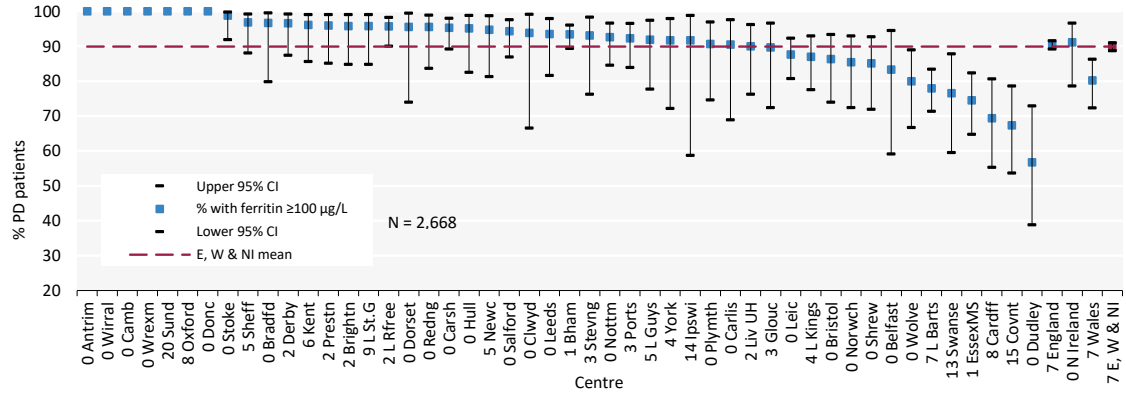

Figure 6.9 Percentage of adult patients prevalent to PD on 31/12/2023 with ferritin ≥100 µg/L by centre
CI – confidence interval

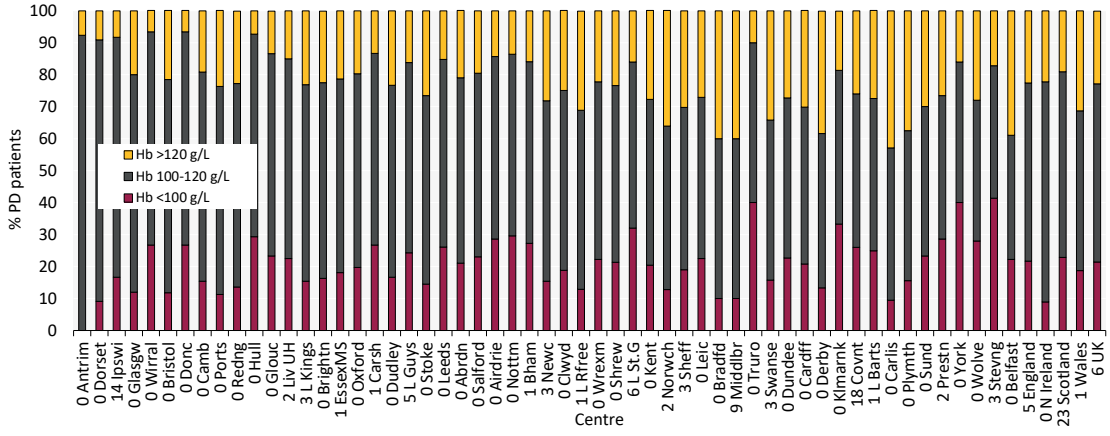

Figure 6.10 Distribution of haemoglobin (Hb) in adult patients prevalent to PD on 31/12/2023 by centre

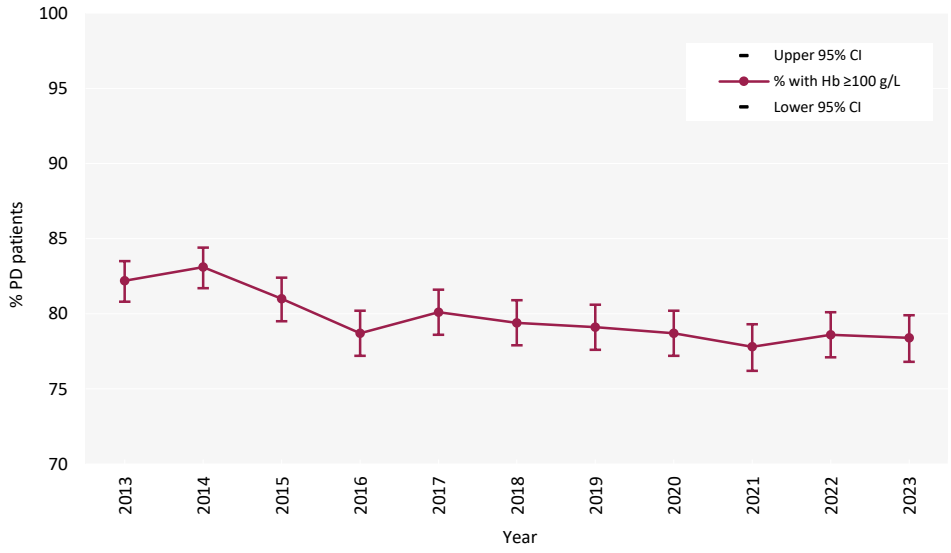

Figure 6.11 Percentage of prevalent adult PD patients with haemoglobin (Hb) ≥100 g/L between 2013 and 2023
CI – confidence interval

Peritonitis in prevalent adult PD patients

PD peritonitis infection rates are collected for English kidney centres by the UKRR in collaboration with NHS England for the Renal Dialysis Quality Dashboard (ukkidney.org/audit-research/data-permissions/data/ukrr-nhs-england-quality-dashboard-dataset) and are listed in the table below. The funnel plot (figure 6.12) shows each centre's 2023 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 6.7 Number of patient-years and peritonitis rate in adult patients receiving PD in 2023 by centre in England

Centre	PD patient years	Peritonitis rate per 1 PD patient year
Bham	284	0.34
Bradfd	35	0.26
Brightn	56	0.20
Bristol	69	0.49
Camb	36	0.39
Carlis	19	0.16
Carsh	128	0.32
Covnt	75	0.29
Derby	74	0.43
Donc	20	0.34
Dorset	24	0.49
Dudley	33	0.37
EssexMS		
Exeter	72	0.27
Glouc	39	0.26
Hull	56	0.73
Ipswi	28	0.18
Kent	69	0.07
L Barts	226	0.40
L Guys	45	0.40
L Kings	104	0.30
L Rfree	146	0.35

Table 6.7 Continued

Centre	PD patient years	Peritonitis rate per 1 PD patient year
L St.G	63	0.35
L West	196	0.31
Leeds	55	0.24
Leic	164	0.33
Liv UH	62	0.46
M RI	89	0.32
Middlbr	16	0.70
Newc	45	0.62
Norwch		
Nottm	94	0.62
Oxford	79	0.39
Plymth	40	0.13
Ports	100	0.35
Prestn	54	0.43
Redng	52	0.50
Salford	90	0.12
Sheff	74	0.34
Shrew	59	0.47
Stevng	50	0.56
Stoke	101	0.22
Sund	31	0.03
Truro	14	0.93
Wirral	20	0.51
Wolve	55	0.34
York	33	0.27
	TOTAL	
England	**3,275**	**0.35**

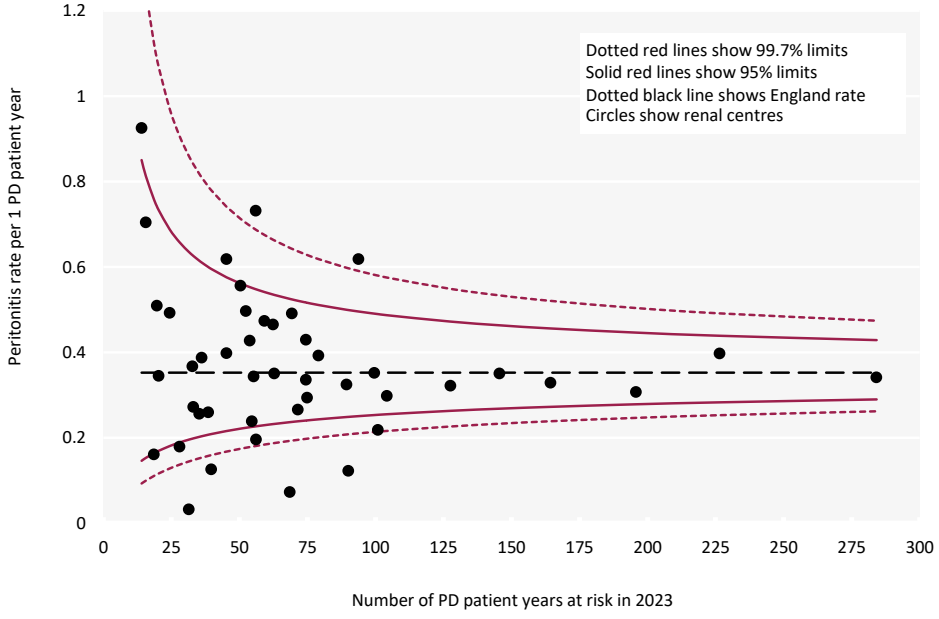

Figure 6.12 PD peritonitis rates in adult patients receiving PD in 2023 per 1 PD patient-year by centre in England
Please visit the UKRR data portal (ukkidney.org/audit-research/data-portals) to identify individual kidney centres

Cause of death in adult PD patients

Cause of death was analysed in prevalent patients receiving PD on 31/12/2022 and followed-up for one year in 2023. 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. Where cause of death was missing in UKRR data, cause of death from Civil Registration records was used. Further detail on the survival of prevalent KRT patients is in chapter 3.

Table 6.8 Cause of death in adult patients prevalent to PD on 31/12/2022 followed-up in 2023 by age group

	PD all ages		PD < 65 years	PD ≥ 65 years
Cause of death	N	%	%	%
Cardiac disease	91	20.8	17.4	21.8
Cerebrovascular disease	17	3.9	8.2	2.7
Infection	87	19.9	16.3	20.9
Malignancy	22	5.0	2.0	5.9
Treatment withdrawal	37	8.5	5.1	9.4
Other	155	35.4	41.8	33.5
Uncertain aetiology	29	6.6	9.2	5.9
Total (with data)	**438**	**100.0**	**100.0**	**100.0**
Missing	36	7.6	6.7	7.9

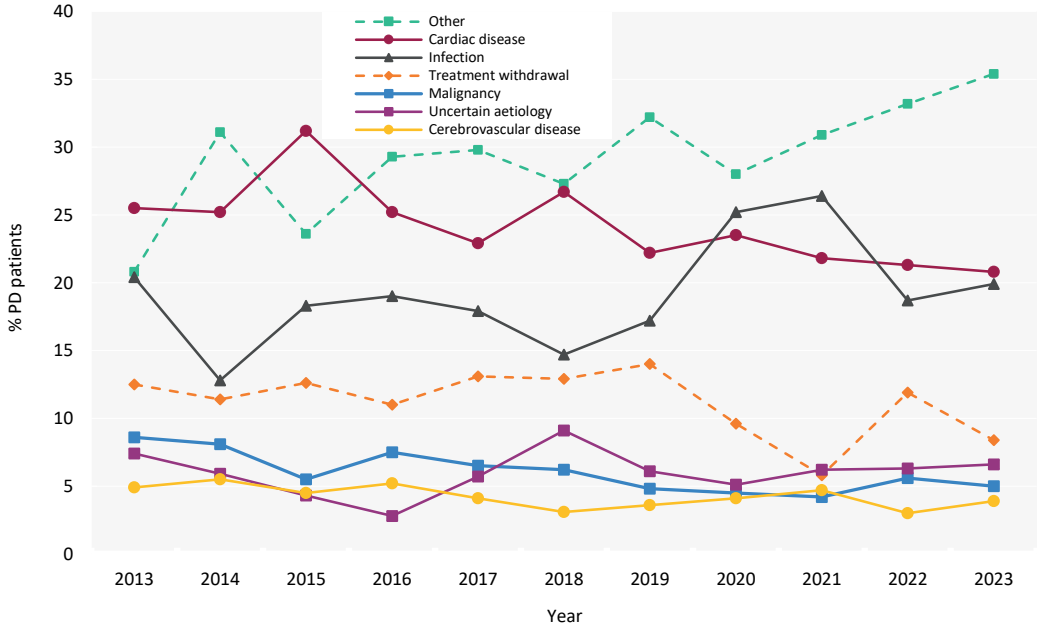

Figure 6.13 Cause of death between 2013 and 2023 for adult patients prevalent to PD at the beginning of the year

UK Kidney Association
UK Renal Registry

Chapter 7

Adults on home haemodialysis (HHD) in the UK at the end of 2023

Contents

Introduction

This chapter describes the population of adult patients with end-stage kidney disease (ESKD) who were receiving regular home haemodialysis (HHD) in the UK at the end of 2023 (figure 7.1). This population comprises patients who were on HHD at the end of 2022 and remained on HHD throughout 2023, as well as patients who commenced/re-commenced HHD in 2023. This latter group includes both incident kidney replacement therapy (KRT) patients who ended 2023 on HHD and prevalent KRT patients who switched to HHD from in-centre haemodialysis (ICHD), peritoneal dialysis (PD), or a transplant (Tx) in 2023. 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 KRT, 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.

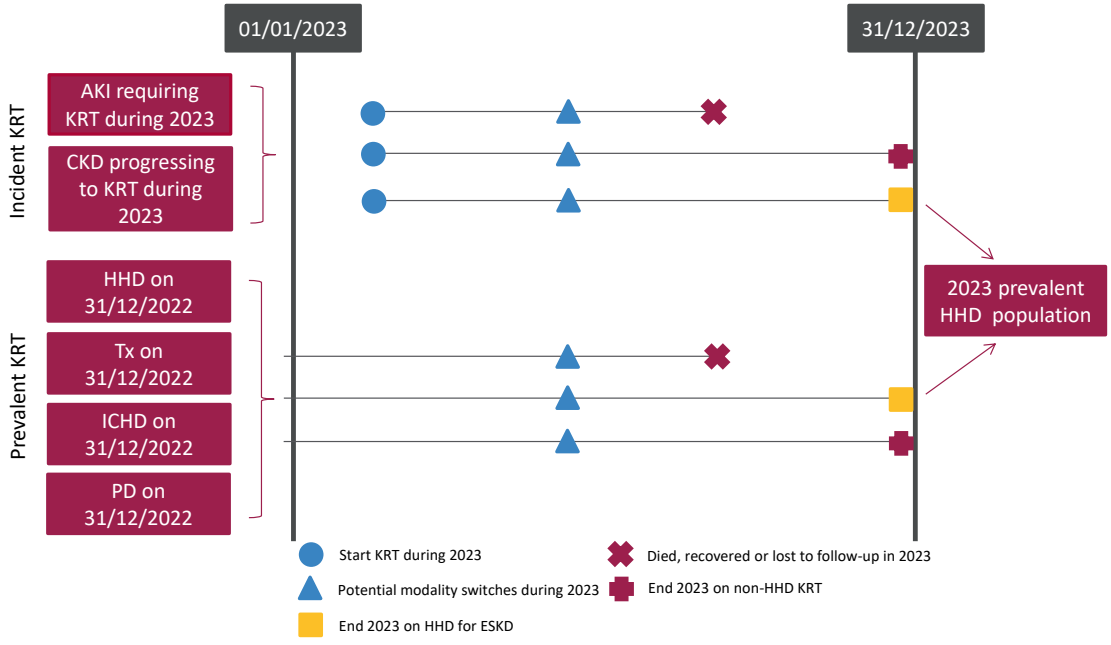

Figure 7.1 Pathways adult patients could follow to be included in the UK 2023 prevalent HHD population

Note that patients receiving dialysis for acute kidney injury (AKI) are only included in this chapter if they had a timeline or KRT modality code for chronic HHD at the end of 2023 or if they had been on KRT for ≥90 days and were on HHD at the end of 2023

CKD – chronic kidney disease

Where possible, the chapter addresses key aspects of the care of patients on HHD for which there are UK Kidney 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 available through the UK Renal Registry (UKRR) data portal (ukkidney.org/audit-research/data-portals).

Rationale for analyses

The analyses begin with a description of the 2023 prevalent adult HHD population, including the number on HHD per million population (pmp).

The UK Kidney Association guidelines (ukkidney.org/health-professionals/guidelines/guidelines-commentaries) provide audit measures relevant to the care of patients on HHD, and the guidelines available during 2023 were used for this audit. Where data permit, attainment of these measures by UK kidney centres in 2023 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 (ukkidney.org/audit-research/data-portals). Audit measures that cannot be reported because the required data items were not collected by the UKRR are omitted.

Table 7.1 The UK KidneyAssociation audit measures relevant to HHD that are reported in this chapter

The UK Kidney 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 (2020)	Proportion of patients who are not iron replete with a serum ferritin <200 µg/L	Table 7.7
	Proportion of patients with haemoglobin 100–120 g/L	
Commentary on the NICE Guideline on Renal Replacement Therapy and Conservative Management (2020)	Number of patients withdrawing from HHD as a proportion of all deaths on HHD	Table 7.8, figure 7.10

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.

Exeter and Manchester were unable to submit patient level data for 2023. Aggregate numbers by modality were provided, enabling inclusion in Tables 7.2 and 7.3. Exeter and Manchester are excluded from all other analyses.

London Kings moved to a new Trust IT system, and as a result data were not submitted for the final quarter of 2023. Data for London Kings presented in this chapter are for patients receiving HHD on 30th September 2023, rather than 31st December 2023.

Key findings

- 1,451 adult patients were receiving HHD for ESKD in the UK on 31/12/2023, compared to 1,458 on 31/12/2022, which represented 2.0% of the KRT population.
- The median age of HHD patients was 55.9 years and 61.9% were male.
- The median adjusted calcium for HHD patients was 2.4 mmol/L and 13.6% were above the target range 2.2–2.5 mmol/L.
- The median pre-dialysis bicarbonate for HHD patients was 24 mmol/L and 75.4% were within the target range 18–26 mmol/L.
- The median pre-dialysis potassium for HHD patients was 5.0 mmol/L and 80.8% were within the target range 4.0–6.0 mmol/L.
- The median ferritin for HHD patients was 371 µg/L and 26.8% had a ferritin <200 µg/L.
- The median haemoglobin for HHD patients was 109 g/L and 25.6% had a haemoglobin<100 g/L.
- Cause of death records from Civil Registration were used where cause of death was missing in the UKRR data. This resulted in improved completeness and changes in proportions of the causes of death. The leading cause of death for patients on HHD was cardiac disease (27.3%) in younger patients (<65 years) and infections (17.5%) in patients ≥ 65 years.

Analyses

Changes to the prevalent adult HHD population

For the 67 adult kidney centres, the number of prevalent patients on HHD was calculated as both a proportion of the prevalent patients on KRT 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 KRT 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)	2023 crude rate (pmp)
Centre	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023		
ENGLAND												
Bham	76	76	71	67	63	2.3	2.3	2.1	2.0	1.8	2.10	30
Bradfd	6	6	7	9	6	0.8	0.8	1.0	1.2	0.7	0.51	12
Brightn	32	31	30	35	34	3.0	2.9	2.7	3.2	3.0	1.08	31
Bristol	16	17	18	15	9	1.1	1.2	1.2	1.0	0.6	1.27	7
Camb	32	26	24	23	20	2.2	1.7	1.5	1.4	1.2	0.99	20
Carlis	0	2	3	6	7	0.0	0.7	1.0	2.0	2.3	0.26	27
Carsh	35	28	28	26	24	2.0	1.5	1.5	1.3	1.2	1.68	14
Colchr	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.30	0
Covnt	20	20	21	18	15	1.8	1.8	1.9	1.6	1.3	0.81	19
Derby	58	63	55	62	60	8.9	9.3	8.0	8.6	8.2	0.58	104
Donc	5	5	5	9	9	1.5	1.5	1.5	2.4	2.3	0.38	24
Dorset	15	16	14	14	14	1.9	2.0	1.8	1.8	1.7	0.75	19
Dudley	12	9	10	14	11	3.3	2.4	2.5	3.7	3.0	0.35	31
EssexMS	24	29	21	23	17	2.8	3.3	2.3	2.6	1.7	1.01	17
Exeter	21	19	16	16	17	1.9	1.7	1.5	1.4	1.5	0.99	17
Glouc	3	4	4	2	3	0.6	0.8	0.7	0.4	0.5	0.53	6
Hull	7	7	12	17	17	0.8	0.8	1.3	1.8	1.8	0.81	21
Ipswi	4	3	2	0	0	0.9	0.7	0.5	0.0	0.0	0.32	0
Kent	20	18	18	21	20	1.8	1.6	1.5	1.7	1.6	1.08	18
L Barts	20	25	25	47	53	0.8	0.9	0.9	1.7	1.8	1.62	33
L Guys	45	48	41	37	38	1.9	2.1	1.8	1.6	1.6	1.01	38
L Kings	17	22	34	39	34	1.4	1.8	2.6	2.8	2.4	0.94	36
L Rfree	11	10	10	9	6	0.5	0.4	0.4	0.4	0.2	1.27	5
L St.G	6	6	6	5	5	0.7	0.7	0.7	0.6	0.6	0.67	7
L West	29	35	36	39	47	0.8	1.0	1.0	1.1	1.3	2.03	23
Leeds	26	22	16	22	26	1.5	1.3	0.9	1.2	1.4	1.40	19
Leic	54	50	48	48	43	2.1	1.9	1.8	1.8	1.5	2.18	20
Liv UH	54	60	57	56	62	3.6	4.1	3.9	3.8	4.1	1.27	49
M RI	75	71	84	82	86	3.7	3.6	4.1	3.9	3.8	1.37	63
Middlbr	19	18	17	20	16	2.0	1.9	1.8	2.1	1.6	0.82	20
Newc	19	15	18	19	21	1.6	1.3	1.5	1.5	1.6	0.96	22
Norwch	14	13	10	10	9	1.7	1.6	1.3	1.2	1.1	0.71	13
Nottm	31	32	28	30	30	2.5	2.6	2.3	2.5	2.5	0.93	32
Oxford	25	17	19	26	24	1.3	0.8	0.9	1.3	1.1	1.54	16
Plymth	7	4	3	3	5	1.3	0.7	0.6	0.6	0.9	0.41	12
Ports	70	83	85	78	77	3.7	4.4	4.4	3.9	3.8	1.79	43
Prestn	49	47	42	40	39	3.7	3.4	3.1	2.9	2.7	1.27	31
Redng	8	8	9	14	17	0.9	0.9	1.0	1.5	1.7	0.74	23
Salford	41	40	31	31	31	3.3	3.2	2.5	2.4	2.3	1.19	26
Sheff	55	61	56	54	44	3.7	4.1	3.7	3.6	3.0	1.12	39
Shrew	27	36	37	40	44	6.2	8.4	8.4	9.0	9.5	0.42	104

Table 7.2 Continued

Centre	N on HHD					% on HHD					Estimated catchment population (millions)	2023 crude rate (pmp)
	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023		
Stevng	36	32	41	36	45	3.7	3.3	4.0	3.4	4.0	1.15	39
Stoke	31	39	41	29	35	3.8	4.8	4.9	3.2	3.8	0.75	47
Sund	12	9	10	11	15	2.1	1.6	1.8	1.9	2.5	0.54	28
Truro	4	4	5	3	9	0.9	0.9	1.1	0.6	1.9	0.37	25
Wirral	8	7	6	6	4	1.9	1.7	1.4	1.5	1.0	0.48	8
Wolve	33	31	38	43	43	5.4	4.7	5.5	5.9	5.5	0.55	78
York	16	18	17	22	18	2.7	3.1	2.9	3.6	3.0	0.49	37
N IRELAND												
Antrim	4	4	2	1	1	1.4	1.4	0.7	0.3	0.3	0.25	4
Belfast	13	10	8	7	8	1.5	1.1	0.9	0.8	0.9	0.54	15
Newry	2	4	3	3	2	0.8	1.5	1.1	1.1	0.7	0.24	8
Ulster	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.21	0
West NI	1	2	2	1	2	0.3	0.6	0.6	0.3	0.6	0.25	8
SCOTLAND												
Abrdn	3	2	2	3	3	0.5	0.4	0.3	0.5	0.5	0.50	6
Airdrie	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.47	0
D&Gall	2	1	1	1	1	1.3	0.6	0.6	0.7	0.7	0.12	8
Dundee	7	6	6	5	4	1.6	1.4	1.5	1.3	1.0	0.37	11
Edinb	2	3	7	9	8	0.2	0.3	0.8	0.9	0.8	0.85	9
Glasgw	18	11	10	11	16	1.0	0.6	0.5	0.6	0.8	1.38	12
Inverns	7	3	2	3	1	2.5	1.1	0.7	1.1	0.3	0.23	4
Klmarnk	14	14	16	12	13	3.9	3.8	4.3	3.2	3.3	0.29	45
Krkcldy	2	3	2	3	2	0.7	1.0	0.7	1.1	0.7	0.28	7
WALES												
Bangor	15	13	21	22	22	7.5	6.0	9.7	10.0	10.1	0.16	139
Cardff	33	34	51	49	44	1.9	2.0	3.0	2.8	2.4	1.16	38
Clwyd	2	6	5	10	9	1.0	2.9	2.5	4.9	4.1	0.18	50
Swanse	45	44	40	39	35	5.2	5.2	4.7	4.6	3.9	0.75	47
Wrexm	7	7	3	3	8	2.3	2.2	1.0	1.0	2.4	0.21	38
TOTALS												
England	1228	1242	1229	1276	1272	2.1	2.1	2.1	2.1	2.1	45.78	28
N Ireland	20	20	15	12	13	1.0	1.0	0.7	0.6	0.6	1.48	9
Scotland	55	43	46	47	48	1.0	0.8	0.9	0.9	0.9	4.48	11
Wales	102	104	120	123	118	3.1	3.2	3.7	3.7	3.4	2.46	48
UK	**1405**	**1409**	**1410**	**1458**	**1451**	**2.1**	**2.1**	**2.0**	**2.1**	**2.0**	**54.20**	**27**

Country HHD populations were calculated by summing the HHD patients from centres in each country. Estimated country populations were derived from publicly available sources (see appendix A for details on estimated catchment population by kidney centre)
Exeter was unable to submit 2021 to 2023 patient level data, Manchester was unable to submit 2023 patient level data, but provided aggregate numbers of patients on KRT at the end of each year by treatment modality
pmp – per million population

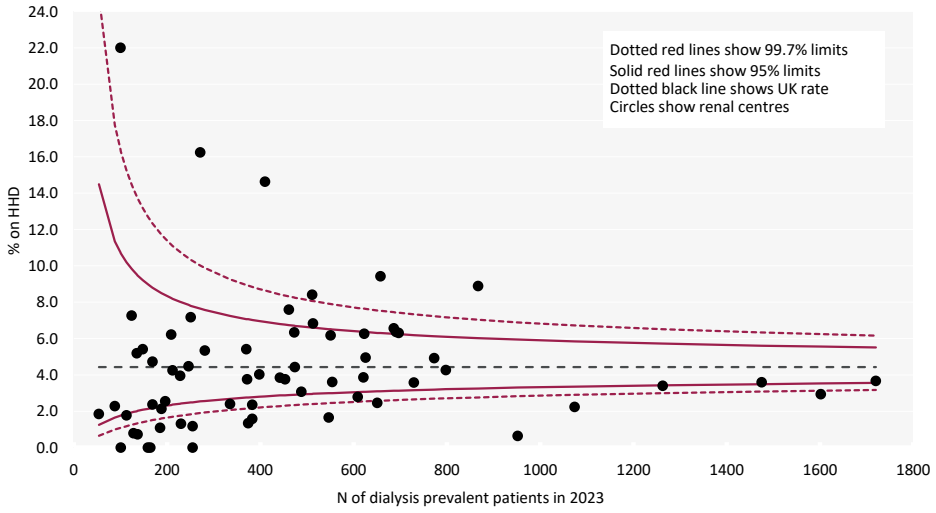

Figure 7.2 Percentage of adult patients prevalent to dialysis on 31/12/2023 who were on HHD by centre

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 31/12/2023 by centre

						Ethnicity				
Centre	N on KRT	N on HHD	% on HHD	Median age (yrs)	% male	% White	% Asian	% Black	% Other	% missing
ENGLAND										
Bham	3,417	63	1.8	55.0	71.4	64.5	16.1	14.5	4.8	1.6
Bradfd	824	6	0.7	60.6	66.7	83.3	16.7	0.0	0.0	0.0
Brightn	1,145	34	3.0	60.6	58.8	91.2	5.9	2.9	0.0	0.0
Bristol	1,522	9	0.6	60.9	22.2	100.0	0.0	0.0	0.0	0.0
Camb	1,629	20	1.2	62.0	65.0	90.0	0.0	10.0	0.0	0.0
Carlis	305	7	2.3	46.1	71.4	100.0	0.0	0.0	0.0	0.0
Carsh	2,001	24	1.2	57.8	70.8	78.3	13.0	8.7	0.0	4.2
Colchr	164	0	0.0							
Covnt	1,158	15	1.3	53.1	60.0	86.7	6.7	6.7	0.0	0.0
Derby	735	60	8.2	59.8	66.7	86.4	8.5	5.1	0.0	1.7
Donc	387	9	2.3	64.0	55.6	100.0	0.0	0.0	0.0	0.0
Dorset	816	14	1.7	65.9	92.9	92.9	7.1	0.0	0.0	0.0
Dudley	368	11	3.0	59.5	72.7	100.0	0.0	0.0	0.0	0.0
EssexMS	974	17	1.7	60.8	82.4	87.5	6.3	0.0	6.3	5.9
Exeter	1,127	17	1.5							
Glouc	560	3	0.5	51.9	33.3	100.0	0.0	0.0	0.0	0.0
Hull	959	17	1.8	43.3	76.5	82.4	0.0	11.8	5.9	0.0
Ipswi	397	0	0.0	.	.	.	.	.	.	.
Kent	1,240	20	1.6	54.7	65.0	90.0	0.0	0.0	10.0	0.0
L Barts	2,959	53	1.8	53.7	52.8	37.7	20.8	32.1	9.4	0.0
L Guys	2,318	38	1.6	50.2	52.6	60.5	5.3	34.2	0.0	0.0
L Kings	1,389	34	2.4	56.0	61.8	51.5	9.1	36.4	3.0	2.9
L Rfree	2,475	6	0.2	49.7	66.7	33.3	16.7	50.0	0.0	0.0
L St.G	878	5	0.6	51.0	80.0	80.0	0.0	20.0	0.0	0.0
L West	3,681	47	1.3	53.0	61.7	31.9	27.7	38.3	2.1	0.0
Leeds	1,906	26	1.4	50.7	65.4	80.8	7.7	3.8	7.7	0.0
Leic	2,820	43	1.5	58.0	81.4	80.0	15.0	5.0	0.0	7.0
Liv UH	1,503	62	4.1	53.5	51.6	94.7	0.0	0.0	5.3	8.1
M RI	2,258	86	3.8							
Middlbr	971	16	1.6	56.7	50.0	81.3	0.0	6.3	12.5	0.0
Newc	1,287	21	1.6	58.5	42.9	100.0	0.0	0.0	0.0	0.0
Norwch	808	9	1.1	56.6	44.4	100.0	0.0	0.0	0.0	0.0
Nottm	1,195	30	2.5	57.3	40.0	90.0	0.0	10.0	0.0	0.0
Oxford	2,132	24	1.1	49.8	50.0	83.3	8.3	4.2	4.2	0.0
Plymth	549	5	0.9	56.6	60.0	100.0	0.0	0.0	0.0	0.0
Ports	2,030	77	3.8	55.6	66.2	90.8	6.2	1.5	1.5	15.6
Prestn	1,436	39	2.7	54.2	61.5	89.2	8.1	2.7	0.0	5.1
Redng	994	17	1.7	54.5	58.8	53.3	26.7	13.3	6.7	11.8
Salford	1,371	31	2.3	57.2	64.5	86.7	0.0	10.0	3.3	3.2
Sheff	1,478	44	3.0	56.8	43.2	86.4	4.5	4.5	4.5	0.0
Shrew	461	44	9.5	60.9	65.9	83.7	4.7	0.0	11.6	2.3
Stevng	1,117	45	4.0	56.3	60.0	68.2	20.5	6.8	4.5	2.2
Stoke	921	35	3.8	56.1	71.4	94.1	0.0	2.9	2.9	2.9
Sund	590	15	2.5	53.0	46.7	100.0	0.0	0.0	0.0	0.0
Truro	468	9	1.9	55.0	55.6	100.0	0.0	0.0	0.0	0.0
Wirral	387	4	1.0	56.0	75.0	100.0	0.0	0.0	0.0	0.0
Wolve	780	43	5.5	53.8	74.4	69.8	16.3	7.0	7.0	0.0

Table 7.3 Continued

Centre	N on KRT	N on HHD	% on HHD	Median age (yrs)	% male	Ethnicity				
						% White	% Asian	% Black	% Other	% missing
York	610	18	3.0	52.5	72.2	94.4	0.0	5.6	0.0	0.0
N IRELAND										
Antrim	311	1	0.3	64.1	100.0	100.0	0.0	0.0	0.0	0.0
Belfast	938	8	0.9	59.4	62.5	100.0	0.0	0.0	0.0	0.0
Newry	277	2	0.7	49.9	50.0	100.0	0.0	0.0	0.0	0.0
Ulster	210	0	0.0							
West NI	357	2	0.6	52.0	0.0	50.0	50.0	0.0	0.0	0.0
SCOTLAND										
Abrdn	608	3	0.5	59.5	0.0					
Airdrie	565	0	0.0							
D&Gall	145	1	0.7	58.3	0.0					
Dundee	384	4	1.0	66.5	75.0					
Edinb	989	8	0.8	56.0	75.0					
Glasgw	1,934	16	0.8	54.2	62.5					
Inverns	310	1	0.3	68.2	100.0					
Klmarnk	394	13	3.3	66.3	76.9					
Krkcldy	288	2	0.7	65.5	50.0					
WALES										
Bangor	218	22	10.1	52.6	68.2	100.0	0.0	0.0	0.0	18.2
Cardff	1,830	44	2.4	59.9	63.6	95.2	2.4	2.4	0.0	4.5
Clwyd	222	9	4.1	55.3	66.7	100.0	0.0	0.0	0.0	22.2
Swanse	901	35	3.9	58.3	57.1	94.1	2.9	2.9	0.0	2.9
Wrexm	327	8	2.4	66.5	37.5	100.0	0.0	0.0	0.0	12.5
TOTALS										
England	61,500	1,272	2.1	55.5	62.0	78.7	8.4	9.6	3.3	2.8
N Ireland	2,093	13	0.6	55.5	53.8	92.3	7.7	0.0	0.0	0.0
Scotland	5,617	48	0.9	60.2	64.6					
Wales	3,498	118	3.4	59.0	61.0	96.3	1.9	1.9	0.0	8.5
UK	**72,708**	**1,451**	**2.0**	**55.9**	**61.9**	**80.4**	**7.8**	**8.8**	**3.0**	**3.3**

Blank cells – no data returned by the centre or data completeness <70%
Breakdown by ethnicity is not shown for centres with <70% data completeness, but these centres were included in national averages
Exeter and Manchester were unable to submit patient level data but provided aggregate numbers of patients on KRT at the end of 2023 by treatment modality
UK ethnicity distribution and completeness does not include Scotland

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 31/12/2023

PRD	N on HHD	% HHD population	Age <65 yrs		Age ≥65 yrs		M/F ratio
			N	%	N	%	
Diabetes	189	14.6	137	13.9	52	16.8	1.4
Glomerulonephritis	328	25.4	269	27.3	59	19.1	2.2
Hypertension	86	6.7	57	5.8	29	9.4	2.9
Polycystic kidney disease	133	10.3	98	10.0	35	11.3	1.1
Pyelonephritis	112	8.7	83	8.4	29	9.4	1.2
Renal vascular disease	13	1.0	6	0.6	7	2.3	1.2
Other	250	19.3	194	19.7	56	18.1	1.4
Uncertain aetiology	182	14.1	140	14.2	42	13.6	1.7
Total (with data)	**1,293**	**100.0**	**984**	**100.0**	**309**	**100.0**	
Missing	55	4.1	42	4.1	13	4.0	2.1

Biochemistry parameters in prevalent adult HHD patients

The UK Kidney 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 31/12/2023 by centre

Centre	Median adj Ca (mmoI/L)	% adj Ca 2.2-2.5 mmoI/L	% adj Ca >2.5 mmoI/L	% data completeness
ENGLAND				
Bham	2.3	82.3	4.8	100.0
Bradfd				100.0
Brightn	2.4	78.8	6.1	100.0
Bristol				100.0
Camb	2.25	45.0	25.0	100.0
Carlis				100.0
Carsh	2.3	78.3	8.7	95.8
Colchr				
Covnt	2.4	54.6	36.4	78.6
Derby	2.4	84.8	6.8	100.0
Donc				100.0
Dorset	2.2	84.6	0.0	100.0
Dudley	2.4	81.8	18.2	100.0
EssexMS	2.4	62.5	31.3	94.1
Exeter				
Glouc				100.0
Hull	2.3	70.6	11.8	100.0
Ipswi				
Kent	2.3	75.0	10.0	100.0
L Barts	2.3	75.5	11.3	100.0
L Guys	2.3	69.7	18.2	86.8
L Kings	2.3	76.5	8.8	100.0
L Rfree				100.0
L St.G				100.0
L West				53.2
Leeds	2.3	73.1	7.7	100.0
Leic	2.3	74.4	9.3	100.0
Liv UH	2.4	72.4	22.4	100.0
M RI				
Middlbr	2.2	62.5	0.0	100.0

Table 7.5 Continued

Centre	Median adj Ca (mmoI/L)	% adj Ca 2.2-2.5 mmoI/L	% adj Ca >2.5 mmoI/L	% data completeness
Newc	2.4	76.2	23.8	100.0
Norwch				88.9
Nottm	2.45	76.7	23.3	100.0
Oxford	2.25	54.2	16.7	100.0
Plymth				100.0
Ports	2.4	83.6	9.6	98.7
Prestn	2.3	71.8	23.1	100.0
Redng	2.3	100.0	0.0	100.0
Salford	2.5	48.3	41.4	100.0
Sheff	2.3	76.7	4.7	97.7
Shrew	2.3	71.8	20.5	100.0
Stoke	2.5	91.4	8.6	100.0
Sund	2.3	60.0	20.0	100.0
Truro				100.0
Wirral				75.0
Wolve	2.4	76.7	18.6	100.0
York	2.3	77.8	0.0	100.0
N IRELAND				
Antrim				100.0
Belfast				100.0
Newry				100.0
Ulster				
West NI				100.0
WALES				
Bangor	2.4	77.3	9.1	100.0
Cardff	2.4	86.4	9.1	100.0
Clwyd				100.0
Swanse	2.4	88.2	8.8	100.0
Wrexm				100.0
TOTALS				
England	2.3	74.3	14.1	96.9
N Ireland	2.4	76.9	0.0	100.0
Wales	2.4	83.6	10.3	100.0
E, W & NI	**2.4**	**75.2**	**13.6**	**97.2**

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

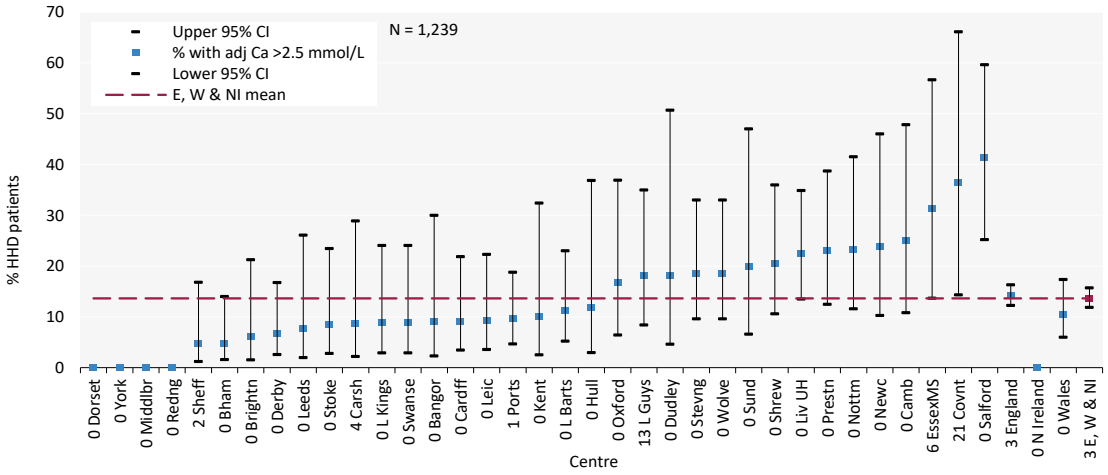

Figure 7.3 Percentage of adult patients prevalent to HHD on 31/12/2023 with adjusted calcium (Ca) above the target range (>2.5 mmol/L) by centre
CI – confidence interval

Table 7.6 Median pre-dialysis potassium and bicarbonate and percentage attaining target ranges in adult patients prevalent to HHD on 31/12/2023 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										
Bham					40.3					61.3
Bradfd					100.0					100.0
Brightn					0.0	27	0.0	45.2	54.8	93.9
Bristol					100.0					100.0
Camb	5.0	5.0	90.0	5.0	100.0	25.5	0.0	60.0	40.0	100.0
Carlis					0.0					100.0
Carsh					0.0					0.0
Colchr										
Covnt					0.0	27	0.0	45.5	54.6	78.6
Derby	4.4	25.4	74.6	0.0	100.0	24	1.7	89.8	8.5	100.0
Donc					100.0					100.0
Dorset	4.9	0.0	92.3	7.7	100.0	24	0.0	100.0	0.0	100.0
Dudley	5.4	0.0	72.7	27.3	100.0	26	0.0	54.6	45.5	100.0
EssexMS	5.3	11.8	88.2	0.0	100.0	26.5	0.0	50.0	50.0	94.1
Exeter										
Glouc					0.0					100.0
Hull	5.2	5.9	76.5	17.7	100.0	24	0.0	94.1	5.9	100.0
Ipswi										
Kent	4.3	45.0	55.0	0.0	100.0	23.5	0.0	85.0	15.0	100.0
L Barts	5.2	7.6	75.5	17.0	100.0	23	1.9	86.8	11.3	100.0
L Guys	4.6	11.1	88.9	0.0	94.7	26	0.0	56.3	43.8	84.2
L Kings					0.0	20	5.9	94.1	0.0	100.0
L Rfree					100.0					66.7
L St.G					0.0					0.0
L West					0.0					29.8
Leeds	5.4	0.0	80.8	19.2	100.0	23.5	0.0	84.6	15.4	100.0
Leic	5.4	9.3	76.7	14.0	100.0	24	0.0	81.4	18.6	100.0
Liv UH					0.0	24.5	1.7	72.4	25.9	100.0
M RI										
Middlbr	5.1	6.3	81.3	12.5	100.0	30	0.0	12.5	87.5	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 completeness	Median (mmoI/L)	% <18 mmol/L	% 18–26 mmol/L	% >26 mmol/L	% data completeness
Newc					0.0	23	0.0	90.5	9.5	100.0
Norwch					88.9					88.9
Nottm	4.8	20.0	76.7	3.3	100.0					36.7
Oxford	5.1	12.5	79.2	8.3	100.0	23.5	8.3	75.0	16.7	100.0
Plymth					100.0					100.0
Ports	4.6	16.4	78.1	5.5	98.7	24	1.5	77.9	20.6	91.9
Prestn	5.2	5.1	84.6	10.3	100.0	24.5	5.3	71.1	23.7	97.4
Redng	4.8	0.0	100.0	0.0	100.0	24	0.0	88.2	11.8	100.0
Salford	5.2	10.3	82.8	6.9	100.0	25	3.9	65.4	30.8	89.7
Sheff	5.0	4.7	88.4	7.0	97.7	24	2.3	72.1	25.6	97.7
Shrew					0.0	22	7.7	89.7	2.6	100.0
Sthend										
Stoke					0.0	27	2.9	42.9	54.3	100.0
Sund					0.0	24	0.0	100.0	0.0	100.0
Truro					100.0					100.0
Wirral					0.0					100.0
Wolve	4.9	9.3	90.7	0.0	100.0	21	11.6	83.7	4.7	100.0
York	5.8	11.1	66.7	22.2	100.0	22	5.6	77.8	16.7	100.0
N IRELAND										
Antrim					100.0					100.0
Belfast					100.0					100.0
Newry					100.0					100.0
Ulster										
West NI					100.0					100.0
WALES										
Bangor	4.6	18.2	77.3	4.6	100.0	26	4.6	54.6	40.9	100.0
Cardff	5.0	4.6	88.6	6.8	100.0	23	4.6	81.8	13.6	100.0
Clwyd					100.0					100.0
Swanse	5.0	0.0	94.1	5.9	100.0	23	0.0	94.1	5.9	100.0
Wrexm					100.0					100.0
TOTALS										
England	5.0	11.9	79.8	8.3	63.1	24	3.0	74.6	22.5	88.6
N Ireland	5.3	0.0	84.6	15.4	100.0	21	0.0	92.3	7.7	100.0
Wales	5.0	6.9	86.2	6.9	100.0	24	3.5	80.2	16.4	100.0
E, W & NI	**5.0**	**11.0**	**80.8**	**8.2**	**66.8**	**24**	**3.0**	**75.4**	**21.7**	**89.7**

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

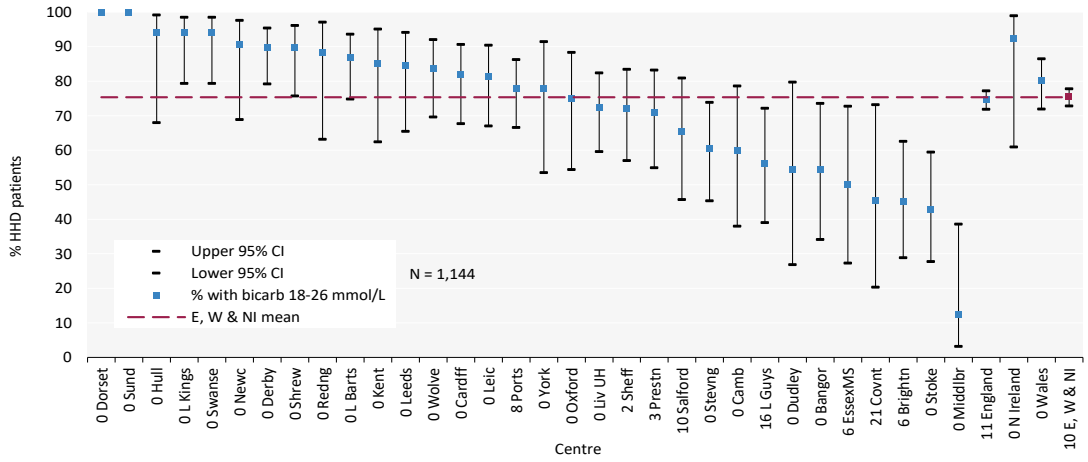

Figure 7.4 Percentage of adult patients prevalent to HHD on 31/12/2023 with pre-dialysis bicarbonate (bicarb) within the target range (18-26 mmol/L) by centre

CI – confidence interval

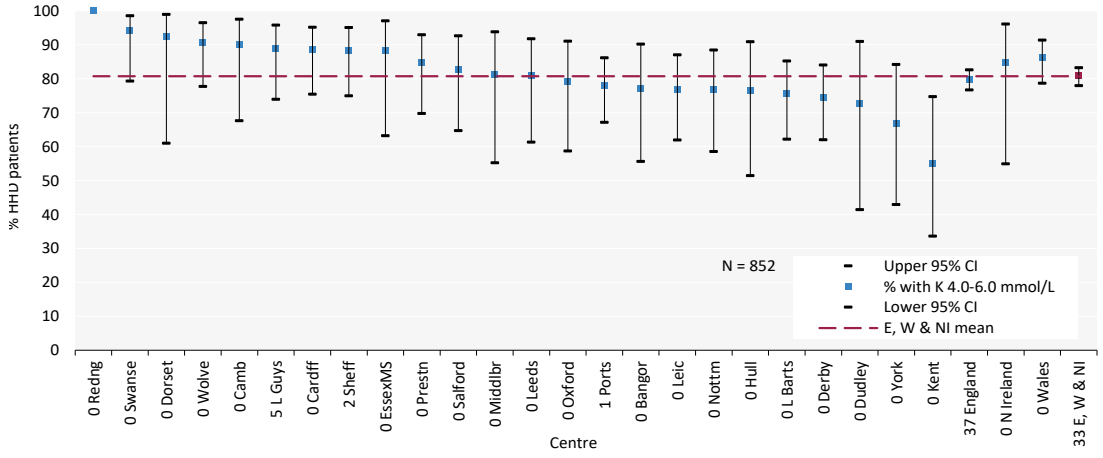

Figure 7.5 Percentage of adult patients prevalent to HHD on 31/12/2023 with pre-dialysis potassium (K) within the target range (4.0-6.0 mmol/L) by centre

CI – confidence interval

Anaemia in prevalent adult HHD patients

UK Kidney Association anaemia guidelines recommend a target haemoglobin of 100-120 g/L. Data are presented in table 7.7 regarding target and median haemoglobin and ferritin levels attained.

Table 7.7 Median haemoglobin and ferritin and percentage attaining target ranges in adult patients prevalent to HHD on 31/12/2023 by centre

	Haemoglobin				Ferritin		
Centre	Median (g/L)	% <100 g/L	% >120 g/L	% data completeness	Median (µg/L)	% <200 µg/L	% data completeness
ENGLAND							
Bham	111	22.6	22.6	100.0	478	16.1	100.0
Bradfd				100.0			100.0
Brightn	110	18.2	12.1	100.0	245	45.5	100.0
Bristol				100.0			100.0
Camb				15.0			15.0
Carlis				100.0			100.0
Carsh	112	26.1	21.7	95.8	430	21.7	95.8
Colchr							
Covnt	110	9.1	9.1	78.6	240	27.3	78.6
Derby	116	15.3	32.2	100.0	422	8.6	98.3
Donc				100.0			100.0
Dorset	109	23.1	15.4	100.0	367	15.4	100.0
Dudley	105	18.2	9.1	100.0	251	45.5	100.0
EssexMS	112	17.6	29.4	100.0	232	35.3	100.0
Exeter							
Glouc				100.0			100.0
Hull	109	23.5	17.6	100.0	831	0.0	100.0
Ipswi							
Kent	109	25.0	20.0	100.0	342	35.0	100.0
L Barts	108	18.9	17.0	100.0	583	17.0	100.0
L Guys	104	33.3	18.2	86.8	375	28.1	84.2
L Kings	112	2.9	17.6	100.0	534	8.8	100.0
L Rfree				100.0			100.0
L St.G				100.0			100.0
L West				55.3			59.6
Leeds	109	30.8	23.1	100.0	144	65.4	100.0
Leic	111	32.6	30.2	100.0	336	23.3	100.0
Liv UH	108	27.6	25.9	100.0	350	20.7	100.0
M RI							
Middlbr	108	25.0	12.5	100.0	1057	6.3	100.0
Newc	111	28.6	38.1	100.0	536	4.8	100.0
Norwch				88.9			88.9
Nottm	107	23.3	20.0	100.0	328	26.7	100.0
Oxford	109	33.3	25.0	100.0	546	13.0	95.8
Plymth				100.0			100.0
Ports	107	30.1	23.3	98.7	242	38.0	96.0
Prestn	112	30.8	28.2	100.0	345	43.2	94.9
Redng	113	23.5	23.5	100.0	317	23.5	100.0
Salford	105	24.1	20.7	100.0	205	44.8	100.0
Sheff	110	39.5	20.9	97.7	411	16.3	97.7
Shrew	107	28.2	15.4	100.0	336	17.9	100.0
Stevng	107	23.3	18.6	100.0	482	9.3	100.0
Stoke	116	11.4	40.0	100.0	311	25.7	100.0
Sund	109	26.7	20.0	100.0	125	73.3	100.0
Truro				100.0			88.9
Wirral				100.0			100.0
Wolve	106	32.6	16.3	100.0	312	39.5	100.0

Table 7.7 Continued

Centre	Haemoglobin				Ferritin		
	Median (g/L)	% <100 g/L	% >120 g/L	% data completeness	Median (µg/L)	% <200 µg/L	% data completeness
York	106	38.9	11.1	100.0	243	27.8	100.0
N IRELAND							
Antrim				100.0			100.0
Belfast				100.0			100.0
Newry				100.0			100.0
Ulster							
West NI				100.0			100.0
SCOTLAND							
Abrdn				100.0			
Airdrie							
D&Gall				100.0			
Dundee				100.0			
Edinb				100.0			
Glasgw	116	20.0	33.3	93.8			
Inverns				100.0			
Klmarnk	107	38.5	0.0	100.0			
Krkcldy				100.0			
WALES							
Bangor	113	18.2	36.4	100.0	443	13.6	100.0
Cardff	108	25.0	4.5	100.0	221	44.2	97.7
Clwyd				100.0			100.0
Swanse	111	14.7	17.6	100.0	406	23.5	100.0
Wrexm				100.0			100.0
TOTALS							
England	109	25.5	21.7	95.6	372	26.1	95.1
N Ireland	109	46.2	15.4	100.0	267	46.2	100.0
Scotland	110	27.7	23.4	97.9			
Wales	109	22.4	15.5	100.0	366	31.3	99.1
UK	**109**	**25.6**	**21.1**	**96.2**	**371**	**26.8**	**95.5**

Blank cells – no data returned by the centre or <10 patients in the centre or data completeness <70%
UK National average for ferritin does not include Scotland

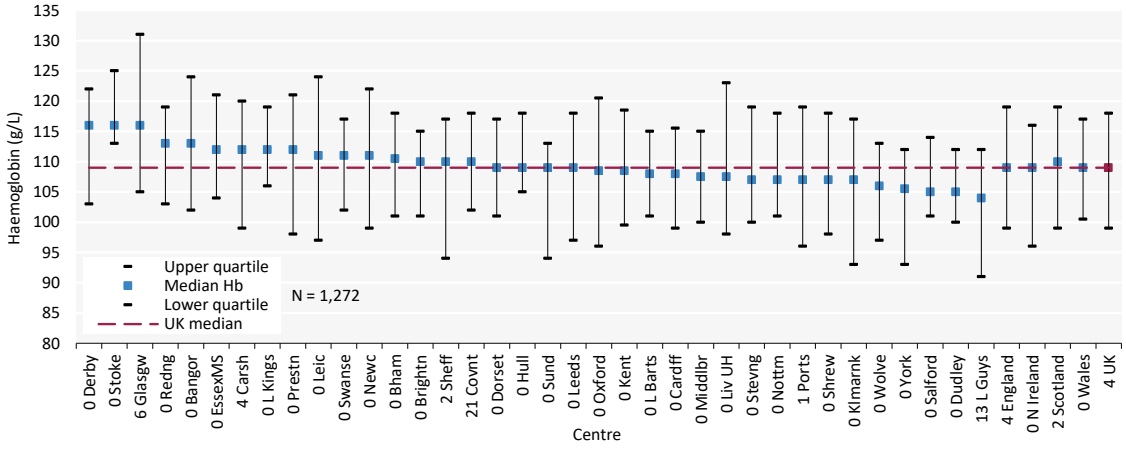

Figure 7.6 Median haemoglobin (Hb) in adult patients prevalent to HHD on 31/12/2023 by centre

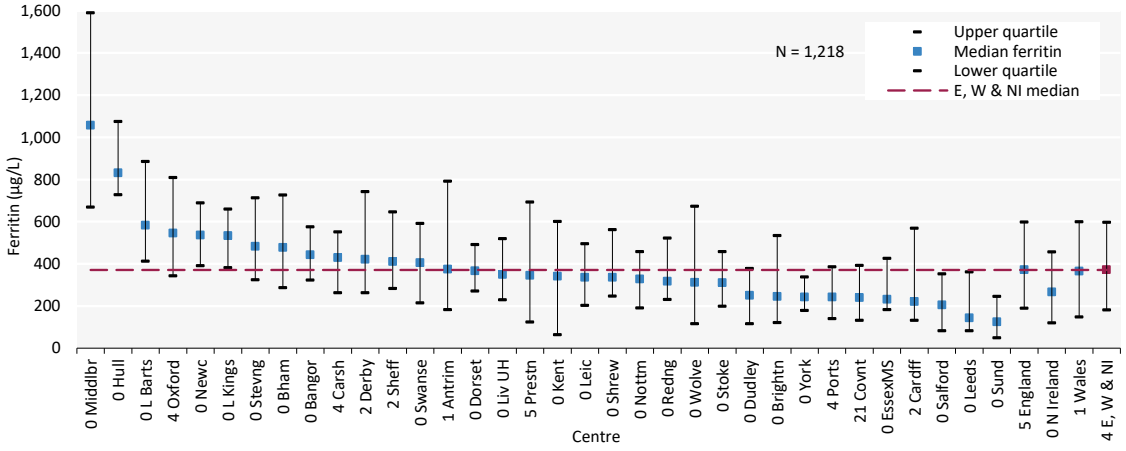

Figure 7.7 Median ferritin in adult patients prevalent to HHD on 31/12/2023 by centre

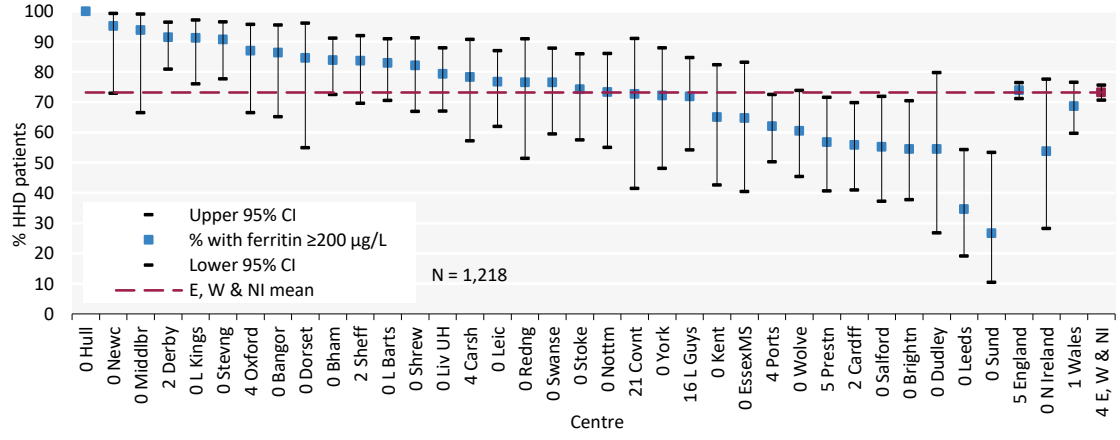

Figure 7.8 Percentage of adult patients prevalent to HHD on 31/12/2023 with ferritin ≥200 µg/L by centre
CI – confidence interval

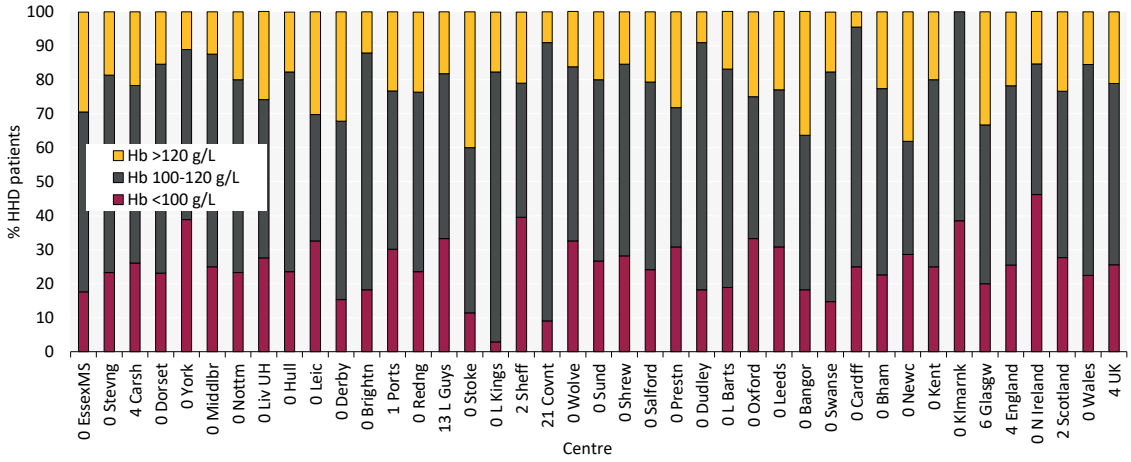

Figure 7.9 Distribution of haemoglobin (Hb) in adult patients prevalent to HHD on 31/12/2023 by centre

Cause of death in adult HHD patients

Cause of death was analysed in prevalent patients receiving HHD on 31/12/2022 and followed-up for one year in 2023. 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. Where the cause of death was missing in the UKRR data, cause of death from Civil Registration records was used. Further detail on the survival of prevalent KRT patients is in chapter 3.

Table 7.8 Cause of death in adult patients prevalent to HHD on 31/12/2022 followed-up in 2023 by age group

	HHD all ages		HHD < 65 years	HHD ≥ 65 years
Cause of death	*N*	%	%	%
Cardiac disease	27	22.0	27.3	15.8
Cerebrovascular disease	6	4.9	6.1	3.5
Infection	20	16.3	15.2	17.5
Malignancy	7	5.7	3.0	8.8
Treatment withdrawal	12	9.8	7.6	12.3
Other	37	30.1	28.8	31.6
Uncertain aetiology	14	11.4	12.1	10.5
Total (with data)	**123**	**100.0**	**100.0**	**100.0**
Missing	7	5.4	5.7	5.0

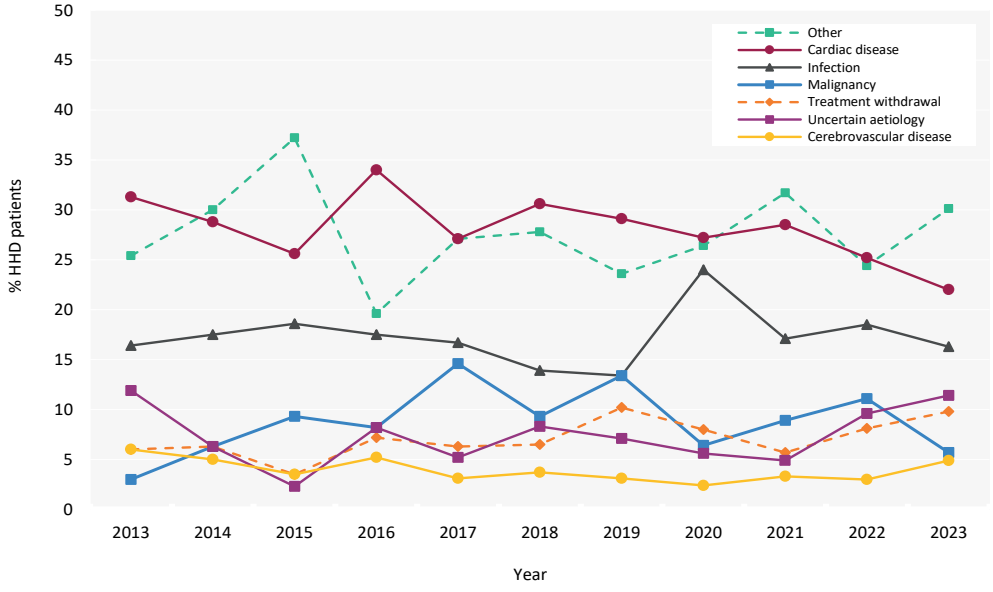

Figure 7.10 Cause of death between 2013 and 2023 for adult patients prevalent to HHD at the beginning of the year

UK Kidney Association
UK Renal Registry

Chapter 8

Children and young people with chronic kidney disease (CKD) and on kidney replacement therapy (KRT) for end-stage kidney disease (ESKD) in the UK in 2023

Contents

Introduction

This chapter describes the population of children and young people aged <18 years with end-stage kidney disease (ESKD) who were on kidney replacement therapy (KRT) in the UK for at least 90 days in 2023 (figure 8.1). This included patients with a kidney 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 recovered within the first 90 days of KRT were excluded from the analyses. For the first time, this report includes a dedicated section on children and young people (<18 years) with chronic kidney disease, outside the context of KRT or AKI. The content of this section is expected to evolve as data submission and completeness become more complete.

There are 13 paediatric kidney 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.

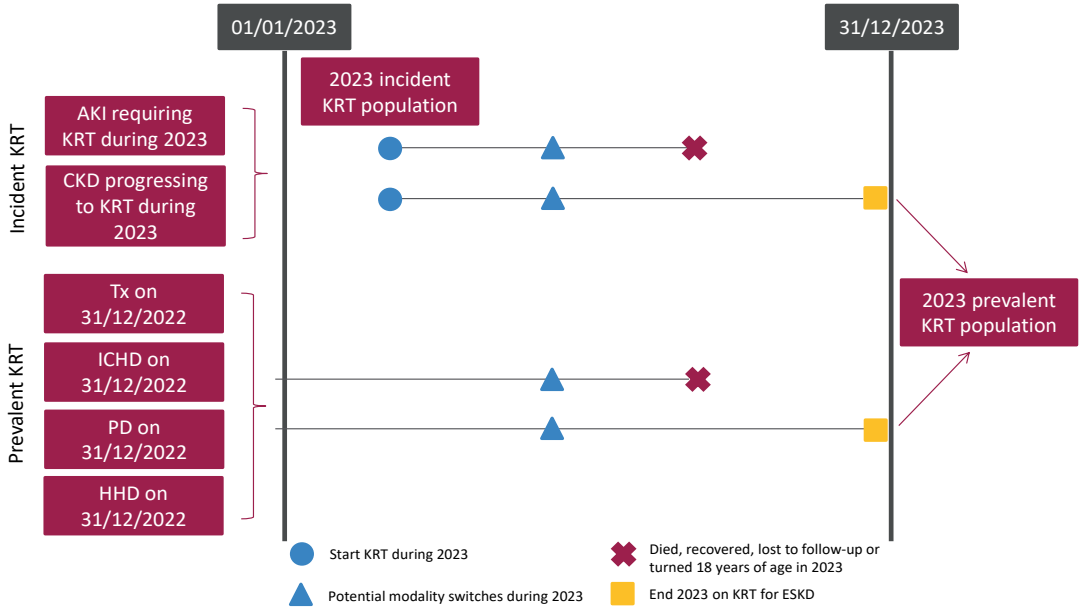

Figure 8.1 Pathways children and young people could follow to be included in the UK 2023 incident and/or prevalent KRT populations

Note that patients who recovered kidney function before 90 days on dialysis are not included in the KRT population
CKD – chronic kidney disease

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

- **Incident population:** patients who started KRT during 2023 and remained on KRT for at least 90 days.
- **Prevalent population:** patients who were on KRT at the end of 2023 and still under the care of a paediatric kidney centre.
- **Five-year populations:** patients who started KRT and remained on KRT for at least 90 days in the periods 2009-2013, 2014-2018 and 2019-2023.

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

- **Incident population:** patients who started KRT during 2023 in either an adult or paediatric centre and remained on KRT for at least 90 days.
- **Prevalent population:** patients who were on KRT at the end of 2023 in either an adult or paediatric centre.

This chapter addresses the following key aspects of the care of children incident to or on KRT 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 KRT:** these include anaemia and mineral and bone disorders.

The sections for these aspects (and tables 8.3 and 8.4) use a restricted prevalent cohort. Children who have moved centre, or changed or started treatment in the quarter are not included for consistency of measurements.

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 KRT:** 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.

For children and young people aged <18 years with CKD not on KRT, the following population is included in the chapter:

A 2023 prevalent CKD population is described, comprising individuals who:

- were reported by a paediatric kidney centre as receiving treatment for CKD at the end of 2023, and
- had an eGFR of <30mL/min/1.73m2 on their last recorded creatinine measurement.

Individuals are categorised as having CKD stage G5 (estimated glomerular filtration rate [eGFR] <15 mL/min/1.73m2) or CKD stage G4 (eGFR 15–29 mL/min/1.73m2). Further categorisation, e.g. by eGFR trend or albuminuria is not possible using UK Renal Registry (UKRR) data.

Possible pathways that a child could follow to be included in the 2023 prevalent CKD children population can be seen in figure 1.1 of Chapter 1 on the adult CKD population.

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, particularly those with earlier stages, may receive care outside specialist kidney centres and are therefore not captured here. In addition, not all paediatric kidney centres are currently submitting CKD data to the UKRR.

Rationale for analyses

For both the children and young people sections, the analyses begin with a description of the 2023 incident and prevalent KRT populations, including the number on KRT 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 KRT and, where data permit, their attainment by UK paediatric kidney centres in 2023 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 KRT incidence and prevalence that are reported in this chapter

Audit guideline	Audit criteria	Related analysis/analyses
The UK Kidney Association: Treatment of adults and children with kidney 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 8.15–8.16, 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 8.18
	Serum bicarbonate concentrations should be 20–26 mmol/L	Table 8.18
	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 8.18
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 8.3-8.4, 8.16

Detail about the completeness of data returned to the UKRR is available through the UKRR data portal (ukkidney.org/audit-research/data-portals). 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. A patient first seen by kidney services within 90 days of starting KRT for ESKD is defined as a 'late presentation'. In this report 'late presentation' is used interchangeably with 'late referral'.

Key findings

Children

- In 2023, 118 patients aged under 16 years commenced KRT for ESKD in the UK, an increase from 109 patients in 2022. This corresponds to an incidence rate of 9.5 pmarp up from 8.8 pmarp in 2022.
- 861 patients aged under 16 years were receiving KRT at UK paediatric kidney centres on 31/12/2023, a number similar to 2022. The prevalence was 69.0 pmarp, with 77.6% having a functioning transplant (52.5% from living donors and 25.1% from deceased donors), 11.5% on haemodialysis, and 10.8% on peritoneal dialysis.
- Tubulointerstitial disease accounted for approximately 50% of all primary renal diseases (PRDs) in prevalent paediatric patients, with a high male:female ratio (3:1).
- At the time of transfer to adult services, 81.5% of paediatric patients had a functioning kidney Tx.
- The median height z-score for children on dialysis was -1.8 compared with -1.0 for those with a functioning Tx.
- The median weight z-score for children on dialysis was -1.1 compared with -0.2 for those with a functioning Tx.
- The median eGFR of children with a kidney transplant on 31/12/2023 was 61 mL/min/1.73m^2 and 7.8% had eGFR <30 mL/min/1.73m^2.
- Of those with complete data, 71.1% of the prevalent paediatric KRT population had 1 or more risk factors for cardiovascular disease; 4.4% had 3 risk factors.
- 53.9% and 61.1% of prevalent HD patients achieved systolic blood pressure (SBP) and diastolic blood pressure (DBP) values <90th percentile, respectively.
- 77.8% and 90.9% of prevalent PD patients achieved SBP and DBP values <90th percentile, respectively.
- 83.7% and 82.6% of prevalent Tx patients achieved SBP and DBP values <90th percentile, respectively.

Young people

- In 2023, 24 patients aged 16 to <18 years started KRT for ESKD in the UK, corresponding to an incidence rate of 15.1 pmarp.
- In young people (16–18 years), KRT prevalence was 141.6 pmarp , with 225 patients receiving KRT (excluding Manchester Children's Hospital), 80.4% of whom were managed in paediatric kidney centres.
- Tubulointerstital disease accounted for 44.1% of all PRDs in prevalent young people, followed by familial/hereditary nephropathies (15.6%) and glomerular disease (13.7%).
- The overall median eGFR of young people with a kidney transplant on 31/12/2023 was 67 mL/min/1.73m^2 and 4.8% had an eGFR of <30 mL/min/1.73m^2.
- 47.4% of young people on dialysis and 69.1% of those transplanted had a blood pressure in the 'normal' range (<130/80 mmHg).

CKD

- In 2023, 173 patients aged under 18 years had CKD 4/5 stage across six paediatric centres, with a crude prevalence rate of 20.1 pmarp with majority (74%) classified as CKD stage 4. The median age was 9.9 years (Interquartile range (IQR) 6.0 - 14.1) and 67.6% were male.

Analyses – children

Changes to the prevalent paediatric KRT population

For the 13 paediatric kidney centres, the number of prevalent children on KRT was calculated as a proportion of the estimated centre catchment population (calculated as detailed in appendix A).

Table 8.2 Number of prevalent paediatric KRT patients by year and by centre; number of KRT patients as a proportion of the catchment population

	N on KRT					Estimated catchment population <16 (millions)	2023 crude rate (pmarp)
Centre	2019	2020	2021	2022	2023		
Bham_P	87	105	98	103	94	1.23	77
Blfst_P	29	27	25	25	22	0.39	56
Brstl_P	53	49	52	48	45	0.91	49
Cardf_P	30	29	28	26	29	0.39	75
Glasg_P	54	58	56	58	54	0.90	60
L Eve_P	77	80	82	83	79	1.55	51
L GOSH_P	150	157	157	158	169	2.56	66
Leeds_P	56	57	59	58	59	0.79	75
Livpl_P	30	39	42	47	54	0.59	92
Manch_P	87	87	86	82	96	0.94	102
Newc_P	37	35	34	30	31	0.53	59
Nottm_P	73	85	83	79	83	1.25	66
Soton_P	30	34	44	45	46	0.46	101
UK	**793**	**842**	**846**	**842**	**861**	**12.48**	**69**

pmarp – per million age-related population

Manch_P was unable to provide data for 2023 but did provide a total prevalent number for <16s. This has been used in this table but not elsewhere in this chapter (except where noted)

Data completeness for prevalent paediatric KRT patients

Data returns of key variables for Tx and dialysis patients <16 years old at the end of 2023 are shown in tables 8.3 and 8.4, respectively, with further detail available through the UKRR data portal (ukkidney.org/audit-research/data-portals).

Table 8.3 Data completeness for paediatric patients (<16 years old) prevalent to Tx on 31/12/2023 by centre

Centre	N with Tx	Data completeness (%)											
		Height	Weight	BMI	SBP	DBP	Hb	Creat	Chol	Bicarb	PTH	Ca	Phos
Bham_P	71	25.4	28.2	25.4	28.2	28.2	100.0	100.0	97.2	100.0	98.6	100.0	100.0
Blfst_P	20	5.0	5.0	5.0	0.0	0.0	100.0	100.0	60.0	100.0	90.0	100.0	100.0
Brstl_P	36	0.0	97.2	0.0	97.2	80.6	97.2	94.4	16.7	94.4	75.0	94.4	94.4
Cardf_P	23	82.6	82.6	82.6	82.6	8.7	87.0	87.0	8.7	87.0	21.7	87.0	87.0
Glasg_P	45	100.0	100.0	100.0	97.8	97.8	100.0	100.0	22.2	100.0	84.4	100.0	100.0
L Eve_P	60	1.7	96.7	0.0	96.7	96.7	96.7	96.7	35.0	96.7	95.0	96.7	96.7
L GOSH_P	125	24.0	26.4	24.0	14.4	14.4	99.2	99.2	78.4	2.4	92.8	0.0	99.2
Leeds_P	44	75.0	100.0	75.0	100.0	43.2	100.0	100.0	95.5	100.0	100.0	100.0	100.0
Livpl_P	35	0.0	0.0	0.0	2.9	0.0	97.1	97.1	54.3	97.1	94.3	97.1	97.1
Newc_P	23	0.0	0.0	0.0	100.0	0.0	100.0	100.0	87.0	100.0	87.0	100.0	100.0
Nottm_P	51	92.2	94.1	92.2	92.2	92.2	100.0	98.0	72.6	98.0	90.2	98.0	98.0
Soton_P	39	100.0	100.0	100.0	76.9	61.5	94.9	94.9	41.0	94.9	92.3	94.9	94.9
UK	**572**	**40.7**	**59.8**	**40.6**	**59.3**	**45.6**	**98.3**	**97.9**	**61.5**	**76.8**	**89.2**	**76.2**	**97.9**

Bicarb – bicarbonate; BMI – body mass index; Ca – calcium; Chol – cholesterol; Creat – creatinine; DBP – diastolic blood pressure; Hb – haemoglobin; Phos – phosphate; PTH – parathyroid hormone; SBP – systolic blood pressure
Children who have moved centre, or changed or started treatment in the quarter are not included

Table 8.4 Data completeness for paediatric patients (<16 years old) prevalent to dialysis on 31/12/2023 by centre

Centre	N on dialysis	Data completeness (%)										
		Height	Weight	BMI	SBP	DBP	Hb	Chol	Bicarb	PTH	Ca	Phos
Bham_P	18	11.1	27.8	11.1	16.7	11.1	83.3	83.3	83.3	83.3	83.3	83.3
Blfst_P	1	0.0	0.0	0.0	0.0	0.0	100.0	100.0	100.0	100.0	100.0	100.0
Brstl_P	4	0.0	100.0	0.0	100.0	75.0	100.0	25.0	100.0	100.0	100.0	100.0
Cardf_P	6	83.3	83.3	83.3	33.3	0.0	100.0	66.7	100.0	100.0	100.0	100.0
Glasg_P	8	100.0	100.0	100.0	100.0	75.0	100.0	62.5	100.0	100.0	100.0	100.0
L Eve_P	15	0.0	86.7	0.0	86.7	86.7	86.7	66.7	86.7	80.0	86.7	86.7
L GOSH_P	28	46.4	71.4	42.9	64.3	64.3	100.0	42.9	7.1	100.0	0.0	100.0
Leeds_P	13	61.5	61.5	46.2	23.1	23.1	100.0	76.9	100.0	100.0	100.0	100.0
Livpl_P	17	0.0	0.0	0.0	0.0	0.0	100.0	41.2	100.0	94.1	100.0	100.0
Newc_P	6	0.0	0.0	0.0	83.3	0.0	100.0	16.7	100.0	100.0	100.0	100.0
Nottm_P	27	92.6	92.6	92.6	92.6	63.0	96.3	85.2	96.3	96.3	96.3	96.3
Soton_P	4	100.0	100.0	100.0	100.0	75.0	100.0	75.0	100.0	100.0	100.0	100.0
UK	**147**	**44.2**	**62.6**	**42.2**	**57.8**	**44.2**	**95.9**	**62.6**	**78.2**	**94.6**	**76.9**	**95.9**

Bicarb – bicarbonate; BMI – body mass index; Ca – calcium; Chol – cholesterol; Creat – creatinine; DBP – diastolic blood pressure; Hb – haemoglobin; Phos – phosphate; PTH – parathyroid hormone; SBP – systolic blood pressure
Children who have moved centre, or changed or started treatment in the quarter are not included

Changes to the incident paediatric KRT population

The number of incident patients on KRT <16 years old was used to calculate age-related rates per million population and were grouped by age, sex, five year time period, ethnicity, centre and PRD.

Table 8.5 Paediatric patients (<16 years old) incident to KRT in 2023 by age and sex

	All patients		Male		Female	
Age group (yrs)	N	pmarp	N	pmarp	N	pmarp
0-<2	20	14.5	13	18.4	7	10.4
2-<4	9	6.2	7	9.5	2	2.8
4-<8	14	4.5	10	6.3	4	2.7
8-<12	24	7.4	13	7.8	11	6.9
12-<16	39	11.7	18	10.6	21	12.9
<16 yrs	**106**	**8.5**	**61**	**9.5**	**45**	**7.4**

pmarp – per million age-related population

Including Manch_P the overall N was 118 and pmarp 9.5

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

	2009-2013		2014-2018		2019-2023	
Age group (yrs)	N	pmarp	N	pmarp	N	pmarp
0-<2	102	12.8	113	14.4	86	12.5
2-<4	65	8.3	70	8.7	52	7.2
4-<8	89	6.1	127	7.7	76	4.9
8-<12	119	8.6	131	8.5	152	9.4
12-<16	188	12.5	178	12.6	190	12.0
<16 yrs	**563**	**9.5**	**619**	**10.0**	**556**	**9.0**

pmarp – per million age-related population

Including Manch_P the overall N for 2019-2023 was 568 and pmarp 9.2

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

	2009-2013		2014-2018		2019-2023	
Ethnicity	N	%	N	%	N	%
White	395	70.7	425	69.0	352	66.4
Asian	103	18.4	118	19.2	108	20.4
Black	23	4.1	37	6.0	33	6.2
Other	38	6.8	36	5.8	37	7.0
<16 yrs	**559**	**100.0**	**616**	**100.0**	**530**	**100.0**

4 children in 2009-2013, 3 in 2014-2018 and 26 in 2019-2023 with no ethnicity recorded were excluded

Table 8.8 Paediatric patients (<16 years old) incident to KRT by centre and 5 year time period

	2009-2013		2014-2018		2019-2023	
Centre	N	%	N	%	N	%
Bham_P	63	11.2	81	13.1	65	11.4
Blfst_P	25	4.4	13	2.1	8	1.4
Brstl_P	36	6.4	31	5.0	24	4.2
Cardf_P	16	2.8	26	4.2	18	3.2
Glasg_P	35	6.2	48	7.8	33	5.8
L Eve_P	60	10.7	68	11.0	61	10.7
L GOSH_P	115	20.4	87	14.1	120	21.1
Leeds_P	43	7.6	46	7.4	38	6.7
Livpl_P	19	3.4	36	5.8	43	7.6
Manch_P	60	10.7	70	11.3	52	9.2
Newc_P	17	3.0	37	6.0	15	2.6
Nottm_P	55	9.8	52	8.4	61	10.7
Soton_P	19	3.4	24	3.9	30	5.3
<16 yrs	**563**	**100.0**	**619**	**100.0**	**568**	**100.0**

Manch_P was unable to provide data for 2023 but did provide a total incident number for <16s. This has been used in this table but not elsewhere in this chapter (except where noted)

PRDs were grouped into categories as shown in table 8.9, with the mapping of disease codes into groups explained in more detail in appendix A.

Table 8.9 Paediatric patients (<16 years old) incident to KRT by primary renal disease (PRD) and 5 year time period

	2009-2013		2014-2018		2019-2023	
PRD	N	%	N	%	N	%
Tubulointerstitial disease	274	49.1	307	49.7	197	41.8
- CAKUT	267	47.8	296	47.9	186	39.5
- Non-CAKUT	7	1.3	11	1.8	11	2.3
Glomerular disease	67	12.0	103	16.7	96	20.4
Familial/hereditary nephropathies	109	19.5	93	15.0	84	17.8
Systemic diseases affecting the kidney	29	5.2	22	3.6	18	3.8
Miscellaneous renal disorders	79	14.2	93	15.0	76	16.1

5 children in 2009-2013, 1 in 2014-2018 and 85 in 2019-2023 with no PRD recorded were excluded
CAKUT – congenital anomalies of the kidneys and urinary tract

Start modality of incident paediatric KRT patients

Start modality used by patients <16 years old starting KRT between 2009 and 2023 was grouped by five year time periods.

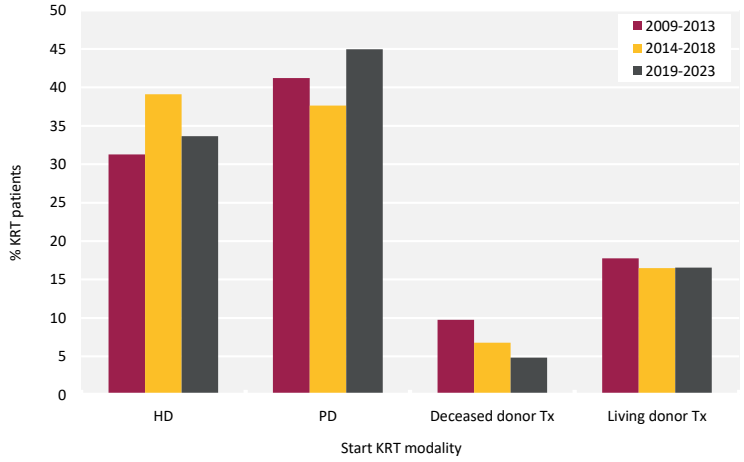

Figure 8.2 Start KRT modality for paediatric patients (<16 years old) incident to KRT by 5 year time period

Pre-emptive transplantation in incident paediatric KRT patients

The analysis of pre-emptive transplantation excluded patients starting KRT aged <3 months and patients known to have presented late.

Table 8.10 Pre-emptive transplantation in the incident paediatric KRT population aged 3 months to 16 years by 5 year time period, sex, ethnicity, age at start of KRT and primary renal disease (PRD)

	N on KRT	N (%) with pre-emptive Tx
Total cohort analysed (2009-2023)	1,311	412 (31.4)
Time period		
2009-2013	409	154 (37.7)
2014-2018	461	140 (30.4)
2019-2023	441	118 (26.8)
Sex		
Male	832	285 (34.3)
Female	479	127 (26.5)
Ethnicity		
White	883	324 (36.7)
Asian	257	46 (17.9)
Black	65	13 (20.0)
Other	82	22 (26.8)
Age at start of RRT (yrs)		
3 mths-<2	163	6 (3.7)
2-<4	163	51 (31.3)
4-<8	237	101 (42.6)
8-<12	318	103 (32.4)
12-<16	430	151 (35.1)
PRD		
Tubulointerstitial disease	646	274 (42.4)
Glomerular disease	190	8 (4.2)
Familial/hereditary nephropathies	215	56 (26.0)
Miscellaneous renal disorders	148	36 (24.3)
Systemic diseases affecting the kidney	43	17 (39.5)

81 children were excluded because they were aged <3 months; 346 children were excluded because they presented late

Demographics of prevalent paediatric KRT patients

The number of prevalent patients on KRT <16 years old was used to calculate age-related rates per million population and were grouped by age, sex and ethnicity.

Table 8.11 Age and sex breakdown of paediatric patients (<16 years old) prevalent to KRT on 31/12/2023

	All patients		Male		Female		M/F pmarp
Age group (yrs)	N	pmarp	N	pmarp	N	pmarp	ratio
0-<2	18	13.0	13	18.4	5	7.4	2.5
2-<4	36	24.9	22	29.8	14	19.9	1.5
4-<8	121	39.2	74	46.9	47	31.2	1.5
8-<12	212	65.3	138	83.0	74	46.7	1.8
12-<16	378	113.7	221	129.8	157	96.8	1.3
<16 yrs	**765**	**61.3**	**468**	**73.2**	**297**	**48.8**	**1.5**

pmarp – per million age-related population
Including Manch_P the overall N was 861 and pmarp 69.0

Table 8.12 Age and ethnicity breakdown of paediatric patients (<16 years old) prevalent to KRT on 31/12/2023

	N			
Age group (yrs)	White	Asian	Black	Other
0-<4	35	5	2	4
4-<8	80	22	8	8
8-<12	139	37	14	20
12-<16	246	72	19	31
<16 yrs	**500**	**136**	**43**	**63**

23 children with no ethnicity recorded were excluded

Treatment modality in prevalent paediatric KRT patients

The current and start KRT modalities for prevalent KRT patients aged <16 years are shown in figures 8.3 and 8.4, respectively. Table 8.13 breaks down current modality for prevalent patients by age group.

Table 8.13 KRT modality used by paediatric patients (<16 years old) prevalent to KRT on 31/12/2023 by age group

		HD		PD		Living donor Tx		Deceased donor Tx	
Age group (yrs)	Total N	N	%	N	%	N	%	N	%
0-<2	18	5	27.8	13	72.2	0	0.0	0	0.0
2-<4	36	8	22.2	13	36.1	11	30.6	4	11.1
4-<8	121	16	13.2	15	12.4	68	56.2	22	18.2
8-<12	212	19	9.0	18	8.5	122	57.5	53	25.0
12-<16	378	40	10.6	24	6.3	201	53.2	113	29.9
<16 yrs	**765**	**88**	**11.5**	**83**	**10.8**	**402**	**52.5**	**192**	**25.1**

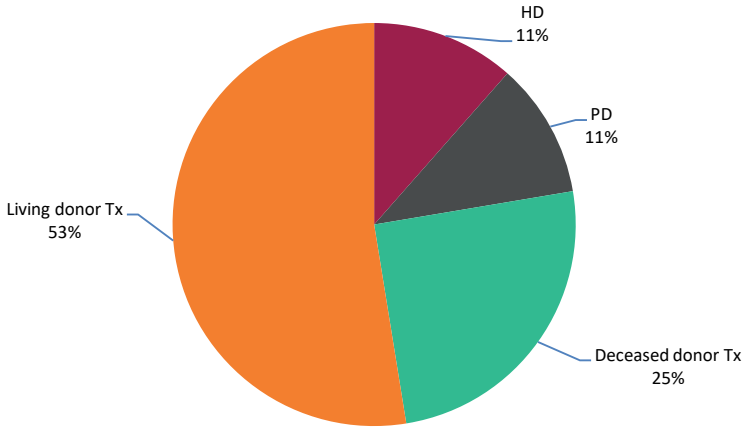

Figure 8.3 KRT modality used by paediatric patients (<16 years old) prevalent to KRT on 31/12/2023

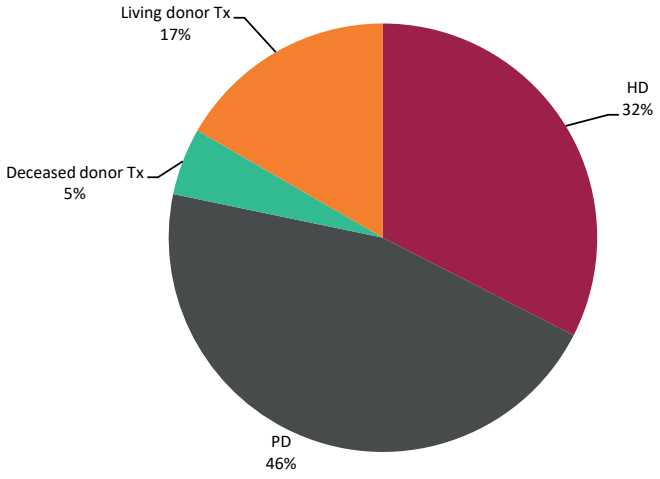

Figure 8.4 KRT modality used at the start of KRT by paediatric patients (<16 years old) prevalent to KRT on 31/12/2023

Causes of ESKD in prevalent paediatric KRT patients

PRDs were grouped into categories as shown in table 8.14.

Table 8.14 Primary renal diseases (PRDs) of paediatric patients (<16 years old) prevalent to KRT on 31/12/2023 by sex and ethnicity

PRD	N	%	N male	N female	% White
Tubulointerstitial disease	346	49.9	259	87	70.1
- CAKUT	338	48.7	254	84	70.9
- Non-CAKUT	8	1.2	5	3	37.5
Glomerular disease	118	17.0	52	66	62.9
Familial/hereditary nephropathies	115	16.6	58	57	72.6
Systemic diseases affecting the kidney	31	4.5	17	14	80.6
Miscellaneous renal disorders	84	12.1	40	44	64.6
Total (with data)	**694**	**100.0**	**426**	**268**	**69.1**
Missing	71	9.3	42	29	48.4

CAKUT – congenital anomalies of the kidneys and urinary tract

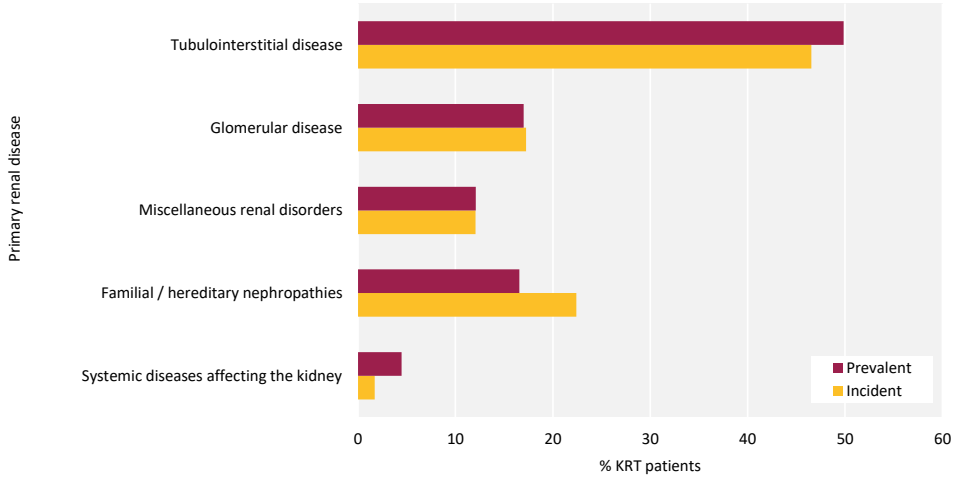

Figure 8.5 Comparison of primary renal diseases for paediatric patients (<16 years old) incident and prevalent to KRT in 2023 excluding missing data

Growth of prevalent paediatric KRT patients

The height and weight of children receiving KRT 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 KRT patients

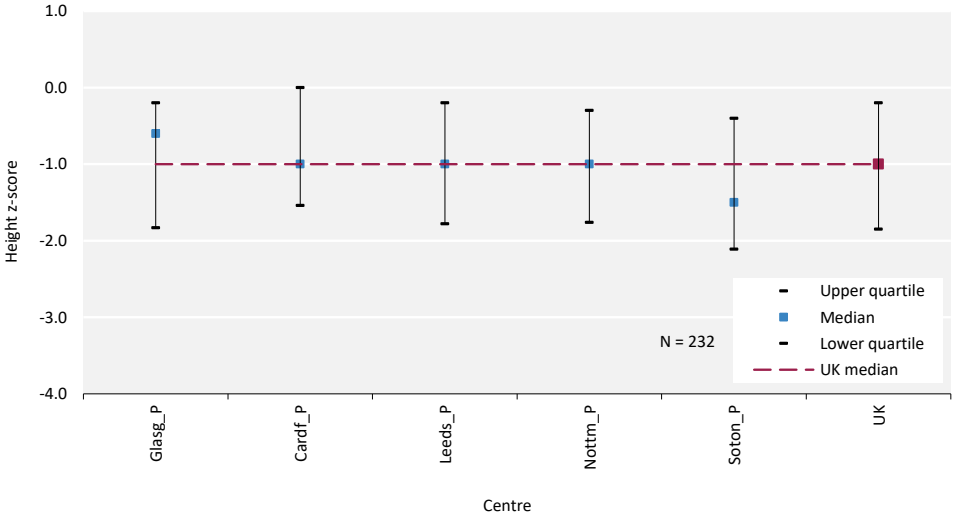

Figure 8.6 Median height z-scores for paediatric patients (<16 years old) prevalent to Tx on 31/12/2023 by centre

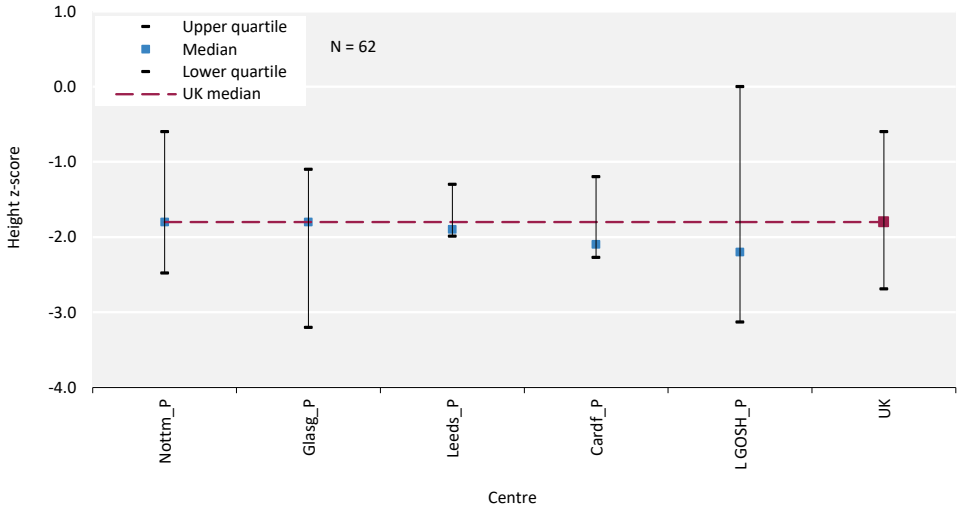

Figure 8.7 Median height z-scores for paediatric patients (<16 years old) prevalent to dialysis on 31/12/2023 by centre (the usual centre exclusion criteria have been relaxed here)

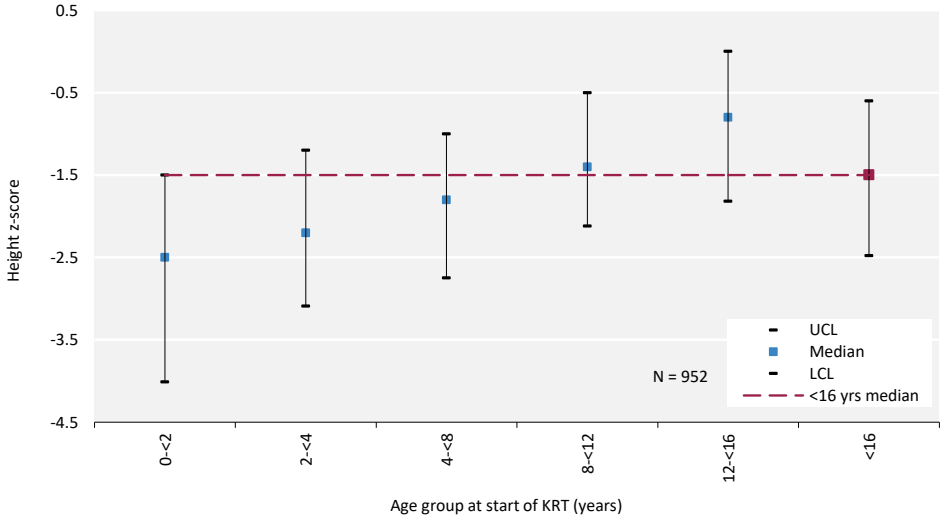

Figure 8.8 Median height z-scores at start of KRT for incident paediatric KRT patients (<16 years old) between 2009 and 2023 by age group at start of KRT

Weight of paediatric KRT patients

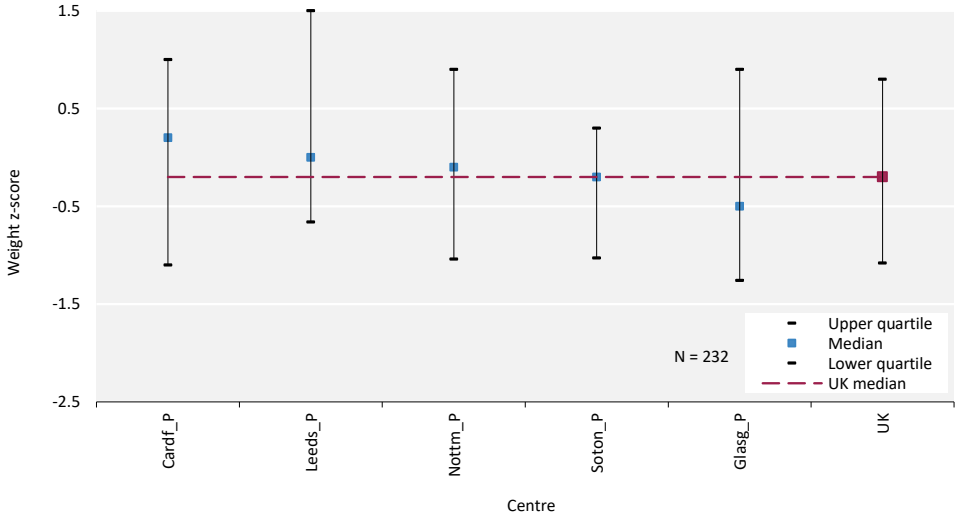

Figure 8.9 Median weight z-scores for paediatric patients (<16 years old) prevalent to Tx on 31/12/2023 by centre

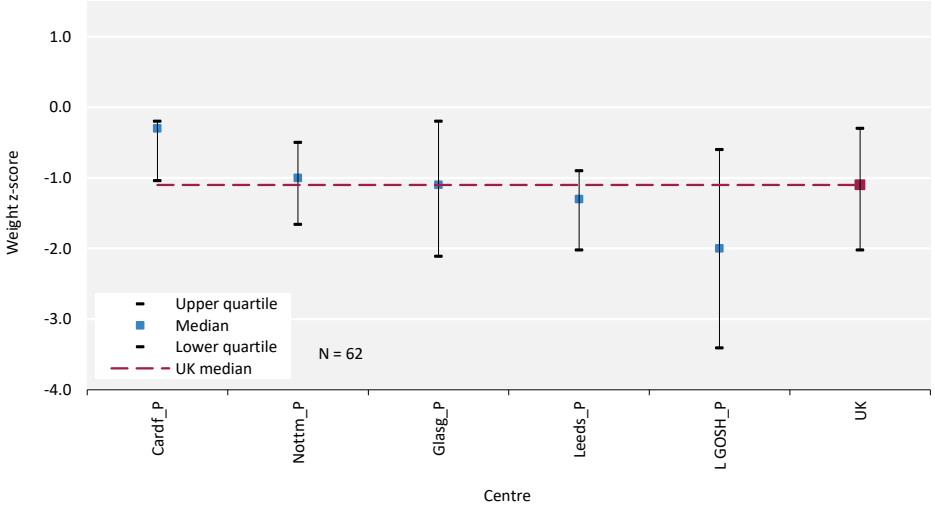

Figure 8.10 Median weight z-scores for paediatric patients (<16 years old) prevalent to dialysis on 31/12/2023 by centre (the usual centre exclusion criteria have been relaxed here)

Cardiovascular risk factor evaluation in prevalent paediatric KRT patients

Obesity in paediatric KRT 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 kidney 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.

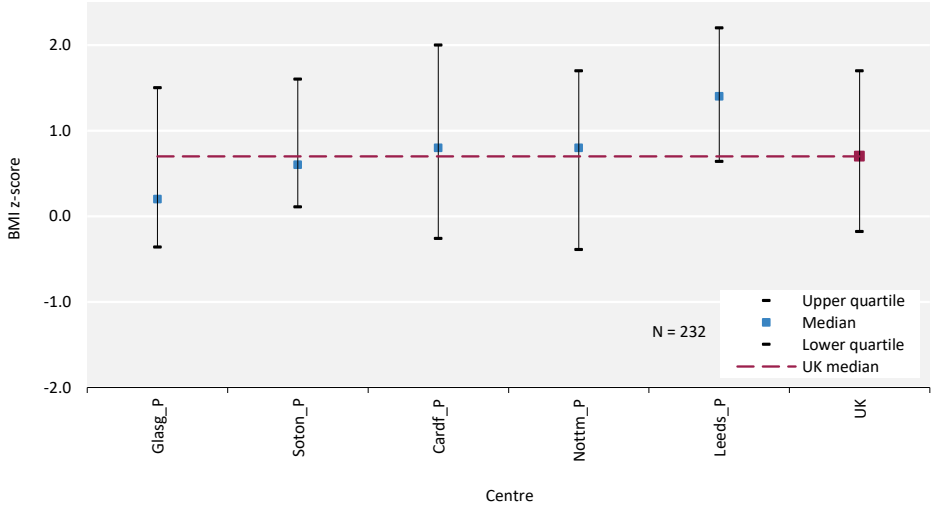

Figure 8.11 Median body mass index (BMI) z-scores for paediatric patients (<16 years old) prevalent to Tx on 31/12/2023 by centre

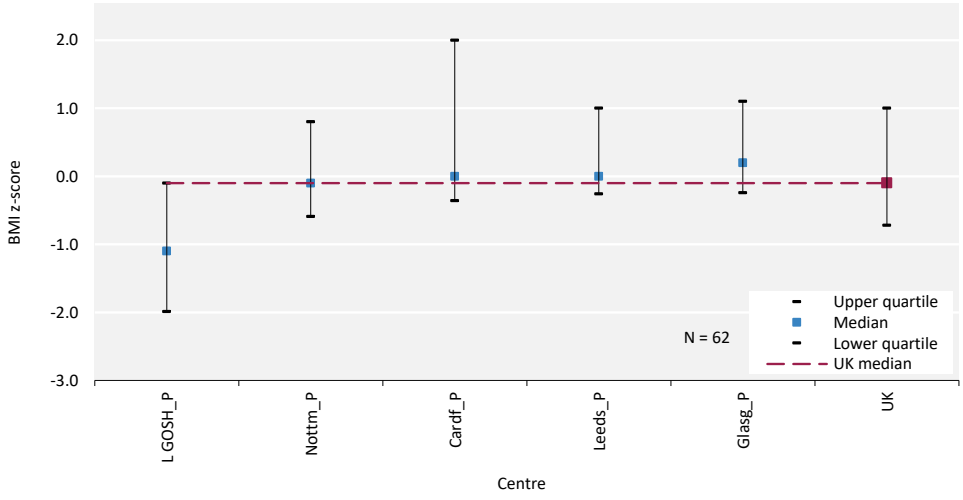

Figure 8.12 Median body mass index (BMI) z-scores for paediatric patients (<16 years old) prevalent to dialysis on 31/12/2023 by centre (the usual centre exclusion criteria have been relaxed here)

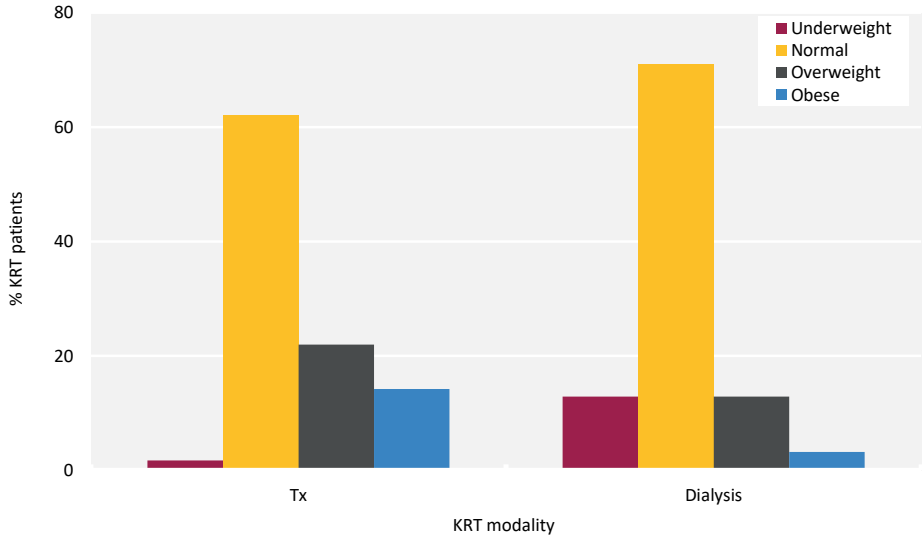

Figure 8.13 Body mass index categorisation of paediatric patients (<16 years old) prevalent to KRT on 31/12/2023 by KRT modality

Hypertension in paediatric KRT patients

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

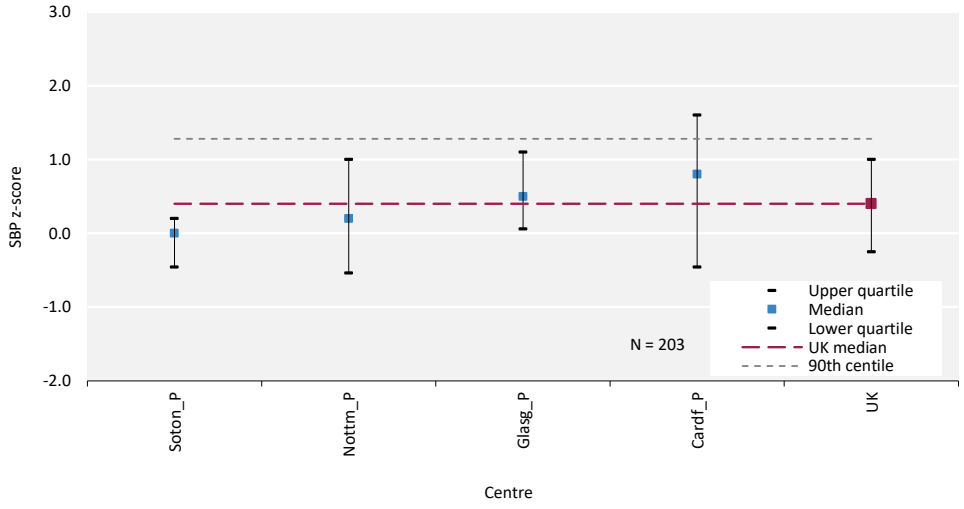

Figure 8.14 Median systolic blood pressure (SBP) z-scores for paediatric patients (<16 years old) prevalent to Tx on 31/12/2023 by centre

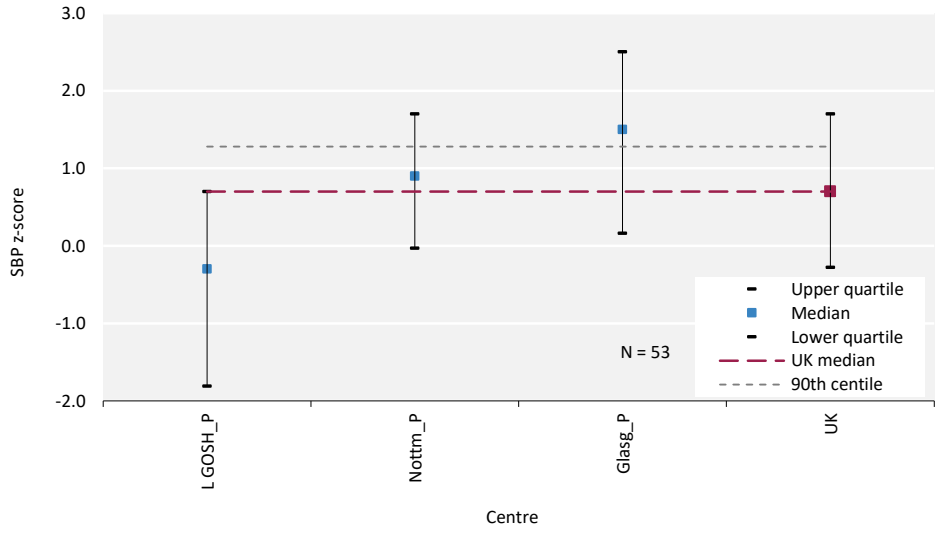

Figure 8.15 Median systolic blood pressure (SBP) z-scores for paediatric patients (<16 years old) prevalent to dialysis on 31/12/2023 by centre (the usual centre exclusion criteria have been relaxed here)

Table 8.15 Percentage of paediatric patients (<16 years old) prevalent to KRT on 31/12/2023 achieving the standards for blood pressures

	SBP		DBP	
Characteristic	N	% <90th percentile	N	% <90th percentile
Total	256	80.08	195	81.5
Age group (yrs)				
0-<5	27	66.7	11	81.8
5-<12	93	76.3	77	81.8
12-<16	136	85.3	107	81.3
Sex				
Male	164	79.9	123	79.7
Female	92	80.4	72	84.7
Ethnicity				
White	175	78.3	137	81.8
Asian	41	85.4	26	76.9
Black	14	85.7	11	81.8
Other	20	80.0	16	81.3
Modality				
HD	26	53.9	18	61.1
PD	27	77.8	22	90.9
Tx	203	83.7	155	82.6

DBP – diastolic blood pressure; SBP – systolic blood pressure
HD – haemodialysis; PD – peritoneal dialysis; Tx – transplant

Cardiovascular risk factors in paediatric KRT patients

The analysis of the percentage of prevalent KRT patients with identified cardiovascular risk factors was restricted to the 159 of the 719 patients (22.1%) with data for all three risk factors.

Table 8.16 Frequency of number of cardiovascular risk factors in paediatric patients (<16 years old) prevalent to KRT on 31/12/2023

N cardiovascular risk factors	Hypertensive	Overweight/Obese	Hypercholesterolaemic	N	%	Total %
0	No	No	No	46	28.9	28.9
1	Yes	No	No	13	8.2	
	No	Yes	No	19	11.9	39.6
	No	No	Yes	31	19.5	
2	Yes	Yes	No	10	6.3	
	Yes	No	Yes	16	10.1	27.0
	No	Yes	Yes	17	10.7	
3	Yes	Yes	Yes	7	4.4	4.4
				159		**100.0**
Total N with the risk factor	**46**	**53**	**71**			
Total % with the risk factor	**28.9**	**33.3**	**44.7**			

Biochemistry parameters in prevalent paediatric KRT patients

The median values and the percentage with eGFR <30 mL/min/1.73m^2 for prevalent 2023 paediatric Tx patients are presented in table 8.17.

Table 8.17 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 31/12/2023 by centre

Centre	N with Tx	Median eGFR (mL/min/1.73m^2)	% eGFR <30 mL/min/1.73m^2	% data completeness
Bham_P	71			23.9
Blfst_P	20			5.0
Brstl_P	36			0.0
Cardf_P	23	64	0.0	82.6
Glasg_P	45	66	0.0	100.0
L Eve_P	60			1.7
L GOSH_P	125			24.0
Leeds_P	44	80	9.1	75.0
Livpl_P	35			0.0
Newc_P	23			0.0
Nottm_P	51	45	10.6	92.2
Soton_P	39	63	5.3	97.4
UK	**572**	**61**	**7.8**	**40.4**

Blank cells – centres with <70% data completeness or <10 patients
For the centres with missing data, completeness of creatinine data was good but completeness of height was low (heights are needed to calculate eGFRs from creatinine)

Table 8.18 Attainment of targets for haemoglobin, calcium, phosphate, parathyroid hormone and bicarbonate in paediatric patients (<16 years old) (a) prevalent to dialysis on 31/12/2023 by centre and (b) prevalent to Tx on 31/12/2023 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	18	13.3	60.0	0.0	80.0	6.7	53.3	6.7	6.7	66.7
Blfst_P	1									
Brstl_P	4									
Cardf_P	6									
Glasg_P	8									
L Eve_P	15	30.8	30.8	0.0	53.9	7.7	46.2	25.0	38.5	61.5
L GOSH_P	28	10.7	39.3			14.3	50.0	60.7		
Leeds_P	13	7.7	46.2	7.7	76.9	0.0	30.8	15.4	15.4	76.9
Livpl_P	17	23.5	47.1	5.9	64.7	0.0	47.1	43.8	0.0	94.1
Newc_P	6									
Nottm_P	27	19.2	50.0	3.9	69.2	7.7	46.2	19.2	0.0	84.6
Soton_P	4									
UK	**147**	**17.7**	**45.4**	**3.5**	**71.7**	**9.9**	**46.8**	**33.1**	**8.7**	**79.1**
TX PATIENTS WITH EGFR <30 ML/MIN/1.73 M^2										
UK	**18**	**16.7**	**83.3**	**6.3**	**87.5**	**5.6**	**83.3**	**20.0**	**12.5**	**81.3**

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 8.19 Median estimated glomerular filtration rate (eGFR) in paediatric patients (<16 years old) prevalent to Tx on 31/12/2023 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						
0.25–<2 years	14	88	30	69	30	66
2–<4 years	2		21	65	18	65
4–<7 years			33	59	24	59
≥ 7 years			7	60	50	45
Total (IQR)	**16**	**92 (71-112)**	**91**	**62 (47-84)**	**122**	**56 (42-72)**

IQR – interquartile range
As seen in table 8.17, completeness of eGFR is 40% of N=572

Transfer to adult kidney services for prevalent paediatric KRT patients

One-hundred and thirty-five paediatric patients transitioned to adult kidney centres in 2023. The median age of patients at transfer was 17.9 years with an IQR of 17.5-18.1 years. Overall, the demographics of this population reflected those of the prevalent paediatric KRT population.

Survival in paediatric KRT patients

Of patients aged <16 years, 1,612 started KRT between 2009 and 2022 at paediatric kidney centres and were included in survival analyses, to allow at least one year follow-up. At the end of 2023, 107 deaths had been reported in these children. Patients included in the analysis must have been alive on KRT for 90 days. The median follow-up time (beyond day 90) was 7.3 years (range 1 day to 14.8 years).

Table 8.20 Unadjusted Kaplan-Meier survival (from day 90) of incident paediatric KRT patients (<16 years old) between 2009 and 2022 by age group at start of KRT

	Age group (yrs)				
	0-<2	2-<4	4-<8	8-<12	12-<16
Survival at 1 year (%)	94.9	97.7	98.9	99.2	99.6
95% CI	91.5-96.9	93.9-99.1	96.6-99.6	97.5-99.7	98.4-99.9
Survival at 2 years (%)	93.0	96.5	96.3	98.0	98.8
95% CI	89.3-95.5	92.3-98.4	93.2-98.0	95.8-99.0	97.3-99.5
Survival at 3 years (%)	89.8	95.8	95.4	97.7	97.9
95% CI	85.4-92.9	91.4-98.0	92.1-97.4	95.4-98.8	96.1-98.9
Survival at 5 years (%)	86.2	95.1	94.5	96.1	96.8
95% CI	81.2-89.9	90.4-97.5	90.9-96.7	93.2-97.8	94.7-98.1
Survival at 10 years (%)	84.3	95.1	91.6	94.1	94.2
95% CI	79.0-88.4	90.4-97.5	86.5-94.8	90.1-96.6	90.9-96.3

CI – confidence interval

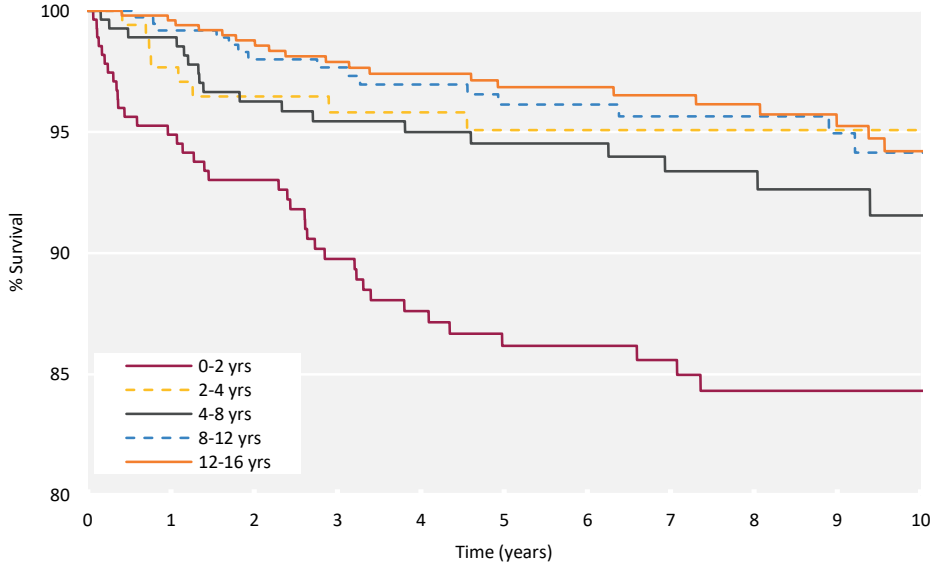

Figure 8.16 Unadjusted Kaplan-Meier survival (from day 90) of incident paediatric KRT patients (<16 years old) between 2009 and 2022 by age group at start of KRT

Analyses – young people

KRT incidence and prevalence in young people

Table 8.21 reports the numbers of young people (16-<18 years old) who started KRT in 2023 (incidence) as well as those on KRT as of 31/12/2023 (prevalence) in both paediatric and adult centres, as an estimated total pmarp and grouped by sex, ethnicity and PRD. For incident young people, start modality is reported; current treatment modality is reported for prevalent patients.

Table 8.21 Demographics of young people (16-<18 years) incident to KRT in 2023 and/or prevalent to KRT on 31/12/2023, by care setting

	Incident			Prevalent		
Characteristic	Paediatric centres	Adult centres	All	Paediatric centres	Adult centres	All
N	11	13	24	181	44	225
pmarp			15.1			141.6
Median age (yrs)	16.8	17.1	17.1	16.9	17.5	17.0
% male	54.6	38.5	45.8	54.1	56.8	54.7
Ethnicity[1] (%)						
White	63.6	66.7	65.0	67.8	66.7	67.6
Asian	27.3	11.1	20.0	17.2	23.1	18.3
Black	0.0	11.1	5.0	7.2	5.1	6.9
Other	9.1	11.1	10.0	7.8	5.1	7.3
Missing ethnicity	0.0	30.8	16.7	0.6	11.4	2.7
PRD[1] (%)						
Tubulointerstitial disease	33.3	22.2	26.7	44.4	42.5	44.1
Glomerular disease	0.0	11.1	6.7	13.5	15.0	13.7
Familial/hereditary nephropathies	0.0	0.0	0.0	15.2	17.5	15.6
Systemic diseases affecting the kidney	16.7	33.3	26.7	2.9	5.0	3.3
Diabetes	0.0	0.0	0.0	0.0	0.0	0.0
Miscellaneous renal disorders	50.0	33.3	40.0	24.0	20.0	23.2
Missing PRD	45.5	30.8	37.5	5.5	9.1	6.2
Modality (%)						
HD	27.3	76.9	54.2	13.8	31.8	17.3
PD	54.6	15.4	33.3	6.6	13.6	8.0
Tx	18.2	7.7	12.5	79.6	54.6	74.7

[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
HD – haemodialysis; PD – peritoneal dialysis; Tx – transplant

Table 8.22 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 8.22 Number of centres that submitted data for young people (16-<18 years) incident to KRT in 2023 and/or prevalent to KRT on 31/12/2023, by care setting

	Incident	Prevalent
Paediatric centres	7 out of 13	12 out of 13
Adult centres	9 out of 67	22 out of 67

Transplant parameters in young people

The median values for age, creatinine and eGFR, and the proportion with an eGFR <30 mL/min/1.73m^2 for young people prevalent to Tx on 31/12/2023 are presented by care setting (adult or paediatric centre).

Table 8.23 Measures of graft function in young people (16–<18 years) prevalent to Tx on 31/12/2023, by care setting

	N on Tx	Median age (yrs)	N with creatinine data	Median creatinine (µmol/L)	Median FAS-eGFR (mL/min/1.73m^2)	% FAS-eGFR <30 mL/min/1.73m^2	% creatinine completeness
Paediatric centres	144	17.0	144	110	69	4.9	100.0
Adult centres	24	17.5	24	130	58	4.2	100.0

Table 8.24 reports the median eGFR for all young people prevalent to Tx on 31/12/2023 by time since transplantation. Small numbers preclude further analysis by care setting (adult or paediatric centre).

Table 8.24 Estimated glomerular filtration rate (eGFR) in young people (16-<18 years) prevalent to Tx on 31/12/2023 by time since transplantation

Time since transplantation	N	Median FAS-eGFR (mL/min/1.73m^2)
< 3 months	5	
3 months–<2 years	37	75
2–<4 years	24	69
4–<7 years	36	60
≥ 7 years	64	63
Total (IQR)	**166**	**67 (53-81)**

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

Biochemical and blood pressure measures in young people

Table 8.25 shows attainment of biochemical and blood pressure measures for young people prevalent to dialysis and transplant on 31/12/2023 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.

Table 8.25 Attainment of biochemical and blood pressure measures in young people (16-<18 years) prevalent to KRT on 31/12/2023, by modality and care setting

	Dialysis			Tx		
Characteristic	Paediatric centres	Adult centres	All	Paediatric centres	Adult centres	All
N	37	20	57	144	24	168
Median (IQR) Hb (g/L)	116 (103-124)	100 (94-117)	109 (97-124)	127 (114-139)	120.5 (104-134)	126 (113-139)
% Hb <100g/L	19.4	47.4	29.1	7.0	8.3	7.2
Median (IQR) Ca (mmol/L)	2.5 (2.4-2.6)	2.3 (2.2-2.4)	2.4 (2.3-2.5)	2.4 (2.4-2.5)	2.4 (2.3-2.5)	2.4 (2.4-2.5)
% Ca in range	70.4	84.2	76.1	90.4	86.4	89.8
Median (IQR) Phos (mmol/L)	1.7 (1.4-2.2)	2 (1.6-2.1)	1.8 (1.5-2.2)	1.1 (1-1.2)	1.1 (0.9-1.3)	1.1 (1-1.3)
% phos in range	52.8	31.6	45.5	64.3	54.2	62.9
Median (IQR) bicarb (mmol/L)	24 (21-27)	22 (18-25)	23 (20-26)	23 (21-25)	22 (20-26)	23 (21-25)
% bicarb in range	60.7	50.0	56.5	77.9	52.4	74.1
Median (IQR) SBP (mmHg)	128 (117-138)	125 (117-140)	126 (117-138)	116 (110-123)	124.5 (111-137)	116 (110-125)
Median (IQR) DBP (mmHg)	72 (65-89)	77.5 (67-86)	72 (65-88)	69 (60-78)	77 (70-83)	70 (60-79)
% 'normal' BP range (<130/80 mmHg)	41.7	57.1	47.4	72.3	50.0	69.1
% high BP (≥140/90 mmHg)	33.3	28.6	31.6	4.8	21.4	7.2

See appendix A for biochemical target ranges
bicarb – bicarbonate; BP – blood pressure; Ca – calcium; DBP – diastolic blood pressure; Hb – haemoglobin; IQR – inter-quartile range; phos – phosphate; SBP – systolic blood pressure

Analyses - Under 18 yrs old with CKD

For the 6 paediatric centres that were able to submit data on their CKD population, the number of prevalent patients with CKD is presented as crude rate per million age-related population (PMARP).

Table 8.26 Demographics and CKD stage of under 18's on 31/12/23

Centre	N with CKD <18yrs old	Median (IQR) age in yrs	% male	% stage G4	% stage G5	CKD 2023 crude rate (pmarp)
Brstl_P	22	10.6 (4.7-13.2)	72.7	90.9	9.1	21.4
Glasg_P	11	10.6 (3.1-14.4)	63.6	90.9	9.1	10.9
L Eve_P	63	10.3 (6.0-13.9)	65.1	76.2	23.8	36.1
L GOSH_P	49	11.0 (6.8-14.3)	71.4	65.3	34.7	16.9
Nottm_P	13	8.9 (6.0-14.6)	61.5	61.5	38.5	9.2
Soton_P	15	6.7 (4.4-10.5)	66.7	66.7	33.3	29.1
Total	**173**	**9.9 (6.0-14.1)**	**67.6**	**74.0**	**26.0**	**20.1**

pmarp - per million age-related population

UK Kidney Association
UK Renal Registry

Abbreviations

UK kidney centre abbreviations and other shortened forms used in the 27th Annual Report

UK kidney centre abbreviations

Adult kidney centres

Abbreviation	City	Hospital
	ENGLAND	
Bham	Birmingham	Heartlands Hospital and Queen Elizabeth 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
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
EssexMS	Essex	Basildon Hospital, Broomfield Hospital and Southend 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 UH	Liverpool	Aintree University Hospital and 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
Stoke	Stoke	University Hospital of North Staffordshire
Sund	Sunderland	Sunderland Royal Hospital
Truro	Truro	Royal Cornwall Hospital
Wirral	Birkenhead	Arrowe Park Hospital
Wolve	Wolverhampton	New Cross Hospital
York	York	York District General Hospital

Adult kidney centres Continued

Abbreviation	City	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	University Hospital Monklands
D&Gall	Dumfries	Mountainhall Treatment Centre
Dundee	Dundee	Ninewells Hospital
Edinb	Edinburgh	Royal Infirmary of Edinburgh
Glasgw	Glasgow	Queen Elizabeth University Hospital
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 kidney 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

ACR	albumin creatinine ratio
adj	adjusted
AKI	acute kidney injury
APD	automated peritoneal dialysis
AVF	arteriovenous fistula
AVG	arteriovenous graft
BAPN	British Assocation for Paediatric Nephrology
Bicarb	bicarbonate
BMI	body mass index
Ca	calcium
CAG	Confidentiality Advisory Group
CAKUT	congenital abnormalities of the kidneys and urinary tract
CAPD	continuous ambulatory peritoneal dialysis
CC	conservative care
CCG	Clinical Commissioning Group
CKD-EPI	CKD Epidemiology Collaboration
Chol	cholesterol
CI	confidence interval
CKD	chronic kidney disease
CL	confidence limit
COVID-19	coronavirus disease 2019
Creat	creatinine
DBD	donor after brain death
DBP	diastolic blood pressure
DCD	donor after circulatory death
E	England
EF	error factor
eGFR	estimated glomerular filtration rate
ERA-EDTA	European Renal Association-European Dialysis and Transplant Association
ESA	erythropoiesis stimulating agent
ESKD	end-stage kidney disease
FAS	Full Age Spectrum
Ferr	ferritin
GIRFT	Getting It Right First Time
Hb	haemoglobin
HB	Health Board
HbA1c	glycated haemoglobin
HD	haemodialysis
HES	Hospital Episode Statistics
HHD	home haemodialysis
HRA	Health Research Authority

ICB	Integrated Care Board
ICHD	in-centre haemodialysis
IQR	interquartile range
IZ	Intermediate zone
K	potassium
KDIGO	Kidney Disease: Improving Global Outcomes
KM	Kaplan Meier
KRT	kidney replacement therapy
LKD	living kidney donor
MRSA	methicillin-resistant *Staphylococcus aureus*
MSOA	Middle Layer Super Output Area
MSSA	methicillin-sensitive *Staphylococcus aureus*
mths	months
NHS	National Health Service
NHSBT	NHS Blood and Transplant
NI	Northern Ireland
NICE	National Institute of Health and Care Excellence
NTL	non-tunnelled line
ONS	Office for National Statistics
PAS	patient administration system
PCR	protein creatinine ratio
PD	peritoneal dialysis
PEDW	Patient Episode Database for Wales
Phos	phosphate
pmarp	per million age-related population
pmp	per million population
PRD	primary renal disease
PREM	patient reported experience measures
PTH	parathyroid hormone
PVD	peripheral vascular disease
SBP	systolic blood pressure
SD	standard deviation
SR	standardised ratio
SRR	Scottish Renal Registry
TL	tunnelled line
Tx	transplant
UK	United Kingdom
UKHSA	UK Health Security Agency
UKKA	UK Kidney Association
UKRDC	UK Renal Data Collaboration
UKRR	UK Renal Registry
URR	urea reduction ratio
W	Wales
yrs	years

Prepared by UK Kidney Association staff

Management team

Ron Cullen (chief executive officer)
Dr James Medcalf (medical director for audit)
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
Dane Rogers
Dr Julie Gilg (consultant biostatistician)

Research

Dr Zoe Plummer
Dr Sherry Masoud
Dr Katie Wong
Dr Lucy Plumb
Susan Pywell
Dr Nithin Bodapati
Lauren Windsor

Data managers

Beth Carter-Crosby
Sarika Dahiya
Sarah Evans
Jacqueline Laken
Stacy Ojo
Jo Wilson
Florianne Socquet-Juglard

KQIP

Katherine Elson
Ranjit Klare
Leeanne Lockley
Julie Slevin
Catherine Stannard
Georgina Hamill
Sarah Law

Informatics and operations

Andrew Atterton
Marta Badji
Philip Main
Garry King
Dr Andre Ortega Alban
George Swinnerton
Oliver Reeves
Michael Ruston
Gleb Rysev
Bidhan Pant

Business support

Hillary Corwin
Caitlin Sewell
Jennifer Barwell
Sharece Charles
Tom Gray
Kareen Heal
Hiedi Hutchinson
Stephanie Lock
Anna O'Hare
Fay Passey
Amy Robinson
Laura Williams
Rachel Chadwick
Danielle Piotrowski

UK Renal Registry 27th Annual Report

Data to 31/12/2023

The UK Renal Registry

The UKRR was established by the Renal Association in 1995 (now the UK Kidney Association after merging with the British Renal Society in 2020) to collate data centrally from all adult UK kidney centres to improve the care of patients with end-stage kidney disease. Although originally limited to patients on kidney replacement therapies (KRT) – 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 KRT have been collated by the UKRR since 2009 and data on advanced CKD in children for the first time this year. The UKRR team manages data collection, analysis and reporting on both new and existing patients on KRT each year. The UK Kidney Assciation has an active and involved Patient Council. Each year the UKRR publishes an annual report comprising centre comparisons, attainment of the UK Kidney Association audit standards, national averages and long term trends.

UKKA
UK Kidney Association
UK Renal Registry

The UK Renal Registry is part of the UK Kidney Association. The UK Kidney Association is a trading name of the Renal Association, a registered charity (no 800733) and a company limited by guarantee, registered in England and Wales under company number 2229663