



UK Kidney Association
UK Renal Registry

UK Renal Registry 25th Annual Report

Data to 31/12/2021

Chronic kidney disease

Incidence of KRT

Prevalence of KRT

Transplant

In-centre haemodialysis

Peritoneal dialysis

Home haemodialysis

Paediatrics

UK Renal Registry 25th Annual Report

Data to 31/12/2021

Suggested citation

UK Renal Registry (2023) UK Renal Registry 25th Annual Report – data to 31/12/2021, 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.

Summary of the UKRR 25th Annual Report – adults

UK Renal Registry (2023) UK Renal Registry Summary of Annual Report – analyses of adult data to the end of 2021, Bristol, UK.
Available from <https://ukkidney.org/audit-research/annual-report>

Summary of the UKRR 25th Annual Report – children and young people

UK Renal Registry (2023) UK Renal Registry Summary of Annual report – analyses of paediatric data to the end of 2020, 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](https://twitter.com/UKKidney)

Foreword



*Professor James Medcalf
Medical director, The UK Kidney Association*

Welcome to another UK Renal Registry Annual Report. This report covers the second year of the COVID-19 pandemic (2021) – and a still much disrupted healthcare system. The number of new patients starting kidney replacement therapy (KRT incidence) increased by 7.3%, but for a second year fewer people started KRT with a kidney transplant (likely because of ongoing disruption to transplant pathways). There was also a rise in the proportion of people who started KRT without the minimum 90 days preparation time with kidney services (now more than 18% of those starting KRT) a sign of wider NHS disruption.

Importantly other aspects of care improved – for example amongst all people who started haemodialysis a greater proportion had definitive access this year – despite more of those people presenting to kidney services with less than 90 days preparation. Compared to pre-pandemic a higher proportion are still starting with a home-therapy, and whilst prevalence of ESKD still increased by 1.5% – it is still slower than before the COVID-19 pandemic.

Writing about the future is always a risk – and the changes we were expecting to the regional commissioning of specialised renal services did not occur as originally anticipated on the 1st April 2023. We do however have a new National Clinical Director (NCD), and a Clinical Reference Group (CRG) which has been reinvigorated and is adopting much of the work of the Renal Services Transformation Programme (now concluded). NHS England, the NCD, the CRG, and the Regional Commission Networks remain very supportive of all our efforts to have timely access to data to help make decisions. We agree – and know many renal units would welcome access to timely comparative information too.

Tempting fate – but one of the things which does appear increasingly likely are renal centres moving to a daily ‘UKRDC’ feed. Several of the large system suppliers are at advanced stages of development for these feeds which will significantly speed up the flow of information to the UKRR. We at the UKRR have been developing an error graphical interface to help centres catch problems with their local data. In the same interface we have an expanding portfolio of visualisations which are running on the near real-time information. If you would like to know more about these developments we will be available to demonstrate at UK Kidney week or please contact us.

I am always conscious that without the support of the individual renal centres in the UK we would be unable to do very much of the work which we do. Just as last year – if you think we could do better – please let us know. Otherwise – thank you again for your continued support.

A handwritten signature in black ink that reads "J. F. Medcalf".

Professor James Medcalf
Medical director, The UK Kidney Association, May 2023

Contents

Introduction	The UK Renal Registry's 25th Annual Report	iii
Chapter 1	Adults with chronic kidney disease (CKD) and estimated glomerular filtration rate (eGFR) <30mL/min/1.73m ² in the UK at the end of 2021	1
Chapter 2	Adults starting kidney replacement therapy (KRT) for end-stage kidney disease (ESKD) in the UK in 2021	11
Chapter 3	Adults on kidney replacement therapy (KRT) in the UK at the end of 2021	53
Chapter 4	Adults with a kidney transplant (Tx) in the UK at the end of 2021	76
Chapter 5	Adults on in-centre haemodialysis (ICHHD) in the UK at the end of 2021	101
Chapter 6	Adults on peritoneal dialysis (PD) in the UK at the end of 2021	128
Chapter 7	Adults on home haemodialysis (HHD) in the UK at the end of 2021	149
Chapter 8	Children and young people on kidney replacement therapy (KRT) for end-stage kidney disease (ESKD) in the UK in 2021	169
Abbreviations	UK kidney centre abbreviations and other shortened forms.....	194

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

Appendix A	Definitions and methodologies used in the 25th Annual Report – data to the end of 2021
Appendix B	Integrated Care System (ICS) and health board (HB) adult incidence and prevalence numbers, rates and standardised ratios – data to the end of 2021

Introduction: The UK Renal Registry's 25th 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 68 adult and 13 paediatric centres against national standards, in particular, the UK Kidney Association's guidelines – ukkidney.org/health-professionals/guidelines/guidelines-commentaries.

The 25th Annual Report includes patients who started KRT in 2021, as well as all patients who were on KRT at the end of 2021. The chapters are split by treatment modality (transplant, in-centre haemodialysis, peritoneal dialysis and home haemodialysis), as well as by adults and children. The online appendices cover the methodologies, including how data are collected and coded (appendix A) and include basic analyses at Integrated Care System 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 more comorbidity data (via linkages) and advanced CKD data are included to understand differences in the transition of patients onto both RRT and conservative non-dialysis pathways. Despite these shortcomings, identifiable centre-specific analyses on the survival of 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.

Chapter 1

Adults with chronic kidney disease (CKD) and estimated glomerular filtration rate (eGFR) <30mL/min/1.73m² in the UK at the end of 2021

Contents

Introduction	3
Rationale for analyses	4
Key findings	5
Analyses	6
Stage and demographics of adult CKD patients	6
Blood pressure in adult CKD patients	8
Biochemistry parameters in adult CKD patients	8
Anaemia in adult CKD patients	9

Introduction

This is the third year the 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 2021 (figure 1.1). A ‘2021 prevalent CKD population’ is described, comprising individuals who:

- were reported by an adult kidney centre as receiving treatment for CKD at the end of 2021, and
- had an eGFR of $<30\text{mL}/\text{min}/1.73\text{m}^2$ on their last recorded creatinine measurement.

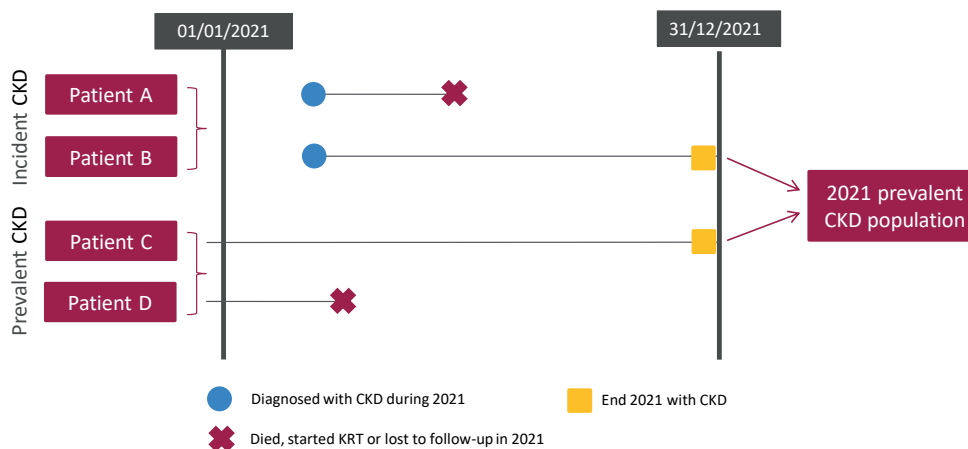


Figure 1.1 Pathways adult patients could follow to be included in the UK 2021 prevalent CKD population

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] $<15\text{ mL}/\text{min}/1.73\text{m}^2$) or CKD stage G4 (eGFR $15\text{--}29\text{ mL}/\text{min}/1.73\text{m}^2$). 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). The UKRR is developing approaches to combine CKD and AKI reporting systems with HES and will publish these elsewhere. Data relating to survival and initiation of KRT/conservative care (CC) are also being prepared separately.

It is important to highlight that the individuals described in this chapter represent a sub-population of those with CKD in the UK. Many individuals with diagnosed CKD receive care without referral to a 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 2021 the UKRR received data from 18 units of the 54 adult centres in England and Wales (one less than in 2020).

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 2021 is reported in this chapter (table 1.1). Some audit measures cannot be reported because the completeness of the required data items is too low. Audit measures in guidelines that have been archived are not included. For consistency with other chapters, table 1.1 is provided to outline the addressed UK Kidney Association audit measures. However, data completeness is poor even for the analyses presented, necessitating caution in interpretation. Further detail about the completeness of data returned to the UKRR is available through the UKRR ([data portal ukkidney.org/audit-research/data-portals](http://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	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 18 of the UK's adult kidney centres.
- The 2021 prevalent CKD population comprised 21,334 patients, with a median age of 77.2 years, compared to a median age of 59.7 years for those on KRT.
- CKD prevalence was 1,176 per million population (pmp) overall, but ranged from 154 to 2,463 pmp between centres. There were also substantial differences in the ages and distribution of disease stages between centres. Such large variation suggests discrepancies in the definitions used for processes of care or reporting of people with CKD between centres.
- The data reported in this chapter highlight the need for improved capture and reporting of CKD data to enable national quality assurance. Concordance with audit measures for the CKD not on KRT population cannot be addressed until this is achieved.

Analyses

Stage and demographics of adult CKD patients

For the 18 adult kidney centres, the number of prevalent patients with CKD and eGFR ≤ 30 mL/min/1.73m² 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 31/12/2021, including those on conservative care (CC) by stage and centre; completeness of proteinuria; number of CKD and 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 2021 crude rate (pmp)	KRT 2021 crude rate (pmp)
Bham ¹	828	25	853	69.4	30.6	0.0	2.05	415	1,611
Camb	144	0	144	62.5	37.5	0.7	0.94	154	1,739
Carlisle	439	60	499	82.6	17.4	60.7	0.26	1,954	1,194
Covnt	1,581	0	1,581	87.7	12.3	4.0	0.80	1,987	1,407
Derby	1,099	0	1,099	82.1	17.9	0.0	0.56	1,957	1,227
EssexMS ²	493	0	493	82.8	17.2	52.5	0.99	496	896
Glouc	1,101	0	1,101	85.8	14.2	0.1	0.51	2,158	1,070
L Guys	951	0	951	71.7	28.3	48.9	1.01	945	2,307
L Kings	391	0	391	35.3	64.7	22.3	0.93	419	1,428
L Rfree	1,708	219	1,927	73.4	26.6	57.9	1.33	1,451	1,792
Leic	3,756	0	3,756	82.5	17.5	44.8	2.09	1,800	1,265
Middlbr	495	0	495	66.1	33.9	0.0	0.81	613	1,183
Oxford	1,903	0	1,903	76.7	23.3	0.0	1.45	1,316	1,385
Plymth	988	1	989	84.5	15.5	35.1	0.40	2,463	1,365
Ports	2,003	2	2,005	73.7	26.3	41.6	1.75	1,145	1,109
Salford	480	1	481	92.5	7.5	63.0	1.15	417	1,054
Swanse	1,815	25	1,840	84.8	15.2	0.0	0.76	2,426	1,125
Truro	764	62	826	82.9	17.1	46.1	0.36	2,306	1,287
Total	20,939	395	21,334	79.0	21.0	27.4	18.14	1,176	1,386

¹The catchment population and 2021 crude rate for KRT reflect the combined Bham population (QEH and Heartlands kidney centres), but CKD patients were only reported for QEH

²The catchment population and 2021 crude rate for KRT reflect the combined population for middle-south Essex (Basildon, Chelmsford and Southend renal centres) though CKD patients were only reported for Southend

CC - conservative care

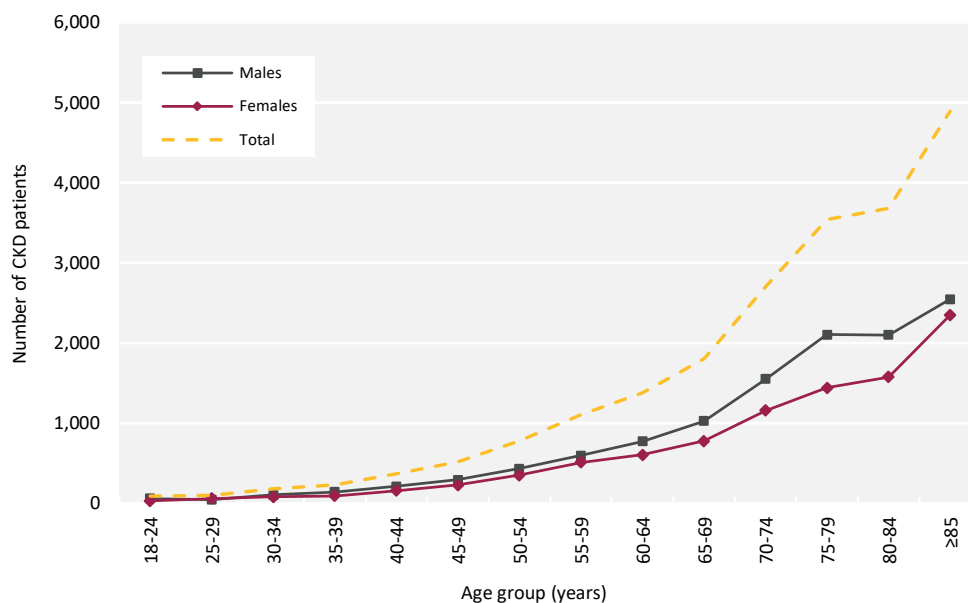
PCR - protein creatinine ratio

ACR - albumin creatinine ratio

The proportion of patients with CKD and eGFR ≤ 30 mL/min/1.73m² 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 31/12/2021 by centre

Centre	N with CKD	Median age (yrs)	% male	Ethnicity					PRD completeness		
				% White	% Asian	% Black	% Other	% missing	% all stages	% stage G4	% stage G5
Bham	853	68.3	58.6	57.5	25.7	13.6	3.2	12.9	11.3	3.5	28.7
Camb	144	73.3	56.3	95.6	2.2	0.7	1.5	6.3	45.1	34.4	63.0
Carlisle	499	77.7	54.9	99.4	0.3	0.3	0.0	32.1	17.8	14.6	33.3
Covnt	1,581	79.6	55.6	88.7	9.1	2.2	0.0	7.8	81.5	80.8	86.6
Derby	1,099	77.7	55.1	90.4	6.4	2.4	0.7	14.4	93.6	92.9	97.0
EssexMS	493	79.2	55.8	93.4	2.5	1.6	2.5	1.0	24.3	19.1	49.4
Glouc	1,101	79.5	58.6	95.2	2.1	1.5	1.2	6.1	49.8	47.6	62.8
L Guys	951	71.0	58.0	59.2	8.0	28.3	4.5	26.0	50.8	44.7	66.2
L Kings	391	66.2	58.1	44.7	9.0	44.1	2.3	20.5	19.7	8.0	26.1
L Rfree	1,927	75.5	54.9	58.0	18.1	13.6	10.3	19.6	46.2	42.2	57.1
Leic	3,756	78.3	54.4	80.7	15.6	2.3	1.3	26.4	58.8	57.0	67.1
Middlbr	495	72.0	56.6	94.6	4.9	0.0	0.5	21.6	21.0	15.0	32.7
Oxford	1,903	76.2	57.6	87.4	5.3	3.2	4.2	75.0	13.9	10.6	24.6
Plymth	989	80.0	51.6	98.6	0.4	0.1	0.8	4.0	17.0	15.6	24.8
Ports	2,005	76.0	57.7	98.1	1.0	0.5	0.4	40.6	15.0	10.8	26.7
Salford	481	75.1	59.9	85.4	11.0	2.1	1.6	9.1	13.3	13.7	8.3
Swanse	1,840	79.2	56.0	98.3	0.8	0.3	0.6	40.7	30.2	27.1	47.5
Truro	826	80.2	55.4	98.3	0.6	0.4	0.7	0.4	20.6	14.9	48.2
Total	21,334	77.2	56.0	84.1	8.5	5.2	2.2	25.9	39.9	37.7	48.3

**Figure 1.2** Number of adult patients prevalent to CKD stages G4 and 5 on 31/12/2021 by age group and sex

Blood pressure in adult CKD patients

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

Table 1.4 Blood pressures in adult patients prevalent to CKD stages G4 and 5 on 31/12/2021 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	4524 (46.1)	142	75	1909 (42.2)	3198 (41.4)	142	75	1398 (43.7)	1326 (63.5)	144	76	511 (38.5)
Age group (yrs)												
18-29	56 (66.7)	133	85	32 (57.1)	38 (63.3)	132	84.5	23 (60.5)	18 (75)	134.5	85	9 (50)
30-39	113 (64.6)	133	84	69 (61.1)	85 (63)	133	83	55 (64.7)	28 (70)	132	84.5	14 (50)
40-49	264 (62.6)	139	84	121 (45.8)	170 (56.7)	138	83	83 (48.8)	94 (77)	142	84	38 (40.4)
50-59	498 (58.8)	141	82	212 (42.6)	326 (54.2)	140	81	146 (44.8)	172 (70.2)	143	82	66 (38.4)
60-64	329 (52.3)	143	78	137 (41.6)	214 (45.6)	143.5	78	92 (43)	115 (71.9)	143	77	45 (39.1)
65-69	412 (51.9)	145	77	163 (39.6)	294 (48.7)	143	77	120 (40.8)	118 (62.1)	146	76.5	43 (36.4)
70-74	647 (50.3)	142	74	273 (42.2)	473 (45.9)	142	75	202 (42.7)	174 (67.7)	144.5	74	71 (40.8)
75-79	746 (44.3)	142	73	326 (43.7)	538 (39.2)	141	73	238 (44.2)	208 (66.7)	142	72.5	88 (42.3)
80-84	717 (42.8)	145	72	279 (38.9)	527 (38.8)	144	71	211 (40)	190 (59.9)	150	73	68 (35.8)
≥85	742 (33.5)	145	70	297 (40)	533 (29.7)	143	70	228 (42.8)	209 (49.6)	149	72	69 (33)
Sex												
Male	2618 (47.6)	142	75	1130 (43.2)	1857 (42.9)	141	75	821 (44.2)	761 (64.5)	144	76	309 (40.6)
Female	1906 (44.2)	143	76	779 (40.9)	1341 (39.4)	142	76	577 (43)	565 (62.2)	145	77	202 (35.8)

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.

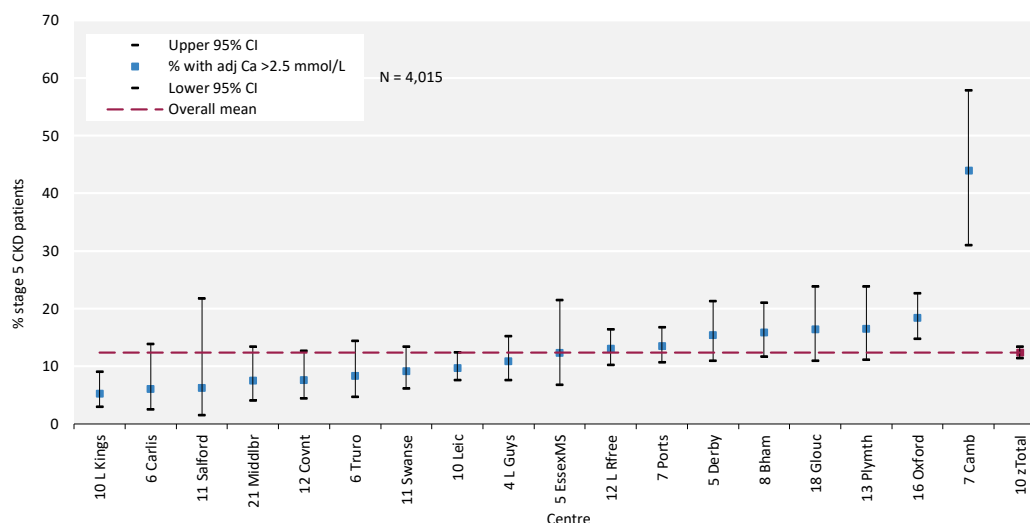


Figure 1.3 Percentage of adult patients prevalent to CKD stage G5 on 31/12/2021 with adjusted serum calcium (Ca) >2.5 mmol/L by centre

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.

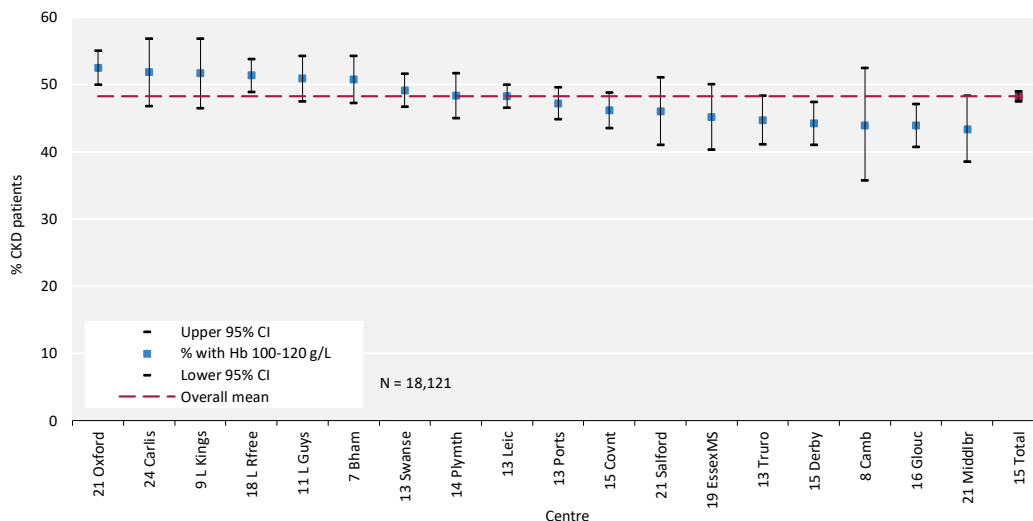


Figure 1.4 Percentage of adult patients prevalent to CKD stages G4 and 5 on 31/12/2020 with haemoglobin (Hb) 100–120 g/L by centre

CI - confidence interval

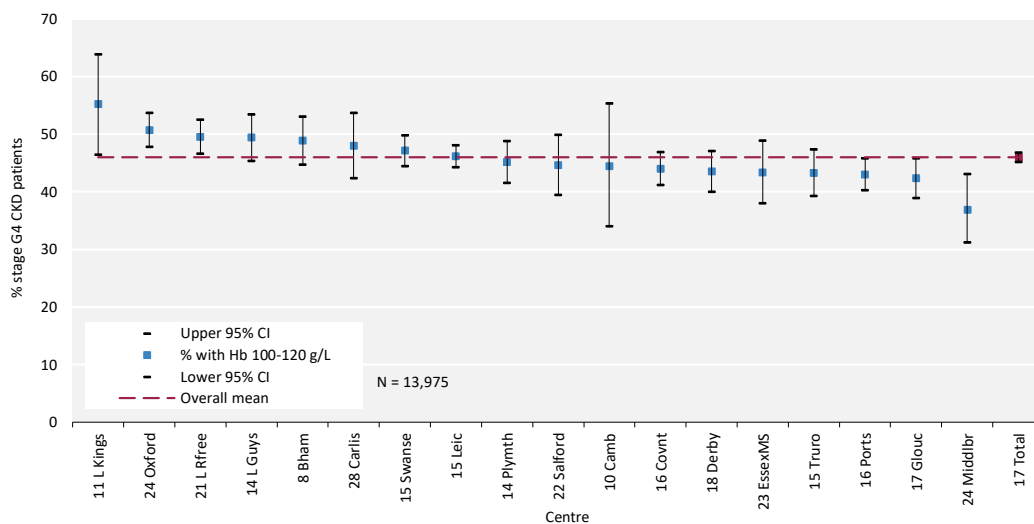


Figure 1.5 Percentage of adult patients prevalent to CKD stage G4 on 31/12/2021 with haemoglobin (Hb) 100–120 g/L by centre

CI - confidence interval

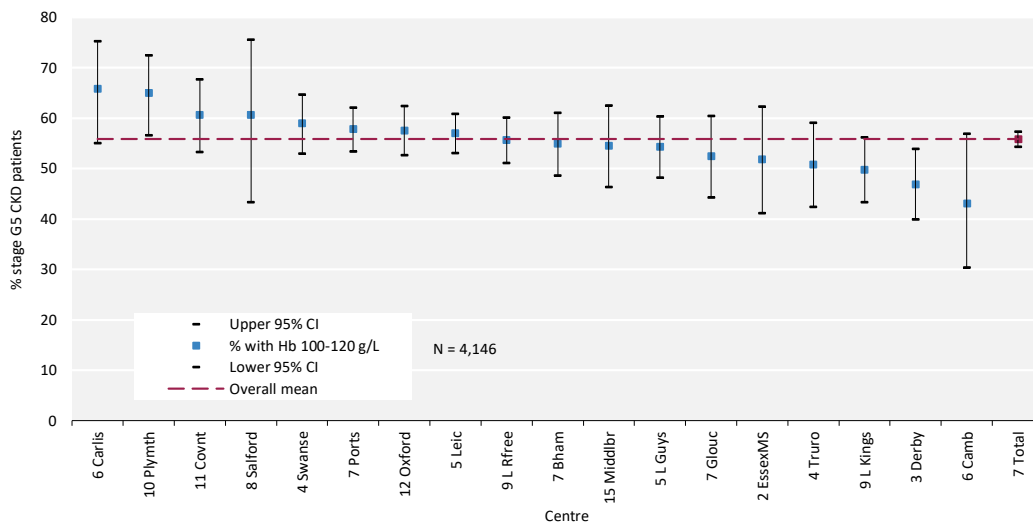


Figure 1.6 Percentage of adult patients prevalent to CKD stage G5 on 31/12/2021 with haemoglobin (Hb) 100-120 g/L by centre

CI - confidence interval

Chapter 2

Adults starting kidney replacement therapy (KRT) for end-stage kidney disease (ESKD) in the UK in 2021

Contents

Introduction	13
Rationale for analyses	15
Key findings	17
Analyses	18
Changes to the incident adult KRT population	18
Demographics and start modality of incident adult KRT patients	21
Modality changes of incident adult KRT patients	26
Late presentation to nephrology services of incident adult KRT patients	30
Start estimated glomerular filtration rate in incident adult KRT patients	33
Anaemia in incident adult KRT patients	34
Biochemistry parameters in incident adult KRT patients	37
Dialysis access in incident adult dialysis patients	39
Survival in incident adult KRT patients	45
Cause of death in incident adult KRT patients	51

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 2021 (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.

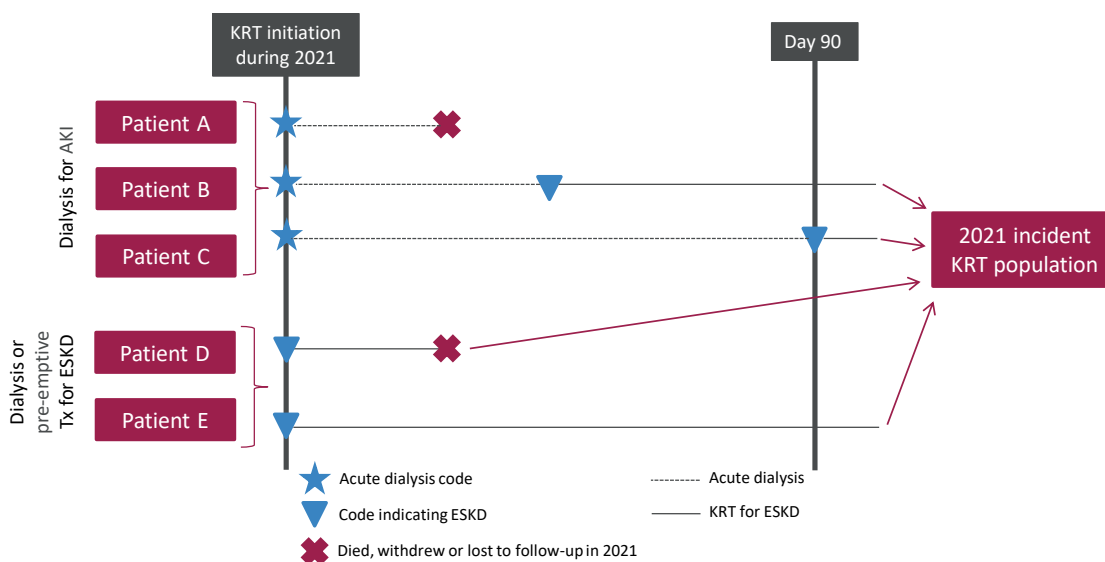


Figure 2.1 Example histories for patients starting KRT, illustrating the use of timeline codes to define dialysis as being ‘acute’ or for ESKD

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.

Survival and cause of death analyses were undertaken on historic incident cohorts to allow sufficient follow-up time and numbers of patients. Dialysis access data were collected separately to the main UKRR quarterly data returns via the 2021 Multisite Dialysis Access Audit. As of the 23rd annual report, fewer data items were collected to reduce the burden on centres and, in future years, the audit will be stopped entirely in centres that provide the data in their regular data returns to the UKRR.

This chapter addresses the following key aspects of the care of patients incident to 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 2021 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 2021 is reported in this chapter (table 2.1). Audit measures in guidelines that have been archived are not included.

Some audit measures – for example, the target for glycated haemoglobin (HbA1c) in those on hypoglycaemia-inducing treatment – cannot be reported because the completeness of the required data is too low. Further detail about the completeness of data returned to the UK Renal Registry (UKRR) is available through the UKRR data portal (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 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. Aggregate numbers by modality were provided, enabling inclusion in Tables 2.2 and 2.3. Exeter is excluded from all other analyses.

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 2.21
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 (2015)	>60% of all patients with established ESKD commencing planned HD should receive dialysis via a functioning AVF or AVG	Table 2.16, figure 2.17
Peritoneal access (2009)	>80% of catheters should be patent at 1 year (censoring for death and elective modality change)	Figure 2.7 shows the KRT modality of PD patients at 1 year

AVF – arteriovenous fistula; AVG – arteriovenous graft

Key findings

- 8,175 adult patients started KRT for ESKD in the UK in 2021, an increase of 7.3% from 2020.
- KRT incidence in adults was 154pmp.
- The median age of incident KRT patients was 63.7 years, but this was dependent on ethnicity (White 65.6 years, Asian 61.8 years and Black 57.8years).
- 63.9% of incident KRT patients were male.
- Diabetes remained the most common identifiable primary renal disease (PRD) and continues to account for an increasing proportion of patients starting KRT (31.3%).
- By 90 days after KRT start 5.2% of patients had died or stopped treatment.
- In 2021 21% of patients started KRT on PD, compared to 21.8% in 2020. This is still a higher proportion than previous years.
- In 2021 only 5.8% of patients started KRT with a transplant, lower than previous years and likely due to ongoing COVID related disruption.
- The mean eGFR at the start of KRT was 7.0 mL/min/1.73m² (HD 6.9 mL/min/1.73m², PD 7.4 mL/min/1.73m² and pre-emptive Tx 10.5 mL/min/1.73m²) compared to 7.2 mL/min/1.73m² in 2020.
- Late presentation was 18.2% which is higher than previous years and 16.4% in 2020.
- Of the 7,004 incident dialysis patients with dialysis access data, 50.2% started dialysis with definitive access (23.3% PD and 26.9% HD with an AVF or AVG), 32.3% with a TL and 17.5% with an NTL.
- A higher proportion of patients started haemodialysis with definitive access this year at 35.1% compared to 26.8% in 2020 and despite an increase in late presentation.
- Short-term (90 day) age-adjusted survival of incident KRT patients in a combined 2 year cohort (2019–2020) was 96.4%, which was slightly lower than the analysis of the 2018–2019 cohort.
- 1 year after 90 day age-adjusted survival for incident KRT patients in a combined 2 year cohort (2019–2020) was 90.4% (compared to 90.6% in the previous analysis of the 2018–2019 cohort).
- There were 8 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 (2017–2020): 3 centres below the lower 95% limit and 5 centres above the upper 95% limit. It is expected that 3 centres would be outside the limits by chance.
- There was no cause of death data available for 40.1% of deaths in the first 90 days of KRT. For those with data, the leading causes of death in the first 90 days were cardiac disease (23.9%) and infection (20.3%).

Analyses

Changes to the incident adult KRT population

For the 68 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)	2021 crude rate (pmp)
	2017	2018	2019	2020	2021		
ENGLAND							
Bham	385	370	372	332	352	2.05	171
Bradfd	82	71	106	83	80	0.49	163
Brightn	154	176	153	143	130	1.08	121
Bristol	157	166	165	131	157	1.22	128
Camb	94	121	135	136	150	0.94	160
Carlis	41	33	40	34	45	0.26	176
Carsh	229	244	229	296	294	1.63	180
Colchr	45	38	40	39	35	0.29	120
Covnt	120	128	141	141	150	0.80	189
Derby	89	84	90	72	88	0.56	157
Donc	56	52	53	47	44	0.38	117
Dorset	103	106	91	88	79	0.73	108
Dudley	58	53	56	61	60	0.34	174
EssexMS	142	125	149	127	134	0.99	135
Exeter*	140	132	157	105	157	0.95	165
Glouc	82	71	63	86	81	0.51	159
Hull	106	105	105	106	94	0.80	117
Ipswi	53	58	57	44	61	0.31	195
Kent	140	137	154	141	180	1.07	168
L Barts	342	344	311	320	253	1.59	159
L Guys	167	181	208	162	196	1.01	195
L Kings	170	150	186	159	219	0.93	234
L Rfree	236	244	265	232	283	1.33	213
L St.G	92	84	101	84	92	0.67	138
L West	408	392	392	364	418	1.96	213
Leeds	176	181	162	152	168	1.37	122
Leic	291	313	367	337	307	2.09	147
Liv Ain	55	66	57	53	63	0.43	146
Liv Roy	136	103	107	97	103	0.81	127
M RI	225	189	209	172	205	1.33	154
Middlbr	117	118	110	97	110	0.81	136
Newc	145	136	114	125	129	0.95	135
Norwch	80	83	105	96	96	0.69	139
Nottm	134	125	128	121	127	0.93	137
Oxford	217	216	203	203	193	1.45	133
Plymth	91	64	62	59	85	0.40	212
Ports	219	222	224	219	237	1.75	135
Prestn	169	180	156	167	197	1.23	160
Redng	105	103	116	100	107	0.70	153
Salford	173	161	172	173	143	1.15	124
Sheff	160	184	160	174	170	1.13	150

Table 2.2 Continued

Centre	N on KRT					Estimated catchment population (millions)	2021 crude rate (pmp)
	2017	2018	2019	2020	2021		
Shrew	62	77	66	45	62	0.41	151
Stevng	140	175	194	170	171	1.11	154
Stoke	100	105	100	117	131	0.73	179
Sund	95	89	88	68	69	0.55	126
Truro	59	61	55	45	71	0.36	198
Wirral	61	62	63	48	52	0.47	111
Wolve	90	94	95	109	121	0.55	220
York	59	51	58	47	49	0.49	101
N IRELAND							
Antrim	47	57	42	29	39	0.25	159
Belfast	78	73	74	78	102	0.53	191
Newry	30	32	30	30	39	0.24	166
Ulster	31	32	28	28	25	0.20	123
West NI	34	41	38	38	34	0.25	135
SCOTLAND							
Abrdn	54	58	29	56	54	0.50	108
Airdrie	66	64	70	55	65	0.46	142
D&Gall	16	18	17	19	13	0.12	106
Dundee	55	36	27	27	37	0.37	100
Edinb	126	106	108	87	91	0.84	108
Glasgw	202	210	203	180	207	1.37	151
Inverns	25	37	18	18	36	0.22	161
Klmarnk	49	38	44	57	39	0.29	133
Krkldy	41	38	45	37	43	0.27	157
WALES							
Bangor	27	25	19	29	20	0.16	122
Cardff	180	189	165	137	154	1.16	133
Clwyd	24	32	28	26	30	0.18	166
Swanse	130	140	159	123	126	0.76	166
Wrexm	25	29	31	38	23	0.21	111
TOTALS							
England	6,850	6,823	6,990	6,527	6,998	44.77	156
N Ireland	220	235	212	203	239	1.47	163
Scotland	634	605	561	536	585	4.45	131
Wales	386	415	402	353	353	2.49	142
UK	8,090	8,078	8,165	7,619	8,175	53.19	154

Country KRT populations were calculated by summing the KRT patients from centres in each country. Estimated country populations were derived from Office for National Statistics figures (see appendix A for details on estimated catchment population by kidney centre)

* Exeter was unable to submit 2021 patient level data. Numbers of incident patients in 2019 were used as estimate for 2021
pmp – per million population

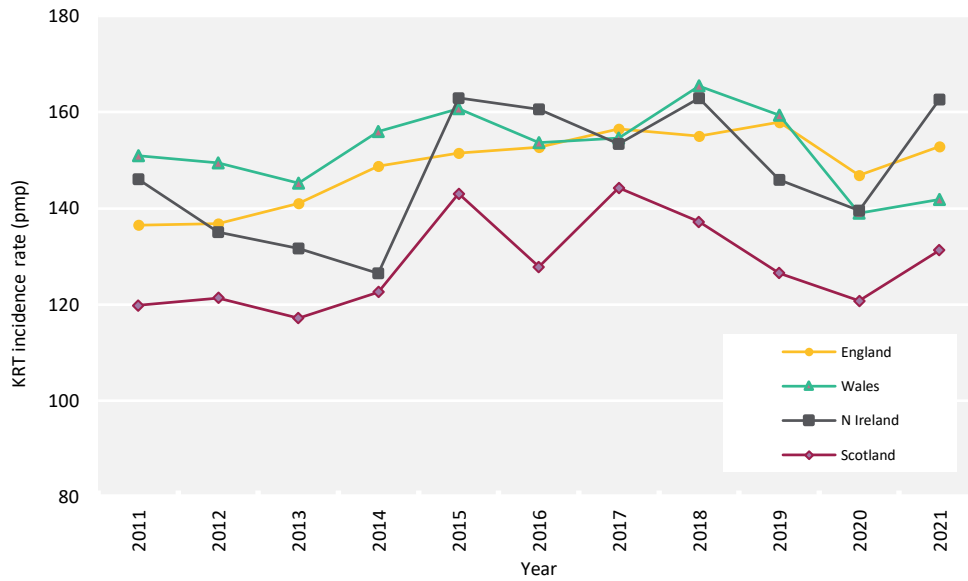


Figure 2.2 Adult KRT incidence rates by country between 2011 and 2021
pmp – per million population

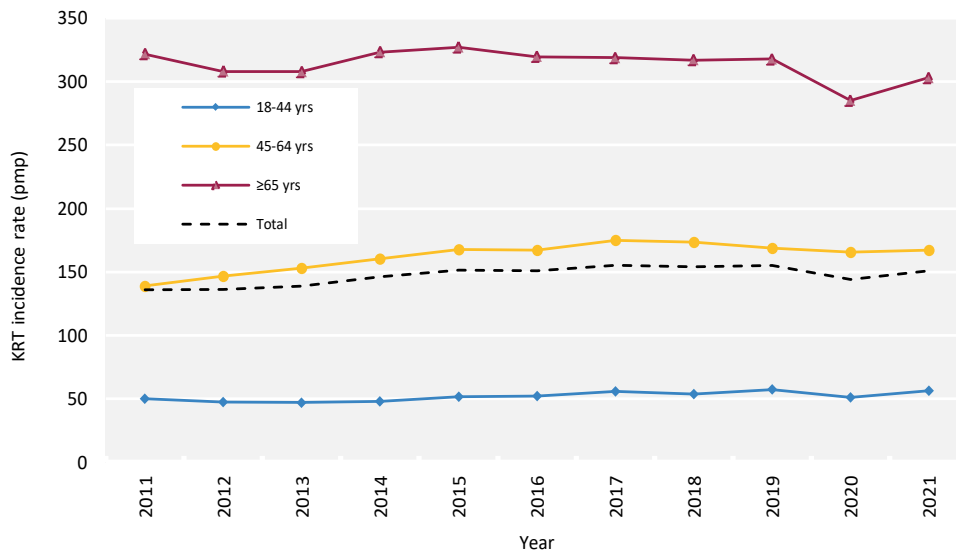


Figure 2.3 Adult KRT incidence rates by age group between 2011 and 2021
pmp – per million population

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 2021 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	352	67.6	29.0	0.6	2.8	12.8	64.1	65.9	60.6	26.7	10.3	2.4	6.3
Bradfd	80	72.5	27.5	0.0	0.0	11.3	62.1	52.5	57.5	35.0	1.3	6.3	0.0
Brightn	130	77.7	16.9	0.0	5.4	19.2	61.6	58.5	88.7	3.5	4.3	3.5	11.5
Bristol	157	71.3	22.9	0.0	5.7	17.2	59.9	60.5	81.0	8.5	8.5	2.1	9.6
Camb	150	72.7	8.7	0.0	18.7	22.0	64.8	64.0	94.5	3.9	0.8	0.8	15.3
Carlis	45	66.7	28.9	0.0	4.4	11.1	60.1	64.4	100.0	0.0	0.0	0.0	2.2
Carsh	294	79.6	20.1	0.0	0.3	4.8	64.1	61.2	66.7	18.4	8.0	6.9	11.2
Colchr	35	100.0	0.0	0.0	0.0	2.9	67.6	68.6	100.0	0.0	0.0	0.0	20.0
Covnt	150	75.3	19.3	0.7	4.7	13.3	67.6	68.0	82.7	12.7	4.7	0.0	0.0
Derby	88	62.5	27.3	6.8	3.4	13.6	66.5	60.2	83.5	12.7	1.3	2.5	10.2
Donc	44	79.6	20.5	0.0	0.0	13.6	63.2	61.4	97.7	2.3	0.0	0.0	2.3
Dorset	79	77.2	13.9	0.0	8.9	16.5	70.1	68.4	94.9	3.8	1.3	0.0	1.3
Dudley	60	83.3	16.7	0.0	0.0	13.3	61.0	75.0	76.7	18.3	3.3	1.7	0.0
EssexMS	134	67.2	29.9	0.0	3.0	5.2	67.6	73.9	86.3	3.4	7.7	2.6	12.7
Exeter*	157	77.7	18.5	0.6	3.2								
Glouc	81	80.3	16.1	0.0	3.7	16.0	67.5	64.2	86.8	5.3	5.3	2.6	6.2
Hull	94	80.9	18.1	0.0	1.1	3.2	61.0	62.8	96.8	3.2	0.0	0.0	1.1
Ipswi	61	85.3	8.2	0.0	6.6	14.8	72.9	62.3	84.2	1.8	5.3	8.8	6.6
Kent	180	77.8	20.0	0.0	2.2	10.6	65.5	66.1	91.4	2.9	2.3	3.4	3.3
L Barts	253	49.0	45.5	0.0	5.5	17.8	58.7	58.9	28.4	41.4	22.8	7.3	8.3
L Guys	196	78.6	14.3	0.0	7.1	15.3	63.2	59.7	51.0	11.1	32.7	5.2	21.9
L Kings	219	79.0	18.3	0.9	1.8	7.3	61.9	62.6	42.4	13.2	41.5	2.9	6.4
L Rfree	283	68.2	24.4	0.0	7.4	15.9	63.5	65.0	40.5	23.2	23.6	12.7	22.3
L St.G	92	63.0	28.3	0.0	8.7	25.0	60.3	70.7	36.0	20.0	16.0	28.0	18.5
L West	418	73.7	22.3	0.0	4.1	17.5	62.8	63.9	41.0	37.9	18.9	2.2	0.2
Leeds	168	79.2	13.7	0.6	6.6	25.6	61.3	65.5	76.2	15.5	6.0	2.4	0.0
Leic	307	78.8	18.6	0.0	2.6	13.7	66.1	66.5	72.6	20.7	4.4	2.2	12.1
Liv Ain	63	81.0	17.5	0.0	1.6	6.3	62.1	58.7	89.7	0.0	3.4	6.9	7.9
Liv Roy	103	68.0	16.5	2.9	12.6	18.4	58.3	68.0	93.6	3.2	1.1	2.1	8.7
M RI	205	62.0	22.0	6.3	9.8	20.5	62.8	62.4	60.5	16.2	20.4	3.0	18.5
Middlbr	110	85.5	9.1	0.0	5.5	12.7	63.2	59.1	93.1	3.9	2.0	1.0	7.3
Newc	129	69.8	19.4	0.0	10.9	24.0	62.9	67.4	89.8	4.7	2.3	3.1	0.8
Norwch	96	79.2	20.8	0.0	0.0	3.1	69.2	58.3	92.8	1.4	1.4	4.3	28.1
Nottm	127	58.3	36.2	0.0	5.5	19.7	63.6	73.2	85.5	8.1	5.6	0.8	2.4
Oxford	193	64.3	25.4	0.0	10.4	30.6	62.3	64.8					43.5
Plymth	85	70.6	17.7	0.0	11.8	23.5	63.1	70.6	98.8	0.0	0.0	1.2	2.4
Ports	237	74.7	17.3	3.4	4.6	13.5	66.1	58.7					30.4
Prestn	197	72.1	17.8	1.0	9.1	24.4	62.5	67.5	81.1	17.9	1.0	0.0	0.5
Redng	107	66.4	25.2	0.0	8.4	15.9	59.7	72.0	68.6	19.8	2.3	9.3	19.6
Salford	143	81.8	9.8	0.0	8.4	21.7	59.0	59.4	70.6	18.9	7.7	2.8	0.0
Sheff	170	70.0	24.1	0.6	5.3	14.1	62.0	62.9	89.1	4.8	4.2	1.8	2.9
Shrew	62	59.7	35.5	1.6	3.2	17.7	64.0	62.9	91.4	0.0	1.7	6.9	6.5
Stevng	171	79.0	16.4	1.2	3.5	11.7	63.0	69.6	66.7	21.3	8.0	4.0	12.3
Stoke	131	57.3	39.7	0.0	3.1	10.7	65.0	58.8	81.2	6.8	6.8	5.1	10.7

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
Sund	69	59.4	37.7	0.0	2.9	5.8	70.2	59.4	92.8	2.9	0.0	4.3	0.0
Truro	71	87.3	9.9	0.0	2.8	9.9	67.6	56.3	97.2	1.4	0.0	1.4	0.0
Wirral	52	71.2	28.9	0.0	0.0	5.8	67.4	67.3	98.1	0.0	1.9	0.0	0.0
Wolve	121	74.4	18.2	6.6	0.8	6.6	64.5	63.6	58.7	28.1	6.6	6.6	0.0
York	49	69.4	16.3	0.0	14.3	28.6	64.5	49.0	95.9	4.1	0.0	0.0	0.0
N IRELAND													
Antrim	39	71.8	25.6	0.0	2.6	12.8	66.9	59.0					69.2
Belfast	102	52.9	18.6	0.0	28.4	38.2	64.4	58.8	98.6	1.4	0.0	0.0	29.4
Newry	39	74.4	23.1	0.0	2.6	12.8	72.7	53.8	100.0	0.0	0.0	0.0	17.9
Ulster	25	88.0	12.0	0.0	0.0	12.0	68.4	64.0	96.0	4.0	0.0	0.0	0.0
West NI	34	85.3	8.8	0.0	5.9	23.5	72.7	70.6	100.0	0.0	0.0	0.0	5.9
SCOTLAND													
Abrdn	54	77.8	16.7	0.0	5.6	13.0	66.5	70.4					
Airdrie	65	81.5	18.5	0.0	0.0	18.5	61.7	53.8					
D&Gall	13	69.2	7.7	0.0	23.1	38.5	69.0	53.8					
Dundee	37	73.0	27.0	0.0	0.0	13.5	67.6	67.6					
Edinb	91	58.2	28.6	0.0	13.2	33.0	60.3	68.1					
Glasgw	207	76.3	11.6	0.0	12.1	31.9	61.7	60.4					
Inverns	36	61.1	22.2	0.0	16.7	33.3	63.5	69.4					
Klmarnk	39	66.7	33.3	0.0	0.0	17.9	65.4	56.4					
Krkldy	43	95.4	4.7	0.0	0.0	7.0	68.3	65.1					
WALES													
Bangor	20	60.0	40.0	0.0	0.0	5.0	67.4	60.0	100.0	0.0	0.0	0.0	30.0
Cardff	154	79.2	11.0	1.3	8.4	15.6	62.8	70.8	93.1	4.6	2.3	0.0	15.6
Clwyd	30	83.3	16.7	0.0	0.0	3.3	68.0	60.0					36.7
Swanse	126	80.2	14.3	0.0	5.6	12.7	63.2	68.3	97.6	1.6	0.8	0.0	0.8
Wrexm	23	91.3	4.4	0.0	4.4	13.0	64.6	69.6	100.0	0.0	0.0	0.0	4.3
TOTALS													
England	6,998	72.4	21.7	0.7	5.2	15.1	63.6	63.9	72.1	15.0	9.2	3.7	9.8
N Ireland	239	67.8	18.4	0.0	13.8	25.1	66.8	60.3	98.8	1.2	0.0	0.0	27.6
Scotland	585	73.7	18.0	0.0	8.4	25.1	63.3	62.7					
Wales	353	79.6	13.9	0.6	6.0	12.7	64.0	68.3	96.1	2.6	1.3	0.0	12.2
UK	8,175	72.6	21.0	0.7	5.7	16.1	63.7	63.9	74.0	14.0	8.6	3.4	10.5

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

Breakdown by ethnicity is not shown for centres with <70% data completeness, but these centres were included in national averages

*Exeter was unable to submit 2021 patient level data, numbers of incident patients in 2019 were used as estimate for 2021

UK ethnicity distribution and completeness does not include Scotland

Table 2.4 Demographics, primary renal diseases (PRDs), referral time and start modality of adult patients incident to KRT in 2021 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	593	718	1,200	1,707	2,038	1,546	216	8,018	63.7
%	7.4	9.0	15.0	21.3	25.4	19.3	2.7		
Sex (%)									
Male	60.7	61.1	64.4	63.0	64.0	65.7	71.8	63.9	64.1
Female	39.3	38.9	35.6	37.0	36.0	34.3	28.2	36.1	63.1
Ethnicity (%)									
White	72.7	66.7	65.2	69.8	77.2	83.9	80.2	74.0	65.6
Asian	15.0	17.5	16.5	15.0	14.6	9.1	8.9	14.0	61.8
Black	8.6	11.5	13.2	10.7	5.4	5.7	6.8	8.6	57.8
Other	3.6	4.3	5.0	4.5	2.8	1.3	4.2	3.4	58.5
Missing	10.4	10.1	9.7	10.8	10.6	11.1	8.6	10.5	64.2
PRD (%)									
Diabetes	20.0	25.8	30.2	37.4	36.1	26.8	23.0	31.3	63.7
Glomerulonephritis	27.4	17.3	15.8	14.0	11.1	7.3	3.7	13.3	56.7
Hypertension	5.6	7.7	7.2	6.5	5.5	7.9	11.8	6.8	63.3
Polycystic kidney disease	2.9	10.1	13.3	7.2	4.2	2.9	1.9	6.4	55.1
Pyelonephritis	6.4	3.7	4.7	4.2	5.0	5.0	9.3	4.9	64.7
Renal vascular disease	0.6	1.3	2.1	2.4	6.3	9.4	10.6	4.6	73.7
Other	22.7	20.5	15.9	15.6	17.0	19.3	12.4	17.6	63.3
Uncertain aetiology	14.4	13.8	10.8	12.7	14.7	21.4	27.3	15.1	67.4
Missing	13.2	13.0	13.4	12.3	15.1	16.1	25.5	14.4	66.1
Referral time (%)									
<90 days	24.0	24.3	17.4	17.4	16.9	16.8	16.0	18.2	61.8
≥90 days	76.0	75.7	82.6	82.6	83.1	83.2	84.0	81.8	64.2
Missing	7.4	6.2	5.6	5.7	5.8	5.5	7.6	5.9	63.8
Start modality (%)									
ICHD	59.5	61.7	67.3	71.2	75.2	82.6	87.0	72.5	65.6
HHD	0.8	1.1	0.7	0.6	0.7	0.3	0.5	0.6	57.1
PD	27.7	28.1	22.6	21.4	20.1	16.0	12.5	21.0	60.4
Tx	12.0	9.1	9.5	6.8	4.0	1.0	0.0	5.8	53.8

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

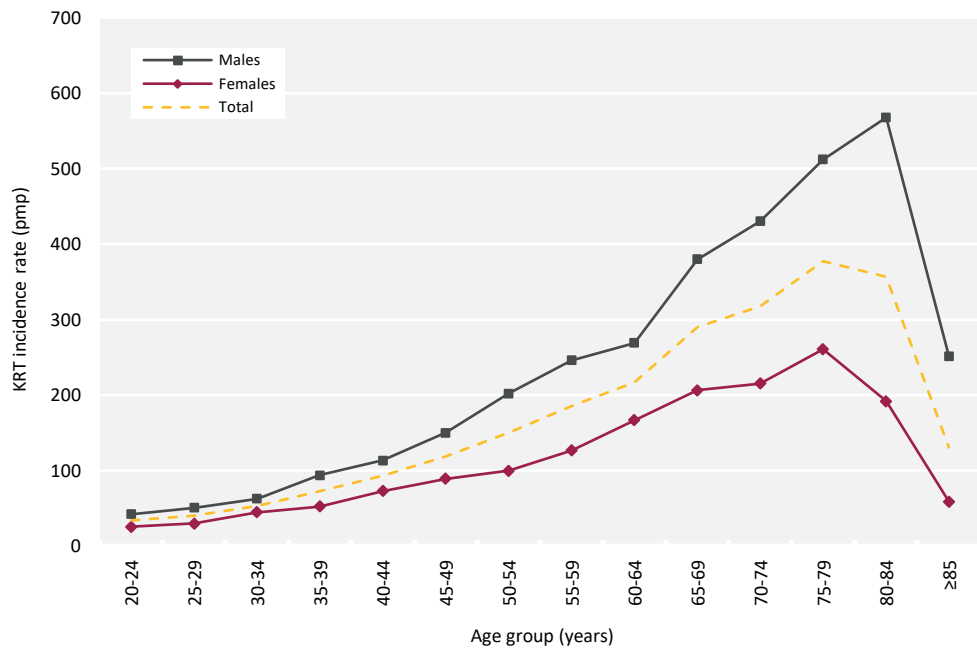


Figure 2.4 Incidence rates for adult patients starting KRT in 2021 by age group and sex
pmp – per million population

Table 2.5 Change in primary renal disease (PRD) of adult patients incident to KRT from 2012 to 2021

PRD	Year of KRT start									
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Diabetes	25.3	25.3	26.3	26.9	27.5	28.7	29.8	30.7	30.6	31.3
Glomerulonephritis	13.7	14.3	12.9	13.4	13.3	13.6	13.0	13.1	12.3	13.3
Hypertension	7.4	7.5	6.4	6.6	6.2	6.5	6.7	7.5	7.2	6.8
Polycystic kidney disease	6.7	7.6	6.5	7.2	6.7	6.8	7.0	6.9	6.7	6.4
Pyelonephritis	6.7	6.6	5.7	6.2	6.2	5.7	5.1	5.4	5.4	4.9
Renal vascular disease	6.2	5.3	6.1	5.9	6.1	5.7	5.6	5.5	4.9	4.6
Other	17.4	18.1	19.8	18.7	18.6	18.7	18.7	16.8	18.1	17.6
Uncertain aetiology	16.6	15.4	16.2	15.0	15.3	14.5	14.1	14.1	14.9	15.1
Missing	2.1	3.2	1.7	2.7	3.2	5.5	4.4	6.9	9.4	14.4

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 2021. Please visit the UKRR data portal (ukkidney.org/audit-research/data-portals) to identify individual kidney centres.

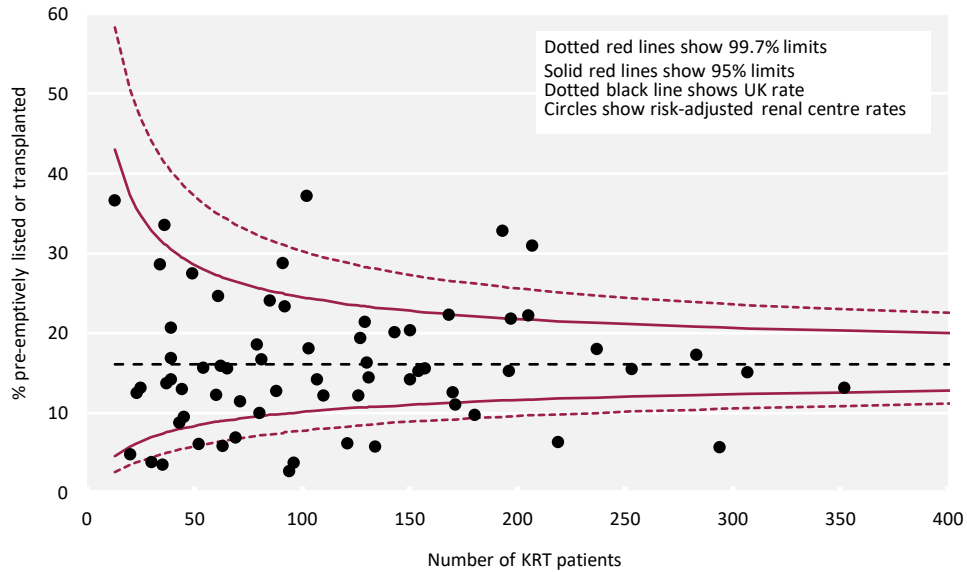


Figure 2.5 Transplant-status (listed or transplanted) at the start of KRT for adult patients incident to KRT in 2021 by centre
Analysis is adjusted for age, sex and PRD (diabetes versus non-diabetes)

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 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				
2016	71.7	0.5	20.0	7.8
2017	71.5	0.4	19.2	9.0
2018	71.7	0.4	19.6	8.3
2019	71.0	0.4	20.1	8.4
2020	71.9	0.4	21.8	6.0
2021	72.5	0.7	21.0	5.8
Day 90 modality				
Oct 2015 - Sept 2016	68.5	0.9	20.4	10.2
Oct 2016 - Sept 2017	68.5	0.8	20.0	10.7
Oct 2017 - Sept 2018	69.1	1.0	19.8	10.2
Oct 2018 - Sept 2019	68.3	1.1	20.8	9.9
Oct 2019 - Sept 2020	69.8	1.0	21.5	7.7
Oct 2020 - Sept 2021	70.5	1.1	21.4	7.1

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 01/10/2020 and 30/09/2021 by country

Country	N	Patients who started KRT					Patients still on RRT at 90 days		
		% on HD ¹	% on PD	% with Tx	% discontinued ²	% died	% on HD ¹	% on PD	% with Tx
England	6,778	67.3	21.1	6.3	0.8	4.6	71.1	22.3	6.6
N Ireland	235	66.4	14.9	13.2	4.7	0.9	70.3	15.8	14.0
Scotland	561	71.5	16.0	9.5	0.0	3.0	73.7	16.5	9.7
Wales	348	74.4	14.7	6.3	0.9	3.7	78.0	15.4	6.6
UK	7,922	67.9	20.3	6.7	0.9	4.3	71.5	21.4	7.1

¹HD includes ICHD and HHD

²Discontinued did not include patients who recovered function within 90 days, because by definition they were not included in the incident cohort

Table 2.8 Start and subsequent KRT modalities for adult patients incident to KRT in 2016 by time after start

Start modality	N	Later modality	Time after start (%)			
			90 days	1 yr	3 yrs	5 yrs
HD	5,639	HD	90.3	73.2	44.1	24.5
		PD	2.2	2.7	1.2	0.4
		Tx	1.2	6.0	15.5	18.2
		Other	1.0	2.1	2.4	2.3
		Died	5.2	15.9	36.9	54.6
PD	1,564	HD	5.9	16.4	20.5	14.5
		PD	89.3	58.6	18.5	6.7
		Tx	2.9	16.3	36.3	40.0
		Other	0.6	1.5	1.3	1.5
		Died	1.2	7.2	23.4	37.3
Tx	608	HD	0.5	0.8	1.0	1.6
		PD	0.0	0.3	0.5	0.3
		Tx	99.2	97.2	93.4	87.8
		Other	0.2	0.5	1.3	1.8
		Died	0.2	1.2	3.8	8.4

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

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 2020 to allow one year follow-up time.

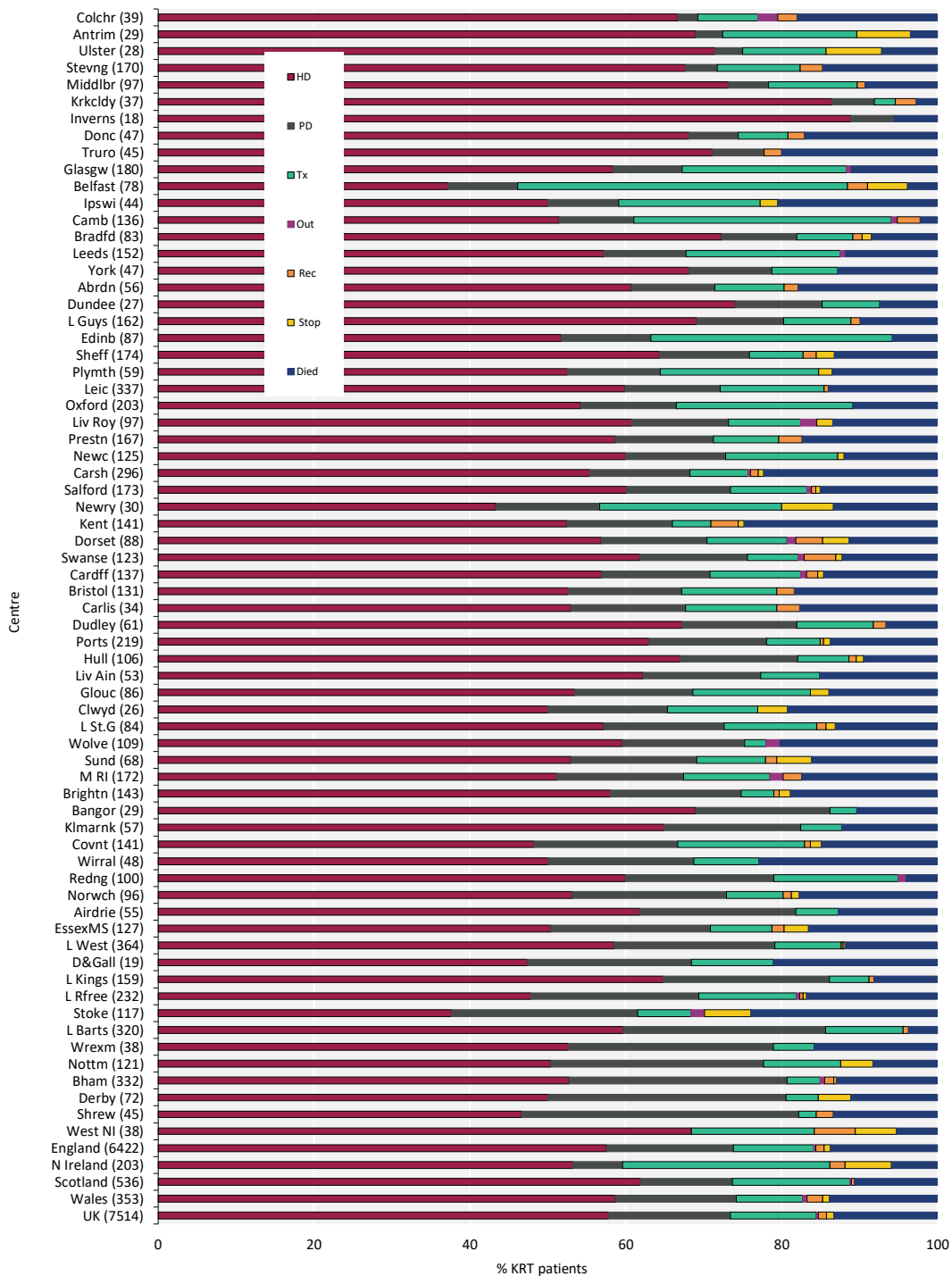


Figure 2.6 KRT modality at 1 year for incident adult KRT patients who started KRT in 2020 by centre

Number of patients in a centre in brackets

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

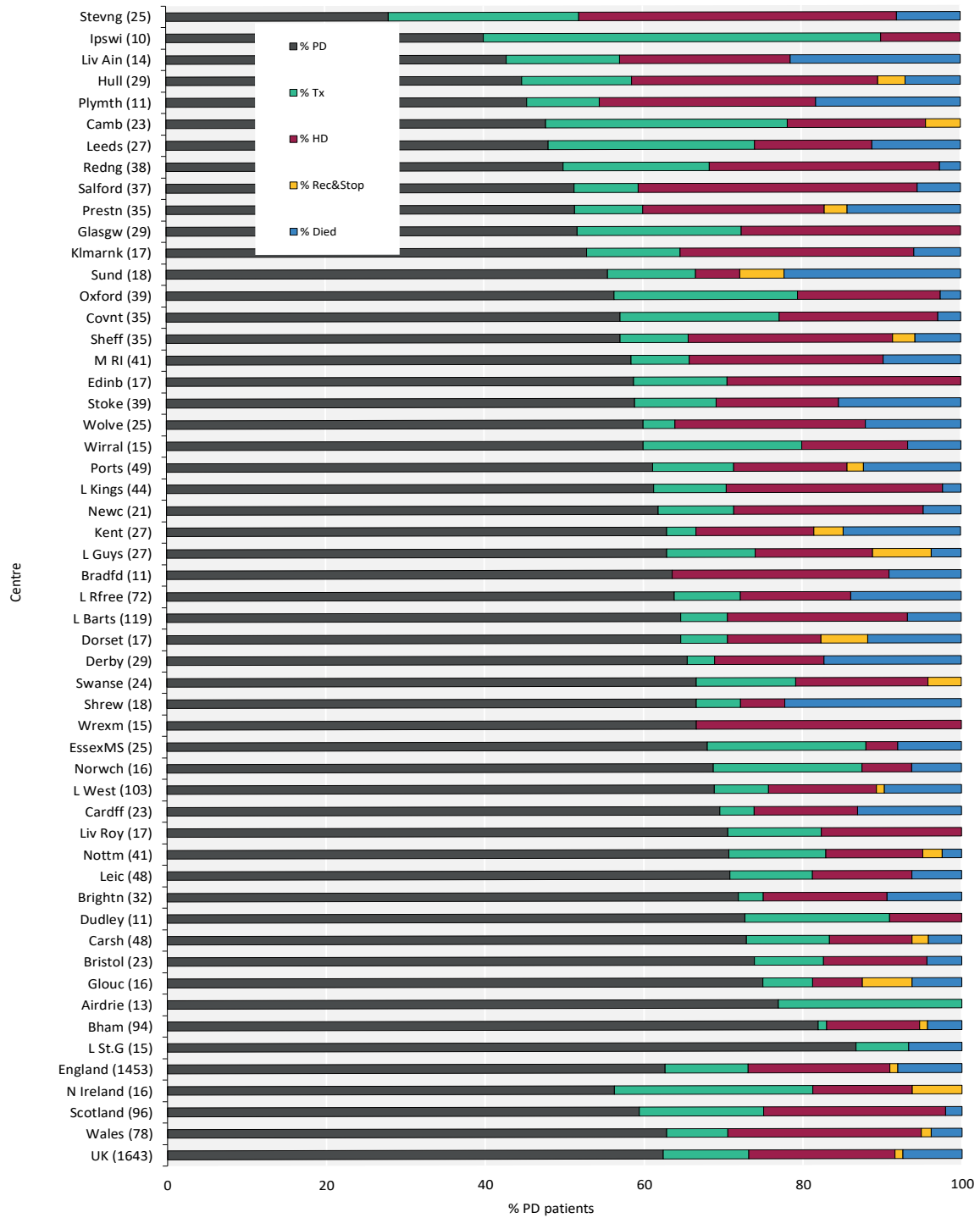


Figure 2.7 KRT modality at 1 year for incident adult PD patients who started KRT in 2020 by centre

Number of patients in a centre in brackets

Rec – recovered kidney function; Stop – treatment withdrawal

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 (2020–2021) 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 (2020–2021 2 year cohort)

Centre	N on KRT		N with referral data	% data completeness		% presenting <90 days before KRT start		% presenting <1 yr before KRT start
	2020	2021		2020	2021	All PRDs	Non-diabetes PRDs	All PRDs
ENGLAND								
Bham	332	352	684	100.0	100.0	17.1	23.3	28.9
Bradfd	83	80	163	100.0	100.0	11.7	15.3	20.2
Brightn	143	130	272	99.3	100.0	14.7	17.0	27.6
Bristol	131	157	263	82.4	98.7	18.6	23.6	28.1
Camb	136	150	285	100.0	99.3	21.8	22.9	38.6
Carlis	34	45	79	100.0	100.0	13.9	20.8	22.8
Carsh	296	294	578	99.3	96.6	23.0		36.0
Colchr	39	35		10.3	8.6			
Covnt	141	150	289	99.3	99.3	14.9	19.2	25.6
Derby	72	88	160	100.0	100.0	18.8	21.4	28.8
Donc	47	44	89	97.9	97.7	9.0	11.5	24.7
Dorset	88	79	166	100.0	98.7	15.7	19.8	24.7
Dudley	61	60	121	100.0	100.0	17.4	16.7	27.3
EssexMS	127	134	247	98.4	91.0	23.9	28.0	39.3
Exeter	105	0	105	100.0		13.3	20.8	21.9
Glouc	86	81	163	98.8	96.3	16.0	18.1	27.0
Hull	106	94	199	99.1	100.0	30.2	34.2	42.7
Ipswi	44	61	84	90.9	72.1	15.5		32.1
Kent	141	180	320	99.3	100.0	10.0	12.1	15.9
L Barts	320	253		60.9	47.8			
L Guys	162	196	345	98.8	94.4	15.9	16.7	33.6
L Kings	159	219	369	99.4	96.3	21.4	25.0	30.6
L Rfree	232	283	505	98.3	97.9	16.6	16.7	27.9
L St.G	84	92	176	100.0	100.0	23.3	26.9	44.9
L West	364	418	778	99.5	99.5	16.7	18.7	33.0
Leeds	152	168	320	100.0	100.0	17.2	19.1	27.8
Leic	337	307	641	99.7	99.3	17.0	14.0	24.3
Liv Ain	53	63	116	100.0	100.0	19.8	23.8	29.3
Liv Roy	97	103	200	100.0	100.0	21.0		31.0
M RI	172	205	319	84.9	84.4	20.4		27.3
Middlbr	97	110	203	99.0	97.3	18.2	20.3	33.5
Newc	125	129	254	100.0	100.0	16.1	20.9	25.6
Norwch	96	96	81	84.4	37.5	32.1	33.9	44.4
Nottm	121	127	248	100.0	100.0	11.7	15.5	23.0
Oxford	203	193	394	99.5	99.5	13.5	19.2	24.6
Plymth	59	85	144	100.0	100.0	27.8	33.0	41.0
Ports	219	237	436	97.3	94.1	15.1		26.1
Prestn	167	197	358	100.0	97.0	17.0	20.4	31.0
Redng	100	107	206	99.0	100.0	16.0	21.3	21.8
Salford	173	143	316	100.0	100.0	15.8	20.9	30.7
Sheff	174	170	342	98.9	100.0	14.9	17.1	25.4
Shrew	45	62	105	97.8	98.4	16.2	19.8	32.4
Stevng	170	171	331	98.8	95.3	14.5	18.3	21.8

Table 2.9 Continued

Centre	N on KRT		N with referral data	% data completeness		% presenting <90 days before KRT start		% presenting <1 yr before KRT start
	2020	2021		2020	2021	All PRDs	Non-diabetes PRDs	All PRDs
Stoke	117	131		61.5	57.3			
Sund	68	69	136	100.0	98.6	13.2	15.7	25.7
Truro	45	71	116	100.0	100.0	14.7	20.5	24.1
Wirral	48	52	100	100.0	100.0	14.0	19.7	26.0
Wolve	109	121	226	98.2	98.3	15.5	18.6	24.3
York	47	49	96	100.0	100.0	15.6	17.8	21.9
N IRELAND								
Antrim	29	39	68	100.0	100.0	14.7	10.0	20.6
Belfast	78	102	169	96.2	92.2	24.3	23.0	30.8
Newry	30	39	67	100.0	94.9	16.4	7.9	26.9
Ulster	28	25	53	100.0	100.0	17.0	22.2	20.8
West NI	38	34	72	100.0	100.0	26.4	33.3	30.6
WALES								
Bangor	29	20	49	100.0	100.0	12.2	16.2	28.6
Cardff	137	154	287	99.3	98.1	11.5	12.2	20.2
Clwyd	26	30	56	100.0	100.0	8.9	11.4	19.6
Swanse	123	126	249	100.0	100.0	15.7	19.7	25.7
Wrexm	38	23	59	97.4	95.7	25.4	26.7	35.6
TOTALS								
England	6,527	6,841	12,634	95.3	93.8	17.3	19.6	28.8
N Ireland	203	239	429	98.5	95.8	21.0	20.7	27.3
Wales	353	353	700	99.4	98.9	14.0	16.6	24.0
E, W & NI	7,083	7,433	13,763	95.6	94.1	17.2	19.5	28.5

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

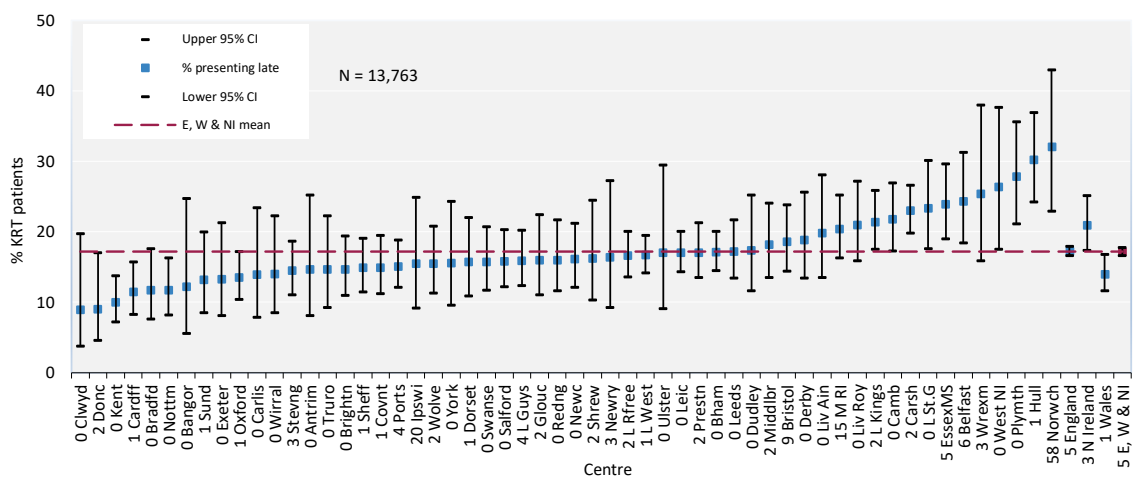


Figure 2.8 Percentage of incident adult KRT patients presenting late (<90 days) to a nephrologist (2019–2021 2 year cohort)
 CI – confidence interval

Table 2.10 Characteristics of incident adult KRT patients by referral time (2020–2021 2 year cohort)

Characteristic	Referral time	
	<90 days	≥90 days
Median age (yrs)	62.6	64.0
% male	68.1	63.6
% starting on PD	9.8	24.5
% on PD at 90 days	11.9	23.3
Mean haemoglobin at KRT start (g/L)	94	100
Mean eGFR at KRT start (mL/min/1.73m ²) ¹	6.2	7.2

¹Data available for approximately 35% of patients
 eGFR – estimated glomerular filtration rate

Late presentation is shown by PRDs, which were grouped into categories as shown in table 2.11, with the mapping of disease codes into groups explained in more detail in appendix A. The proportion of patients with each PRD presenting late is shown for patients with PRD data. The proportion of patients with no PRD data is shown on a separate line.

Table 2.11 Referral time of incident adult KRT patients by primary renal disease (PRD) (2020–2021 2 year cohort)

PRD	N with data	Referral time			
		<90 days		≥90 days	
		N	%	N	%
Diabetes	3,788	335	8.8	3,453	91.2
Glomerulonephritis	1,541	203	13.2	1,338	86.8
Hypertension	890	147	16.5	743	83.5
Polycystic kidney disease	791	41	5.2	750	94.8
Pyelonephritis	623	110	17.7	513	82.3
Renal vascular disease	574	72	12.5	502	87.5
Other	2,202	742	33.7	1,460	66.3
Uncertain aetiology	1,867	338	18.1	1,529	81.9
Total (with data)	12,276	1,988	16.2	10,288	83.8
Missing	1,487	380	25.6	1,107	74.4

Table 2.12 Referral time of incident adult KRT patients by year of start (restricted to centres reporting continuous data for 2015–2021)

Referral time	KRT start year (%)						
	2015	2016	2017	2018	2019	2020	2021
<90 days	16.1	15.2	16.0	15.1	15.7	15.9	18.1
3-6 mths	4.6	4.7	4.8	4.5	4.1	3.7	4.5
6-12 mths	7.9	8.2	6.9	7.4	7.7	7.5	6.7
≥12 mths	71.4	72.0	72.3	73.1	72.4	72.8	70.7

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 (35% overall), (ii) if the date of KRT start is incorrect, the documented start eGFR may have been taken after the patient had started KRT.

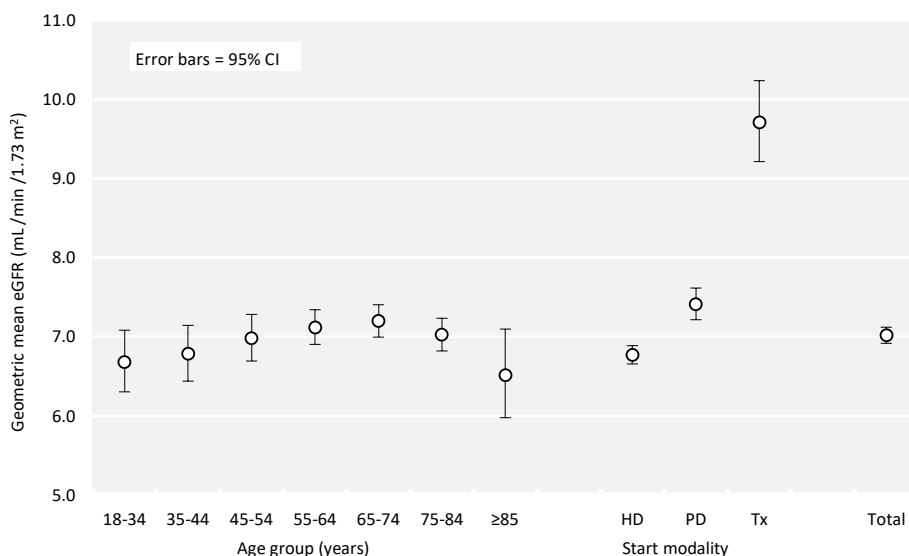


Figure 2.9 Geometric mean estimated glomerular filtration rates (eGFR) for adult patients incident to KRT in 2021 by age group and start modality

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 2021 by centre

Centre	All KRT patients		Median Hb (g/L) by modality			Median Hb (g/L) by presentation time		% data completeness
	Median Hb (g/L)	% Hb \geq 100 g/L	Tx	PD	HD	\geq 90 days	<90 days	
ENGLAND								
Bham	99	47.9	105	105	94	100	91	94.9
Bradfd	99	46.3		112	94	99		83.8
Brightn	102	58.1		111	100	102	96	95.4
Bristol	104	68.4		113	101	105	101	98.7
Camb	100	53.3	106	111	97	102	97	71.3
Carlis	100	51.1		114	93	101		100.0
Carsh	94	40.3		106	92	97	92	96.3
Colchr								65.7
Covnt	98	46.5		107	94	100	92	96.0
Derby	97	40.5		104	94	98	95	95.5
Donc	95	39.0			91	97		93.2
Dorset	100	52.0			96	101	94	94.9
Dudley	95	39.7		109	93	97	91	96.7
EssexMS	93	35.7		105	90	98	88	94.0
Exeter								
Glouc	99	48.7		105	98	98	101	96.3
Hull	97	45.9		110	93	104	88	90.4
Ipswi	92	30.5			90	92		96.7
Kent	97	42.5		105	95	97	91	96.7
L Barts								56.9
L Guys	93	31.3	99	103	91	93	93	98.0
L Kings	96	41.0		103	93	97	92	91.3
L Rfree	100	51.3	110	105	96	101	97	98.6
L St.G	94	40.5		103	90	97	92	96.7
L West	101	54.3	117	105	100	102	93	72.3
Leeds	91	30.6	110	106	89	93	83	95.2
Leic	95	41.5	108	106	93	98	91	90.2
Liv Ain								44.4
Liv Roy								44.7
M RI	95	42.2	103	100	94	96	93	97.1
Middlbr	100	50.0			99	101	87	90.9
Newc	98	46.5	111	107	94	100	85	98.5
Norwch	96	45.7		112	89			84.4
Nottm	100	50.8		107	95	101	91	94.5
Oxford	98	43.7	101	102	95	98	91	94.8
Plymth	100	54.2	108	109	99	100	102	97.7
Ports	98	44.0	115	104	95	99	93	98.7
Prestn	96	42.7	102	102	94	95	92	97.5
Redng	94	35.0		104	91	94	93	93.5
Salford	95	41.3	110	107	90	96	87	96.5
Sheff	95	40.1		108	91	98	82	98.2
Shrew	108	60.7		112	98	108		98.4
Stevng	97	45.8		101	96	99	93	98.3
Stoke	105	71.1		109	103			92.4
Sund	101	56.1		104	99	101		95.7
Truro	97	47.8			94	97		94.4

Table 2.13 Continued

Centre	All KRT 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								44.2
Wolve	97	42.1		103	95	99	83	94.2
York	97	40.4		105	93	99		95.9
N IRELAND								
Antrim	101	52.8			95	105		92.3
Belfast	107	68.4	115	116	100	110	90	93.1
Newry	101	55.6			96	102		92.3
Ulster	97	45.8			96	101		96.0
West NI	104	61.8			103	104		100.0
WALES								
Bangor	110	60.0			95	110		100.0
Cardiff	96	47.0	110	104	96	97	94	98.1
Clwyd	87	34.5			86	88		96.7
Swanse	97	44.4		107	97	98	90	100.0
Wrexam	96	43.5			96	95		100.0
TOTALS								
England	98	45.8	107	105	94	99	92	90.2
N Ireland	104	60.4	115	113	99	105	88	94.1
Wales	97	45.6	107	107	95	97	92	98.9
UK	98	46.2	107	106	94	99	92	90.7

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

For Scotland data see the Scottish Renal Registry Annual report 2022 (publichealthscotland.scot/publications/scottish-renal-registry/scottish-renal-registry-reporting-on-2021/)

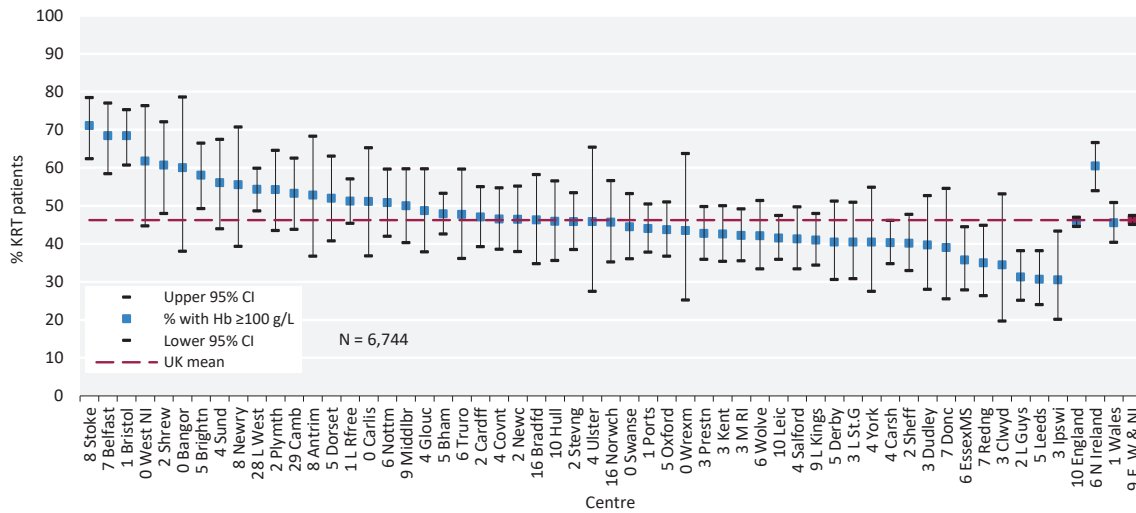


Figure 2.10 Percentage of adult patients incident to KRT in 2021 with haemoglobin (Hb) ≥ 100 g/L at start of KRT treatment by centre
 CI – confidence interval

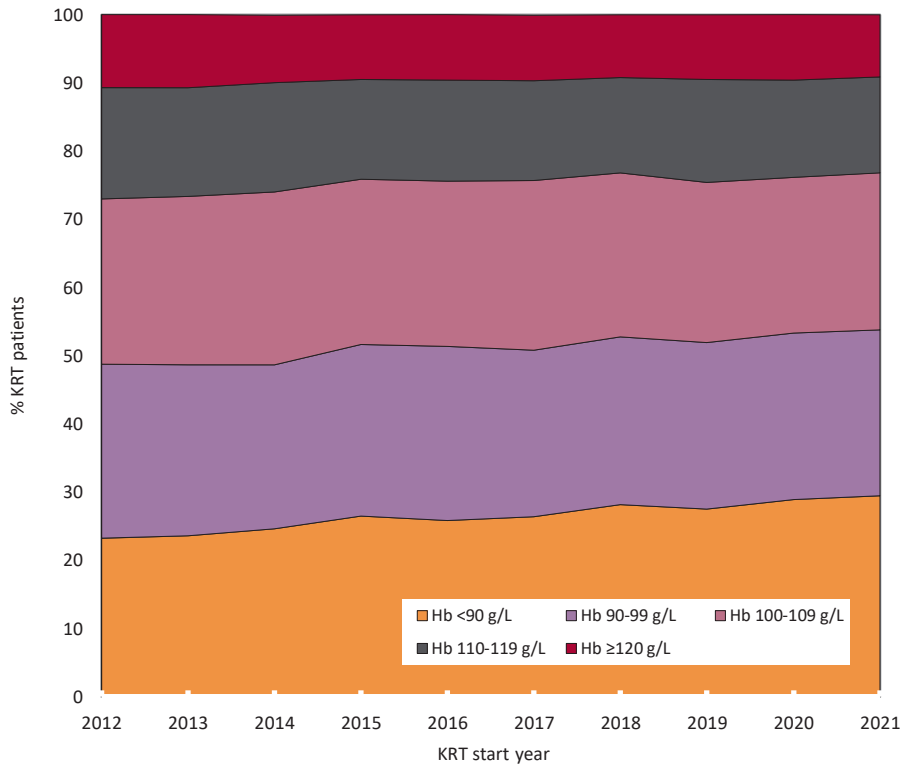


Figure 2.11 Distribution of haemoglobin (Hb) in incident adult KRT patients by year of start between 2012 and 2021

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 2021 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	81.6	8.3	98.9
Bradfd	2.4	79.7	17.6	92.5
Brightn	2.3	80.8	3.1	100.0
Bristol	2.3	93.0	5.7	100.0
Camb	2.4	84.9	9.4	92.7
Carlis	2.3	77.3	0.0	97.8
Carsh	2.2	71.7	2.8	96.3
Colchr	2.3	83.3	6.7	85.7
Covnt	2.3	86.4	1.4	93.3
Derby	2.3	80.7	5.7	100.0
Donc	2.4	90.9	6.8	100.0
Dorset	2.3	68.0	14.1	98.7
Dudley	2.4	85.0	10.0	100.0
EssexMS	2.3	83.2	3.8	97.8
Exeter				
Glouc	2.4	80.3	12.4	100.0
Hull	2.4	86.4	6.8	93.6
Ipswi	2.3	72.1	8.2	100.0
Kent	2.3	77.0	10.1	98.9
L Barts	2.3	81.5	3.7	96.1
L Guys	2.4	83.7	9.2	100.0
L Kings	2.3	78.9	5.2	97.3
L Rfree	2.3	80.9	5.7	99.7
L St.G	2.4	81.1	10.0	97.8
L West	2.3	74.7	6.7	75.6
Leeds	2.3	79.3	5.5	97.6
Leic	2.3	77.4	7.8	96.4
Liv Ain	2.4	73.6	15.1	84.1
Liv Roy	2.4	84.3	12.1	80.6
M RI	2.4	81.5	7.3	100.0
Middlbr	2.2	81.3	2.8	97.3
Newc	2.4	79.8	8.5	100.0
Norwch	2.3	80.0	8.2	88.5
Nottm	2.2	66.7	4.0	99.2
Oxford	2.3	77.3	6.0	95.9
Plymth	2.3	88.1	3.6	98.8
Ports	2.3	80.2	5.9	100.0
Prestn	2.3	71.7	3.3	91.4
Redng	2.3	81.3	6.5	100.0
Salford	2.4	80.3	11.3	99.3
Sheff	2.3	78.2	3.5	100.0
Shrew	2.3	82.3	16.1	100.0
Stevng	2.3	77.8	4.7	100.0
Stoke	2.4	82.4	13.6	95.4
Sund	2.3	75.0	8.8	98.6
Truro	2.3	87.3	7.0	100.0

Table 2.14 Continued

Centre	Median adj Ca (mmol/L)	% adj Ca 2.2–2.5 mmol/L	% adj Ca >2.5 mmol/L	% data completeness
Wirral	2.3	69.1	7.1	80.8
Wolve	2.3	73.5	12.0	96.7
York	2.4	85.4	12.5	98.0
N IRELAND				
Antrim	2.4	89.7	7.7	100.0
Belfast	2.3	82.8	6.1	97.1
Newry	2.4	76.3	5.3	97.4
Ulster	2.4	79.2	12.5	96.0
West NI	2.2	76.5	2.9	100.0
WALES				
Bangor	2.4	85.0	10.0	100.0
Cardff	2.3	82.5	5.8	100.0
Clwyd	2.2	56.7	3.3	100.0
Swanse	2.3	84.9	2.4	100.0
Wrexm	2.4	95.7	4.4	100.0
TOTALS				
England	2.3	79.6	7.0	95.8
N Ireland	2.3	81.6	6.4	97.9
Wales	2.3	82.2	4.5	100.0
E, W & NI	2.3	79.7	6.8	96.0

Ca - calcium

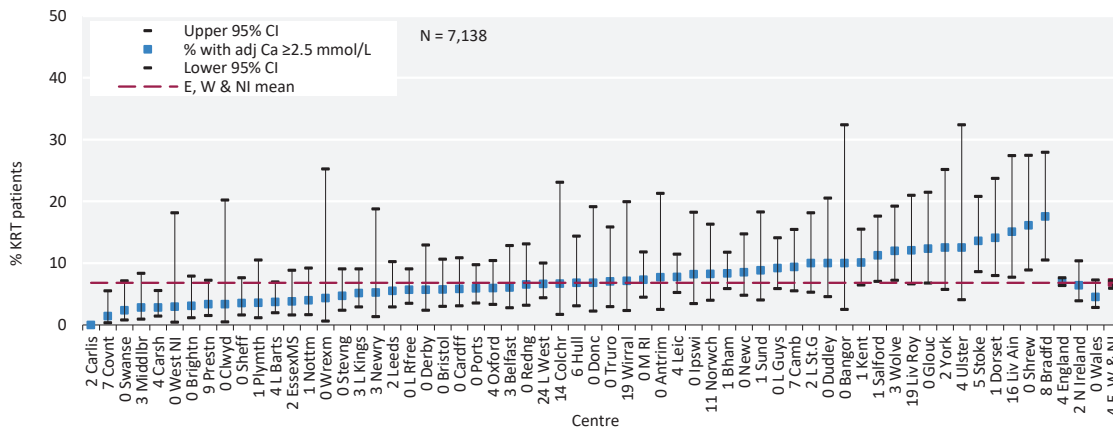


Figure 2.12 Percentage of adult patients incident to KRT in 2021 with adjusted calcium (Ca) above the normal range (>2.5 mmol/L) by centre
 CI – confidence interval

Dialysis access in incident adult dialysis patients

In previous years, incident dialysis access data were collected separately to the main UKRR quarterly data returns via the Multisite Dialysis Access Audit. This year in addition to the audit, some incident dialysis access data were 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 2021 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 2021 by first dialysis access type

Characteristic	HD – first dialysis access type				PD		
	N	AVF/AVG	TL	NTL	N	Total	
Total							
N	5,372	1,884	2,262	1,226	1,632	7,004	
%		35.1	42.1	22.8			
Age (%)	Median (yrs)	66	67	64	65	60	64
	IQR (yrs)	53,75	56,76	51,75	53,74	47,72	52,74
	<45 yrs	728	22.3	50.7	27.1	357	1,085
	45–54 yrs	748	32.8	46.9	20.3	261	1,009
	55–64 yrs	1,133	37.3	39.5	23.1	352	1,485
	65–74 yrs	1,428	38.2	37.8	23.9	400	1,828
	≥75 yrs	1,335	38.1	41.5	20.4	262	1,597
PRD (%)	Diabetes	1,392	39.0	41.2	19.8	364	1,756
	Glomerulonephritis	488	39.3	40.8	19.9	227	715
	Hypertension	285	37.9	40.4	21.8	83	368
	Polycystic kidney disease	195	61.0	30.8	8.2	113	308
	Pyelonephritis	179	36.9	36.3	26.8	60	239
	Renal vascular disease	223	37.7	42.2	20.2	46	269
	Other	766	21.5	46.1	32.4	170	936
	Uncertain aetiology	647	34.9	43.7	21.3	206	853
	Missing	240	30.4	36.7	32.9	43	283
Referral time (%)	<90 days	1,075	5.9	48.0	46.1	120	1,195
	90–179 days	210	17.1	64.8	18.1	59	269
	180–364 days	326	28.8	53.4	17.8	91	417
	≥365 days	3,024	47.0	37.9	15.1	1,066	4,090
	Missing	66	12.1	53.0	34.8	6	72
Sex (%)	Male	3,479	35.2	41.8	23.1	1,026	4,505
	Female	1,893	34.9	42.7	22.4	606	2,499
Ethnicity (%)	White	3,102	36.3	41.1	22.6	920	4,022
	Asian	592	35.8	40.7	23.5	226	818
	Black	382	24.1	45.3	30.6	111	493
	Other	145	26.9	47.6	25.5	53	198
	Missing	378	32.5	41.3	26.2	95	473
eGFR at start¹	Median	7	7	7	6	8	7
	IQR (yrs)	5,9	6,8	5,9	5,9	6,9	5,9
Diabetes² (%)	Yes	691	40.2	42.0	17.8	152	843
	No	837	38.8	39.7	21.5	264	1,101
	Missing	123	29.3	39.8	30.9	21	144

¹eGFR units are mL/min/1.73m²

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

A centre was excluded from the analysis of a particular variable if it returned data for <70% of patients

AVF – arteriovenous fistula; AVG – arteriovenous graft; eGFR – estimated glomerular filtration rate; IQR – interquartile range; NTL – non-tunnelled line; PRD – primary renal disease; TL – tunnelled line

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

Dialysis access data are described in relation to age, PRD and timing of presentation. Delayed presentation/referral to kidney services is defined as being within 90 days (3 months) prior to the start of KRT.

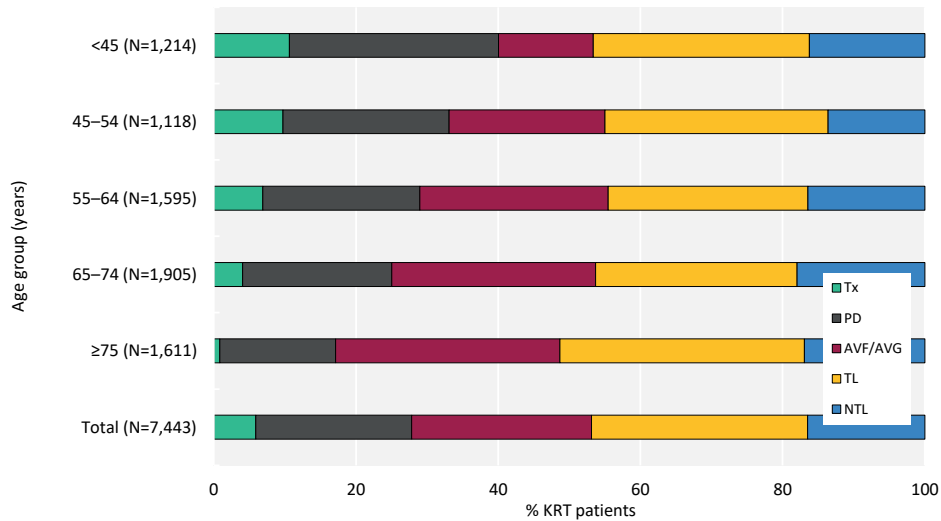


Figure 2.13 Dialysis access used for adult patients incident to KRT in 2021 by age group
 AVF – arteriovenous fistula; AVG – arteriovenous graft; NTL – non-tunnelled line; TL – tunnelled line

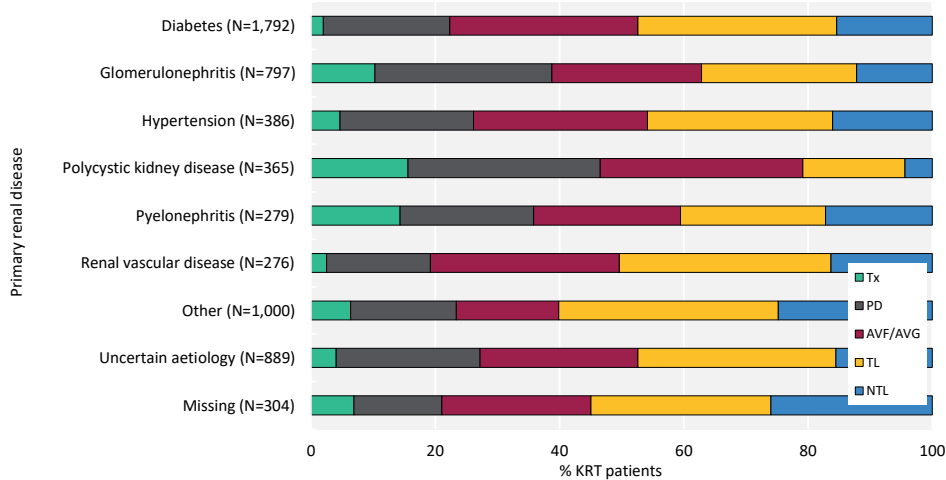


Figure 2.14 Dialysis access used for adult patients incident to KRT in 2021 by primary renal disease
 AVF – arteriovenous fistula; AVG – arteriovenous graft; NTL – non-tunnelled line; TL – tunnelled line

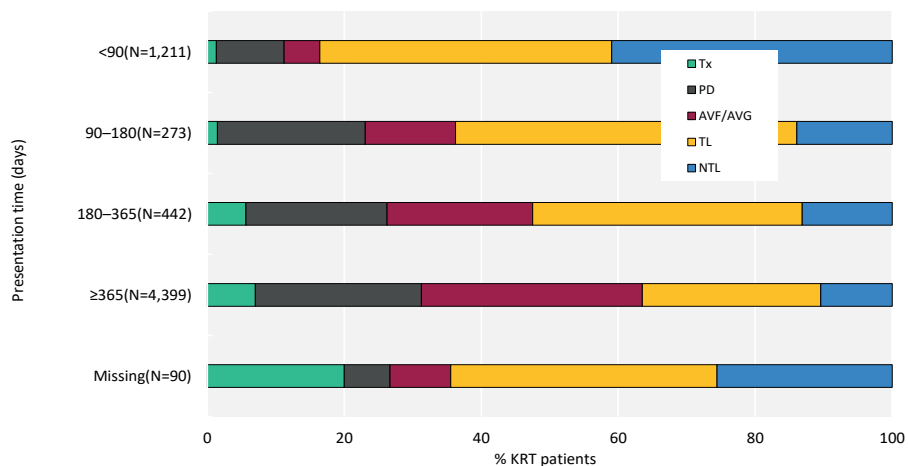


Figure 2.15 Dialysis access used for adult patients incident to KRT in 2021 by presentation time
 AVF – arteriovenous fistula; AVG – arteriovenous graft; NTL – non-tunnelled line; TL – tunnelled line

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

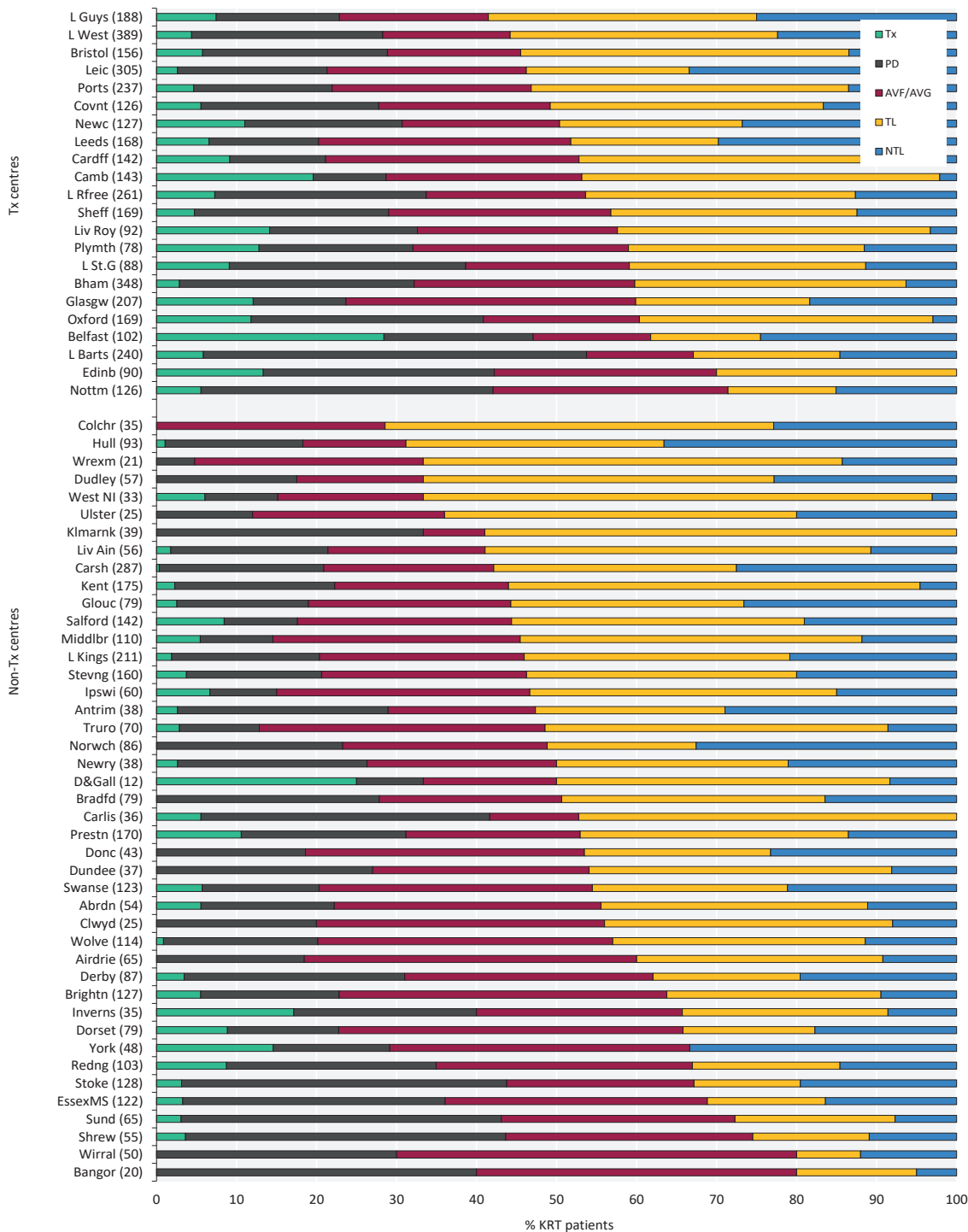


Figure 2.16 First dialysis access used for adult patients incident to KRT in 2021 by centre
 Number of incident patients on KRT in a centre in brackets
 Centres are ordered by decreasing use of lines
 AVF – arteriovenous fistula; AVG – arteriovenous graft; NTL – non-tunnelled line; TL – tunnelled line

Table 2.16 Start modality and dialysis access used for adult patients incident to dialysis in 2021 by presentation before start of dialysis by centre

Centre	Early presenters (≥ 90 days)(%)					Late presenters (<90 days) (%)					Start modality (%)		
	N	PD	AVF/AVG	TL	NTL	N	PD	AVF/AVG	TL	NTL	HD	PD	Tx
Antrim	30	33.3	23.3	30.0	13.3	7	0.0	0.0	0.0	100.0	71.1	26.3	2.6
Bangor	18	44.4	44.4	11.1	0.0	2	0.0	0.0	50.0	50.0	60.0	40.0	0.0
Belfast	45	33.3	31.1	17.8	17.8	23	17.4	4.3	17.4	60.9	52.9	18.6	28.4
Bham	277	35.4	33.2	26.0	5.4	61	6.6	6.6	75.4	11.5	67.8	29.3	2.9
Bradfd	71	29.6	25.4	32.4	12.7	8	12.5	0.0	37.5	50.0	72.2	27.8	0.0
Brightn	105	20.0	49.5	24.8	5.7	15	6.7	0.0	53.3	40.0	77.2	17.3	5.5
Bristol	118	28.0	21.2	40.7	10.2	27	11.1	0.0	59.3	29.6	71.2	23.1	5.8
Camb	90	12.2	38.9	47.8	1.1	25	8.0	0.0	84.0	8.0	71.3	9.1	19.6
Cardff	111	15.3	38.7	40.5	5.4	16	0.0	12.5	68.8	18.8	78.9	12.0	9.2
Carlisle	28	46.4	14.3	39.3	0.0	6	0.0	0.0	100.0	0.0	58.3	36.1	5.6
Carsh	213	23.0	27.2	32.4	17.4	64	15.6	4.7	20.3	59.4	79.1	20.6	0.3
Clwyd	23	21.7	39.1	34.8	4.3	2	0.0	0.0	50.0	50.0	80.0	20.0	0.0
Colchr	1					2					100.0	0.0	0.0
Covnt	5	100.0	0.0	0.0	0.0	114	20.2	23.7	37.7	18.4	72.2	22.2	5.6
Derby	68	33.8	38.2	19.1	8.8	16	6.3	6.3	18.8	68.8	69.0	27.6	3.4
Donc	40	20.0	37.5	22.5	20.0	3	0.0	0.0	33.3	66.7	81.4	18.6	0.0
Dorset	56	19.6	58.9	16.1	5.4	16	0.0	6.3	25.0	68.8	77.2	13.9	8.9
Dudley	46	21.7	19.6	43.5	15.2	11	0.0	0.0	45.5	54.5	82.5	17.5	0.0
EssexMS	92	40.2	38.0	14.1	7.6	24	8.3	16.7	20.8	54.2	63.9	32.8	3.3
Glouc	61	19.7	31.1	27.9	21.3	15	6.7	6.7	33.3	53.3	81.0	16.5	2.5
Hull	61	24.6	19.7	34.4	21.3	31	3.2	0.0	29.0	67.7	81.7	17.2	1.1
Ipswi	35	5.7	48.6	31.4	14.3	6	33.3	0.0	16.7	50.0	85.0	8.3	6.7
Kent	137	20.4	27.7	49.6	2.2	34	20.6	0.0	64.7	14.7	77.7	20.0	2.3
L Barts	92					21					46.3	47.9	5.8
L Guys	144	19.4	24.3	35.4	20.8	23	4.3	0.0	39.1	56.5	77.1	15.4	7.4
L Kings	156	21.8	33.3	30.8	14.1	43	9.3	2.3	44.2	44.2	79.6	18.5	1.9
L Rfree	193	33.7	26.4	30.6	9.3	48	6.3	2.1	60.4	31.3	66.3	26.4	7.3
L St.G	57	36.8	28.1	21.1	14.0	23	21.7	8.7	60.9	8.7	61.4	29.5	9.1
L West	303	29.4	20.5	35.6	14.5	69	5.8	0.0	31.9	62.3	71.7	23.9	4.4
Leeds	132	17.4	39.4	18.9	24.2	25	0.0	4.0	24.0	72.0	79.8	13.7	6.5
Leic	234	24.4	32.5	19.2	23.9	61	0.0	0.0	24.6	75.4	78.7	18.7	2.6
Liv Ain	42	19.0	26.2	47.6	7.1	13	23.1	0.0	53.8	23.1	78.6	19.6	1.8
Liv Roy	69	23.2	33.3	42.0	1.4	10	10.0	0.0	70.0	20.0	67.4	18.5	14.1
Middlbr	82	11.0	39.0	45.1	4.9	19	5.3	5.3	52.6	36.8	85.5	9.1	5.5
Newc	94	25.5	26.6	28.7	19.1	19	5.3	0.0	10.5	84.2	69.3	19.7	11.0
Newry	29	31.0	27.6	27.6	13.8	8	0.0	12.5	37.5	50.0	73.7	23.7	2.6
Norwch	13					18					76.7	23.3	0.0
Nottm	107	40.2	34.6	15.0	10.3	12	25.0	0.0	8.3	66.7	57.9	36.5	5.6
Oxford	132	34.1	25.0	37.9	3.0	17	23.5	0.0	70.6	5.9	59.2	29.0	11.8
Plymth	60	23.3	35.0	33.3	8.3	8	12.5	0.0	37.5	50.0	67.9	19.2	12.8
Ports	177	20.3	32.8	36.2	10.7	37	8.1	2.7	64.9	24.3	78.1	17.3	4.6
Prestn	122	24.6	30.3	35.2	9.8	30	16.7	0.0	46.7	36.7	68.8	20.6	10.6
Redng	77	31.2	37.7	18.2	13.0	17	17.6	23.5	29.4	29.4	65.0	26.2	8.7
Salford	105	11.4	36.2	37.1	15.2	25	4.0	0.0	52.0	44.0	82.4	9.2	8.5
Sheff	129	31.0	33.3	29.5	6.2	32	3.1	12.5	43.8	40.6	71.0	24.3	4.7
Shrew	45	44.4	37.8	8.9	8.9	8	25.0	0.0	50.0	25.0	56.4	40.0	3.6
Stevng	122	20.5	31.1	35.2	13.1	30	6.7	3.3	36.7	53.3	79.4	16.9	3.8
Stoke	71					0					56.3	40.6	3.1
Sund	53	43.4	35.8	15.1	5.7	10	30.0	0.0	50.0	20.0	56.9	40.0	3.1
Swanse	98	17.3	42.9	23.5	16.3	18	5.6	0.0	38.9	55.6	79.7	14.6	5.7
Truro	58	12.1	43.1	37.9	6.9	10	0.0	0.0	80.0	20.0	87.1	10.0	2.9
Ulster	19	15.8	31.6	42.1	10.5	6	0.0	0.0	50.0	50.0	88.0	12.0	0.0
West NI	24	12.5	25.0	62.5	0.0	7	0.0	0.0	85.7	14.3	84.8	9.1	6.1
Wirral	46	30.4	54.3	6.5	8.7	4	25.0	0.0	25.0	50.0	70.0	30.0	0.0
Wolve	92	18.5	43.5	31.5	6.5	21	23.8	9.5	33.3	33.3	79.8	19.3	0.9
Wrexm	13	7.7	46.2	23.1	23.1	7	0.0	0.0	100.0	0.0	95.2	4.8	0.0

Table 2.16 Continued

Centre	Early presenters (≥90 days)(%)					Late presenters (<90 days) (%)					Start modality (%)		
	N	PD	AVF/AVG	TL	NTL	N	PD	AVF/AVG	TL	NTL	HD	PD	Tx
York	32	21.9	56.3	0.0	21.9	9	0.0	0.0	0.0	100.0	70.8	14.6	14.6
Total	4,953	26.8	31.9	29.7	11.6	1,236	11.1	5.1	42.2	41.6	72.2	22.1	5.6

Start modality breakdown includes patients with missing presentation time

Blank cells - referral data completeness < 70%; breakdown by access type not presented but these centres were included in the totals

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

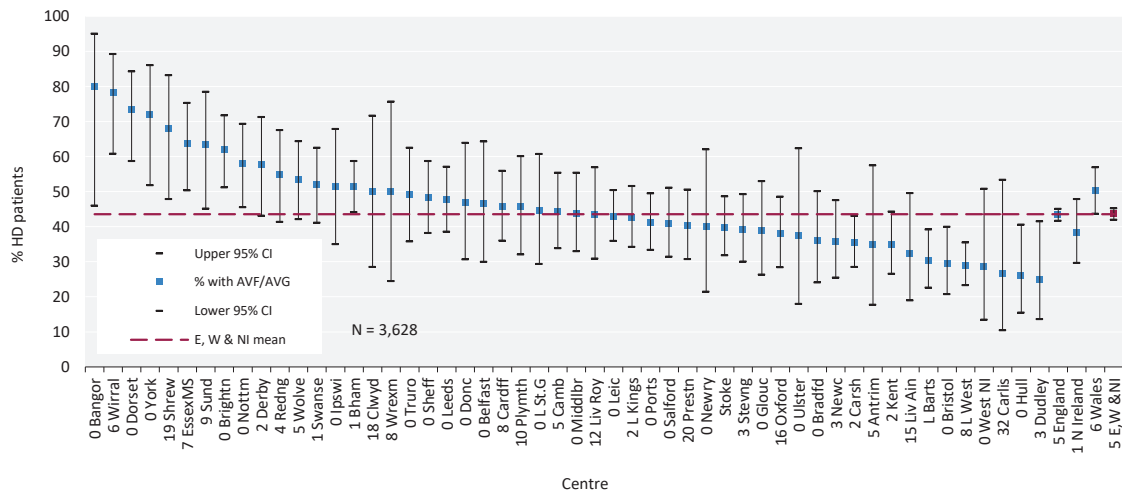


Figure 2.17 Percentage of adult patients incident to HD in 2021 who started dialysis using either an arteriovenous fistula (AVF) or an arteriovenous graft (AVG) by centre, excluding late presenters
CI – confidence interval

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 2020 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 2.17 90 days and 1 year after 90 days survival (adjusted to age 60 years) of incident adult KRT patients (2019–2020 2 year cohort) by country

Survival period	England	N Ireland	Scotland	Wales	UK
Survival at 90 days (%)	96.2	98.4	96.1	97.5	96.4
95% CI	95.9-96.6	97.4-99.5	95.1-97.2	96.6-98.5	96.0-96.7
Survival 1 year after 90 days (%)	90.4	92.4	91.3	87.8	90.4
95% CI	89.8-91.0	90.2-94.7	89.7-92.9	85.7-89.9	89.9-90.9

CI – confidence interval

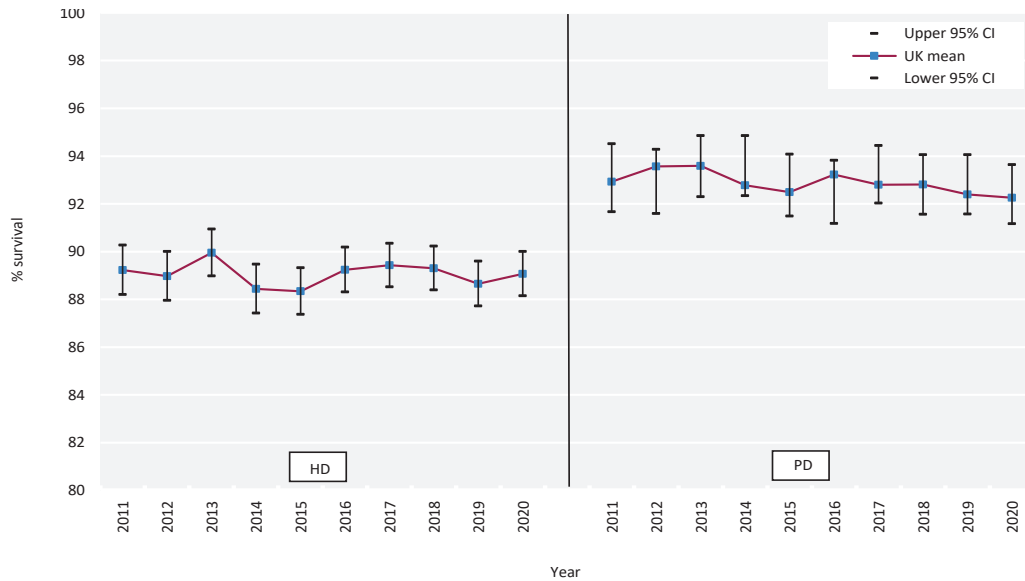


Figure 2.18 1 year after 90 days survival (adjusted to age 60 years) of incident adult KRT patients by start modality between 2011 and 2020

CI – confidence interval

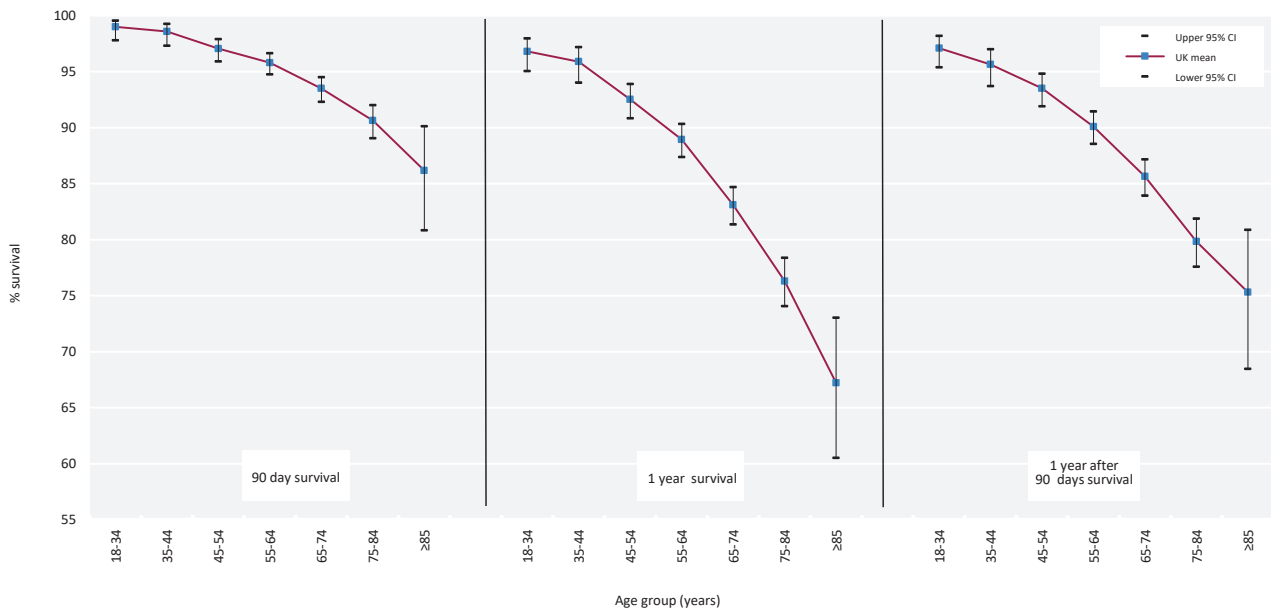


Figure 2.19 90 days, 1 year and 1 year after 90 days survival of incident adult KRT patients by age group (2020 cohort)

CI – confidence interval

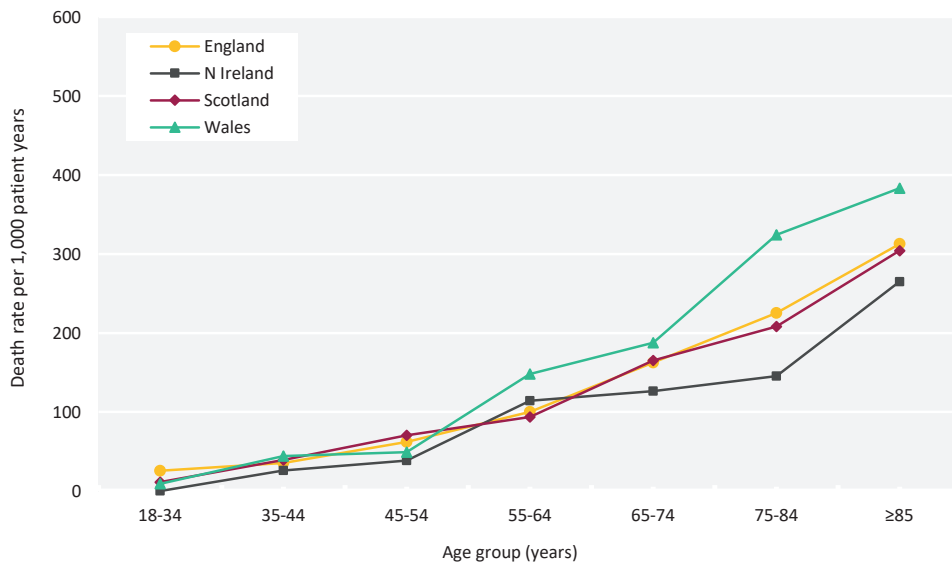


Figure 2.20 1 year after 90 days death rate per 1,000 incident KRT adult patient years by age group and country (2017–2020 4 year cohort)

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).

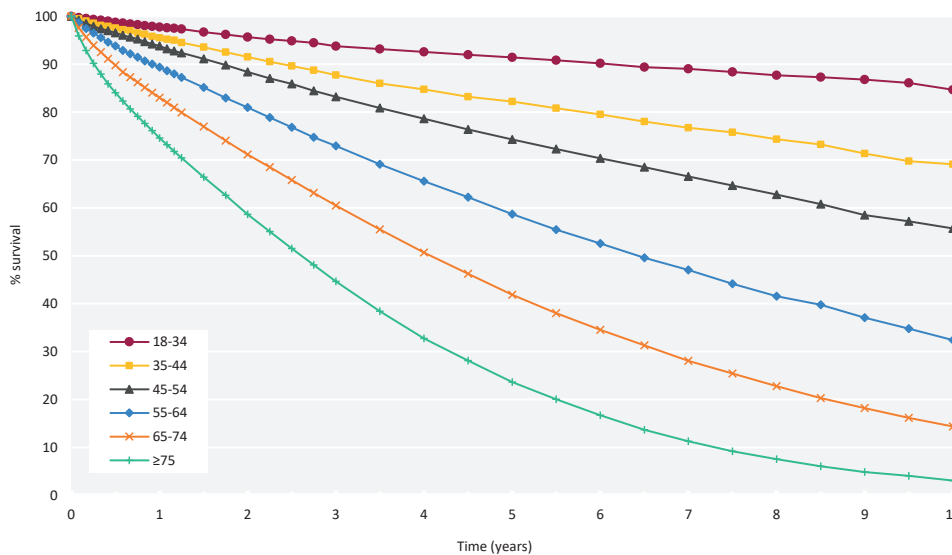


Figure 2.21 Survival (unadjusted) of incident adult KRT patients from day 0 by age group (2011–2020 10 year cohort)

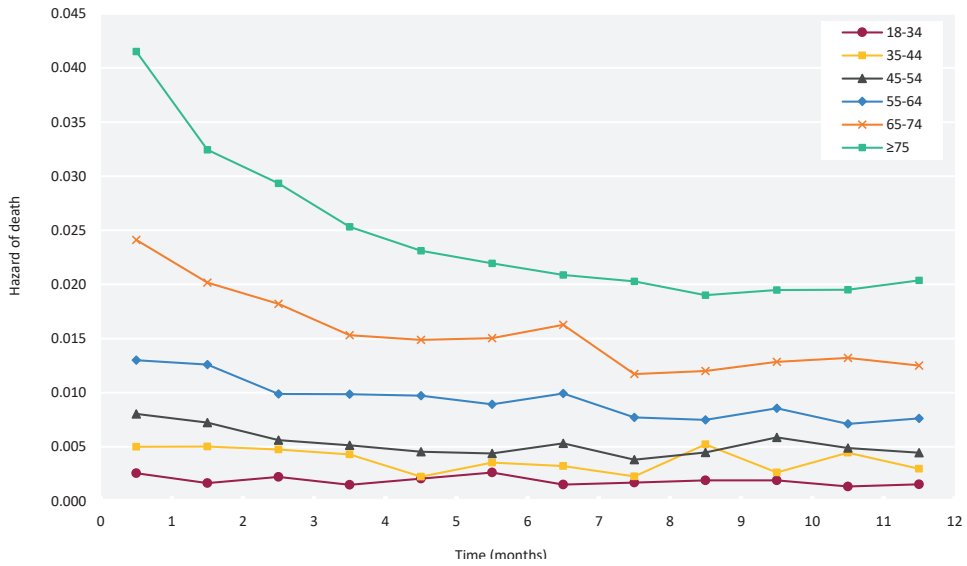


Figure 2.22 Monthly hazard of death (unadjusted) of incident adult KRT patients from day 0 to 1 year by age group (2011–2020 10 year cohort)

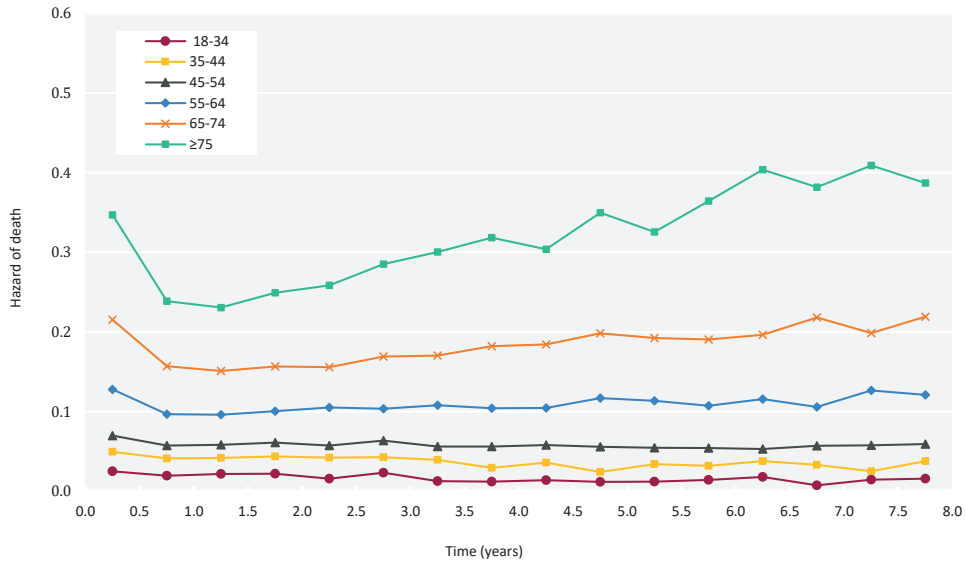


Figure 2.23 6 monthly hazard of death (unadjusted) of incident adult KRT patients from day 0 to 8 years by age group (2011–2020 10 year cohort)

Table 2.18 Survival (unadjusted) of incident adult KRT patients aged <65 years (2001–2020)

Cohort	Unadjusted survival (%)										95% CI for longest survival	N
	1 yr	2 yr	3 yr	4 yr	5 yr	6 yr	7 yr	8 yr	9 yr	10 yr		
2020	92.2										91.3-92.9	4,142
2019	93.2	86.4									85.3-87.4	4,195
2018	92.9	86.9	80.1								78.8-81.3	4,253
2017	93.0	87.2	81.6	76.4							75.1-77.7	4,235
2016	92.9	87.5	82.1	77.2	71.4						69.9-72.8	4,015
2015	92.3	86.4	81.4	76.9	72.6	68.3					66.8-69.8	3,923
2014	92.8	86.8	81.4	77.0	73.4	69.2	65.0				63.5-66.6	3,668
2013	93.7	88.2	83.1	77.7	73.2	68.6	64.6	60.2			58.5-61.8	3,572
2012	93.1	87.4	81.9	76.9	72.6	68.6	64.9	60.9	57.5		55.8-59.1	3,516
2011	93.2	88.6	83.6	79.0	74.5	70.9	67.7	64.7	60.7	57.5	55.7-59.2	3,339
2010	92.3	86.6	81.7	77.4	72.8	69.6	66.4	62.5	59.5	56.6	54.9-58.3	3,363
2009	91.2	85.1	80.4	76.3	71.1	67.0	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	59.4	56.5	54.8-58.2	3,450
2007	92.5	86.9	81.7	76.6	72.9	69.1	65.8	62.4	59.1	56.1	54.3-57.8	3,310
2006	90.6	84.9	80.0	75.5	71.7	67.9	63.7	60.8	57.8	55.1	53.3-56.8	3,149
2005	89.6	83.5	78.4	73.7	69.0	65.5	62.4	59.4	56.4	53.8	51.9-55.6	2,830
2004	89.6	83.3	77.9	72.5	67.8	64.0	60.9	57.1	54.6	53.0	51.0-54.9	2,536
2003	89.3	82.5	77.2	72.4	67.1	62.9	59.3	56.6	54.0	51.5	49.3-53.6	2,176
2002	88.8	81.1	75.2	69.6	65.5	61.5	58.0	55.0	51.9	49.8	47.5-52.0	1,981
2001	88.0	81.0	75.4	70.0	65.1	60.4	56.4	53.0	50.1	48.0	45.5-50.4	1,678

CI – confidence interval

Table 2.19 Survival (unadjusted) of incident adult KRT patients aged ≥65 years (2001–2020)

Cohort	Unadjusted survival (%)										95% CI for longest survival	N
	1 yr	2 yr	3 yr	4 yr	5 yr	6 yr	7 yr	8 yr	9 yr	10 yr		
2020	79.4										78.0-80.7	3,674
2019	80.0	64.4									62.8-65.8	3,949
2018	79.3	65.3	51.7								50.1-53.3	3,817
2017	79.3	67.4	53.6	42.0							40.4-43.6	3,834
2016	80.1	65.2	52.8	40.3	30.8						29.3-32.3	3,756
2015	78.2	64.8	52.2	42.0	32.0	24.8					23.5-26.2	3,811
2014	78.5	64.2	52.2	41.3	32.8	26.2	19.8				18.5-21.1	3,588
2013	78.5	64.6	53.1	42.9	34.5	27.6	20.7	15.5			14.3-16.8	3,436
2012	77.2	65.1	54.2	44.0	35.4	27.7	21.8	17.1	13.3		12.1-14.5	3,328
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	20.0	15.3	11.7	9.1	8.1-10.1	3,219
2006	72.0	58.1	46.8	37.2	28.8	22.9	17.4	13.2	10.5	8.3	7.4-9.4	3,110
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	2,942
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	2,599
2003	68.3	53.2	41.4	31.6	24.3	18.1	14.0	10.8	8.2	6.5	5.5-7.6	2,230
2002	65.9	50.9	40.4	31.8	24.0	18.4	13.7	10.8	8.1	6.4	5.4-7.5	2,039
2001	66.1	51.7	38.2	28.6	21.4	15.9	11.9	8.7	7.0	5.4	4.3-6.6	1,636

CI – confidence interval

Due to small numbers of incident patients in a given year, centre one year after the first 90 days survival is compared using a rolling four year cohort (table 2.20). Centre-specific one year survival rates were adjusted for not only age (figure 2.24), but also sex and comorbidities for centres with at least 85% completeness (figure 2.25). UKRR comorbidity data have been augmented using diagnostic and procedure codes from HES in England and PEDW in Wales (see appendix A for details). Centres can be identified in the funnel plots using the number of patients in the centre in table 2.20. Given there are 68 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 2.20 1 year after 90 days adjusted survival (60 years, male and median comorbidity score) of incident adult KRT patients by centre (2017–2020 4 year cohort)

Centre	Age adjusted survival				Case-mix adjusted survival ¹			
	N on KRT	Adj 1 yr after 90 days survival (%)	Limits for funnel plot		N on KRT	Adj 1 yr after 90 days survival (%)	Limits for funnel plot	
			Lower 95% limit	Upper 95% limit			Lower 95% limit	Upper 95% limit
D&Gall	66	89.3	81.0	95.7				
Inverns	91	92.0	82.8	95.2				
Bangor	96	89.6	83.0	95.1	96	90.6	83.0	95.1
Clwyd	106	87.5	83.5	94.9	106	87.6	83.5	94.9
Newry	119	87.7	84.0	94.8	113	83.2	83.7	94.8
Ulster	120	91.3	84.0	94.8	118	88.0	83.9	94.7
Wrexm	125	85.9	84.2	94.7	125	84.7	84.2	94.7
Carlisle	145	90.3	84.8	94.5	144	89.9	84.7	94.4
Dundee	145	91.1	84.8	94.5				
West NI	146	93.8	84.8	94.5	145	91.2	84.7	94.4
Krkldy	156	93.1	85.0	94.4				
Colchr	160	92.2	85.1	94.3	156	92.8	85.0	94.3
Antrim	164	94.3	85.2	94.3	148	92.8	84.8	94.4
Klmarnk	179	88.3	85.5	94.2				
Abrdn	185	92.4	85.6	94.1				
Ipswi	188	90.8	85.6	94.1	179	90.5	85.4	94.1
Truro	195	91.6	85.7	94.1	193	91.7	85.7	94.0
Donc	197	88.9	85.8	94.0	196	88.6	85.7	94.0
York	199	88.2	85.8	94.0	199	87.9	85.8	94.0
Liv Ain	213	88.0	86.0	93.9	188	88.1	85.6	94.1
Wirral	219	90.4	86.1	93.9	219	91.6	86.0	93.9
Dudley	224	93.4	86.1	93.9	224	93.6	86.1	93.8
Shrew	249	88.0	86.4	93.7	249	88.8	86.4	93.7
Airdrie	254	89.7	86.5	93.7				
Plymth	255	86.0	86.5	93.7	251	86.5	86.4	93.7
Glouc	279	90.4	86.7	93.6	275	90.2	86.6	93.6
Belfast	291	94.2	86.8	93.5				
Derby	313	93.0	86.9	93.5	313	93.3	86.9	93.4
Bradfd	322	88.3	87.0	93.4	322	89.1	87.0	93.4
Sund	341	86.3	87.1	93.4	339	88.7	87.1	93.3
L St.G	343	91.8	87.1	93.4	334	91.6	87.0	93.3
Norwch	346	91.2	87.2	93.3	340	90.0	87.1	93.3
Wolve	360	86.0	87.2	93.3	360	86.9	87.2	93.3
Dorset	361	91.0	87.2	93.3	361	90.5	87.2	93.3
Hull	389	91.4	87.4	93.2	389	91.3	87.3	93.2
Stoke	391	87.1	87.4	93.2	388	88.0	87.3	93.2
Redng	407	93.8	87.5	93.2	407	94.1	87.4	93.1
Edinb	419	92.9	87.5	93.1				
Liv Roy	424	90.5	87.5	93.1	372	90.6	87.2	93.2
Middlbr	431	93.3	87.6	93.1	431	93.9	87.5	93.1
Camb	468	94.6	87.7	93.0	468	94.0	87.7	93.0
Newc	492	91.1	87.8	93.0	491	91.7	87.7	92.9

Table 2.20 Continued

Centre	Age adjusted survival				Case-mix adjusted survival ¹			
	N on KRT	Adj 1 yr after 90 days survival (%)	Limits for funnel plot		N on KRT	Adj 1 yr after 90 days survival (%)	Limits for funnel plot	
			Lower 95% limit	Upper 95% limit			Lower 95% limit	Upper 95% limit
Covnt	493	92.4	87.8	93.0	482	91.9	87.7	92.9
Nottm	495	88.5	87.8	93.0	495	89.0	87.8	92.9
EssexMS	525	92.0	87.9	92.9	520	92.3	87.8	92.9
Exeter	530	91.5	87.9	92.9	526	91.2	87.9	92.9
Swanse	542	89.0	88.0	92.9	542	89.3	87.9	92.8
Kent	545	88.6	88.0	92.9	545	88.1	87.9	92.8
Brightn	579	88.8	88.1	92.8	568	88.5	88.0	92.8
Bristol	581	88.9	88.1	92.8	571	89.2	88.0	92.8
Prestn	624	87.0	88.2	92.7	624	87.3	88.1	92.7
Sheff	632	90.5	88.2	92.7	630	90.7	88.1	92.7
Cardff	640	88.4	88.2	92.7	640	88.1	88.1	92.7
L Kings	640	92.9	88.2	92.7	634	93.4	88.1	92.7
Stevng	641	92.6	88.2	92.7	641	92.6	88.1	92.7
Salford	657	88.9	88.2	92.7	656	89.1	88.2	92.7
Leeds	660	93.0	88.2	92.7	660	93.2	88.2	92.7
L Guys	679	91.6	88.3	92.7	679	91.2	88.2	92.6
M RI	743	90.2	88.4	92.6	722	90.8	88.3	92.6
Glasgw	767	90.0	88.4	92.6				
Oxford	810	92.4	88.5	92.5	795	92.3	88.4	92.5
Ports	846	90.1	88.6	92.5	837	90.0	88.5	92.4
Carsh	902	90.8	88.6	92.4	885	90.7	88.6	92.4
L Rfree	945	89.3	88.7	92.4	923	89.7	88.6	92.4
Leic	1,233	91.8	88.9	92.2	1,214	91.3	88.9	92.2
L Barts	1,279	92.9	89.0	92.2	1,128	92.2	88.8	92.2
Bham	1,392	90.6	89.1	92.1	1,382	90.6	89.0	92.1
L West	1,483	91.0	89.1	92.1	1,440	91.0	89.0	92.1

¹Centres excluded if <85% comorbidity data were available – this included Belfast and all Scottish kidney centres
Survival adjusted to age 60 years, male and median comorbidity score

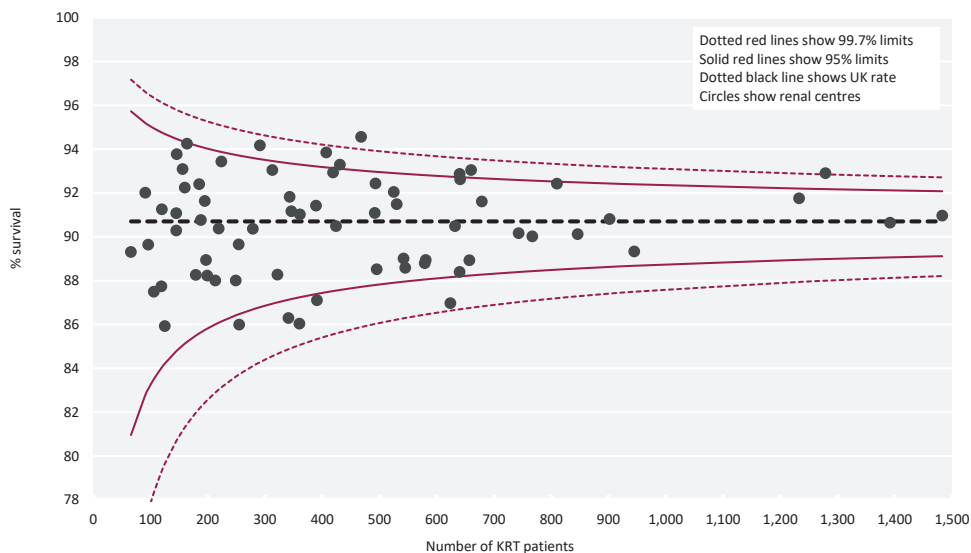


Figure 2.24 1 year after 90 days survival (adjusted to age 60 years) of incident adult KRT patients by centre (2017–2020 4 year cohort)

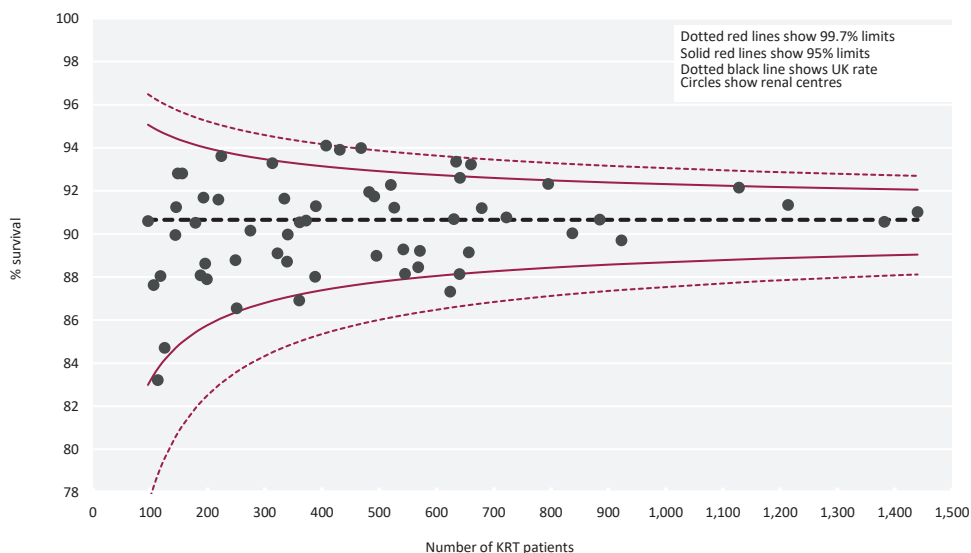


Figure 2.25 1 year after 90 days survival (adjusted to age 60 years, male and median comorbidity score) of incident adult KRT patients by centre (2017–2020 4 year cohort)

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.

Table 2.21 Cause of death in the first 90 days and one year after 90 days in incident adult KRT patients by age group (2017–2020 4 year cohort)

Cause of death	First 90 days				1 year after 90 days			
	All ages		<65 yrs (%)	≥65 yrs (%)	All ages		<65 yrs (%)	≥65 yrs (%)
	N	%			N	%		
Cardiac disease	221	23.9	29.0	22.3	473	19.7	23.3	18.1
Cerebrovascular disease	23	2.5	3.1	2.3	87	3.6	5.1	3.0
Infection	187	20.3	21.5	19.9	505	21.0	23.6	19.9
Malignancy	60	6.5	4.4	7.2	191	7.9	6.8	8.5
Treatment withdrawal	153	16.6	8.8	19.1	460	19.1	13.2	21.7
Other	219	23.7	26.3	22.9	509	21.2	22.0	20.8
Uncertain aetiology	60	6.5	7.0	6.3	179	7.4	6.1	8.1
Total (with data)	923	100.0	100.0	100.0	2,404	100.0	100.0	100.0
Missing	619	40.1	42.4	39.4	1,151	32.4	31.8	32.6

Chapter 3

Adults on kidney replacement therapy (KRT) in the UK at the end of 2021

Contents

Introduction	55
Rationale for analyses	56
Key findings	57
Analyses	58
Changes to the prevalent adult KRT population	58
Demographics and treatment modality of prevalent adult KRT patients	61
Dialysis access in prevalent adult dialysis patients	70
Survival in adult dialysis patients	70
Cause of death in adult KRT patients	74

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 2021 (figure 3.1). Patients may have started KRT prior to 2021 or during 2021. Three KRT modalities are available to patients with ESKD – haemodialysis (HD), peritoneal dialysis (PD) and kidney transplantation. HD may be undertaken in-centre (ICHD) or at home (HHD).

The size of the prevalent population on each 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.

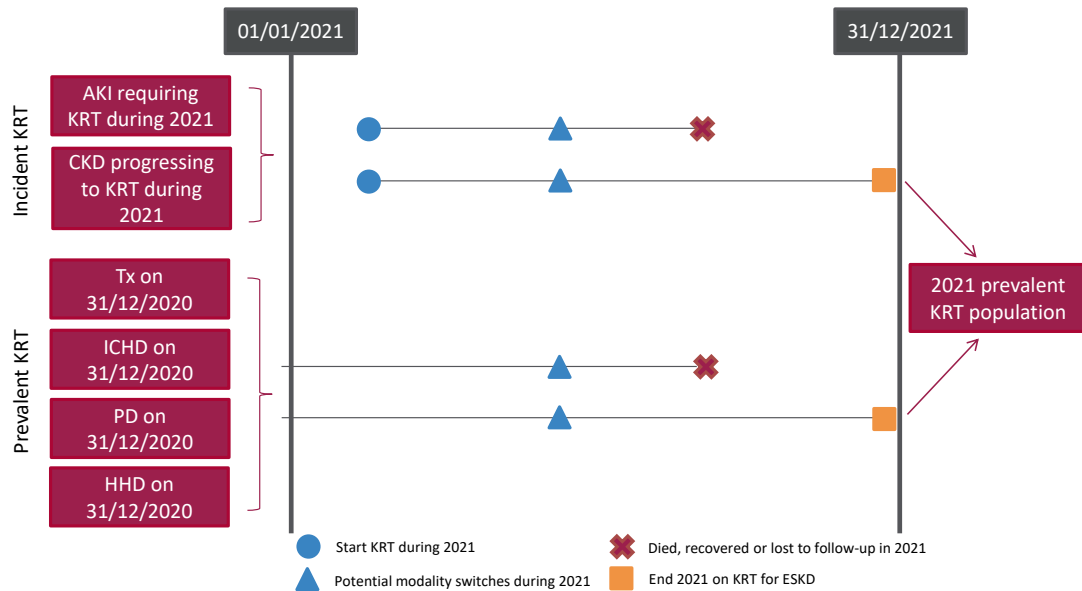


Figure 3.1 Pathways adult patients could follow to be included in the UK 2021 prevalent KRT population

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 2021 or if they had been on KRT for ≥ 90 days and were on KRT at the end of 2021. 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 2021 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 was unable to submit patient level data for 2021. Aggregate numbers by modality were provided, enabling inclusion in Tables 3.1 and 3.2. Exeter is excluded from all other analyses.

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

Key findings

- 69,497 adult patients were receiving KRT for ESKD on 31/12/2021. This represents a 1.5% increase from 2020 and approaches the 2-2.5% increase that was seen in the years before the pandemic.
- KRT prevalence was 1,307 per million population compared 1,290 per million population in 2020.
- The median age of KRT patients was 59.47 years (ICHD 66.1 years, HHD 56.0 years, PD 63.3 years and Tx 56.5 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).
- 61.3% of KRT patients were male.
- Tx continued as the most common treatment modality (56.4%) – ICHD comprised 36%, PD 5.6% and HHD 2.0% of the KRT population.
- The most common identifiable primary renal disease was glomerulonephritis (19.7%), followed by diabetes (18.7%).
- There were 2 centres above the upper 95% limit and 2 centres below the lower 95% limit in the funnel plots showing 1 year age-, sex- and comorbidity-adjusted survival for patients prevalent to dialysis on 31/12/2020. It is expected that 3 centres would be outside the limits by chance.
- There was no cause of death data available for 37.7% of deaths. For those with data, the leading cause of death was infection amongst both patients > 65 years and < 65 years at 26.8% and 30.4% respectively, with a significant contribution from COVID related deaths.

Analyses

Changes to the prevalent adult KRT population

For the 68 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)	2021 crude rate (pmp)
	2017	2018	2019	2020	2021		
ENGLAND							
Bham	3,174	3,249	3,312	3,261	3,309	2.05	1,611
Bradfd	674	688	732	724	735	0.49	1,496
Brightn	1,012	1,055	1,064	1,077	1,092	1.08	1,013
Bristol	1,473	1,471	1,487	1,476	1,497	1.22	1,225
Camb	1,336	1,387	1,456	1,509	1,629	0.94	1,739
Carlis	281	293	301	297	305	0.26	1,194
Carsh	1,696	1,752	1,781	1,850	1,907	1.63	1,170
Colchr	129	122	145	150	145	0.29	497
Covnt	966	959	1,076	1,102	1,119	0.80	1,407
Derby	555	586	654	676	689	0.56	1,227
Donc	333	330	342	341	339	0.38	903
Dorset	730	764	773	798	786	0.73	1,077
Dudley	366	360	366	372	398	0.34	1,157
EssexMS	831	844	851	885	895	0.99	900
Exeter	1,057	1,083	1,089	1,092	1,077	0.95	1,130
Glouc	511	522	531	522	546	0.51	1,070
Hull	872	880	904	914	919	0.80	1,148
Ipswi	436	428	428	426	421	0.31	1,347
Kent	1,091	1,112	1,139	1,143	1,192	1.07	1,114
L Barts	2,498	2,600	2,659	2,685	2,750	1.59	1,729
L Guys	2,166	2,231	2,321	2,317	2,322	1.01	2,307
L Kings	1,155	1,183	1,247	1,252	1,334	0.93	1,428
L Rfree	2,191	2,233	2,344	2,337	2,380	1.33	1,792
L St.G	839	834	852	852	866	0.67	1,302
L West	3,475	3,560	3,607	3,531	3,556	1.96	1,810
Leeds	1,619	1,683	1,727	1,752	1,784	1.37	1,299
Leic	2,357	2,452	2,580	2,621	2,640	2.09	1,265
Liv Ain	210	217	226	242	264	0.43	611
Liv Roy	1,253	1,271	1,258	1,208	1,207	0.81	1,486
M RI	2,052	2,066	2,048	1,986	2,077	1.33	1,556
Middlbr	904	930	953	946	955	0.81	1,183
Newc	1,116	1,153	1,172	1,197	1,226	0.95	1,286
Norwch	781	788	810	808	784	0.69	1,136
Nottm	1,184	1,197	1,217	1,210	1,220	0.93	1,313
Oxford	1,880	1,943	1,973	2,016	2,003	1.45	1,385
Plymth	541	540	535	542	548	0.40	1,365
Ports	1,746	1,763	1,881	1,899	1,941	1.75	1,109
Prestn	1,272	1,322	1,342	1,368	1,379	1.23	1,117
Redng	795	814	862	869	877	0.70	1,256
Salford	1,117	1,173	1,243	1,268	1,215	1.15	1,054
Sheff	1,442	1,482	1,489	1,490	1,496	1.13	1,319
Shrew	387	430	437	427	442	0.41	1,077

Table 3.1 Continued

Centre	N on KRT					Estimated catchment population (millions)	2021 crude rate (pmp)
	2017	2018	2019	2020	2021		
Stevng	884	938	961	974	1,014	1.11	913
Stoke	811	806	806	813	845	0.73	1,154
Sund	544	560	570	556	547	0.55	999
Truro	425	437	450	445	461	0.36	1,287
Wirral	390	400	416	414	412	0.47	877
Wolve	583	609	614	655	691	0.55	1,259
York	557	569	582	572	581	0.49	1,196
N IRELAND							
Antrim	255	274	285	287	296	0.25	1,204
Belfast	844	878	881	890	911	0.53	1,706
Newry	241	252	253	264	281	0.24	1,195
Ulster	183	191	185	201	203	0.20	999
West NI	313	327	328	351	339	0.25	1,350
SCOTLAND							
Abrdn	563	572	558	565	578	0.50	1,155
Airdrie	466	488	524	517	504	0.46	1,098
D&Gall	135	145	149	156	154	0.12	1,257
Dundee	435	445	449	430	411	0.37	1,116
Edinb	825	862	885	889	926	0.84	1,101
Glasgw	1,772	1,813	1,854	1,848	1,865	1.37	1,357
Inverns	262	279	282	271	278	0.22	1,243
Klmarnk	337	340	359	369	365	0.29	1,249
Krkldy	304	298	295	291	295	0.27	1,078
WALES							
Bangor	195	203	201	216	217	0.16	1,323
Cardff	1,683	1,720	1,730	1,679	1,700	1.16	1,469
Clwyd	179	190	205	204	204	0.18	1,126
Swanse	789	825	869	850	853	0.76	1,125
Wrexm	323	314	311	323	300	0.21	1,443
TOTALS							
England	54,697	56,069	57,613	57,867	58,817	44.77	1,314
N Ireland	1,836	1,922	1,932	1,993	2,030	1.47	1,381
Scotland	5,099	5,242	5,355	5,336	5,376	4.45	1,207
Wales	3,169	3,252	3,316	3,272	3,274	2.49	1,315
UK	64,801	66,485	68,216	68,468	69,497	53.19	1,307

Country KRT populations were calculated by summing the KRT patients from centres in each country. Estimated country populations were derived from Office for National Statistics figures (see appendix A for details on estimated catchment population by kidney centre) Exeter was unable to submit 2021 patient level data, but provided aggregate numbers of patients on KRT at the end of 2021, by treatment modality

pmp – per million population

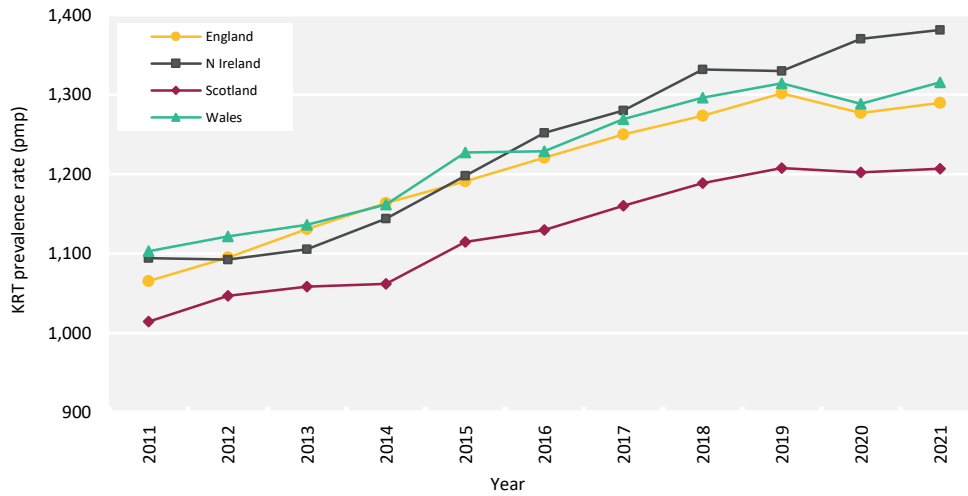


Figure 3.2 Adult KRT prevalence rates by country between 2011 and 2021
pmp – per million population

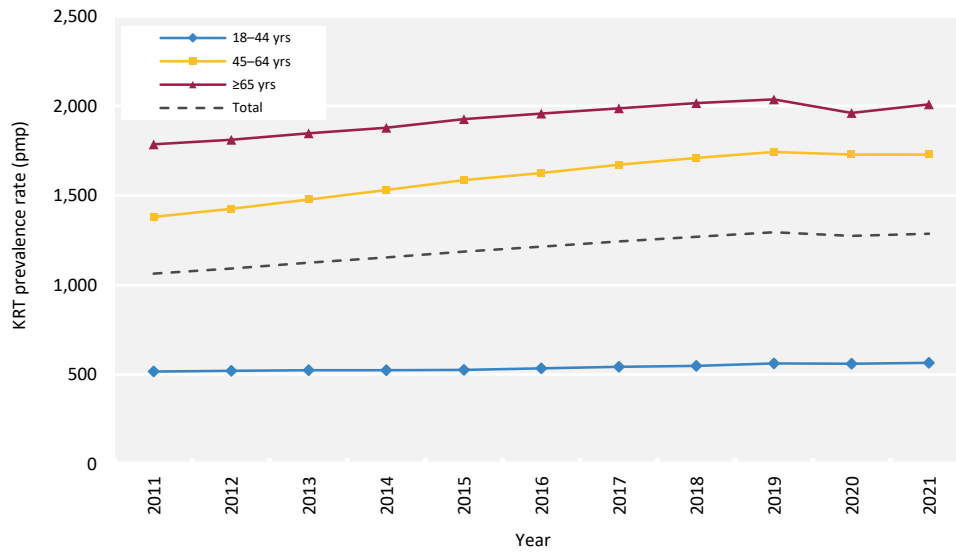


Figure 3.3 Adult KRT prevalence rates by age group between 2011 and 2021
pmp – per million population

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 31/12/2021 by centre

Centre	N on KRT	% on ICHD	% on PD	% on HHD	% with Tx	Median age (yrs)	% male	Ethnicity				
								% White	% Asian	% Black	% Other	% missing
ENGLAND												
Bham	3,309	40.7	8.4	2.1	48.8	58.9	59.2	56.7	29.6	10.8	2.9	1.5
Bradfd	735	37.4	5.0	1.0	56.6	56.7	60.0	51.2	43.7	2.7	2.4	0.0
Brightn	1,092	38.8	6.3	2.7	52.1	61.3	62.4	89.4	6.1	2.1	2.4	3.7
Bristol	1,497	31.8	5.1	1.2	61.9	59.0	61.0	88.4	4.0	5.7	1.9	1.1
Camb	1,629	21.8	1.8	1.5	75.0	58.0	63.1	90.0	5.9	2.5	1.6	3.2
Carlisle	305	37.4	9.8	1.0	51.8	60.1	60.7	99.0	1.0	0.0	0.0	0.0
Carsh	1,907	46.4	7.0	1.5	45.1	61.7	61.3	65.7	17.3	11.2	5.7	3.9
Colchr	145	100.0	0.0	0.0	0.0	73.7	64.8	96.4	0.7	0.7	2.2	4.8
Covnt	1,119	33.1	7.2	2.0	57.7	59.9	62.5	77.9	16.8	5.1	0.2	0.2
Derby	689	38.0	9.6	8.0	44.4	61.8	63.1	82.3	12.2	2.9	2.5	1.6
Donc	339	51.6	3.8	1.5	43.1	62.4	61.7	93.8	3.0	1.2	2.1	0.6
Dorset	786	38.7	2.9	1.8	56.6	65.5	60.8	96.4	1.7	0.4	1.5	0.0
Dudley	398	55.3	10.1	2.5	32.2	63.6	64.8	78.6	14.6	5.8	1.0	0.0
EssexMS	895	47.9	10.4	2.3	39.3	63.1	66.3	85.3	5.9	5.3	3.4	3.9
Exeter	1,077	44.2	6.8	1.5	47.5							
Glouc	546	41.4	6.6	0.0	52.0	63.2	61.9	90.9	3.9	2.8	2.4	1.3
Hull	919	39.3	5.7	1.3	53.8	59.3	64.2	95.7	2.3	1.0	1.0	0.5
Ipswi	421	33.3	7.8	0.5	58.4	63.1	62.5	82.4	2.2	4.5	10.9	4.0
Kent	1,192	38.4	6.0	1.5	54.0	60.7	60.9	91.7	3.3	2.1	2.9	1.4
L Barts	2,750	39.8	9.4	0.9	49.9	58.0	58.9	32.3	35.3	25.3	7.2	2.3
L Guys	2,322	31.4	3.0	1.8	63.8	57.1	59.1	57.8	10.4	27.3	4.5	4.0
L Kings	1,334	50.4	7.3	2.5	39.7	59.6	60.6	42.5	14.5	38.8	4.3	1.5
L Rfree	2,380	30.9	7.3	0.4	61.4	58.5	60.5	42.5	22.8	22.6	12.1	7.5
L St.G	866	37.2	6.1	0.6	56.1	60.0	59.0	40.2	25.2	23.6	11.1	5.4
L West	3,556	36.3	6.0	1.0	56.6	61.0	61.6	38.1	36.5	19.2	6.2	0.1
Leeds	1,784	32.5	3.0	0.9	63.6	57.6	61.3	76.2	16.8	5.4	1.6	0.2
Leic	2,640	38.0	5.2	1.8	55.0	60.3	60.9	72.9	20.3	5.2	1.7	4.7
Liv Ain	264	68.6	8.3	4.9	18.2	62.4	63.3	94.2	1.2	1.9	2.7	2.3
Liv Roy	1,207	30.7	2.7	3.6	63.0	58.0	61.0	90.4	3.2	3.4	3.0	1.9
M RI	2,077	24.6	4.7	4.0	66.7	57.9	59.9	66.6	13.8	17.4	2.2	2.6
Middlbr	955	36.5	2.1	1.8	59.6	59.8	63.9	93.5	4.5	0.7	1.3	0.8
Newc	1,226	28.6	4.7	1.5	65.2	59.5	60.2	92.9	4.5	1.2	1.4	0.2
Norwch	784	36.2	5.7	1.3	56.8	62.6	60.6	96.8	1.2	0.9	1.1	3.2
Nottm	1,220	29.8	8.4	2.3	59.5	58.6	61.8	81.0	8.5	7.7	2.7	0.2
Oxford	2,003	23.1	3.3	0.9	72.6	58.4	61.3	78.9	11.2	5.1	4.8	14.3
Plymth	548	30.1	6.2	0.0	63.7	62.4	66.6	97.3	0.7	0.4	1.6	0.0
Ports	1,941	33.4	4.6	4.4	57.5	60.5	60.2	91.9	4.5	1.1	2.5	9.3
Prestn	1,379	36.3	4.0	3.0	56.6	59.6	60.9	82.5	15.9	0.9	0.7	0.0
Redng	877	34.7	5.7	1.0	58.6	60.1	62.7	64.6	23.4	5.5	6.5	6.5
Salford	1,215	33.9	6.9	2.6	56.6	58.5	61.0	76.5	17.7	3.7	2.1	0.0
Sheff	1,496	37.0	5.5	3.7	53.7	59.5	62.8	87.8	6.8	2.7	2.7	1.8
Shrew	442	41.4	11.5	8.4	38.7	61.8	64.3	90.6	3.9	2.3	3.2	1.8
Stevng	1,014	52.2	3.6	3.8	40.4	61.6	62.8	70.9	17.1	9.2	2.9	3.2
Stoke	845	31.4	12.7	4.9	51.1	59.6	63.3	89.5	5.9	2.3	2.2	3.8

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	547	39.3	6.8	1.8	52.1	60.3	59.6	95.2	3.3	0.6	0.9	0.4
Truro	461	39.9	4.8	1.1	54.2	63.4	58.6	98.0	0.7	0.0	1.3	0.0
Wirral	412	46.6	4.9	1.5	47.1	61.0	64.3	96.1	1.9	1.2	0.7	0.0
Wolve	691	50.1	9.3	5.5	35.2	59.9	61.2	60.3	27.7	10.0	2.0	0.1
York	581	32.7	4.6	2.9	59.7	61.3	60.6	95.7	1.6	0.3	2.4	0.5
N IRELAND												
Antrim	296	38.9	6.1	0.7	54.4	64.9	63.2	99.6	0.0	0.4	0.0	10.5
Belfast	911	14.5	3.0	0.9	81.7	58.1	61.0	97.6	1.8	0.3	0.2	4.4
Newry	281	30.6	4.6	1.1	63.7	61.6	60.1	98.5	0.7	0.4	0.4	3.9
Ulster	203	48.8	1.5	0.0	49.8	65.8	59.1	94.1	3.9	1.5	0.5	0.0
West NI	339	31.0	1.8	0.9	66.4	59.1	60.2	99.1	0.6	0.3	0.0	1.5
SCOTLAND												
Abrdn	578	32.7	3.5	0.3	63.5	58.8	59.2					71.1
Airdrie	504	38.7	5.8	0.0	55.6	58.6	57.9					26.4
D&Gall	154	34.4	5.2	0.6	59.7	61.3	62.3					42.2
Dundee	411	36.3	3.9	1.5	58.4	60.5	63.0					69.6
Edinb	926	30.6	3.6	0.8	65.1	59.5	64.8					79.9
Glasgw	1,865	30.8	2.0	0.5	66.6	58.6	59.7					56.9
Inverns	278	33.5	4.0	0.7	61.9	58.8	59.4					55.4
Klmarnk	365	37.8	9.0	4.4	48.8	61.3	60.0					63.0
Krkldy	295	55.6	2.4	1.0	41.0	63.4	63.7					85.4
WALES												
Bangor	217	35.0	6.0	9.7	49.3	61.5	65.9	98.6	0.0	0.0	1.4	4.1
Cardff	1,700	31.2	3.4	3.0	62.4	58.8	62.2	91.0	6.2	1.2	1.6	2.5
Clwyd	204	44.1	5.4	0.0	50.5	63.1	65.7	97.3	2.1	0.5	0.0	8.3
Swanse	853	47.5	5.7	4.7	42.1	62.9	63.4	97.3	1.8	0.4	0.6	0.2
Wrexm	300	33.3	5.3	1.0	60.3	58.1	65.7	95.9	1.0	1.0	2.0	2.0
TOTALS												
England	58,817	36.4	5.9	2.1	55.6	59.7	61.2	71.9	15.1	9.5	3.5	2.8
N Ireland	2,030	26.5	3.3	0.8	69.5	60.0	60.9	97.9	1.4	0.5	0.2	4.3
Scotland	5,376	34.2	3.6	0.9	61.3	59.5	60.9					62.0
Wales	3,274	36.7	4.5	3.5	55.3	60.1	63.3	94.0	3.9	0.8	1.3	2.3
UK	69,497	36.0	5.6	2.0	56.4	59.7	61.3	74.3	13.9	8.6	3.2	7.5

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

Breakdown by ethnicity is not shown for centres with <70% data completeness, but these centres were included in national averages

Exeter was unable to submit 2021 patient level data, but provided aggregate numbers of patients on KRT at the end of 2021, by treatment modality

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 31/12/2021 by age group

Characteristic	Age group (yrs)							Total	Median age (yrs)
	18–34	35–44	45–54	55–64	65–74	75–84	≥85		
Total									
N on KRT	5,363	7,799	12,759	17,304	14,647	8,824	1,724	68,420	59.7
% on KRT	7.8	11.4	18.6	25.3	21.4	12.9	2.5		
Sex (%)									
Male	7.6	11.2	18.4	25.4	21.6	13.1	2.6	61.3	60.0
Female	8.3	11.7	19.1	25.1	21.1	12.5	2.3	38.7	59.4
Ethnicity (%)									
White	7.9	10.8	18.1	25.1	21.7	13.6	2.7	74.3	60.1
Asian	8.8	13.9	19.4	23.0	23.4	9.8	1.7	13.9	59.0
Black	6.0	12.3	23.1	31.7	14.8	9.7	2.4	8.6	57.5
Other	10.0	16.8	20.6	24.0	17.2	9.2	2.1	3.2	56.0
Missing	6.9	9.5	16.7	24.4	23.7	16.2	2.6	7.5	62.3
PRD (%)									
Diabetes	2.8	9.0	18.0	28.9	25.6	13.6	2.1	18.7	62.0
Glomerulonephritis	9.2	14.1	21.5	26.6	18.7	8.8	1.2	19.7	57.0
Hypertension	3.1	9.2	18.8	26.7	21.0	17.0	4.1	6.3	61.9
Polycystic kidney disease	1.9	5.5	19.5	34.4	26.7	11.2	0.8	10.5	61.6
Pyelonephritis	11.0	14.8	21.6	24.6	16.3	9.5	2.3	9.4	55.8
Renal vascular disease	2.2	3.7	6.9	13.4	29.2	34.7	9.8	2.6	73.7
Other	10.0	16.8	20.6	24.0	17.2	9.2	2.1	3.2	56.0
Uncertain aetiology	6.9	11.8	17.8	21.5	21.5	16.2	4.3	14.5	61.3
Missing	6.9	9.5	16.7	24.4	23.7	16.2	2.6	7.5	62.3
Modality (%)									
ICHD	4.7	7.3	13.4	22.0	24.1	22.6	5.9	35.9	66.1
HHD	8.6	14.2	24.6	27.8	16.2	7.8	0.8	2.0	56.0
PD	7.9	9.5	15.1	21.2	23.3	19.3	3.7	5.6	63.3
Tx	9.8	14.1	22.1	27.7	19.7	6.3	0.3	56.5	56.5

Variation between centres in the proportion of patients prevalent to dialysis on 31/12/2021 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.

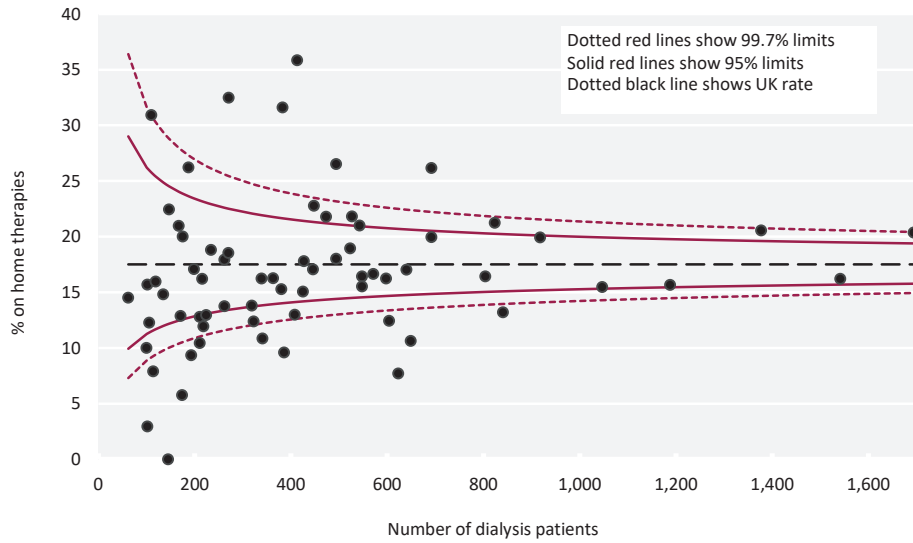


Figure 3.4 Percentage of adult patients prevalent to dialysis on 31/12/2021 on home therapies (PD and HHD) by centre

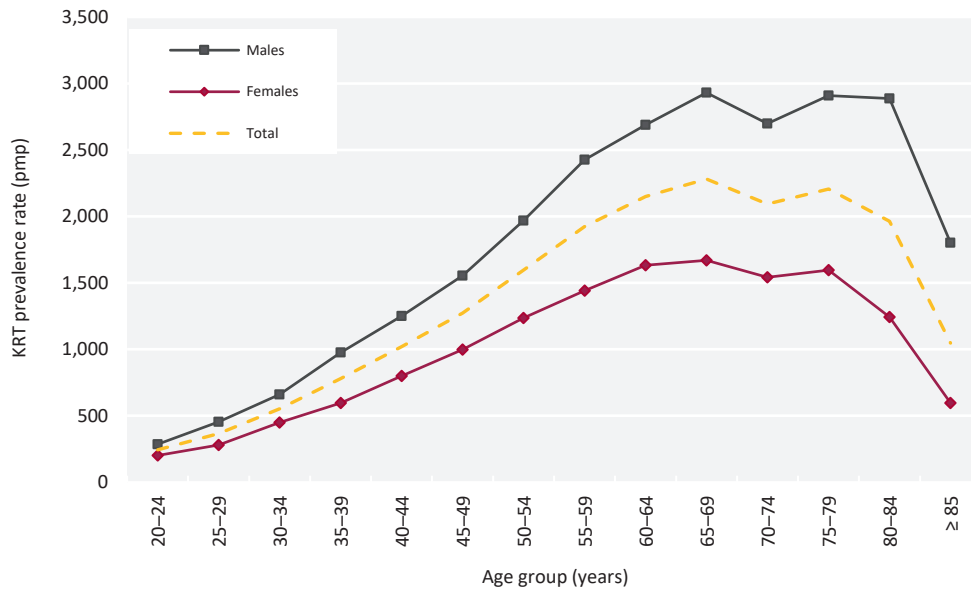


Figure 3.5 Prevalence rates for adult patients on KRT on 31/12/2021 by age group and sex
pmp – per million population

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

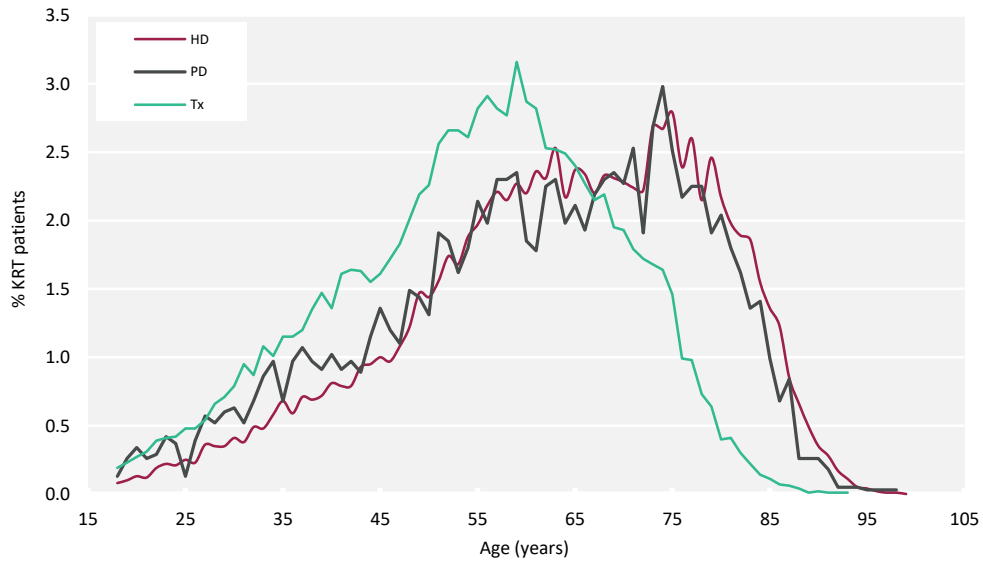


Figure 3.6 Age profile of adult patients prevalent to KRT on 31/12/2021 by KRT modality

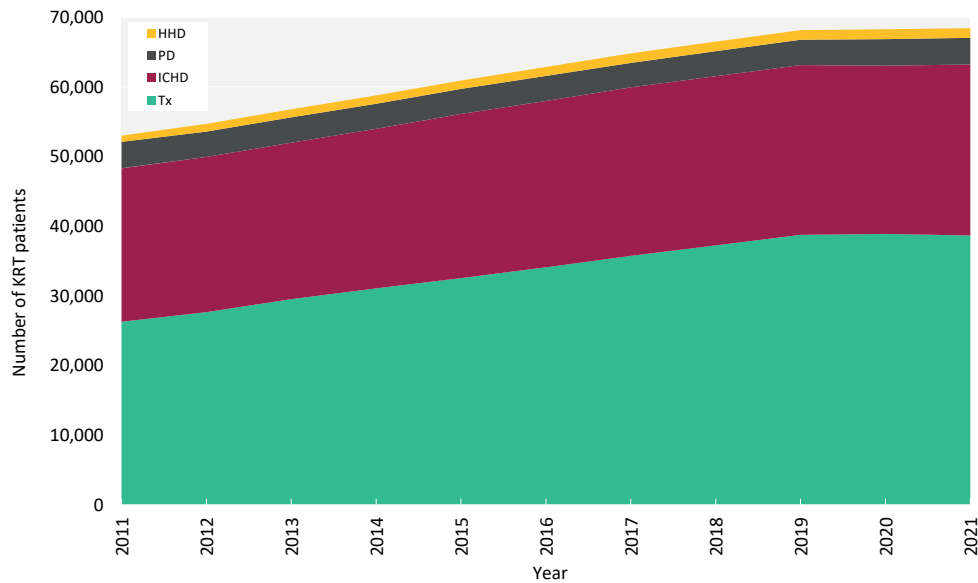


Figure 3.7 Growth in numbers of prevalent adult KRT patients by treatment modality between 2011 and 2021

Table 3.4 Change in adult KRT prevalence rates by modality between 2017 and 2021

Year	Prevalence (pmp)					% growth in prevalence				
	HD	PD	Dialysis	Tx	KRT	HD	PD	Dialysis	Tx	KRT
2017	490	67	558	687	1,244					
2018	490	68	558	711	1,269	-0.1	1.2	0.1	3.5	2.0
2019	490	69	559	736	1,295	0.0	1.3	0.2	3.5	2.0
2020	477	71	548	726	1,274	-2.6	2.6	-2.0	-1.4	-1.6
2021	487	72	559	727	1,286	2.1	1.5	2.0	0.2	1.0
Average annual growth 2017-2021						-0.1	1.6	0.1	1.5	0.8

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 2012 and 2021, in particular the increase in diabetes.

Table 3.5 Treatment modality of adult patients prevalent to KRT on 31/12/2021 by primary renal disease (PRD)

PRD	N on KRT	% KRT population	Modality (%)		
			HD	PD	Tx
Diabetes	12,328	18.7	55.9	7.0	37.0
Glomerulonephritis	13,006	19.7	26.8	4.5	68.7
Hypertension	4,191	6.3	44.9	6.3	48.8
Polycystic kidney disease	6,940	10.5	21.5	4.3	74.2
Pyelonephritis	6,192	9.4	27.7	3.5	68.8
Renal vascular disease	1,718	2.6	63.9	8.6	27.5
Other	12,159	18.4	35.2	4.5	60.4
Uncertain aetiology	9,554	14.5	38.1	6.4	55.5
Total (with data)	66,088	100.0	37.1	5.3	57.6
Missing	2,332	3.4	61.0	13.1	25.9

Table 3.6 Change in primary renal disease (PRD) of adult patients prevalent to KRT between 2012 and 2021

PRD	Year									
	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Diabetes	16.3	16.6	16.8	17.2	17.4	17.8	18.1	18.4	18.6	18.7
Glomerulonephritis	19.5	19.6	19.5	19.5	19.5	19.5	19.5	19.5	19.6	19.7
Hypertension	6.3	6.3	6.3	6.3	6.2	6.3	6.2	6.4	6.4	6.3
Polycystic kidney disease	10.0	10.2	10.2	10.3	10.3	10.3	10.4	10.4	10.5	10.5
Pyelonephritis	11.6	11.4	11.1	10.7	10.6	10.3	10.0	9.7	9.6	9.4
Renal vascular disease	3.4	3.2	3.1	3.0	3.0	3.0	2.9	2.8	2.7	2.6
Other	16.4	16.7	17.1	17.3	17.6	17.9	18.2	18.2	18.3	18.4
Uncertain aetiology	16.6	16.1	15.9	15.6	15.4	15.0	14.7	14.5	14.5	14.5
Missing	0.6	0.7	0.7	0.7	0.8	1.1	1.2	1.6	2.2	3.4

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).

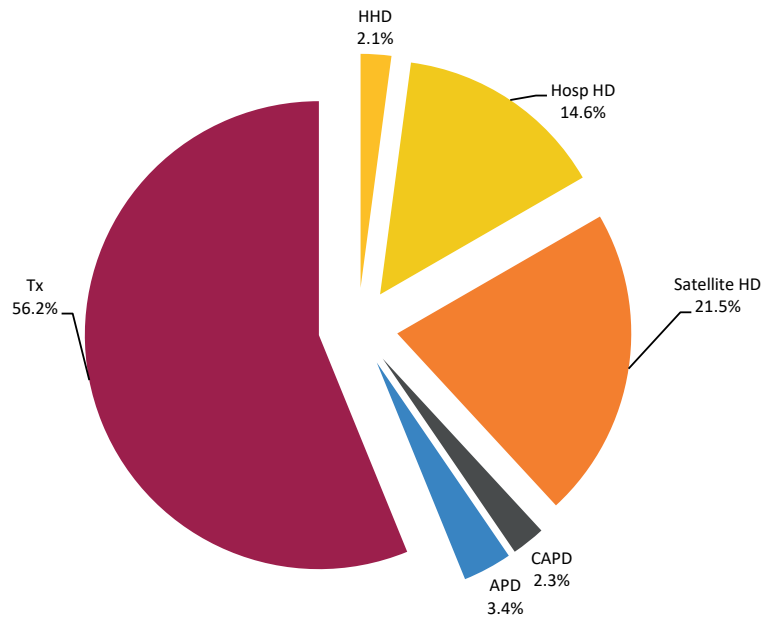


Figure 3.8 Detailed treatment modality of adult patients prevalent to KRT on 31/12/2021

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

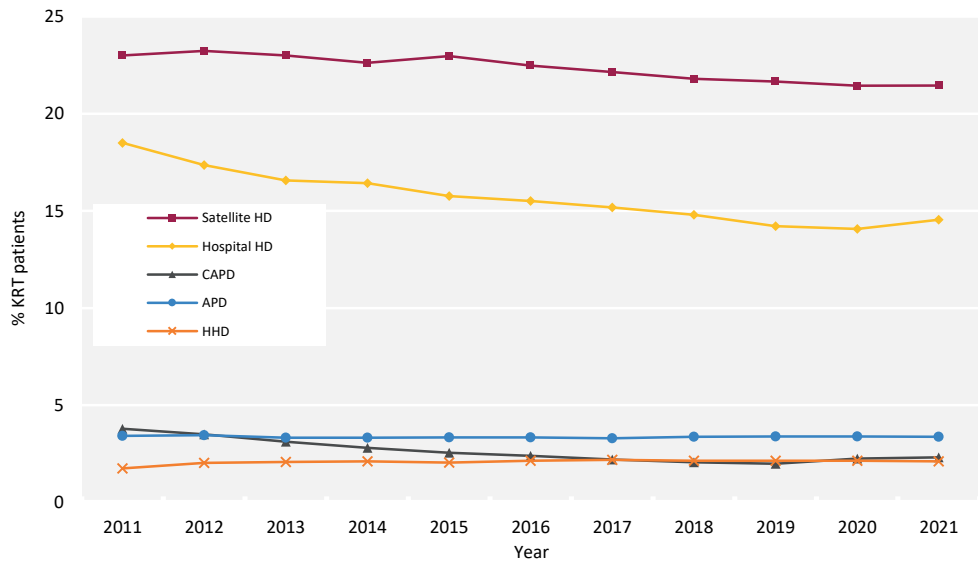


Figure 3.9 Detailed dialysis modality changes in prevalent adult KRT patients between 2011 and 2021

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 31/12/2021 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	1,694	34.2	5.1	83.7	4.0	28.6	51.0	16.4	3.0	13.4
Bradfd	319	34.3	5.8	88.4	2.2	73.7	12.5	11.6	7.8	3.8
Brightn	523	34.5	5.9	86.8	5.7	38.2	42.8	13.2	8.4	4.8
Bristol	571	31.6	4.7	86.5	3.2	15.1	68.3	13.5	8.1	5.4
Camb	408	26.0	1.6	92.9	5.9	34.6	52.5	7.1	4.9	2.2
Carlis	147	31.2	5.7	79.6	2.0	46.9	30.6	20.4	4.8	15.7
Carsh	1,047	27.2	4.3	87.2	2.7	20.7	63.8	12.8	3.3	9.5
Colchr	145	6.1	3.1	100.0	0.0	69.0	31.0	0.0	0.0	0.0
Covnt	473	38.7	6.4	82.9	4.7	78.2	0.0	17.1	17.1	0.0
Derby	383	32.2	4.7	82.8	14.4	60.1	8.4	17.2	11.5	5.7
Donc	193	25.0	6.7	93.3	2.6	53.4	37.3	6.7	2.6	4.2
Dorset	341	31.8	10.4	93.3	4.1	23.8	65.4	6.7	2.4	4.1
Dudley	270	29.8	5.1	85.2	3.7	35.6	45.9	14.8	9.6	5.2
EssexMS	543	33.8	2.6	82.9	3.9	72.4	6.6	17.1	2.6	12.3
Exeter										
Glouc	262	34.0	8.0	86.3	0.0	73.7	12.6	13.7	0.8	13.0
Hull	425	22.3	5.5	87.8	2.8	42.8	42.1	12.2	7.1	5.2
Ipswi	175	17.7	2.7	81.1	1.1	74.3	5.7	18.9	10.3	7.4
Kent	548	29.1	6.8	86.9	3.3	29.2	54.4	13.1	11.0	2.2
L Barts	1,377	36.1	5.5	81.3	1.8	32.5	47.0	18.7	9.2	9.6
L Guys	841	36.4	7.5	91.7	4.9	14.0	72.8	8.3	1.8	6.5
L Kings	804	25.9	5.4	87.8	4.2	15.1	68.5	12.2	5.0	7.2
L Rfree	918	34.4	9.4	81.2	1.1	2.9	77.1	18.9	8.8	10.0
L St.G	380	41.9	8.8	86.1	1.3	28.2	56.6	14.0	2.4	11.6
L West	1,542	49.5	15.5	86.1	2.3	14.6	69.2	13.9	10.6	3.3
Leeds	649	35.2	12.3	91.8	2.5	14.6	74.7	8.2	2.0	6.2
Leic	1,188	36.2	10.0	88.4	4.0	15.2	69.2	11.6	2.0	9.6
Liv Ain	216	20.4	7.4	89.8	6.0	13.4	70.4	10.2	1.9	8.3
Liv Roy	446	23.3	9.5	92.8	9.9	28.3	54.7	7.2	3.8	3.4
M RI	692	35.5	13.9	86.0	12.1	12.9	61.0	14.0	6.4	7.7
Middlbr	386	35.1	4.7	94.8	4.4	28.8	61.7	5.2	5.2	0.0
Newc	427	33.0	8.1	86.4	4.2	57.4	24.8	13.6	1.4	12.2
Norwch	339	14.6	.	86.7	3.0	47.2	36.6	13.3	9.7	3.5
Nottm	494	35.7	5.7	79.2	5.7	31.0	42.5	20.9	5.5	15.4
Oxford	548	41.8	11.8	88.0	3.5	31.4	53.1	12.0	4.0	8.0
Plymth	199	31.5	5.6	82.9	0.0	77.9	5.0	17.1	6.0	11.1
Ports	824	30.5	9.4	89.1	10.3	18.7	60.1	10.9	3.8	7.2
Prestn	598	35.8	11.4	90.8	7.0	17.7	66.1	9.2	2.3	6.9
Redng	363	37.7	5.3	86.2	2.5	32.2	51.5	13.8	11.3	2.5
Salford	527	41.1	21.6	84.1	5.9	20.1	58.1	15.9	7.4	8.5
Sheff	692	29.1	6.2	88.2	8.1	44.5	35.6	11.9	3.8	8.1
Shrew	271	29.2	5.3	81.2	13.7	39.5	28.0	18.8	1.5	17.0
Stevng	604	32.5	7.9	94.0	6.5	50.5	37.1	6.0	2.8	3.2
Stoke	413	31.4	4.8	74.1	9.9	42.1	22.0	25.9	3.2	18.2
Sund	262	31.0	7.5	85.9	3.8	48.5	33.6	14.1	1.5	12.6
Truro	211	31.3	6.1	89.6	2.4	49.3	37.9	10.4	4.3	6.2
Wirral	218	31.0	12.7	90.8	2.8	40.8	47.3	9.2	0.9	8.3
Wolve	448	28.9	4.7	85.7	8.5	70.3	6.9	14.3	2.0	11.2
York	234	37.1	7.3	88.5	7.3	30.8	50.4	11.5	2.1	9.4

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
N IRELAND¹										
Antrim	135	20.0	5.7	86.7	1.5	85.2	0.0	13.3	3.7	8.2
Belfast	167	25.9	6.1	83.8	4.8	79.0	0.0	16.2	0.6	15.6
Newry	102	24.3	7.7	87.3	2.9	84.3	0.0	12.8	2.0	8.8
Ulster	102	30.4	.	97.1	0.0	97.1	0.0	2.9	0.0	2.0
West NI	114	34.1	4.3	94.7	2.6	92.1	0.0	5.3	1.8	3.5
SCOTLAND²										
Abrdn	211	29.8	8.5	90.5	1.0	89.6	0.0	9.5	7.6	1.9
Airdrie	224	46.0	13.0	87.1	0.0	87.1	0.0	13.0	5.4	7.6
D&Gall	62	46.2	11.1	87.1	1.6	85.5	0.0	12.9	3.2	9.7
Dundee	171	30.4	4.3	90.6	3.5	87.1	0.0	9.4	1.8	7.6
Edinb	323	42.9	8.9	89.8	2.2	87.6	0.0	10.2	3.4	6.8
Glasgw	623	48.1	12.7	93.9	1.6	92.3	0.0	6.1	1.1	5.0
Inverns	106	43.5	6.7	89.6	1.9	87.7	0.0	10.4	5.7	4.7
Klmarnk	187	30.6	12.7	82.4	8.6	73.8	0.0	17.7	2.1	15.5
Krkldy	174	31.1	5.0	96.0	1.7	94.3	0.0	4.0	1.7	2.3
WALES										
Bangor	110	32.0	3.3	88.2	19.1	50.9	18.2	11.8	5.5	6.4
Cardff	640	28.2	6.7	90.9	8.0	10.0	73.0	9.1	4.5	4.5
Clwyd	100	20.0	4.9	89.1	0.0	89.1	0.0	9.9	7.9	2.0
Swanse	494	27.3	6.8	90.1	8.1	46.8	35.2	9.9	4.5	5.5
Wrexm	119	21.1	12.9	86.6	2.5	68.9	15.1	13.5	0.8	12.6
TOTALS										
England	25,578	33.6	7.7	86.6	4.7	31.7	50.2	13.4	5.4	7.8
N Ireland	620	26.9	4.7	89.2	2.6	86.6	0.0	10.8	1.6	8.4
Scotland	2,081	41.0	9.9	90.6	2.3	88.4	0.0	9.4	3.1	6.3
Wales	1,463	27.2	6.8	90.0	7.9	35.7	46.4	10.0	4.5	5.5
UK	29,742	33.7	7.7	87.1	4.6	37.0	45.5	12.9	5.1	7.6

Blank cells – no data returned by the centre

¹There were no satellite units in Northern Ireland

²All 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.

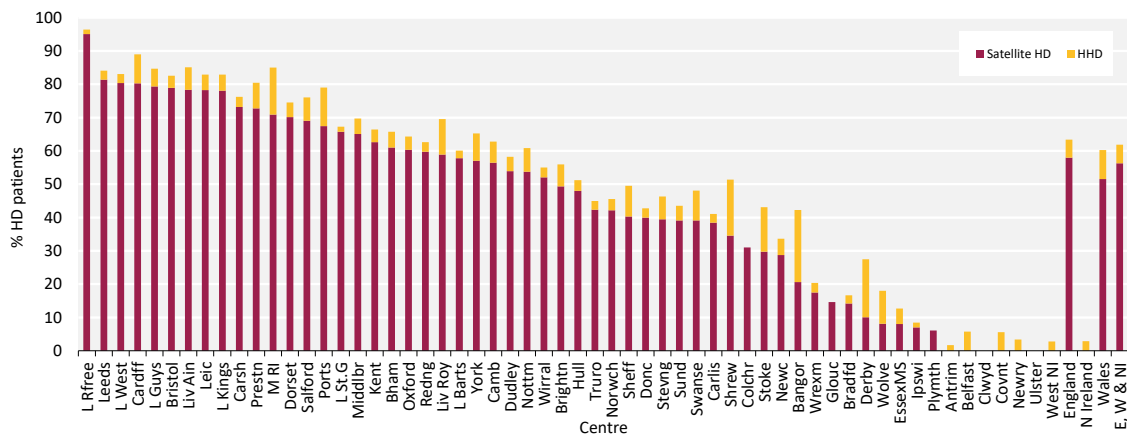


Figure 3.10 Adult patients prevalent to HD on 31/12/2021 treated with satellite HD or HHD by centre
There were no satellite units in Northern Ireland and Scottish centres were excluded because data on satellite HD were not available

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 31/12/2020 and followed-up for one year in 2021. 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 31/12/2020 by centre

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
D&Gall	63	88.4	76.2	93.3				
Newry	82	84.4	77.8	92.7	79	83.0	80.3	94.5
Clwyd	95	84.4	78.6	92.4	95	87.6	81.3	94.1
Inverns	97	85.3	78.7	92.3				
Bangor	102	85.8	78.9	92.2	102	89.0	81.7	94.0
Ulster	112	89.9	79.3	92.0	108	88.3	81.9	93.9
Antrim	133	88.4	80.1	91.7	125	87.1	82.6	93.6
West NI	138	87.0	80.2	91.6	124	84.7	82.5	93.6
Wrexm	138	79.3	80.2	91.6	138	82.4	82.9	93.5
Carlisle	143	85.6	80.4	91.5	140	87.4	83.0	93.4
Colchr	144	87.6	80.4	91.5	142	90.0	83.1	93.4
Krkcldy	147	90.8	80.5	91.5				
Ipswi	169	84.8	81.0	91.2	164	87.8	83.6	93.2
Truro	171	84.3	81.0	91.2	168	87.9	83.6	93.2
Dundee	172	86.9	81.0	91.2				
Plymth	173	82.6	81.1	91.2	173	87.0	83.7	93.1
Klmarnk	181	88.3	81.2	91.1				
Liv Ain	184	85.2	81.3	91.1	160	87.7	83.5	93.2
Belfast	193	85.2	81.4	91.0				
Donc	195	85.7	81.4	91.0	193	88.1	84.1	92.9
Abrdn	207	86.9	81.6	90.9				
Wirral	208	82.6	81.6	90.9	207	86.5	84.3	92.8
York	221	90.0	81.8	90.8	221	91.7	84.5	92.7
Airdrie	221	85.2	81.8	90.8				
Glouc	235	86.1	82.0	90.7	233	88.8	84.6	92.7
Dudley	244	88.5	82.1	90.6	244	90.5	84.8	92.6
Shrew	248	89.4	82.1	90.6	248	91.6	84.8	92.6
Sund	252	87.7	82.2	90.6	251	91.1	84.8	92.6
Bradfd	299	86.6	82.6	90.3	297	89.1	85.2	92.3
Edinb	318	89.1	82.8	90.2				
Norwch	336	86.6	82.9	90.1	331	87.8	85.5	92.2
Redng	344	87.0	82.9	90.1	344	90.0	85.6	92.2
Middlbr	347	85.4	83.0	90.1	347	88.4	85.6	92.1
Dorset	349	89.2	83.0	90.1	349	90.8	85.6	92.1
Derby	352	89.2	83.0	90.1	352	91.2	85.6	92.1
Camb	361	86.7	83.1	90.0	361	88.3	85.7	92.1
Stoke	365	85.8	83.1	90.0	364	88.3	85.7	92.1
L St.G	366	89.4	83.1	90.0	359	91.7	85.7	92.1
Newc	383	87.5	83.2	90.0	383	90.4	85.8	92.0
Hull	389	87.9	83.2	89.9	389	89.8	85.8	92.0
Wolve	396	85.8	83.2	89.9	395	88.7	85.8	92.0
Liv Roy	436	86.7	83.4	89.8	406	89.2	85.9	92.0
Covnt	437	86.6	83.4	89.8	433	88.1	86.0	91.9
Nottm	455	87.5	83.5	89.7	454	90.2	86.1	91.8
Kent	468	84.1	83.6	89.7	468	86.3	86.2	91.8
Swanse	472	87.8	83.6	89.7	472	90.5	86.2	91.8
Brightn	486	84.5	83.6	89.7	476	86.7	86.2	91.8
Bristol	516	85.4	83.7	89.6	510	88.5	86.3	91.7
EssexMS	517	87.6	83.8	89.6	515	89.7	86.3	91.7
Oxford	517	83.6	83.8	89.6	511	87.2	86.3	91.7
Salford	539	81.4	83.8	89.5	539	86.2	86.4	91.6
Prestn	559	84.0	83.9	89.5	540	87.9	86.4	91.6
Glasgw	567	83.5	83.9	89.5				
Stevng	576	85.4	83.9	89.5	573	88.3	86.5	91.6

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
Cardiff	576	88.4	83.9	89.5	576	90.7	86.5	91.6
Leeds	604	86.8	84.0	89.4	603	89.8	86.6	91.5
M RI	627	88.3	84.1	89.4	619	90.5	86.6	91.5
Sheff	655	85.7	84.1	89.3	655	88.1	86.7	91.4
L Kings	702	88.4	84.2	89.2	698	90.8	86.8	91.4
Ports	753	87.1	84.3	89.2	744	89.6	86.9	91.3
L Guys	764	87.8	84.4	89.1	764	89.5	86.9	91.3
L Rfree	858	86.1	84.5	89.0	845	88.8	87.0	91.2
Carsh	949	88.4	84.6	88.9	932	90.3	87.1	91.1
Leic	1,078	85.6	84.8	88.8	1,070	87.7	87.3	91.0
L Barts	1,281	90.6	85.0	88.7	1,161	91.5	87.4	90.9
L West	1,398	87.7	85.1	88.6	1,359	90.0	87.5	90.8
Bham	1,587	89.6	85.2	88.5	1,576	91.3	87.7	90.7

Centres are ordered by increasing number of patients

¹Centres excluded if <85% comorbidity data were available – this included Belfast and all Scottish kidney centres

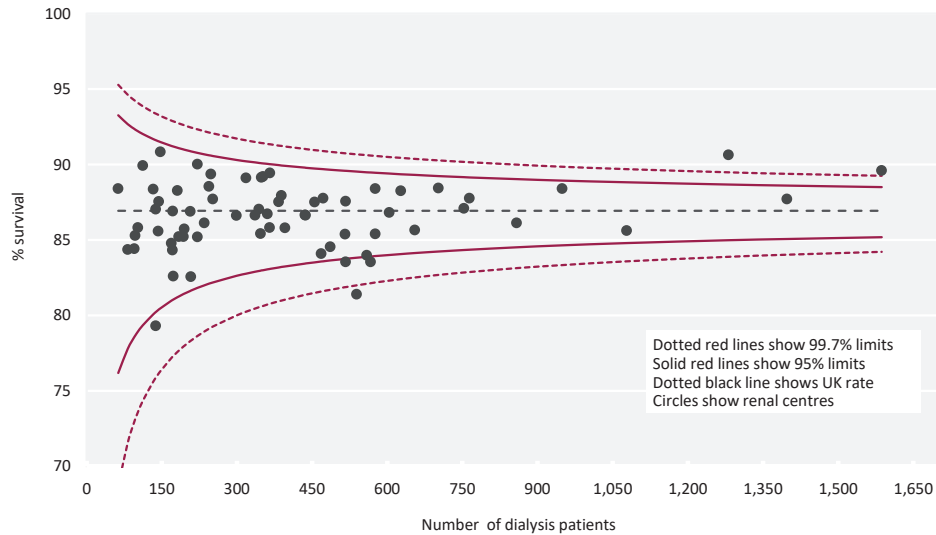


Figure 3.11 1 year survival (adjusted to age 60 years) of adult patients prevalent to dialysis on 31/12/2020 by centre

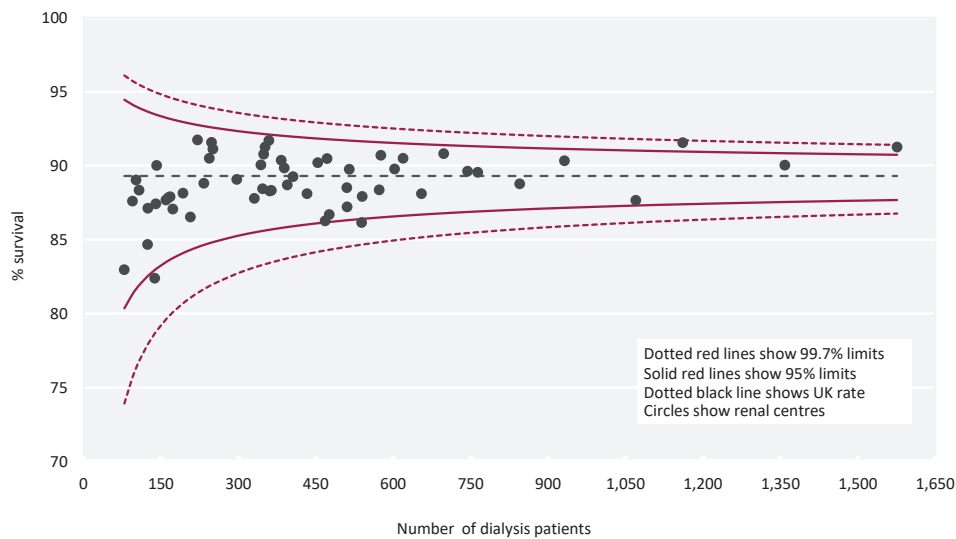


Figure 3.12 1 year survival (adjusted to 60 years, male and median comorbidity score) of adult patients prevalent to dialysis on 31/12/2020 by centre

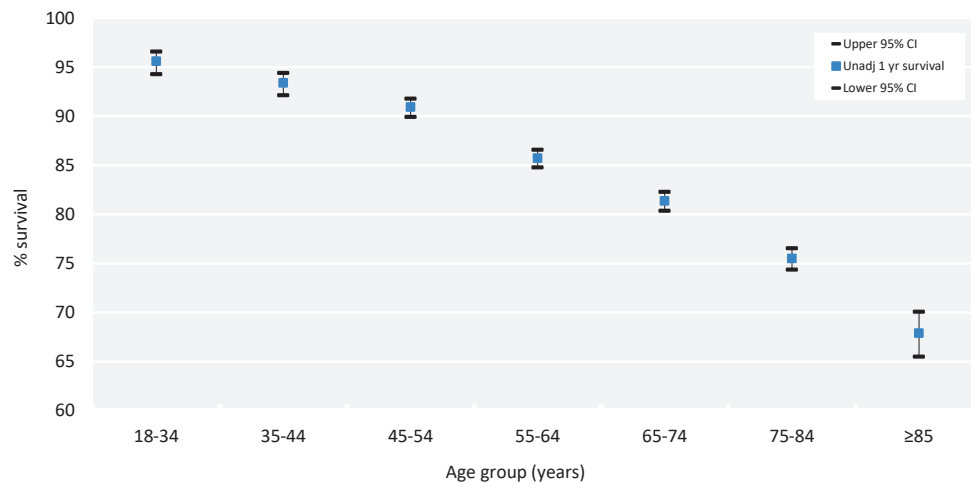


Figure 3.13 1 year survival (unadjusted) of adult patients prevalent to dialysis on 31/12/2020 by age group
 CI – confidence interval

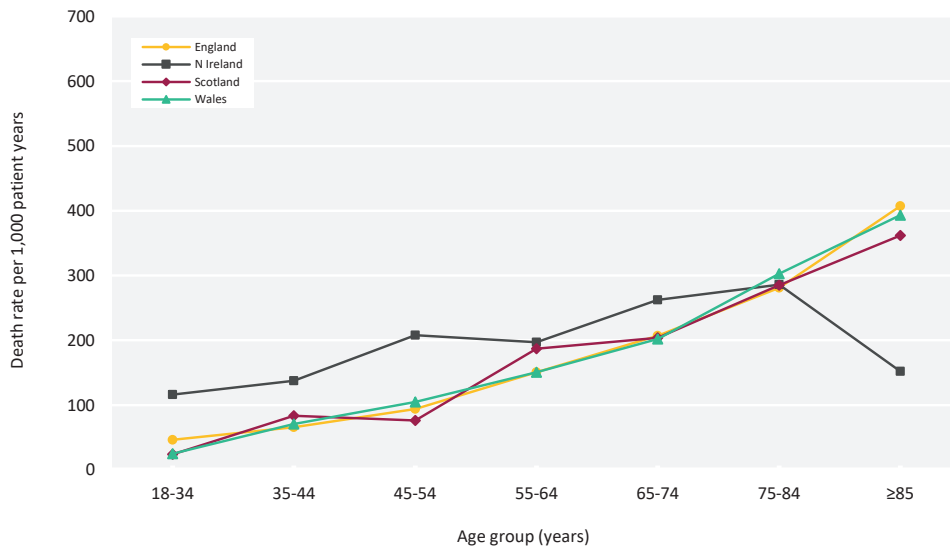


Figure 3.14 1 year death rate per 1,000 patient years for adult patients prevalent to dialysis on 31/12/2020 by country and age group

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

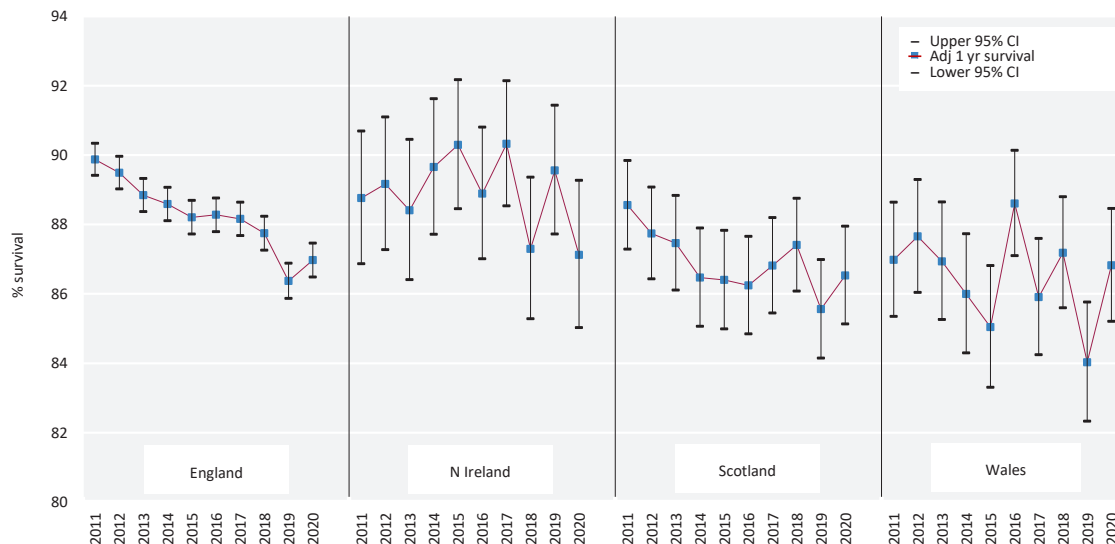


Figure 3.15 1 year survival (adjusted to age 60 years) for prevalent adult dialysis patients by country between 2011 and 2020

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 31/12/2020 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-2021 (thousands)	UK deaths in 2021	Death rate per 1,000 population	Expected number of deaths in UKRR population	UKRR deaths in 2021	UKRR death rate per 1,000 prevalent KRT patients	Relative risk of death in 2021	Relative risk of death 1998-2001 cohort
20-24	4,035	1,601	0.4	0	7	7	18.7	41.1
25-29	4,367	2,178	0.5	1	20	13	25.0	41.8
30-34	4,655	3,255	0.7	2	60	24	33.7	31.2
35-39	4,477	4,929	1.1	4	82	25	22.4	26.0
40-44	4,227	6,908	1.6	7	130	31	19.1	22.6
45-49	4,215	10,693	2.5	14	212	40	15.7	19.0
50-54	4,641	17,332	3.7	27	346	48	12.7	12.8
55-59	4,574	25,060	5.5	46	591	71	12.9	10.1
60-64	3,956	33,867	8.6	68	783	99	11.5	10.4
65-69	3,354	44,434	13.2	92	781	112	8.5	7.9
70-74	3,345	68,579	20.5	133	1,025	158	7.7	7.2
75-79	2,490	86,264	34.6	159	982	214	6.2	5.3
80-84	1,698	105,622	62.2	179	839	291	4.7	4.0
≥85	1,649	252,104	152.9	214	542	388	2.0	3.0
Total	51,683	662,826	12.8	945	6,400	100	6.8	7.7

Cause of death in adult KRT patients

Cause of death was analysed in prevalent patients receiving KRT on 31/12/2020 and followed-up for one year in 2021. 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.

Table 3.10 Cause of death in adult patients prevalent to KRT on 31/12/2020 followed-up in 2021 by age group

Cause of death	KRT all ages		KRT <65 yrs		KRT ≥65 yrs	
	N	%	N	%	N	%
Cardiac disease	715	17.9	283	20.7	432	16.5
Cerebrovascular disease	97	2.4	42	3.1	55	2.1
Infection	1,119	28.1	416	30.4	703	26.8
Malignancy	263	6.6	86	6.3	177	6.8
Treatment withdrawal	437	11.0	72	5.3	365	13.9
Other	1,032	25.9	351	25.6	681	26.0
Uncertain aetiology	327	8.2	120	8.8	207	7.9
Total (with data)	3,990	100.0	1,370	100.0	2,620	100.0
Missing	2,411	37.7	862	38.6	1,549	37.2

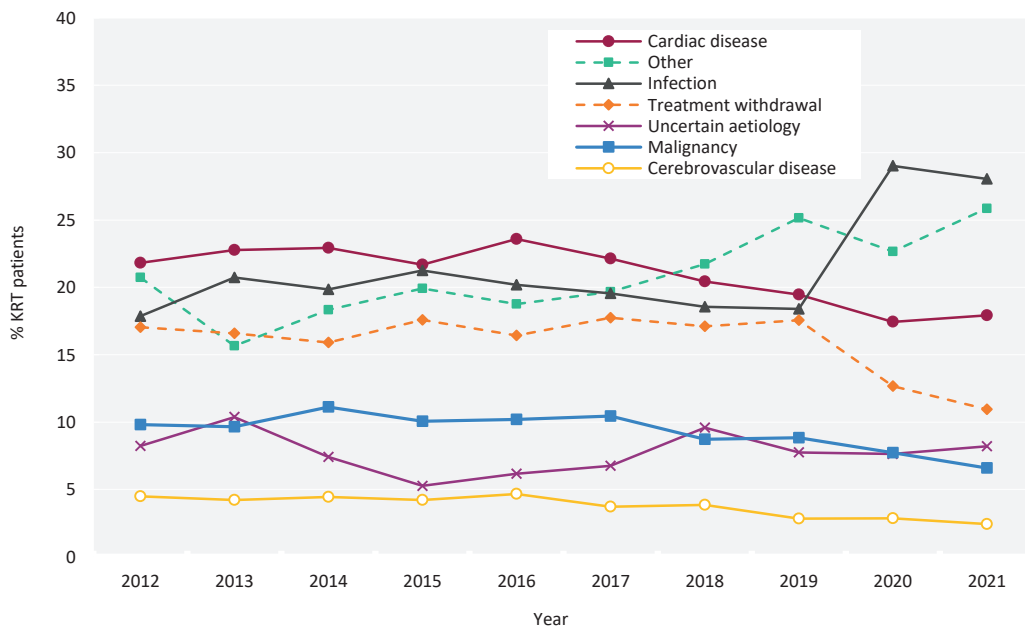


Figure 3.16 Cause of death between 2012 and 2021 for adult patients prevalent to KRT at the beginning of the year

Chapter 4

Adults with a kidney transplant (Tx) in the UK at the end of 2021

Contents

Introduction.....	78
Rationale for analyses	80
Key findings	81
Analyses	82
Kidney Tx activity.....	82
Early kidney Tx outcomes	84
Changes to the prevalent adult kidney Tx population.....	87
Demographics of prevalent adult kidney Tx patients	91
Graft function and anaemia in prevalent adult kidney Tx patients.....	94
Blood pressure in prevalent adult kidney Tx patients.....	96
Biochemistry parameters in prevalent adult kidney Tx patients.....	97
Survival of adult kidney Tx patients.....	99
Cause of death in adult kidney Tx patients.....	99

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 2021 (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.

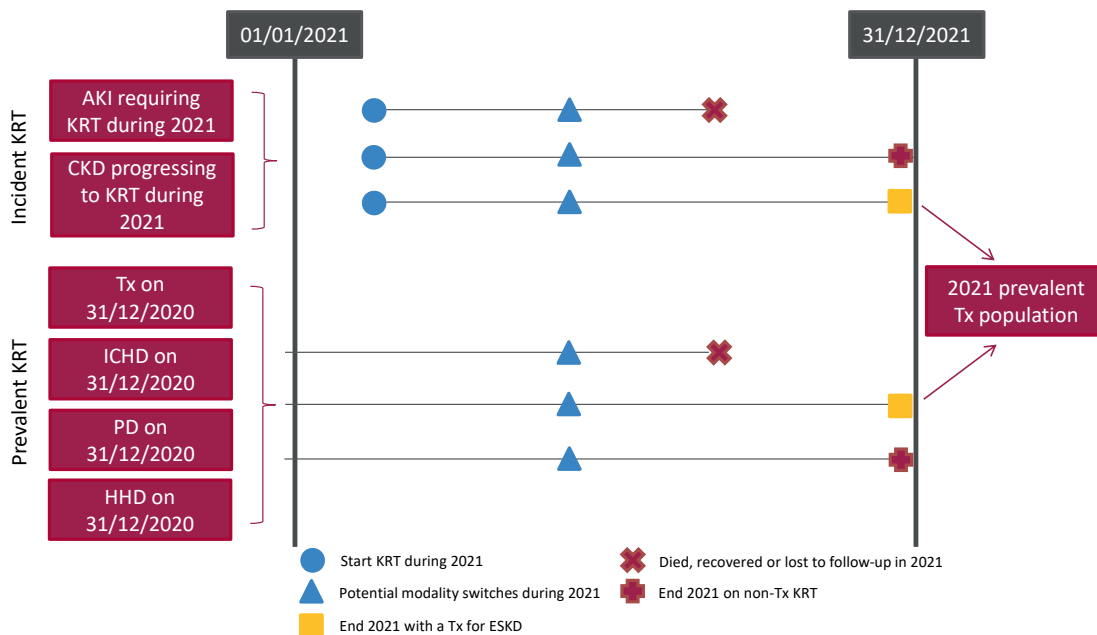


Figure 4.1 Pathways adult patients could follow to be included in the UK 2021 prevalent Tx population

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 2021 or if they had been on KRT for ≥ 90 days and were on Tx at the end of 2021

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 2021 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 2021 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 4.8, figures 4.13–4.14 (proteinuria was not adequately collected)
	Proportion of patients achieving dyslipidaemia targets	Table 4.8
	Incidence of hyperparathyroidism	Table 4.8
	Prevalence of anaemia	Table 4.8, figures 4.11–4.12
Anaemia (2020)	Treatment guidelines for anaemia in kidney Tx patients should be similar to those for CKD patients not on dialysis	Table 4.8, figures 4.11–4.12

In 2021, 23 of the 68 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 was unable to submit patient level data for 2021. Aggregate numbers by modality were provided, enabling inclusion in Tables 4.5 and 4.6. Exeter is excluded from all other analyses.

Key findings

- 39,189 adult patients had a kidney Tx for ESKD in the UK on 31/12/2021, which represented 56.4% of the KRT population.
- The median age of kidney Tx patients was 56.5 years and 60.8% were male.
- There was a 15% increase in overall kidney Tx performed in 2021 compared to 2020, with an increase in kidney Tx from LKDs by 36%, DCDs by 24% and a 1% decrease in DBDs. Transplant activity has not yet recovered to pre-pandemic levels.
- The median eGFR for kidney Tx patients 1 year after transplantation was 56.5 mL/min/1.73m² from LKD, 51.5 mL/min/1.73m² from DBD and 47.1 mL/min/1.73m² from DCD.
- 16.3% of kidney Tx patients had eGFR <30 mL/min/1.73m².
- The median decline in eGFR slope beyond the first year after transplantation was 0.8 mL/min/1.73m²/year.
- There was no cause of death data available for 39.6% of deaths on Tx. For those Tx patients with data, the leading cause of death was infection (37.1%) compared to 32% in 2020 and 18.7% the previous year. The continuing increase is most likely due to COVID related deaths.

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, 2019–2021 calendar years

Organ	2019	2020	2021	% change 2020-2021
Kidney DBD ¹	1,417	1,220	1,209	-1
Kidney DCD ²	1024	683	845	24
Kidney LKD	1,042	587	801	36
Kidney and liver ³	18	5	9	80
Kidney and heart	1	0	2	
Kidney and pancreas ⁴	157	97	111	14
Kidney and pancreas islets ⁵	4	0	0	
Small bowel (inc kidney)	7	4	6	50
Total kidney Tx	3,670	2,596	2,983	15

¹Includes en bloc transplants (5 in 2019, 2 in 2020, and 2 in 2021) and double kidney transplants (18 in 2019, 10 in 2020, 10 in 2021)

²Includes en bloc transplants (3 in 2019, 2 in 2020, and 5 in 2021) and double kidney transplants (24 in 2019, 9 in 2020, and 18 in 2021)

³Includes DCD transplants (45 in 2019, 23 in 2020, and 31 in 2021)

⁴Includes DCD transplants (1 in 2021)

⁵Includes DCD transplants (2 in 2019 and 2 in 2021)

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 2019, adjusted by sex, age and primary renal disease (PRD) (figure 4.2). The analysis for LKD transplantation only is shown separately (figure 4.3).

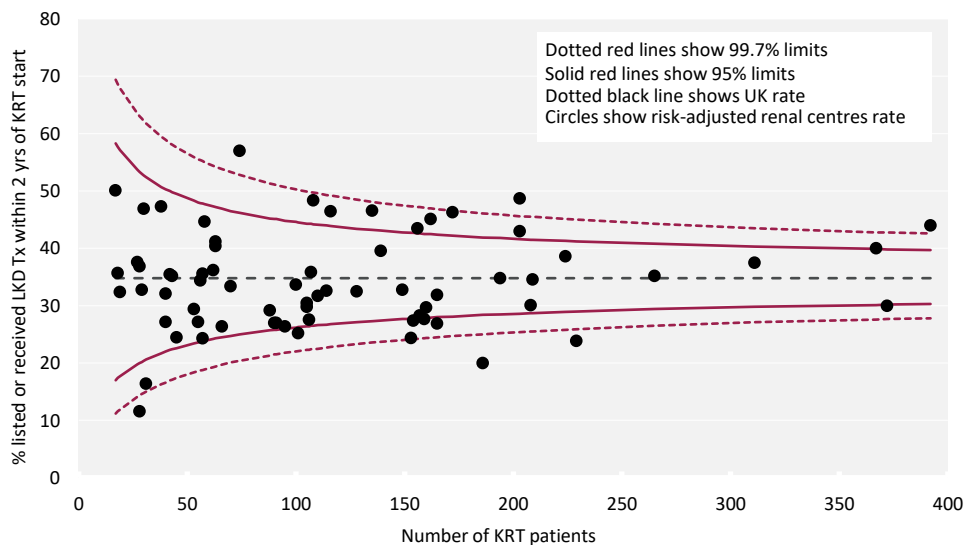


Figure 4.2 Percentage of adult patients incident to KRT in 2019 who were waitlisted or received a living kidney donor (LKD) Tx within 2 years of KRT start adjusted by age, sex and primary renal disease by centre

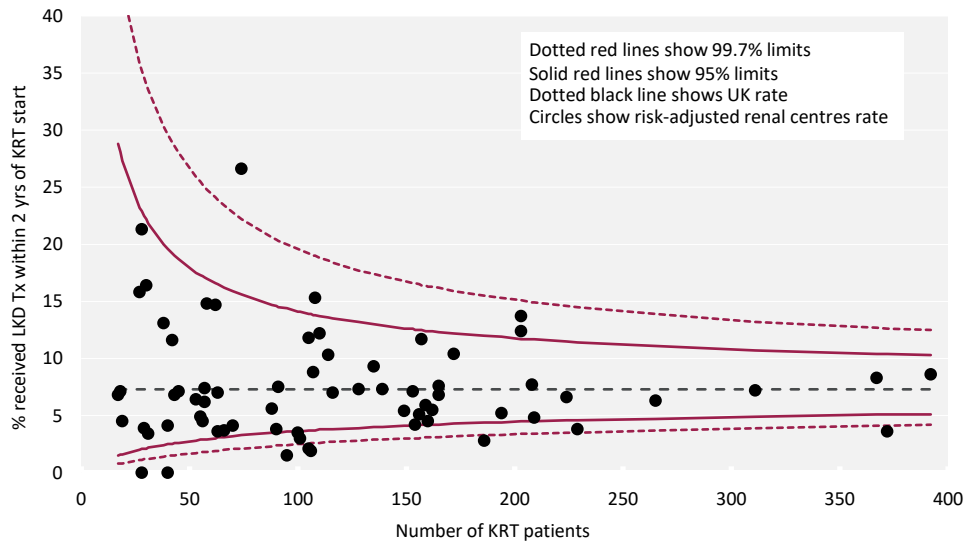


Figure 4.3 Percentage of adult patients incident to KRT in 2019 who received a living kidney donor (LKD) Tx within 2 years of KRT start adjusted by age, sex and primary renal disease by centre

Early kidney Tx outcomes

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

Table 4.3 Risk-adjusted first adult kidney-only Tx, graft and patient survival by Tx type and Tx centre¹ (cohorts detailed in footnote)

Centre	Deceased donor				Living donor			
	Adj 1 yr survival (%)		Adj 5 yr survival (%)		Adj 1 yr survival (%)		Adj 5 yr survival (%)	
	Graft	Patient	Graft	Patient	Graft	Patient	Graft	Patient
Bham	93	97	85	88	98	100	93	91
Belfast	94	97	86	87	99	99	91	94
Bristol	95	94	89	85	97	100	91	93
Camb	96	98	91	87	99	100	95	93
Cardff	95	97	86	85	97	100	N/A	N/A
Covnt	94	97	92	89	97	100	92	98
Edin	97	99	89	94				
Glasgw	96	96	83	85	98	99	92	96
L Barts	94	92	81	87	99	100	90	93
L Guy's	98	98	85	91	100	100	94	97
L Rfree	96	97	85	92	100	100	92	98
L St.G	96	97	88	92	99	99	95	97
L West	95	97	88	85	99	98	91	94
Leeds	95	96	84	88	98	99	90	96
Leic	98	97	88	89	99	100	93	94
Liv Roy	94	95	84	86	98	99	93	94
M RI	96	95	89	85	98	98	92	94
Newc	97	96	84	85	99	99	93	91
Nottm	97	95	91	90	98	100	96	92
Oxford	97	96	90	90	98	99	94	96
Plymth	93	91	N/A	N/A	97	98		
Ports			N/A	N/A				
Sheff	94	98	90	91	98	100	98	95
UK total	95	97	86	88	98	99	93	94

Cohorts for survival rate estimation: 1 year survival: 1/4/2017–31/03/2021; 5 year survival: 1/4/2013–31/3/2017; first grafts only – re-grafts excluded for patient survival estimation

Since the cohorts to estimate 1 and 5 year survival are different, some centres may appear to have 5 year survival better than 1 year survival

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

¹Information 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://nhsbtbde.blob.core.windows.net/umbraco-assets-corp/26790/kidney-annual-report-2020-21.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 2014–2020) was 97.0%.

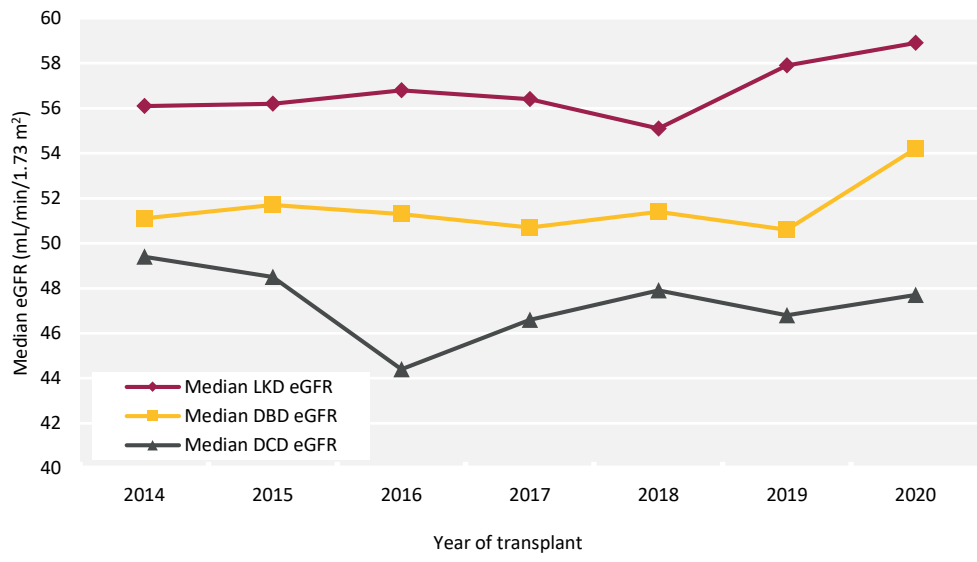


Figure 4.4 Median estimated glomerular filtration rate (eGFR) for kidney Tx at 1 year by donor type and year of transplantation between 2014 and 2020

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

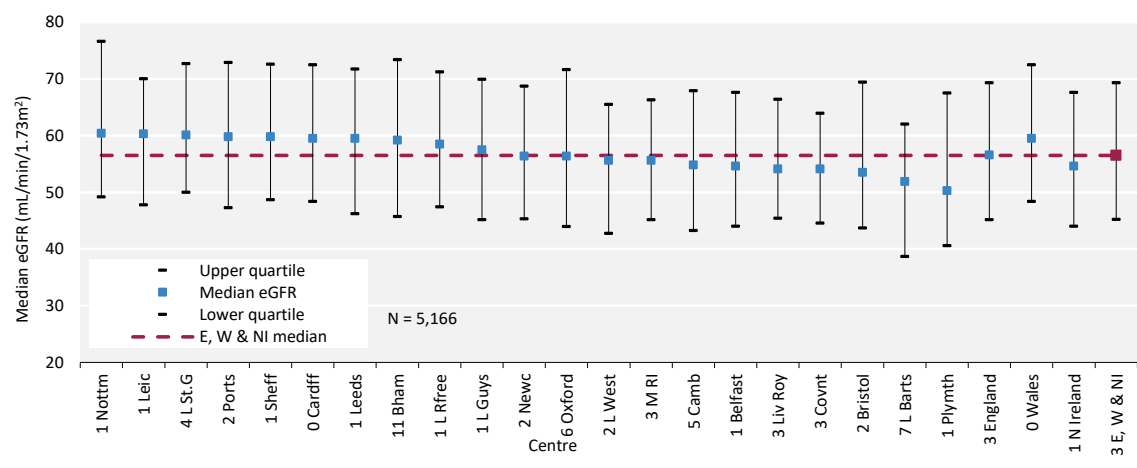


Figure 4.5 Median estimated glomerular filtration rate (eGFR) at 1 year post-living kidney donor (LKD) Tx by transplanting centre for transplantation that occurred between 2014 and 2020

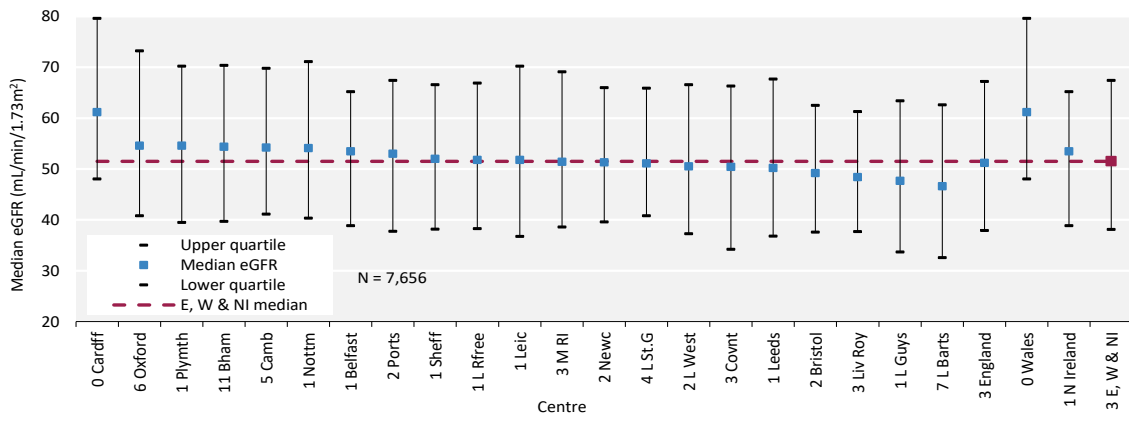


Figure 4.6 Median estimated glomerular filtration rate (eGFR) at 1 year post-donor after brain death (DBD) Tx by transplanting centre for transplantation that occurred between 2014 and 2020

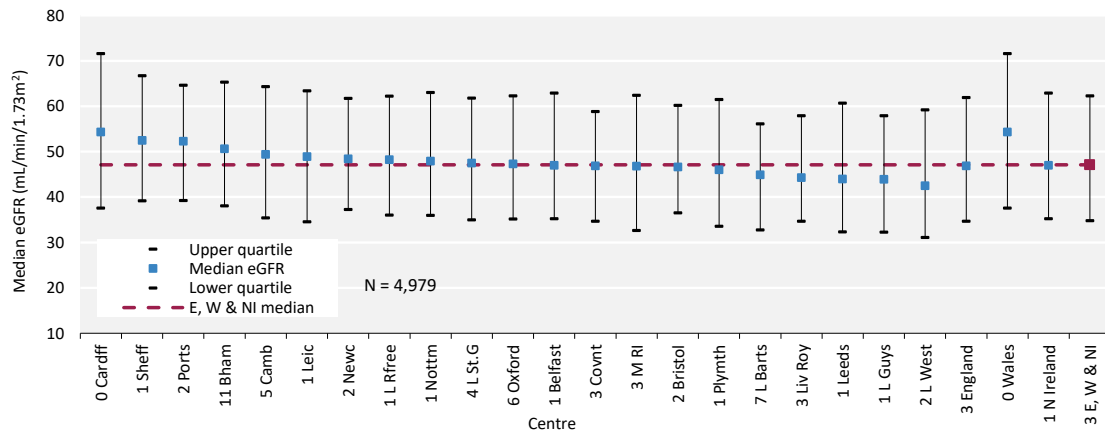


Figure 4.7 Median estimated glomerular filtration rate (eGFR) at 1 year post-donor after circulatory death (DCD) Tx by transplanting centre for transplantation that occurred between 2014 and 2020

Changes to the prevalent adult kidney Tx population

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

Table 4.4 Percentage completeness of estimated glomerular filtration rate (eGFR), blood pressure, haemoglobin, total cholesterol, adjusted calcium, phosphate and parathyroid hormone (PTH) by centre for adult patients prevalent to Tx on 31/12/2021

Centre	N with Tx	Data completeness (%)						
		eGFR	Blood pressure	Haemoglobin	Total cholesterol	Adjusted calcium	Phosphate	PTH
TX CENTRES								
Bham	1,574	90.9	75.7	90.7	81.5	89.8	89.5	1.8
Belfast	720	98.9	95.0	98.3	98.9	98.3	98.3	26.9
Bristol	902	98.9	85.5	98.2	93.1	98.5	98.0	96.7
Camb	1,167	93.2	0.0	93.3	76.4	89.1	88.4	83.0
Cardff	1,032	98.1	93.3	97.6	64.1	97.5	97.5	13.7
Covnt	629	94.6	54.4	95.6	68.2	94.9	41.2	38.6
L Barts	1,322	90.5	0.2	90.2	91.2	89.5	89.6	90.2
L Guys	1,451	94.3	0.0	93.6	41.5	91.0	91.0	24.1
L Rfree	1,418	93.4	78.8	92.8	65.0	88.9	88.7	62.6
L St.G	467	93.8	75.2	93.8	69.4	89.3	89.3	87.6
L West	1,957	93.0	0.0	92.7	33.9	91.7	92.5	27.9
Leeds	1,108	98.1	83.8	97.8	95.8	96.5	89.3	43.3
Leic	1,432	96.0	0.6	96.3	93.2	95.0	94.4	40.1
Liv Roy	742	95.7	1.2	65.6	55.4	92.9	94.3	0.9
M RI	1,317	92.6	5.4	92.4	72.7	92.3	92.3	71.3
Newc	781	93.5	58.0	93.2	38.7	93.0	92.8	60.3
Nottm	705	98.3	92.9	95.6	72.5	96.7	96.0	82.0
Oxford	1,399	84.9	0.0	85.0	42.9	82.3	82.2	40.5
Plymth	341	97.7	90.9	97.4	79.8	97.1	95.0	70.4
Ports	1,091	92.4	16.7	92.1	48.1	90.1	83.8	35.6
Sheff	782	96.9	77.4	96.4	38.0	96.2	96.2	18.3
DIALYSIS CENTRES								
Antrim	161	99.4	41.6	99.4	99.4	98.1	98.1	36.0
Bangor	103	95.2	38.8	95.2	99.0	95.2	95.2	35.0
Bradfd	406	97.8	2.0	97.3	81.0	88.7	85.0	55.7
Brightn	554	98.0	22.6	98.0	79.6	96.8	96.6	61.4
Carlis	156	81.4	0.0	80.1	54.5	77.6	75.0	43.0
Carsh	840	80.2	3.7	79.5	38.7	78.8	78.7	32.4
Clwyd	102	99.0	1.0	98.0	99.0	97.1	97.1	72.6
Derby	297	98.3	92.9	98.3	96.0	97.6	97.6	87.5
Donc	144	100.0	75.0	99.3	58.3	97.9	96.5	11.8
Dorset	438	74.4	23.1	80.8	61.9	81.1	62.1	48.4
Dudley	127	97.6	11.0	97.6	84.3	97.6	96.9	0.0
EssexMS	338	89.4	17.8	92.3	63.3	80.5	74.9	12.1
Exeter								
Glouc	276	95.3	54.0	94.9	49.6	92.0	88.8	26.8
Hull	484	98.4	1.2	98.6	37.2	95.3	95.0	14.9
Ipswi	240	91.3	9.2	90.4	62.9	90.0	89.6	59.6
Kent	626	97.6	91.7	97.8	38.3	96.8	96.8	10.9
L Kings	506	96.8	0.2	96.6	77.9	96.8	96.6	81.6
Liv Ain	44	95.5	4.6	54.6	61.4	93.2	93.2	2.3
Middlbr	561	85.0	0.0	84.1	46.0	81.3	78.6	8.4
Newry	172	97.7	66.9	96.5	98.8	94.8	95.4	98.3

Table 4.4 Continued

Centre	N with Tx	Data completeness (%)						
		eGFR	Blood pressure	Haemoglobin	Total cholesterol	Adjusted calcium	Phosphate	PTH
Norwch	442	97.5	0.5	96.8	96.2	88.7	88.5	20.1
Prestn	757	95.9	0.0	95.9	62.4	92.1	91.3	32.2
Redng	504	98.4	63.7	98.4	38.1	97.6	97.2	19.6
Salford	679	98.5	0.0	98.1	97.4	97.9	97.8	0.2
Shrew	163	82.8	26.4	82.8	67.5	71.8	71.8	14.1
Stevng	391	97.4	79.0	95.9	40.2	92.8	91.8	50.9
Stoke	424	97.2	0.0	97.6	98.4	96.9	96.9	72.6
Sund	280	96.8	0.0	96.4	52.9	96.8	96.4	60.7
Swanse	342	99.4	95.6	99.1	63.5	98.8	98.8	74.9
Truro	247	98.4	0.0	98.0	59.1	96.8	96.8	58.7
Ulster	100	95.0	93.0	95.0	100.0	95.0	95.0	13.0
West NI	219	98.2	60.7	96.4	100.0	96.8	96.8	93.6
Wirral	187	94.1	1.6	67.9	75.4	79.7	87.2	8.0
Wolve	237	94.5	62.0	91.1	87.3	93.7	46.0	59.1
Wrexm	175	97.1	76.6	97.1	98.3	96.6	96.6	97.7
York	338	98.2	66.3	97.9	68.3	95.6	94.4	19.8
TOTALS								
England	31,271	93.6	30.5	92.4	64.8	91.5	89.0	43.6
N Ireland	1,372	98.4	79.6	97.7	99.2	97.4	97.5	46.6
Wales	1,754	98.1	83.5	97.7	71.4	97.5	97.5	38.7
E, W & NI	34,397	94.0	35.1	92.9	66.5	92.0	89.8	43.5

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

Exeter was unable to submit patient level data for 2021

For the 67 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 4.5 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

Centre	N with Tx					% with Tx					Estimated catchment population (millions)	2021 crude rate (pmp)
	2017	2018	2019	2020	2021	2017	2018	2019	2020	2021		
TX CENTRES												
Belfast	641	673	692	721	744	76.0	76.7	78.6	81.0	81.7	0.53	1,393
Bham	1,517	1,575	1,630	1,603	1,615	47.8	48.5	49.2	49.2	48.8	2.05	786
Bristol	907	925	939	928	926	61.6	62.9	63.2	62.9	61.9	1.22	758
Camb	978	1,019	1,109	1,181	1,221	73.2	73.5	76.2	78.3	75.0	0.94	1,303
Cardff	1,044	1,073	1,083	1,066	1,060	62.0	62.4	62.6	63.5	62.4	1.16	916
Covnt	567	579	620	636	646	58.7	60.4	57.6	57.7	57.7	0.80	812
Edinb	482	522	546	565	603	58.4	60.6	61.7	63.6	65.1	0.84	717
Glasgw	1,136	1,156	1,216	1,240	1,242	64.1	63.8	65.6	67.1	66.6	1.37	904
L Barts	1,200	1,266	1,379	1,349	1,373	48.0	48.7	51.9	50.2	49.9	1.59	863
L Guys	1,416	1,458	1,550	1,512	1,481	65.4	65.4	66.8	65.3	63.8	1.01	1,472
L Rfree	1,346	1,374	1,426	1,426	1,462	61.4	61.5	60.8	61.0	61.4	1.33	1,101
L St.G	487	494	501	478	486	58.1	59.2	58.8	56.1	56.1	0.67	731
L West	1,894	1,975	2,042	2,025	2,014	54.5	55.5	56.6	57.4	56.6	1.96	1,025
Leeds	999	1,054	1,082	1,117	1,135	61.7	62.6	62.7	63.8	63.6	1.37	827
Leic	1,290	1,363	1,442	1,494	1,452	54.7	55.6	55.9	57.0	55.0	2.09	696
Liv Roy	792	815	814	769	761	63.2	64.1	64.7	63.7	63.1	0.81	937
M RI	1,407	1,422	1,400	1,326	1,385	68.6	68.8	68.4	66.8	66.7	1.33	1,038
Newc	710	732	765	781	799	63.6	63.5	65.3	65.3	65.2	0.95	838
Nottm	727	743	751	734	726	61.4	62.1	61.7	60.7	59.5	0.93	781
Oxford	1,346	1,407	1,435	1,456	1,455	71.6	72.4	72.7	72.2	72.6	1.45	1,006
Plymth	341	362	360	359	349	63.0	67.0	67.3	66.2	63.7	0.40	869
Ports	1,053	1,070	1,133	1,108	1,117	60.3	60.7	60.2	58.4	57.6	1.75	638
Sheff	787	821	835	804	804	54.6	55.4	56.1	54.0	53.7	1.13	709
DIALYSIS CENTRES												
Abrdn	311	328	343	349	367	55.2	57.3	61.5	61.8	63.5	0.50	733
Airdrie	257	274	296	292	280	55.2	56.2	56.5	56.5	55.6	0.46	610
Antrim	120	131	145	161	161	47.1	47.8	50.9	56.1	54.4	0.25	655
Bangor	94	100	106	107	107	48.2	49.3	52.7	49.5	49.3	0.16	653
Bradfd	376	392	412	416	416	55.8	57.0	56.3	57.5	56.6	0.49	847
Brightn	487	510	545	556	569	48.1	48.3	51.2	51.6	52.1	1.08	528
Carlis	156	162	155	152	158	55.5	55.3	51.5	51.2	51.8	0.26	619
Carsh	724	766	834	843	860	42.7	43.7	46.8	45.6	45.1	1.63	528
Clwyd	94	98	104	107	103	52.5	51.6	50.7	52.5	50.5	0.18	569
D&Gall	76	83	87	89	92	56.3	57.2	58.4	57.1	59.7	0.12	751
Derby	234	258	296	300	306	42.2	44.0	45.3	44.4	44.4	0.56	545
Donc	117	119	132	140	146	35.1	36.1	38.6	41.1	43.1	0.38	389
Dorset	394	422	436	449	445	54.0	55.2	56.4	56.3	56.6	0.73	610
Dudley	95	106	111	123	128	26.0	29.4	30.3	33.1	32.2	0.34	372
Dundee	232	254	259	253	240	53.3	57.1	57.7	58.8	58.4	0.37	652
EssexMS	312	331	328	351	352	37.6	39.2	38.5	39.7	39.3	0.99	354
Exeter	514	537	541	535	512	48.6	49.6	49.7	49.0	47.5	0.95	537
Glouc	216	243	269	266	284	42.3	46.6	50.7	51.0	52.0	0.51	557
Hull	461	480	498	498	494	52.9	54.6	55.1	54.5	53.8	0.80	617
Inverns	164	169	171	170	172	62.6	60.6	60.6	62.7	61.9	0.22	769
Ipswi	236	232	240	255	246	54.1	54.2	56.1	59.9	58.4	0.31	787
Kent	595	633	649	639	644	54.5	56.9	57.0	55.9	54.0	1.07	602
Klmarnk	159	167	182	181	178	47.2	49.1	50.7	49.1	48.8	0.29	609
Krkldy	149	153	143	136	121	49.0	51.3	48.5	46.7	41.0	0.27	442
L Kings	461	480	525	513	530	39.9	40.6	42.1	41.0	39.7	0.93	567
Liv Ain	15	20	29	41	48	7.1	9.2	12.8	16.9	18.2	0.43	111
Middlbr	537	539	558	573	569	59.4	58.0	58.6	60.6	59.6	0.81	705

Table 4.5 Continued

Centre	N with Tx					% with Tx					Estimated catchment population (millions)	2021 crude rate (pmp)
	2017	2018	2019	2020	2021	2017	2018	2019	2020	2021		
Newry	138	152	162	173	179	57.3	60.3	64.0	65.5	63.7	0.24	761
Norwch	422	445	454	461	445	54.0	56.5	56.1	57.1	56.8	0.69	645
Prestn	672	721	745	771	781	52.8	54.5	55.5	56.4	56.6	1.23	633
Redng	448	468	483	500	514	56.4	57.5	56.0	57.5	58.6	0.70	736
Salford	572	621	687	690	688	51.2	52.9	55.3	54.4	56.6	1.15	597
Shrew	139	146	151	166	171	35.9	34.0	34.6	38.9	38.7	0.41	417
Stevng	366	378	381	380	410	41.4	40.3	39.7	39.0	40.4	1.11	369
Stoke	409	419	439	430	432	50.4	52.0	54.5	52.9	51.1	0.73	590
Sund	264	278	280	296	285	48.5	49.6	49.1	53.2	52.1	0.55	521
Swanse	334	346	358	353	359	42.3	41.9	41.2	41.5	42.1	0.76	473
Truro	243	249	261	259	250	57.2	57.0	58.0	58.2	54.2	0.36	698
Ulster	67	75	81	102	101	36.6	39.3	43.8	50.8	49.8	0.20	497
West NI	188	202	207	223	225	60.1	61.8	63.1	63.5	66.4	0.25	896
Wirral	159	169	183	195	194	40.8	42.3	44.0	47.1	47.1	0.47	413
Wolve	195	204	228	239	243	33.5	33.5	37.1	36.5	35.2	0.55	443
Wrexm	171	171	175	177	181	52.9	54.5	56.3	54.8	60.3	0.21	870
York	325	340	349	338	347	58.4	59.8	60.0	59.1	59.7	0.49	714
TOTALS												
England	29,908	31,122	32,412	32,461	32,674	54.7	55.5	56.3	56.1	55.6	44.77	730
N Ireland	1,154	1,233	1,287	1,380	1,410	62.9	64.2	66.6	69.2	69.5	1.47	959
Scotland	2,966	3,106	3,243	3,275	3,295	58.2	59.3	60.6	61.4	61.3	4.45	740
Wales	1,737	1,788	1,826	1,810	1,810	54.8	55.0	55.1	55.3	55.3	2.49	727
UK	35,765	37,249	38,768	38,926	39,189	55.2	56.0	56.8	56.9	56.4	53.19	737

Country Tx populations were calculated by summing the Tx patients from centres in each country. Estimated country populations were derived from Office for National Statistics figures (see appendix A for details on estimated catchment population by kidney centre)

Exeter was unable to submit 2021 patient level data but provided aggregate numbers of patients on KRT at the end of 2021 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 centre patients with no ethnicity data is shown separately.

Table 4.6 Demographics of adult patients prevalent to Tx on 31/12/2021 by centre

Centre	N on KRT	N with Tx	% with Tx	Median age (yrs)	% male	Ethnicity				% missing
						% White	% South Asian	% Black	% Other	
TX CENTRES										
Belfast	911	744	81.7	56.6	60.5	97.7	1.9	0.3	0.1	2.7
Bham	3,309	1,615	48.8	53.5	58.0	61.1	28.8	7.2	2.8	0.8
Bristol	1,497	926	61.9	56.7	59.5	89.6	3.7	4.8	2.0	0.2
Camb	1,629	1,221	75.0	55.6	62.2	89.3	6.5	2.6	1.7	0.5
Cardff	1,700	1,060	62.4	56.3	62.9	92.2	5.2	0.9	1.8	1.0
Covnt	1,119	646	57.7	55.3	61.3	78.1	17.2	4.3	0.3	0.2
Edinb	926	603	65.1	57.0	64.3					76.1
Glasgw	1,865	1,242	66.6	56.6	58.9					44.5
L Barts	2,750	1,373	49.9	54.5	59.2	39.1	34.4	19.6	6.9	0.6
L Guys	2,322	1,481	63.8	54.4	60.4	65.4	10.7	19.3	4.6	1.2
L Rfree	2,380	1,462	61.4	55.9	60.8	46.6	22.6	18.5	12.4	4.5
L St.G	866	486	56.1	58.0	56.2	48.3	25.6	17.3	8.8	3.7
L West	3,556	2,014	56.6	58.4	63.0	43.1	34.4	15.1	7.4	0.1
Leeds	1,784	1,135	63.6	55.7	60.3	79.5	15.1	4.2	1.2	0.0
Leic	2,640	1,452	55.0	57.2	58.0	72.5	21.0	4.9	1.7	1.4
Liv Roy	1,207	761	63.0	56.1	62.3	92.9	2.5	2.6	2.0	0.5
M RI	2,077	1,385	66.7	55.5	59.9	76.2	14.6	7.1	2.3	0.7
Newc	1,226	799	65.2	57.4	58.6	94.0	4.5	0.8	0.8	0.1
Nottm	1,220	726	59.5	55.4	59.9	85.3	6.8	5.0	3.0	0.0
Oxford	2,003	1,455	72.6	56.3	62.3	79.9	11.6	4.1	4.3	9.6
Plymth	548	349	63.7	58.7	67.1	96.6	1.2	0.3	2.0	0.0
Ports	1,941	1,117	57.5	56.9	58.1	93.9	3.8	0.7	1.7	2.5
Sheff	1,496	804	53.7	55.8	63.2	89.3	6.6	1.6	2.5	1.4
DIALYSIS CENTRES										
Abrdn	578	367	63.5	53.8	57.8					58.3
Airdrie	504	280	55.6	55.6	59.3	95.8	2.3	0.4	1.5	5.7
Antrim	296	161	54.4	57.5	60.9	99.4	0.0	0.6	0.0	1.2
Bangor	217	107	49.3	57.5	65.4	99.1	0.0	0.0	1.0	1.9
Bradfd	735	416	56.6	52.3	60.8	52.9	44.0	2.4	0.7	0.0
Brightn	1,092	569	52.1	57.0	62.2	91.3	5.5	1.1	2.1	0.9
Carlisle	305	158	51.8	57.8	62.7	98.1	1.9	0.0	0.0	0.0
Carsh	1,907	860	45.1	58.1	62.3	70.6	16.8	8.7	3.9	0.6
Colchr	145	0								
Clwyd	204	103	50.5	58.2	61.2	97.0	2.0	1.0	0.0	1.9
D&Gall	154	92	59.7	58.5	63.0	97.2	1.4	0.0	1.4	22.8
Derby	689	306	44.4	58.5	62.1	82.0	12.4	2.6	2.9	0.0
Donc	339	146	43.1	57.8	65.1	95.9	2.8	0.7	0.7	0.7
Dorset	786	445	56.6	60.2	59.3	96.6	1.6	0.5	1.4	0.0
Dudley	398	128	32.2	57.3	68.8	80.5	14.1	3.1	2.3	0.0
Dundee	411	240	58.4	57.3	59.6					58.8
EssexMS	895	352	39.3	58.0	63.1	87.1	4.9	4.0	4.0	0.6
Exeter	1,077	512	47.5							
Glouc	546	284	52.0	59.4	59.5	92.9	4.2	1.1	1.8	0.4
Hull	919	494	53.8	55.8	64.4	96.6	1.4	0.6	1.4	0.2
Inverns	278	172	61.9	55.6	57.6					37.8
Ipswi	421	246	58.4	59.0	61.0	83.7	3.3	4.5	8.6	0.4
Kent	1,192	644	54.0	57.3	59.0	91.6	3.9	1.4	3.1	0.3

Table 4.6 Continued

Centre	N on KRT	N with Tx	% with Tx	Median		Ethnicity					
				age (yrs)	% male	% White	% South Asian	% Black	% Other	% missing	
Klmarnk	365	178	48.8	57.1	61.2						43.8
Krkcdy	295	121	41.0	57.9	61.2						75.2
L Kings	1,334	530	39.7	57.3	62.3	49.3	17.4	28.7	4.5	0.2	
Liv Ain	264	48	18.2	52.9	62.5	91.7	0.0	2.1	6.3	0.0	
Middlbr	955	569	59.6	57.7	62.4	94.9	3.3	0.7	1.1	0.0	
Newry	281	179	63.7	56.7	59.2	98.3	0.6	0.6	0.6	1.1	
Norwch	784	445	56.8	58.5	60.2	97.8	1.1	0.7	0.5	0.0	
Prestn	1,379	781	56.6	56.8	60.4	84.8	14.0	0.9	0.4	0.0	
Redng	877	514	58.6	58.5	62.7	65.7	23.6	4.9	5.8	5.3	
Salford	1,215	688	56.6	57.0	60.5	82.0	14.4	2.2	1.5	0.0	
Shrew	442	171	38.7	55.3	62.6	93.0	3.5	2.3	1.2	0.0	
Stevng	1,014	410	40.4	57.2	63.7	69.0	20.2	8.3	2.4	0.0	
Stoke	845	432	51.1	54.3	63.4	91.5	5.4	1.4	1.7	1.6	
Sund	547	285	52.1	57.2	60.0	95.1	3.2	0.7	1.1	0.4	
Swanse	853	359	42.1	57.0	61.8	96.9	2.0	0.0	1.1	0.3	
Truro	461	250	54.2	58.5	58.0	97.6	0.8	0.0	1.6	0.0	
Ulster	203	101	49.8	57.4	58.4	92.1	4.0	3.0	1.0	0.0	
West NI	339	225	66.4	55.5	59.6	99.1	0.5	0.5	0.0	0.4	
Wirral	412	194	47.1	59.0	67.0	95.9	3.1	0.5	0.5	0.0	
Wolve	691	243	35.2	56.0	58.4	67.5	24.7	6.6	1.2	0.0	
Wrexm	300	181	60.3	54.5	65.8	95.0	1.7	0.6	2.8	0.6	
York	581	347	59.7	57.5	60.2	95.7	1.7	0.3	2.3	0.3	
TOTALS											
England	58,817	32,674	55.6	56.5	60.8	75.3	14.5	6.9	3.4	1.3	
N Ireland	2,030	1,410	69.5	56.6	60.1	97.8	1.4	0.6	0.2	1.8	
Scotland	5,376	3,295	61.3	56.3	60.1					49.7	
Wales	3,274	1,810	55.3	56.4	63.0	94.1	3.7	0.6	1.6	0.9	
UK	69,497	39,189	56.4	56.5	60.8	77.6	13.1	6.2	3.1	5.4	

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 was unable to submit 2021 patient level data but provided aggregate numbers of patients on KRT at the end of 2021 by treatment modality

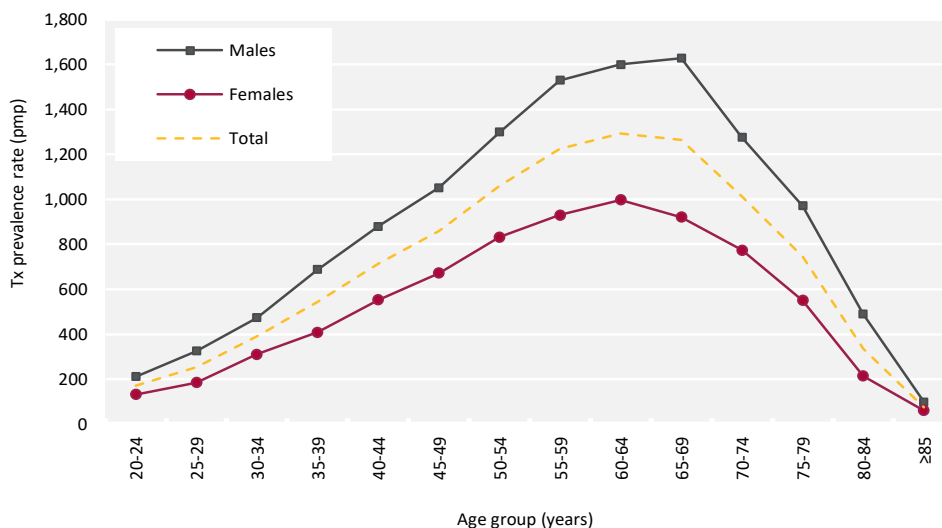


Figure 4.8 Adult Tx prevalence rate on 31/12/2021 by age group and sex
pmp – per million population

The distribution of primary renal diseases (PRDs) as a cause of ESKD in the incident Tx population is compared to the prevalent Tx population (table 4.7). Comparison to dialysis populations is shown in chapter 3. PRDs were grouped into categories, with the mapping of disease codes into groups explained in more detail in appendix A. The proportion of Tx patients with each PRD is shown for patients with PRD data and these total 100% of patients with data. The proportion of patients with no PRD data is shown on a separate line.

Table 4.7 Primary renal diseases (PRDs) of adult patients incident to Tx in 2021 and adult patients prevalent to Tx on 31/12/2021

PRD	Incident Tx		Prevalent Tx	
	N	%	N	%
Diabetes	496	18.7	4,565	12.0
Glomerulonephritis	631	23.7	8,934	23.5
Hypertension	168	6.3	2,047	5.4
Polycystic kidney disease	294	11.1	5,152	13.5
Pyelonephritis	227	8.5	4,262	11.2
Renal vascular disease	49	1.8	472	1.2
Other	473	17.8	7,339	19.3
Uncertain aetiology	321	12.1	5,302	13.9
Total (with data)	2,659	100.0	38,073	100.0
Missing	140	5.0	604	1.6

Graft function and anaemia in prevalent adult kidney Tx patients

Accepting the limitations of interpreting eGFR in the post-Tx population, analyses by centres were divided into the proportion of patients with eGFR greater or less than 30 mL/min/1.73m² and the proportion of patients achieving an adequate haemoglobin level (defined as a haemoglobin ≥100 g/L).

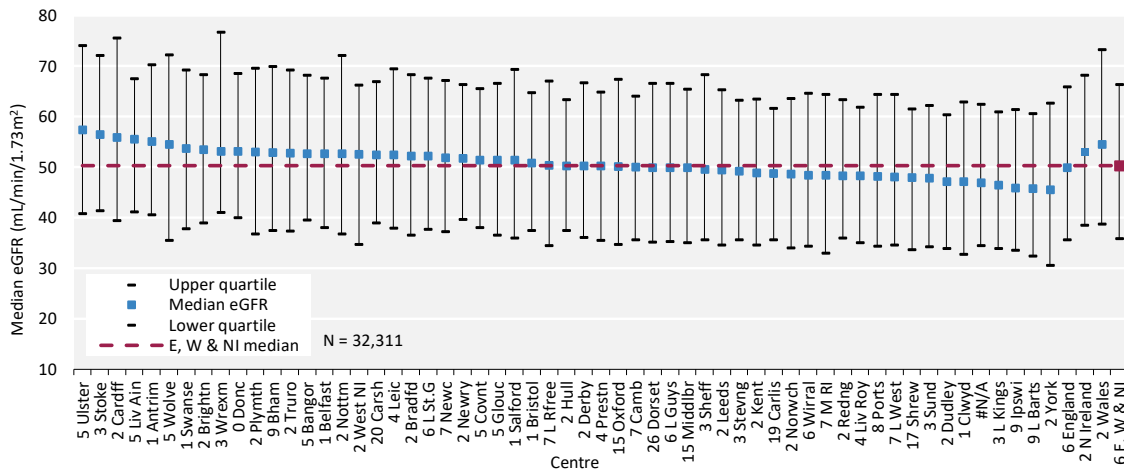


Figure 4.9 Median estimated glomerular filtration rate (eGFR) in adult patients prevalent to Tx on 31/12/2021 by centre

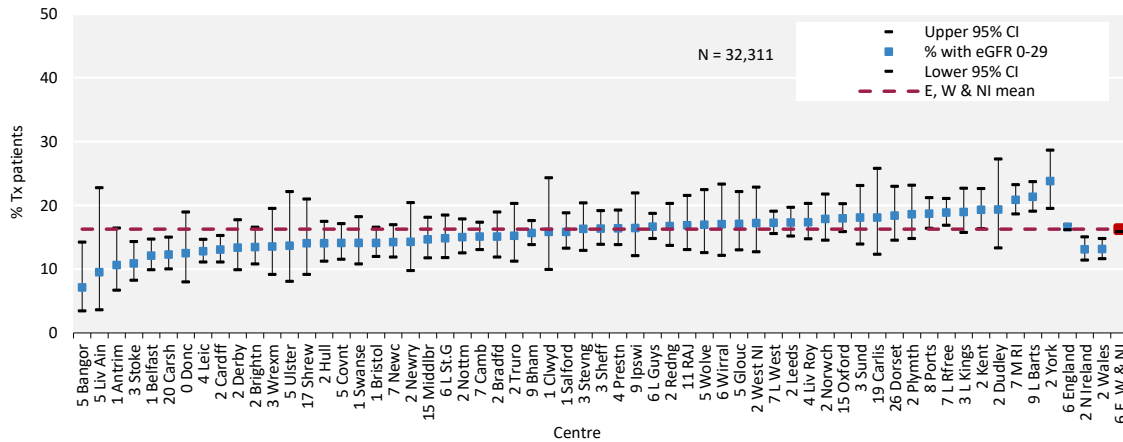


Figure 4.10 Percentage of adult patients prevalent to Tx on 31/12/2021 with an estimated glomerular filtration rate (eGFR) <30mL/min/1.73m² by centre
CI – confidence interval

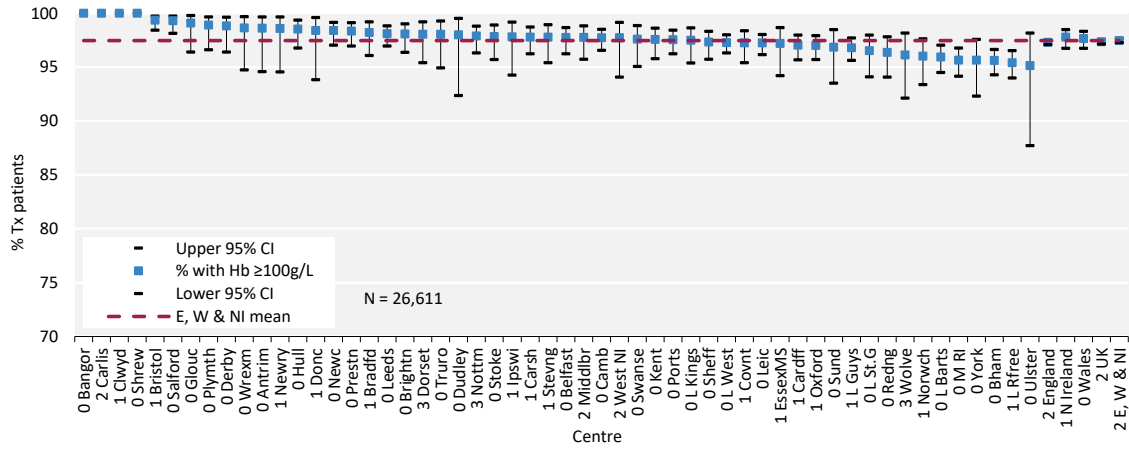


Figure 4.11 Percentage of adult patients prevalent to Tx on 31/12/2021 with an estimated glomerular filtration rate (eGFR) $\geq 30\text{mL}/\text{min}/1.73\text{m}^2$ achieving haemoglobin (Hb) $\geq 100\text{g}/\text{L}$ by centre
CI – confidence interval

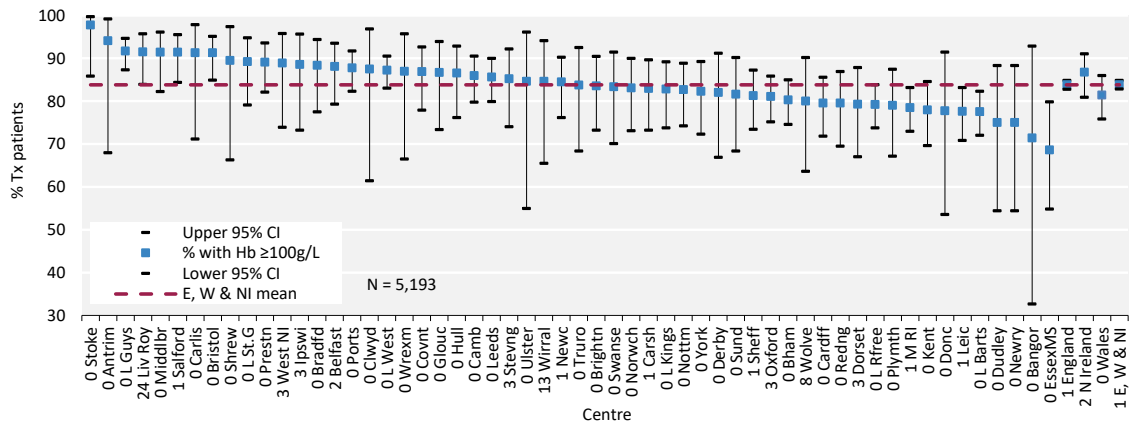


Figure 4.12 Percentage of adult patients prevalent to Tx on 31/12/2021 with an estimated glomerular filtration rate (eGFR) $< 30\text{mL}/\text{min}/1.73\text{m}^2$ achieving haemoglobin (Hb) $\geq 100\text{g}/\text{L}$ by centre
CI – confidence interval

Blood pressure in prevalent adult kidney Tx patients

Blood pressure data completeness was variable (table 4.4) and only centres with $\geq 70\%$ 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.

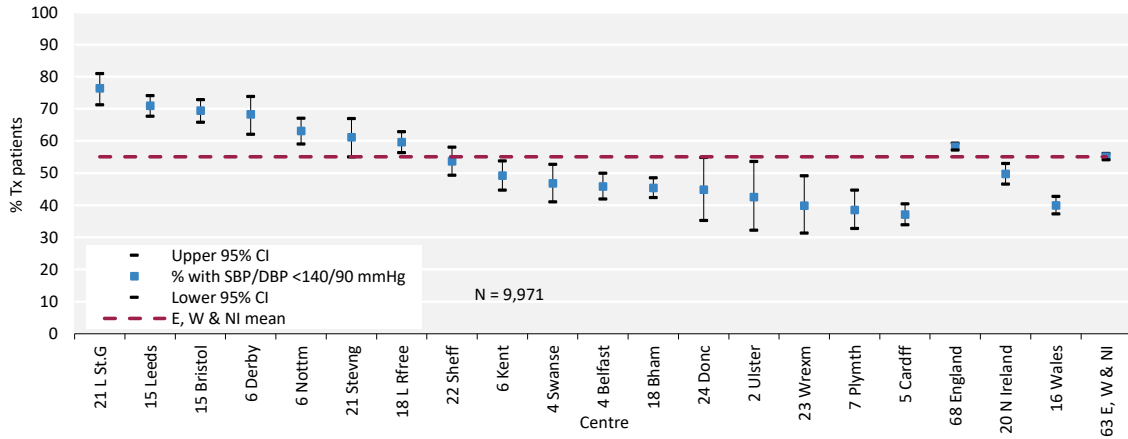


Figure 4.13 Percentage of adult patients prevalent to Tx on 31/12/2021 with estimated glomerular filtration rate (eGFR) ≥ 30 mL/min/1.73m² achieving blood pressure of $<140/90$ mmHg by centre
CI – confidence interval; DBP – diastolic blood pressure; SBP – systolic blood pressure

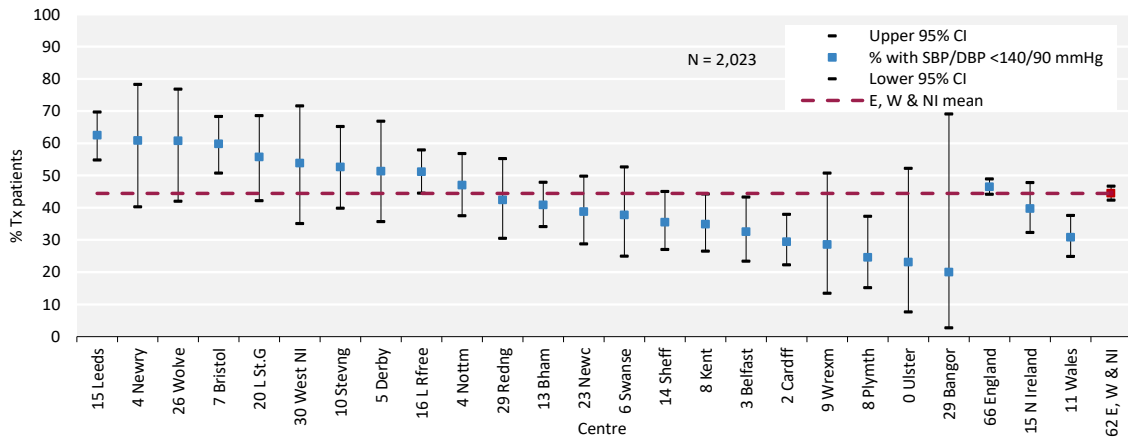


Figure 4.14 Percentage of adult patients prevalent to Tx on 31/12/2021 with estimated glomerular filtration rate (eGFR) <30 mL/min/1.73m² achieving blood pressure of $<140/90$ mmHg by centre
CI – confidence interval; DBP – diastolic blood pressure; SBP – systolic blood pressure

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 4.8 Estimated glomerular filtration rate (eGFR), blood pressure and biochemical parameters in adult patients prevalent to Tx on 31/12/2021 compared with adult patients prevalent to dialysis on 31/12/2021 by CKD stage

Characteristic	Tx CKD stage (eGFR)				Prevalent dialysis Stage 5D
	Stage 1-2T (≥ 60 mL/min/1.73 m ²)	Stage 3T (30-59 mL/min/1.73 m ²)	Stage 4T (15-29 mL/min/1.73 m ²)	Stage 5T (<15 mL/min/1.73 m ²)	
N	10,919	16,147	4,463	796	22,343
%	33.8	50.0	13.8	2.5	
eGFR (mL/min/1.73m²)					
mean \pm SD	77.0 \pm 13.4	45.3 \pm 8.4	23.6 \pm 4.2	11.5 \pm 2.4	
median	73.9	45.5	24.1	12.0	
SBP (mmHg)					
mean \pm SD	136 \pm 17	138 \pm 18	142 \pm 19	147 \pm 22	137 \pm 25
% ≥ 140 mmHg	37.4	41.8	51.0	59.3	43.6
DBP (mmHg)					
mean \pm SD	81 \pm 10	80 \pm 11	80 \pm 13	83 \pm 13	71 \pm 15
% ≥ 90 mmHg	18.1	18.5	19.4	24.2	10.7
Total cholesterol (mmol/L)					
mean \pm SD	4.4 \pm 1.0	4.5 \pm 1.1	4.5 \pm 1.2	4.5 \pm 1.3	3.9 \pm 1.1
% ≥ 4.0 mmol/L	65.0	66.6	65.2	62.6	40.1
Haemoglobin (g/L)					
mean \pm SD	138 \pm 16	129 \pm 17	116 \pm 16	107 \pm 16	110 \pm 14
% <100 g/L	1.5	3.5	13.4	31.7	20.1
Phosphate (mmol/L)					
mean \pm SD	1.0 \pm 0.2	1.0 \pm 0.2	1.1 \pm 0.3	1.5 \pm 0.4	1.7 \pm 0.5
% >1.7 mmol/L	0.2	0.3	2.3	21.1	43.5
Adjusted Ca (mmol/L)					
mean \pm SD	2.4 \pm 0.1	2.4 \pm 0.1	2.4 \pm 0.1	2.4 \pm 0.2	2.4 \pm 0.2
% >2.5 mmol/L	26.7	27.2	20.5	15.3	16.6
% <2.2 mmol/L	2.0	2.7	5.6	17.9	16.6
PTH (pmol/L)					
median	8.4	9.8	15.9	30.9	34.1
% >72 pmol/L	0.5	0.7	3.2	13.4	18.9

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 01/01/2011 and 31/12/2019 were considered for inclusion. A minimum duration of 18 months graft function was required and three or more creatinine measurements from the second year of graft function onwards were used to plot eGFR slope. If a Tx failed, but there were at least three creatinine measurements between one year post-Tx and graft failure, the patient was included, but no creatinine measurements after the quarter preceding the recorded date of Tx failure were analysed.

Table 4.9 Differences in median estimated glomerular filtration rate (eGFR) slope between demographic subgroups of adult patients who received their first kidney Tx between 01/01/2011 and 31/12/2019

Characteristic	N	Median slope	Lower quartile	Upper quartile
Age at Tx (yrs)				
<40	4,916	-1.33	-4.56	0.86
40-55	8,461	-0.68	-3.09	1.14
>55	7,411	-0.67	-3.08	1.11
Ethnicity				
White	14,634	-0.70	-3.11	1.08
Asian	2,882	-1.22	-4.07	1.02
Black	1,587	-1.41	-4.62	0.75
Other	622	-0.94	-3.37	0.80
Sex				
Male	12,843	-0.58	-3.04	1.23
Female	7,945	-1.24	-3.94	0.78
Diabetes				
No Diabetes	16,996	-0.71	-3.19	1.10
Diabetes	3,483	-1.37	-4.27	0.85
Tx donor				
Deceased	14,159	-0.85	-3.47	1.11
Living	6,629	-0.76	-3.20	1.01
Year of Tx				
2011	1,970	-0.87	-2.91	0.44
2012	2,178	-1.02	-3.04	0.36
2013	2,395	-1.02	-3.10	0.53
2014	2,329	-0.82	-2.98	0.71
2015	2,314	-0.69	-2.90	0.99
2016	2,387	-0.78	-3.36	1.25
2017	2,543	-0.69	-3.59	1.52
2018	2,463	-0.47	-3.92	2.48
2019	2,209	-0.67	-5.85	4.11
Status of Tx patients at end of follow-up				
Died	2,223	-1.28	-4.30	1.02
Graft failed	1,825	-6.09	-11.77	-3.10
Re-transplanted	75	-3.07	-6.72	-1.31
Graft functioning	16,740	-0.46	-2.58	1.27
Total	20,788	-0.82	-3.39	1.07

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 4.3. NHSBT reports the survival of Tx recipients.

Cause of death in adult kidney Tx patients

Cause of death was analysed in patients prevalent to KRT on 31/12/2020 and followed-up for one year in 2021, with comparisons between Tx and dialysis presented in table 4.10. Work is being undertaken to better understand and code the cause of death in Tx recipients. The proportion of 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.

Table 4.10 Cause of death in adult patients prevalent to KRT on 31/12/2020 followed-up in 2021 by modality

Cause of death	All modalities		Dialysis		Tx	
	N	%	N	%	N	%
Cardiac disease	715	17.9	613	20.7	102	9.9
Cerebrovascular disease	97	2.4	73	2.5	24	2.3
Infection	1,119	28.0	735	24.9	384	37.1
Malignancy	263	6.6	144	4.9	119	11.5
Treatment withdrawal	437	11.0	422	14.3	15	1.5
Other	1,032	25.9	747	25.3	285	27.6
Uncertain aetiology	327	8.2	222	7.5	105	10.2
Total (with data)	3,990	100.0	2,956	100.0	1,034	100.0
Missing	2,411	37.7	1,734	37.0	677	39.6

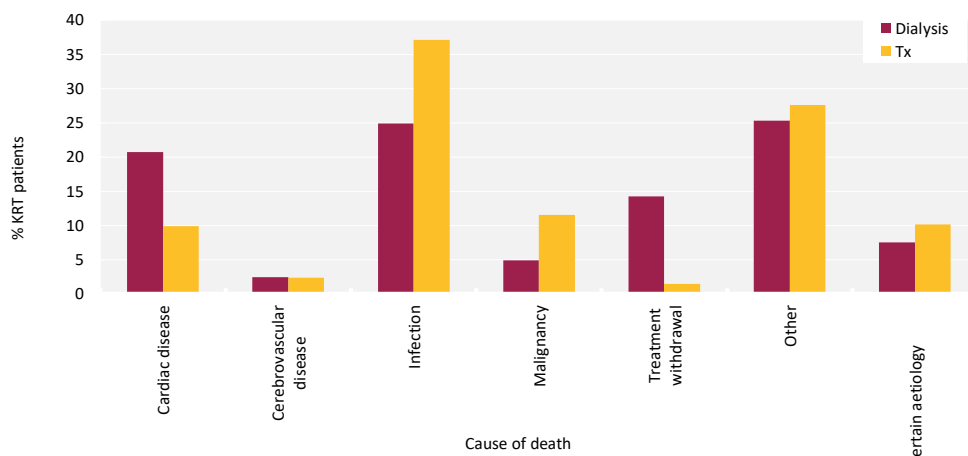


Figure 4.15 Cause of death for adult patients prevalent to KRT on 31/12/2020 followed-up in 2021 by modality

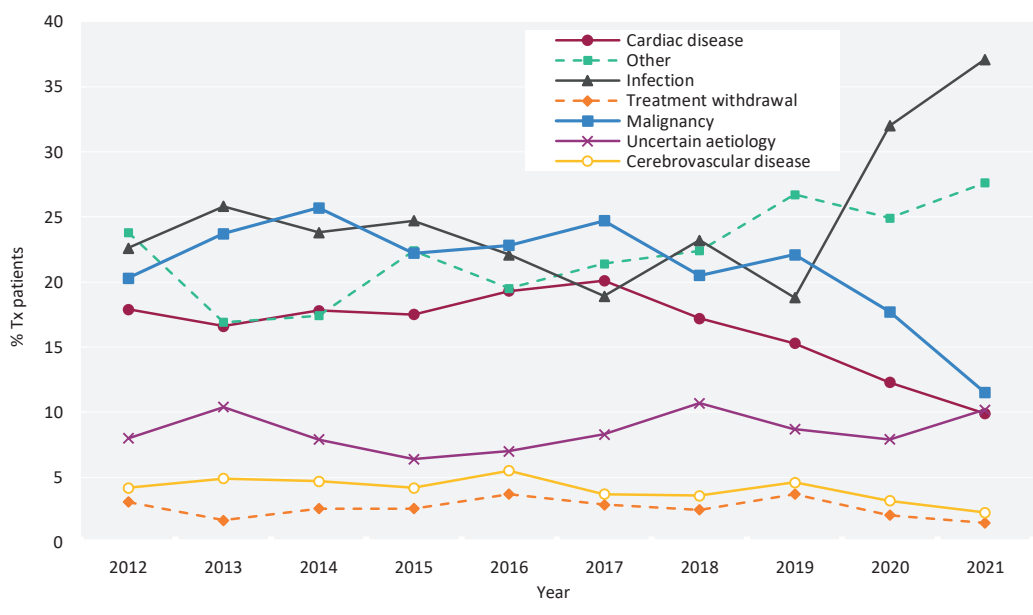


Figure 4.16 Cause of death between 2012 and 2021 for adult patients prevalent year

Chapter 5

Adults on in-centre haemodialysis (ICHHD) in the UK at the end of 2021

Contents

Introduction	103
Rationale for analyses	105
Key findings	107
Analyses	108
Changes to the prevalent adult ICHD population	108
Demographics of prevalent adult ICHD patients	110
Adequacy of dialysis in prevalent adult ICHD patients	112
Biochemistry parameters in prevalent adult ICHD patients	115
Anaemia in prevalent adult ICHD patients	122
Dialysis access in prevalent adult dialysis patients	126
Cause of death in adult ICHD patients	127

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 2021 (figure 5.1). This population comprises patients who were on ICHD at the end of 2020 and remained on ICHD throughout 2021, as well as patients who commenced/re-commenced ICHD in 2021. This latter group includes both incident kidney replacement therapy (KRT) patients who ended 2021 on ICHD and prevalent KRT patients who switched to ICHD from home haemodialysis (HHD), peritoneal dialysis (PD), or a transplant (Tx) in 2021. 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.

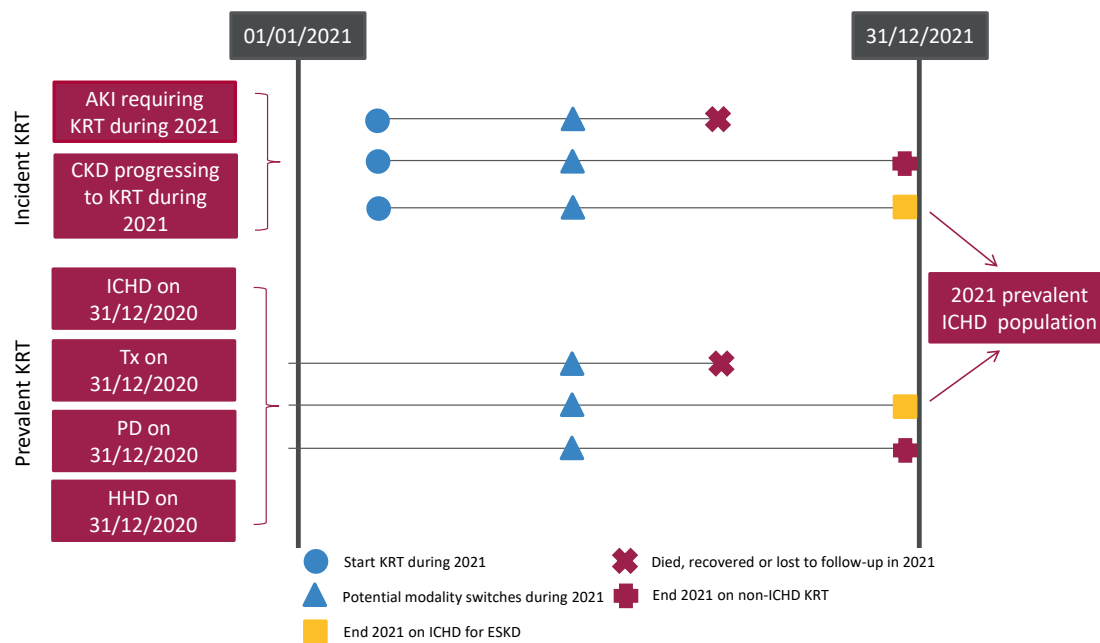


Figure 5.1 Pathways adult patients could follow to be included in the UK 2021 prevalent ICHD population

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 2021 or if they had been on KRT for ≥ 90 days and were on ICHD at the end of 2021
 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) when 2021 data becomes available.

Rationale for analyses

The analyses begin with a description of the 2021 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, where data permit, their attainment by UK kidney centres in 2021 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. Aggregate numbers by modality were provided enabling inclusion in tables 5.2 and 5.3. Exeter is excluded from all other analyses.

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	
Vascular access (2015)	Proportion of prevalent dialysis patients with definitive access (AVF/AVG/PD catheter) – ≥80%	Figure 5.16
Planning, initiating and withdrawing KRT (2014)	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

- 25,009 adult patients were receiving ICHD for ESKD in the UK on 31/12/2021, which represented 36.0% of the KRT population. The number of people on ICHD has increased by 2.9% since 2020 following the reduction due to the COVID pandemic.
- The median age of ICHD patients was 66.1 years and 62.1% were male.
- 82.8% of ICHD patients achieved a dialysis adequacy of URR >65%.
- 92.7% of ICHD patients had dialysis 3 times a week and a further 1.5% had dialysis more frequently than this.
- 66.6% of ICHD patients had dialysis for 4–5 hours per session compared to 66.4% last year and 70.9% in 2019 (suggesting that COVID related disruption continues).
- The median adjusted calcium for ICHD patients was 2.3 mmol/L and 10.4% were above the target range 2.2–2.5 mmol/L.
- The median pre-dialysis bicarbonate for ICHD patients was 23 mmol/L and 83.1% were within the target range 18–26 mmol/L.
- The median pre-dialysis potassium for ICHD patients was 4.8 mmol/L and 13.8% had a pre-dialysis potassium of >6 mmol/L.
- The median haemoglobin and ferritin for ICHD patients was 111 g/L and 483 µg/L, respectively.
- 20.3% of ICHD patients had a haemoglobin <100 g/L and 20.9% had a haemoglobin >120 g/L.
- Of the 54 centres that provided adequate data on long term dialysis access in England, Northern Ireland and Wales, 5 centres achieved the 80% target for definitive access amongst prevalent dialysis patients (AVF/AVG/PD catheter).
- There was no cause of death data available for 36.9% of deaths. For those with data, the leading cause of death in patients under 65 years was cardiac disease at 26.1% , with infection accounting for 23.1% of deaths. In those older than 65 years, the leading cause of death was infection (25.1%), with a likely contribution from Covid related deaths.

Analyses

Changes to the prevalent adult ICHD population

For the 68 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

Centre	N on ICHD					% on ICHD					Estimated catchment population (millions)	2021 crude rate (pmp)
	2017	2018	2019	2020	2021	2017	2018	2019	2020	2021		
ENGLAND												
Bham	1,333	1,349	1,349	1,314	1,348	42.0	41.5	40.7	40.3	40.7	2.05	656
Bradfd	269	261	280	276	275	39.9	37.9	38.3	38.1	37.4	0.49	560
Brightn	425	446	432	425	424	42.0	42.3	40.6	39.5	38.8	1.08	393
Bristol	491	475	469	463	476	33.3	32.3	31.5	31.4	31.8	1.22	390
Camb	306	304	287	276	355	22.9	21.9	19.7	18.3	21.8	0.94	379
Carlis	98	101	111	111	114	34.9	34.5	36.9	37.4	37.4	0.26	446
Carsh	849	858	840	858	885	50.1	49.0	47.2	46.4	46.4	1.63	543
Colchr	129	122	145	150	145	100.0	100.0	100.0	100.0	100.0	0.29	497
Covnt	333	306	355	362	370	34.5	31.9	33.0	32.8	33.1	0.80	465
Derby	191	197	238	244	262	34.4	33.6	36.4	36.1	38.0	0.56	467
Donc	178	179	180	177	175	53.5	54.2	52.6	51.9	51.6	0.38	466
Dorset	291	291	289	299	304	39.9	38.1	37.4	37.5	38.7	0.73	417
Dudley	201	204	207	208	220	54.9	56.7	56.6	55.9	55.3	0.34	640
EssexMS	411	409	414	422	429	49.5	48.5	48.6	47.7	47.9	0.99	432
Exeter	455	450	443	454	476	43.0	41.6	40.7	41.6	44.2	0.95	499
Glouc	245	242	231	226	226	47.9	46.4	43.5	43.3	41.4	0.51	443
Hull	349	350	350	352	361	40.0	39.8	38.7	38.5	39.3	0.80	451
Ipswi	147	151	142	135	140	33.7	35.3	33.2	31.7	33.3	0.31	448
Kent	424	418	420	424	458	38.9	37.6	36.9	37.1	38.4	1.07	428
L Barts	1,031	1,061	1,032	1,045	1,094	41.3	40.8	38.8	38.9	39.8	1.59	688
L Guys	669	692	673	693	730	30.9	31.0	29.0	29.9	31.4	1.01	725
L Kings	577	597	610	616	672	50.0	50.5	48.9	49.2	50.4	0.93	719
L Rfree	685	684	742	722	735	31.3	30.6	31.7	30.9	30.9	1.33	553
L St.G	310	294	302	320	322	36.9	35.3	35.4	37.6	37.2	0.67	484
L West	1,449	1,430	1,381	1,271	1,292	41.7	40.2	38.3	36.0	36.3	1.96	658
Leeds	538	542	552	549	580	33.2	32.2	32.0	31.3	32.5	1.37	422
Leic	899	917	958	957	1,002	38.1	37.4	37.1	36.5	38.0	2.09	480
Liv Ain	160	154	160	163	181	76.2	71.0	70.8	67.4	68.6	0.43	419
Liv Roy	352	360	370	360	370	28.1	28.3	29.4	29.8	30.7	0.81	456
M RI	497	501	497	505	511	24.2	24.2	24.3	25.4	24.6	1.33	383
Middlbr	332	349	344	327	349	36.7	37.5	36.1	34.6	36.5	0.81	432
Newc	327	339	329	355	351	29.3	29.4	28.1	29.7	28.6	0.95	368
Norwch	302	294	296	289	284	38.7	37.3	36.5	35.8	36.2	0.69	412
Nottm	354	350	359	349	363	29.9	29.2	29.5	28.8	29.8	0.93	391
Oxford	451	445	455	475	463	24.0	22.9	23.1	23.6	23.1	1.45	320
Plymth	141	128	126	150	165	26.1	23.7	23.6	27.7	30.1	0.40	411
Ports	544	529	591	607	649	31.2	30.0	31.4	32.0	33.4	1.75	371
Prestn	516	519	505	500	501	40.6	39.3	37.6	36.5	36.3	1.23	406
Redng	302	297	315	300	304	38.0	36.5	36.5	34.5	34.7	0.70	436
Salford	387	402	395	432	412	34.6	34.3	31.8	34.1	33.9	1.15	358
Sheff	550	551	539	548	554	38.1	37.2	36.2	36.8	37.0	1.13	488

Table 5.2 Continued

Centre	N on ICHD					% on ICHD					Estimated catchment population (millions)	2021 crude rate (pmp)
	2017	2018	2019	2020	2021	2017	2018	2019	2020	2021		
Shrew	184	206	204	174	183	47.5	47.9	46.7	40.7	41.4	0.41	446
Stevng	465	489	507	538	529	52.6	52.1	52.8	55.2	52.2	1.11	476
Stoke	301	281	265	250	265	37.1	34.9	32.9	30.8	31.4	0.73	362
Sund	243	243	252	219	215	44.7	43.4	44.2	39.4	39.3	0.55	393
Truro	158	168	164	159	184	37.2	38.4	36.4	35.7	39.9	0.36	514
Wirral	202	203	207	194	192	51.8	50.8	49.8	46.9	46.6	0.47	409
Wolve	301	317	304	326	346	51.6	52.1	49.5	49.8	50.1	0.55	630
York	184	183	184	192	190	33.0	32.2	31.6	33.6	32.7	0.49	391
N IRELAND												
Antrim	117	119	117	110	115	45.9	43.4	41.1	38.3	38.9	0.25	468
Belfast	179	173	158	144	132	21.2	19.7	17.9	16.2	14.5	0.53	247
Newry	77	82	78	78	86	32.0	32.5	30.8	29.5	30.6	0.24	366
Ulster	109	106	96	96	99	59.6	55.5	51.9	47.8	48.8	0.20	487
West NI	113	114	106	118	105	36.1	34.9	32.3	33.6	31.0	0.25	418
SCOTLAND												
Abrdn	226	214	190	192	189	40.1	37.4	34.1	34.0	32.7	0.50	378
Airdrie	191	192	207	196	195	41.0	39.3	39.5	37.9	38.7	0.46	425
D&Gall	51	55	52	56	53	37.8	37.9	34.9	35.9	34.4	0.12	432
Dundee	183	161	162	158	149	42.1	36.2	36.1	36.7	36.3	0.37	405
Edinb	306	301	296	288	283	37.1	34.9	33.4	32.4	30.6	0.84	337
Glasgw	573	587	575	551	575	32.3	32.4	31.0	29.8	30.8	1.37	418
Inverns	83	90	92	89	93	31.7	32.3	32.6	32.8	33.5	0.22	416
Klmarnk	144	141	139	147	138	42.7	41.5	38.7	39.8	37.8	0.29	472
Krkldy	144	135	138	146	164	47.4	45.3	46.8	50.2	55.6	0.27	599
WALES												
Bangor	73	70	66	78	76	37.4	34.5	32.8	36.1	35.0	0.16	463
Cardff	530	554	551	512	531	31.5	32.2	31.8	30.5	31.2	1.16	459
Clwyd	71	75	86	84	90	39.7	39.5	42.0	41.2	44.1	0.18	497
Swanse	347	373	389	394	405	44.0	45.2	44.8	46.4	47.5	0.76	534
Wrexm	120	113	106	114	100	37.2	36.0	34.1	35.3	33.3	0.21	481
TOTALS												
England	20,536	20,638	20,800	20,761	21,431	37.5	36.8	36.1	35.9	36.4	44.77	479
N Ireland	595	594	555	546	537	32.4	30.9	28.7	27.4	26.5	1.47	365
Scotland	1,901	1,876	1,851	1,823	1,839	37.3	35.8	34.6	34.2	34.2	4.45	413
Wales	1,141	1,185	1,198	1,182	1,202	36.0	36.4	36.1	36.1	36.7	2.49	483
UK	24,173	24,293	24,404	24,312	25,009	37.3	36.5	35.8	35.5	36.0	53.19	470

Country ICHD populations were calculated by summing the ICHD patients from centres in each country. Estimated country populations were derived from Office for National Statistics figures (see appendix A for details on estimated catchment population by kidney centre)

Exeter was unable to submit patient level data but provided aggregate numbers of patients on KRT at the end of 2021 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 31/12/2021 by centre

Centre	N on KRT	N on ICHD	% on ICHD	Median age (yrs)	% male	Ethnicity				% missing
						% White	% Asian	% Black	% Other	
ENGLAND										
Bham	3,309	1,348	40.7	65.5	59.4	50.8	31.0	15.1	3.1	2.0
Bradfd	735	275	37.4	62.9	58.2	45.5	46.2	3.6	4.7	0.0
Brightn	1,092	424	38.8	68.4	61.6	86.1	7.1	3.8	3.0	6.6
Bristol	1,497	476	31.8	64.6	63.9	84.7	5.2	8.4	1.7	2.3
Camb	1,629	355	21.8	72.5	64.5	92.0	4.2	1.9	1.9	12.4
Carlis	305	114	37.4	62.2	57.9	100.0	0.0	0.0	0.0	0.0
Carsh	1,907	885	46.4	67.7	60.1	60.0	18.4	14.3	7.3	6.7
Colchr	145	145	100.0	73.7	64.8	96.4	0.7	0.7	2.2	4.8
Covnt	1,119	370	33.1	69.8	62.2	74.8	19.0	6.2	0.0	0.3
Derby	689	262	38.0	67.1	63.7	80.2	12.7	4.0	3.2	3.8
Donc	339	175	51.6	68.5	60.6	91.4	3.4	1.7	3.4	0.6
Dorset	786	304	38.7	72.0	61.5	96.1	2.0	0.3	1.6	0.0
Dudley	398	220	55.3	69.9	63.2	76.4	15.5	7.7	0.5	0.0
EssexMS	895	429	47.9	68.0	69.5	82.7	6.7	7.4	3.2	5.8
Exeter	1,077	476	44.2							
Glouc	546	226	41.4	72.1	65.5	89.6	3.2	5.0	2.3	1.8
Hull	919	361	39.3	64.0	64.8	95.0	3.4	1.4	0.3	1.1
Ipswi	421	140	33.3	71.6	65.0	79.7	0.8	4.5	15.0	5.0
Kent	1,192	458	38.4	66.6	64.4	92.2	2.9	2.7	2.2	2.0
L Barts	2,750	1,094	39.8	62.1	58.9	24.5	35.2	32.4	7.9	4.3
L Guys	2,322	730	31.4	63.1	58.1	41.9	9.4	44.2	4.5	9.5
L Kings	1,334	672	50.4	62.3	58.5	35.8	13.0	47.4	3.8	2.7
L Rfree	2,380	735	30.9	64.3	59.5	35.6	21.9	31.3	11.3	12.9
L St.G	866	322	37.2	64.8	63.4	27.2	25.2	34.4	13.2	6.2
L West	3,556	1,292	36.3	65.5	61.1	30.3	39.0	25.7	5.0	0.0
Leeds	1,784	580	32.5	63.0	64.3	69.8	20.6	7.3	2.3	0.5
Leic	2,640	1,002	38.0	66.5	65.3	71.8	20.6	5.8	1.8	9.1
Liv Ain	264	181	68.6	66.2	63.0	94.9	1.7	1.1	2.3	2.8
Liv Roy	1,207	370	30.7	64.0	61.4	85.3	5.1	5.1	4.5	4.3
M RI	2,077	511	24.6	65.4	59.1	40.2	12.3	45.7	1.8	4.5
Middlbr	955	349	36.5	66.0	67.0	90.9	7.0	0.9	1.2	2.3
Newc	1,226	351	28.6	65.9	62.7	91.2	4.3	2.0	2.6	0.0
Norwch	784	284	36.2	71.9	59.9	95.0	1.2	1.5	2.3	8.5
Nottm	1,220	363	29.8	67.6	65.6	73.4	10.8	13.3	2.5	0.6
Oxford	2,003	463	23.1	66.4	60.0	74.6	10.6	8.0	6.8	26.8
Plymth	548	165	30.1	67.0	65.5	98.2	0.0	0.6	1.2	0.0
Ports	1,941	649	33.4	66.7	62.9	87.4	5.9	2.1	4.6	19.1
Prestn	1,379	501	36.3	65.8	62.7	78.8	19.0	1.0	1.2	0.0
Redng	877	304	34.7	66.8	63.2	61.4	25.4	5.7	7.5	7.9
Salford	1,215	412	33.9	61.9	62.1	65.3	25.2	6.3	3.2	0.0
Sheff	1,496	554	37.0	65.9	63.2	84.3	8.0	4.6	3.1	2.5
Shrew	442	183	41.4	70.8	66.7	87.2	4.4	2.8	5.6	1.6
Stevng	1,014	529	52.2	67.5	62.8	71.9	15.4	9.8	3.0	5.3
Stoke	845	265	31.4	70.0	64.9	86.6	7.5	2.8	3.2	4.5
Sund	547	215	39.3	66.0	60.0	95.3	3.3	0.5	0.9	0.0
Truro	461	184	39.9	70.5	59.8	98.4	0.5	0.0	1.1	0.0
Wirral	412	192	46.6	64.5	62.0	96.4	0.5	2.1	1.0	0.0

Table 5.3 Continued

Centre	N on KRT	N on ICHD	% on ICHD	Median age (yrs)	% male	Ethnicity				% missing
						% White	% Asian	% Black	% Other	
Wolve	691	346	50.1	63.9	63.3	51.0	34.5	12.2	2.3	0.3
York	581	190	32.7	71.4	58.9	95.2	1.1	0.5	3.2	1.1
N IRELAND										
Antrim	296	115	38.9	75.8	64.3	100.0	0.0	0.0	0.0	19.1
Belfast	911	132	14.5	65.4	61.4	96.7	1.6	0.8	0.8	6.8
Newry	281	86	30.6	68.4	58.1	98.7	1.3	0.0	0.0	9.3
Ulster	203	99	48.8	76.3	59.6	96.0	4.0	0.0	0.0	0.0
West NI	339	105	31.0	71.5	61.9	99.0	1.0	0.0	0.0	3.8
SCOTLAND										
Abrdn	578	189	32.7	67.4	60.8					93.1
Airdrie	504	195	38.7	62.8	56.4					50.8
D&Gall	154	53	34.4	71.5	64.2					69.8
Dundee	411	149	36.3	68.0	66.4					83.9
Edinb	926	283	30.6	63.7	65.7					86.6
Glasgw	1,865	575	30.8	64.8	60.9					81.7
Inverns	278	93	33.5	72.5	63.4					83.9
Klmarnk	365	138	37.8	69.0	63.8					80.4
Krkldy	295	164	55.6	68.0	64.6					92.1
WALES										
Bangor	217	76	35.0	71.4	60.5	97.3	0.0	0.0	2.7	1.3
Cardff	1,700	531	31.2	64.5	62.7	87.9	8.9	1.6	1.6	5.1
Clwyd	204	90	44.1	68.8	68.9	97.4	2.6	0.0	0.0	14.4
Swanse	853	405	47.5	69.1	64.4	97.5	1.5	0.7	0.2	0.2
Wrexm	300	100	33.3	66.4	66.0	97.9	0.0	1.0	1.0	4.0
TOTALS										
England	58,817	21,431	36.4	66.0	62.0	66.2	16.4	13.5	3.9	4.7
N Ireland	2,030	537	26.5	71.9	61.3	98.0	1.6	0.2	0.2	8.0
Scotland	5,376	1,839	34.2	65.8	62.4					81.1
Wales	3,274	1,202	36.7	66.7	63.9	93.3	4.6	1.0	1.0	3.8
UK	69,497	25,009	36.0	66.1	62.1	68.6	15.3	12.4	3.6	10.5

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

Breakdown by ethnicity is not shown for centres with <70% data completeness, but these centres were included in national averages
Exeter was unable to submit patient level data but provided aggregate numbers of patients on KRT at the end of 2021 by treatment modality

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 31/12/2021

PRD	N on ICHD	% ICHD population	Age <65 yrs		Age ≥65 yrs		M/F ratio
			N	%	N	%	
Diabetes	6,710	29.0	3,244	29.3	3,466	28.6	1.7
Glomerulonephritis	3,148	13.6	1,838	16.6	1,310	10.8	2.0
Hypertension	1,809	7.8	876	7.9	933	7.7	2.3
Polycystic kidney disease	1,342	5.8	711	6.4	631	5.2	1.1
Pyelonephritis	1,580	6.8	799	7.2	781	6.4	1.6
Renal vascular disease	1,076	4.6	185	1.7	891	7.4	1.9
Other	4,008	17.3	2,014	18.2	1,994	16.5	1.3
Uncertain aetiology	3,495	15.1	1,386	12.5	2,109	17.4	1.6
Total (with data)	23,168	100.0	11,053	100.0	12,115	100.0	
Missing	1,365	5.6	575	4.9	790	6.1	1.7

Adequacy of dialysis in prevalent adult ICHD patients

URR and session duration were calculated only for patients who were undertaking ICHD three times per week. Patients who had missing data for the number of dialysis sessions per week were assumed to be dialysing three times per week for the purposes of calculating the median URR.

Table 5.5 Median urea reduction ratio (URR) and distribution of session frequency and time for adult patients prevalent to ICHD on 31/12/2021 using end of third quarter data (30/09/2021)

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	79	90.9	10.6	87.8	1.6	20.0	79.1	0.9	98.6	95.1	95.2
Bradfd	71	72.3	10.5	88.8	0.7	32.5	67.5	0.0	89.4	100.0	100.0
Brightn	73	87.3	4.9	94.8	0.2	17.4	82.6	0.0	97.9	99.8	100.0
Bristol	74	79.2	3.9	95.2	0.9	27.7	72.3	0.0	99.8	100.0	100.0
Camb									0.0	0.0	0.0
Carlisle	73	80.2	7.3	92.7	0.0	23.7	76.3	0.0	98.9	83.7	82.6
Carsh	75	84.4	2.0	98.0	0.0	5.6	94.4	0.0	84.6	99.9	97.2
Colchr	77	89.2	0.8	99.2	0.0	27.7	72.3	0.0	99.2	100.0	100.0
Covnt	76	86.7	10.2	89.5	0.3	39.2	60.8	0.0	97.3	99.1	97.6
Derby	75	85.9	1.3	97.5	1.3				83.1	99.6	13.9
Donc	75	88.6	0.7	99.3	0.0	31.9	68.1	0.0	97.4	92.9	94.1
Dorset	76	90.4	5.4	93.9	0.7	18.4	81.6	0.0	83.2	99.3	99.6
Dudley	75	79.9	5.5	94.0	0.5	17.0	83.0	0.0	93.2	98.0	97.9
EssexMS	71	78.2	15.5	83.5	1.0	37.1	62.9	0.0	97.9	99.2	99.1
Exeter											
Glouc	75	90.9	7.1	92.4	0.5				100.0	97.5	0.0
Hull	77	90.7							99.1	0.9	1.8
Ipswi	73	79.5	14.4	84.8	0.8	11.9	88.1	0.0	76.2	97.7	92.7
Kent	70	74.3	3.7	93.9	2.4	81.9	18.1	0.0	84.5	99.3	99.7
L Barts			6.6	93.0	0.3	67.7	32.3	0.0	0.0	97.6	97.4
L Guys	75	86.7							89.7	0.0	0.0
L Kings	74	85.1	3.3	96.5	0.2	54.7	45.3	0.0	98.0	99.8	99.8
L Rfree									0.0	0.0	0.0
L St.G			2.0	98.0	0.0				4.4	99.0	63.8
L West	77	89.6	11.1	88.4	0.5	37.2	62.2	0.6	92.7	98.5	98.4
Leeds	72	80.4	8.4	91.0	0.6	27.6	72.4	0.0	99.4	99.8	100.0
Leic	73	80.3	1.5	97.9	0.7	18.3	79.2	2.5	99.7	99.5	99.8

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
Liv Ain			1.6	93.7	4.7	10.1	89.1	0.8	0.0	96.2	96.0
Liv Roy			1.8	94.6	3.6	8.0	91.6	0.4	0.0	99.3	98.9
M RI			3.1	95.0	1.9	5.4	94.3	0.2	63.3	90.2	90.4
Middlbr	72	83.7	3.2	95.5	1.3				97.3	100.0	0.0
Newc	71	76.5	10.5	88.0	1.5	52.3	47.7	0.0	100.0	100.0	100.0
Norwch	73	77.2	4.5	94.4	1.1	62.2	37.8	0.0	87.0	97.1	97.0
Nottm	75	90.8	0.9	94.4	4.7	8.3	91.4	0.3	92.4	99.1	99.0
Oxford	74	81.0	0.0	100.0	0.0	19.3	80.7	0.0	75.8	98.8	98.8
Plymth	74	88.9	2.2	97.8	0.0				98.5	97.1	0.0
Ports			4.6	94.2	1.2	49.0	50.3	0.7	0.0	99.7	99.6
Prestn	70	68.9							84.8	0.0	0.2
Redng	74	83.5	5.1	94.5	0.4	23.8	76.2	0.0	100.0	99.3	98.1
Salford	68	63.5	8.1	77.7	14.2	28.0	72.0	0.0	70.7	98.3	96.8
Sheff	72	79.3	4.0	93.3	2.8	85.4	14.6	0.0	99.0	98.6	98.5
Shrew	75	89.9	0.6	92.4	7.0	13.2	86.8	0.0	99.4	99.4	99.4
Stevng	71	68.9	10.0	87.9	2.1	42.7	57.3	0.0	98.8	98.7	98.8
Stoke			9.3	86.9	3.8	22.0	78.0	0.0	65.9	100.0	100.0
Sund	76	86.8	3.1	88.7	8.2	23.6	76.4	0.0	100.0	99.0	92.5
Truro	74	87.3	3.1	96.9	0.0				94.3	100.0	0.0
Wirral	73	82.1	4.3	93.2	2.5	30.3	69.7	0.0	98.1	94.7	95.6
Wolve	74	82.3	2.3	97.4	0.3				98.7	99.4	3.6
York	79	94.7	1.7	96.0	2.3	17.9	82.1	0.0	100.0	97.7	98.8
N IRELAND											
Antrim	73	90.1	0.0	98.1	1.9	14.9	85.1	0.0	99.0	99.0	99.0
Belfast	74	82.8	2.6	95.7	1.7	16.5	83.5	0.0	100.0	95.9	99.1
Newry	73	81.4	21.3	78.8	0.0	55.6	44.4	0.0	92.2	98.8	98.4
Ulster	68	64.8	3.2	96.8	0.0	24.2	75.8	0.0	100.0	98.9	100.0
West NI	70	69.6	4.9	91.2	3.9	67.0	33.0	0.0	96.8	98.1	99.0
SCOTLAND											
Abrdn	71	81.9							100.0		
Airdrie	70	74.8							87.1		
D&Gall	71	70.2							92.2		
Dundee	74	88.4							89.6		
Edinb	73	87.8							97.3		
Glasgw	70	75.0							93.7		
Inverns	72	84.4							87.5		
Klmarnk	72	76.8							89.6		
Krkldy	71	80.8							98.7		
WALES											
Bangor	71	79.1	5.4	90.5	4.1	59.7	40.3	0.0	100.0	100.0	100.0
Cardff	74	90.1							98.8	0.0	0.0
Clwyd	70	79.5							98.7	0.0	0.0
Swanse	75	81.1	5.6	93.6	0.8	35.0	65.0	0.0	99.4	100.0	100.0
Wrexm	71	72.7	2.9	97.1	0.0	21.0	77.0	2.0	95.2	96.3	96.2
TOTALS											
England	74	83.2	5.7	92.7	1.6	33.0	66.7	0.3	76.2	85.6	76.9
N Ireland	72	78.0	5.7	92.7	1.6	33.2	66.8	0.0	98.1	98.0	99.2
Scotland	72	79.6							93.7		
Wales	73	84.1							98.7	49.7	48.1
UK	74	82.8	5.7	92.7	1.5	33.1	66.6	0.3	79.3	84.0	75.9

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

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

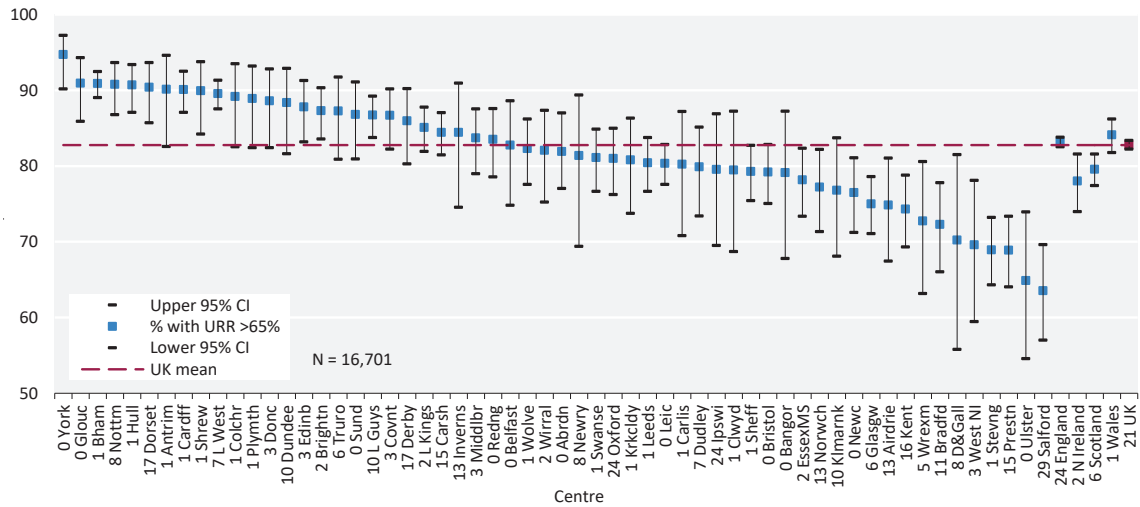


Figure 5.2 Percentage of adult patients prevalent to ICHD on 31/12/2021 with urea reduction ratio (URR) >65% by centre
CI – confidence interval

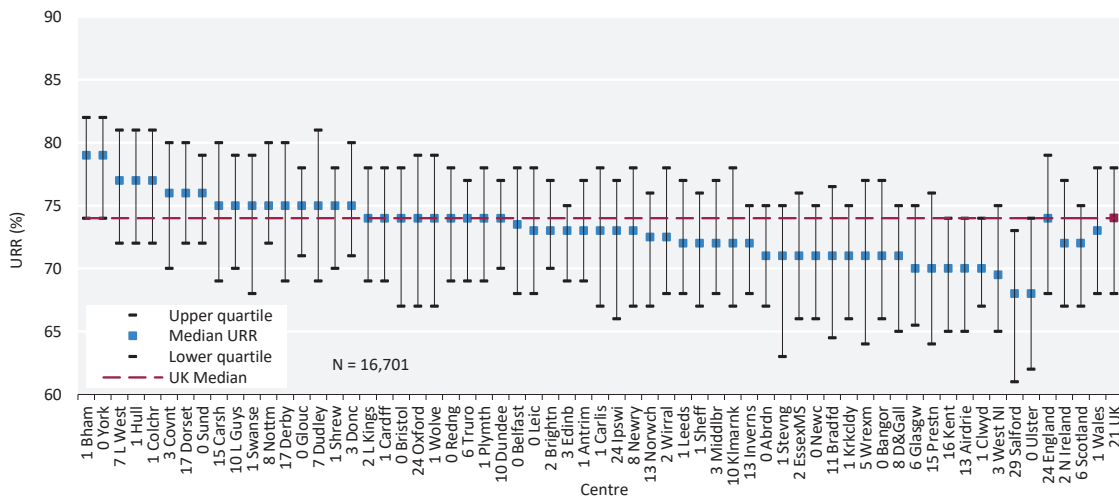


Figure 5.3 Median urea reduction ratio (URR) achieved in adult patients prevalent to ICHD on 31/12/2021 by centre

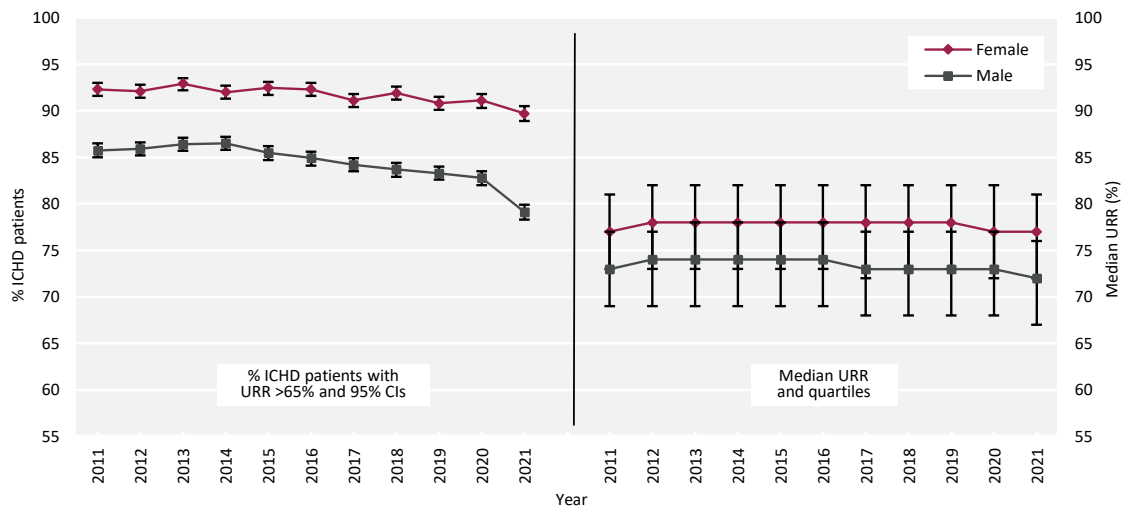


Figure 5.4 Change in the percentage of prevalent adult ICHD patients with urea reduction ratio (URR) >65% and the median URR by sex between 2011 and 2021

CI - confidence interval

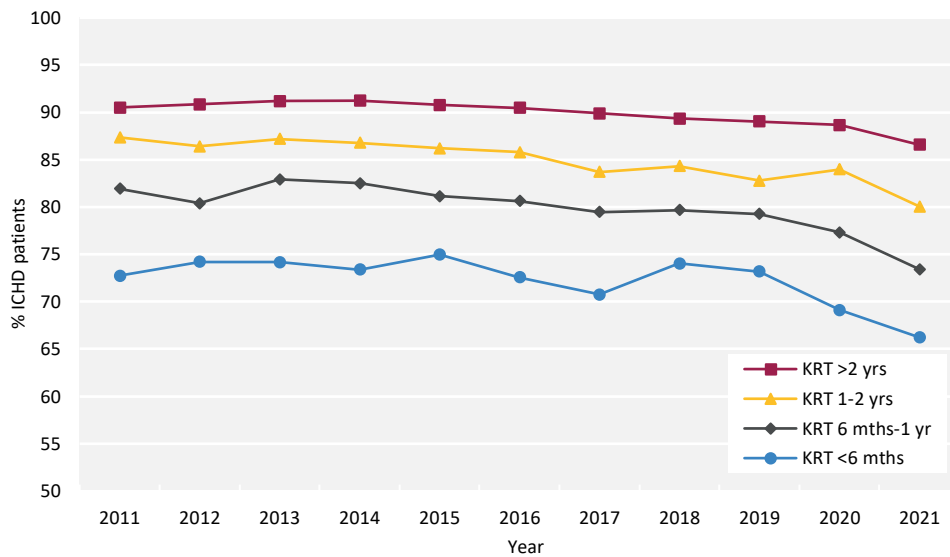


Figure 5.5 Percentage of prevalent adult ICHD patients achieving urea reduction ratio (URR) >65% by time on KRT between 2011 and 2021

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 31/12/2021 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	2.4	76.6	15.0	99.7
Bradfd	2.4	72.4	23.0	100.0
Brightn	2.3	77.7	9.9	100.0
Bristol	2.4	83.4	15.0	100.0
Camb	2.3	82.9	4.7	99.1
Carlis	2.3	79.6	10.2	100.0
Carsh	2.3	73.4	9.5	99.6
Colchr	2.3	86.4	6.1	100.0
Covnt	2.3	80.5	7.4	100.0
Derby	2.4	84.1	11.0	100.0
Donc	2.4	78.5	17.1	100.0
Dorset	2.4	80.7	13.6	99.6
Dudley	2.4	77.7	19.8	100.0
EssexMS	2.3	82.5	9.9	99.7
Exeter				
Glouc	2.4	84.7	10.3	100.0
Hull	2.4	76.0	17.4	100.0
Ipswi	2.3	77.1	9.8	97.6
Kent	2.4	72.1	18.5	99.3
L Barts	2.3	77.5	6.4	98.2
L Guys	2.4	79.8	11.1	100.0
L Kings	2.3	75.4	7.7	99.8
L Rfree	2.3	78.0	6.9	100.0
L St.G	2.4	77.2	10.3	99.0
L West	2.3	74.0	8.8	87.0
Leeds	2.3	82.9	7.8	100.0
Leic	2.3	76.3	8.6	99.9
Liv Ain	2.5	69.4	26.1	97.5
Liv Roy	2.4	81.4	13.5	98.2
M RI	2.4	81.2	14.9	86.3
Middlbr	2.3	80.9	0.9	100.0
Newc	2.4	77.2	11.4	100.0
Norwch	2.3	83.3	9.4	89.7
Nottm	2.4	82.4	10.6	100.0
Oxford	2.3	78.5	9.8	86.5
Plymth	2.3	78.0	6.4	99.3
Ports	2.3	79.6	7.3	100.0
Prestn	2.3	75.7	5.6	89.1
Redng	2.3	83.0	8.2	100.0
Salford	2.3	79.8	9.2	100.0
Sheff	2.3	80.3	5.9	99.8
Shrew	2.4	79.0	20.5	99.4
Stoke	2.4	83.8	13.2	84.3
Sund	2.3	71.7	9.1	100.0
Truro	2.4	74.0	22.5	100.0
Wirral	2.3	77.7	8.2	95.5
Wolve	2.4	83.1	11.7	99.0
York	2.3	90.3	5.1	100.0
N IRELAND				
Antrim	2.4	86.5	11.5	100.0
Belfast	2.4	83.1	13.6	100.0
Newry	2.3	76.0	3.8	100.0

ICHD

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
Ulster	2.4	75.8	24.2	100.0
West NI	2.3	79.2	7.9	100.0
WALES				
Bangor	2.3	89.0	6.9	100.0
Cardff	2.4	81.7	13.6	99.8
Clwyd	2.3	79.5	9.0	98.7
Swanse	2.3	87.2	4.6	100.0
Wrexm	2.3	87.6	5.2	98.0
TOTALS				
England	2.3	78.5	10.5	97.6
N Ireland	2.4	80.5	12.4	100.0
Wales	2.3	84.4	9.0	99.6
E, W & NI	2.3	78.9	10.4	97.8

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

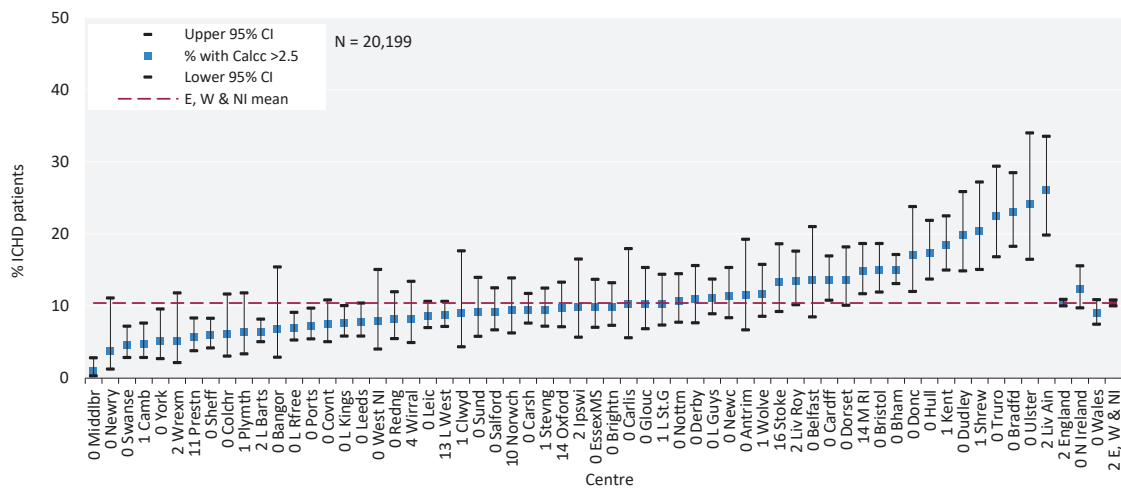


Figure 5.6 Percentage of adult patients prevalent to ICHD on 31/12/2021 with adjusted calcium (Ca) above the target range (>2.5 mmol/L) by centre
CI – confidence interval

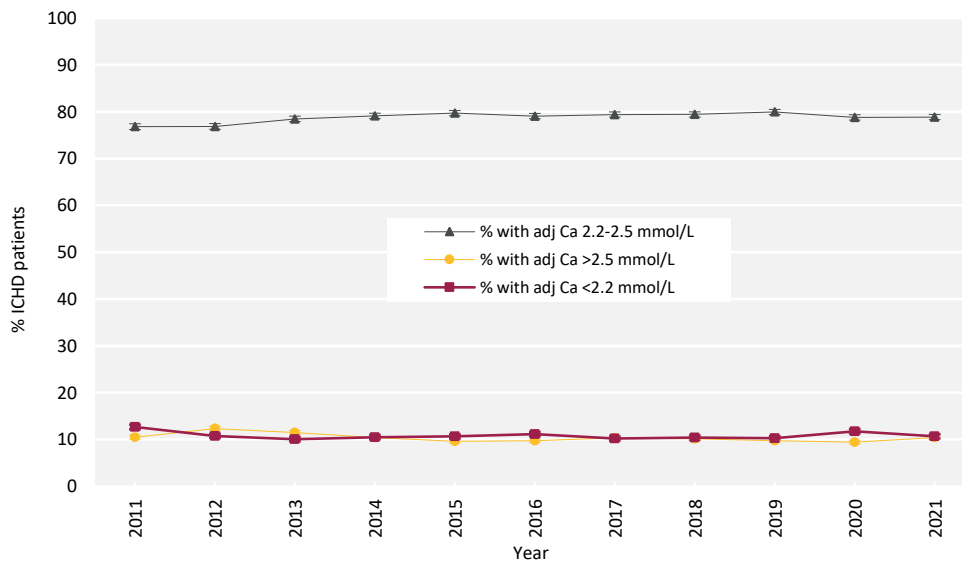


Figure 5.7 Change in percentage of prevalent adult ICHD patients within, above and below the target range for adjusted calcium (Ca 2.2–2.5 mmol/L) between 2011 and 2021

Table 5.7 Median pre-dialysis potassium and bicarbonate and percentage attaining target ranges in adult patients prevalent to ICHD on 31/12/2021 by centre

Centre	Pre-dialysis potassium					Pre-dialysis bicarbonate				
	Median (mmol/L)	% <4.0 mmol/L	% 4.0–6.0 mmol/L	% >6.0 mmol/L	% complete	Median (mmol/L)	% <18 mmol/L	% 18–26 mmol/L	% >26 mmol/L	% complete
ENGLAND										
Bham	4.2	36.8	60.3	34.2	99.7	23	4.1	88.8	7.1	99.7
Bradfd	4.8	11.1	80.5	7.8	100.0	24	1.2	82.7	16.2	99.6
Brightn					0.0	23	3.0	85.6	11.4	100.0
Bristol	4.8	19.4	77.2	15.9	100.0	21	4.4	94.9	0.7	100.0
Camb	4.9	4.7	90.9	2.9	98.8					12.4
Carlis					0.0	21	10.2	87.8	2.0	100.0
Carsh					0.0					24.4
Colchr	4.7	18.2	79.6	12.5	100.0	22	3.8	93.9	2.3	100.0
Covnt					0.0	23	5.0	89.8	5.3	100.0
Derby	4.7	15.1	81.6	11.1	100.0	21	6.1	93.5	0.4	100.0
Donc	4.7	12.0	82.3	7.8	100.0	22	1.3	96.2	2.5	100.0
Dorset	4.8	8.6	88.9	5.8	99.6	22	6.8	87.1	6.1	99.6
Dudley	4.8	13.4	82.7	9.3	100.0					62.9
EssexMS	4.8	7.5	86.8	4.9	89.2	24	1.9	84.6	13.5	99.1
Exeter										
Glouc					0.0	24	1.5	91.1	7.4	100.0
Hull	4.8	9.0	85.3	6.4	100.0	24	1.2	82.9	15.9	100.0
Ipswi					0.0	24	0.8	81.2	18.0	97.6
Kent	4.5	28.2	67.5	24.0	99.3	20	11.7	87.6	0.7	99.3
L Barts	4.7	17.7	76.6	15.4	98.3	21	12.4	85.0	2.6	98.2
L Guys	4.6	24.4	71.2	21.3	100.0	23	1.2	89.8	9.0	100.0
L Kings	5.2	8.2	79.3	6.2	99.8	20	10.2	89.4	0.5	99.5
L Rfree	4.9	13.3	78.4	10.9	100.0	21	10.2	89.2	0.6	94.1
L St.G					0.0	27	1.1	47.8	51.1	93.5
L West					0.0					52.6
Leeds	5.0	3.4	91.3	2.1	100.0	23	2.2	89.0	8.8	100.0
Leic	4.9	9.6	84.7	7.9	99.9	24	2.8	70.9	26.3	99.9
Liv Ain					0.0	24	3.2	79.6	17.2	97.5

Table 5.7 Continued

Centre	Pre-dialysis potassium					Pre-dialysis bicarbonate				
	Median (mmol/L)	% <4.0 mmol/L	% 4.0–6.0 mmol/L	% >6.0 mmol/L	% complete	Median (mmol/L)	% <18 mmol/L	% 18–26 mmol/L	% >26 mmol/L	% complete
Liv Roy					0.0	26	0.3	53.2	46.5	98.2
M RI					0.0	23	3.3	88.3	8.5	85.5
Middlbr	4.7	16.1	80.6	12.4	99.7	31	0.0	3.7	96.3	99.7
Newc					0.0	22	3.7	88.6	7.7	100.0
Norwch	5.1	3.9	86.9	2.1	99.6	22	4.1	89.8	6.1	94.3
Nottm	4.9	8.2	87.2	5.7	100.0	23	1.5	93.3	5.2	99.7
Oxford	4.9	8.6	85.2	6.1	86.7	22	7.9	79.3	12.8	85.3
Plymth	4.8	12.1	85.1	7.6	99.3	21	13.0	84.7	2.3	92.3
Ports	4.9	6.2	86.5	4.5	100.0	23	3.8	79.0	17.2	99.8
Prestn					0.0	23	4.8	88.2	7.0	100.0
Redng					0.0	23	1.4	93.3	5.3	100.0
Salford	4.6	17.6	78.2	14.1	100.0					0.0
Sheff	4.9	9.9	80.9	7.6	99.8	22	4.4	90.7	5.0	99.8
Shrew					0.0	21	7.0	90.6	2.3	99.4
Sthend										
Stoke					0.0	26	1.0	62.6	36.4	85.1
Sund					0.0	21	9.1	88.9	2.0	100.0
Truro	4.9	7.1	88.8	4.1	100.0	26	0.0	51.5	48.5	100.0
Wirral					0.0	24	0.6	81.4	18.0	96.6
Wolve	4.8	7.5	86.4	5.0	99.0	20	11.4	88.3	0.3	99.0
York	5.2	3.4	86.3	1.6	100.0	22	2.9	93.7	3.4	100.0
N IRELAND										
Antrim	4.9	12.5	84.6	7.4	100.0	26	0.0	70.2	29.8	100.0
Belfast	5.1	1.7	92.4	0.4	100.0	21	7.6	91.5	0.9	100.0
Newry	4.7	15.2	79.8	8.8	100.0	23	2.5	96.2	1.3	100.0
Ulster	4.7	8.8	87.9	4.5	100.0	23	1.1	98.9	0.0	100.0
West NI	5.0	5.0	89.1	2.1	100.0	22	3.0	96.0	1.0	100.0
WALES										
Bangor					0.0	24	2.7	82.2		100.0
Cardff					0.0	24	1.2	85.7		99.2
Clwyd					0.0	24	1.3	91.0		98.7
Swanse					0.0	23	3.5	89.0		100.0
Wrexm					0.0	25	1.0	74.2		98.0
TOTALS										
England	4.8	5.0	79.6	14.0	64.0	23	5.0	82.7	12.3	88.3
N Ireland	4.9		87.2	6.0	100.0	23	3.0	90.1	6.9	100.0
Wales					0.0	24	2.1	86.0	12.0	99.4
E, W & NI	4.8	14.4	79.9	13.8	61.5	23	4.8	83.1	12.2	89.2

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

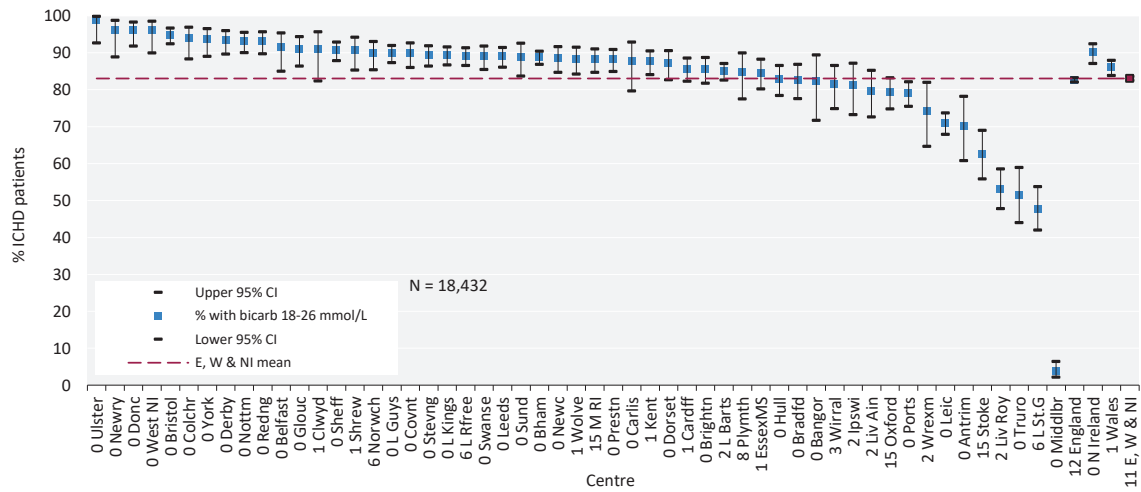


Figure 5.8 Percentage of adult patients prevalent to ICHD on 31/12/2021 with pre-dialysis bicarbonate (bicarb) within the target range (18–26 mmol/L) by centre
 CI – confidence interval
 Bicarb - bicarbonate

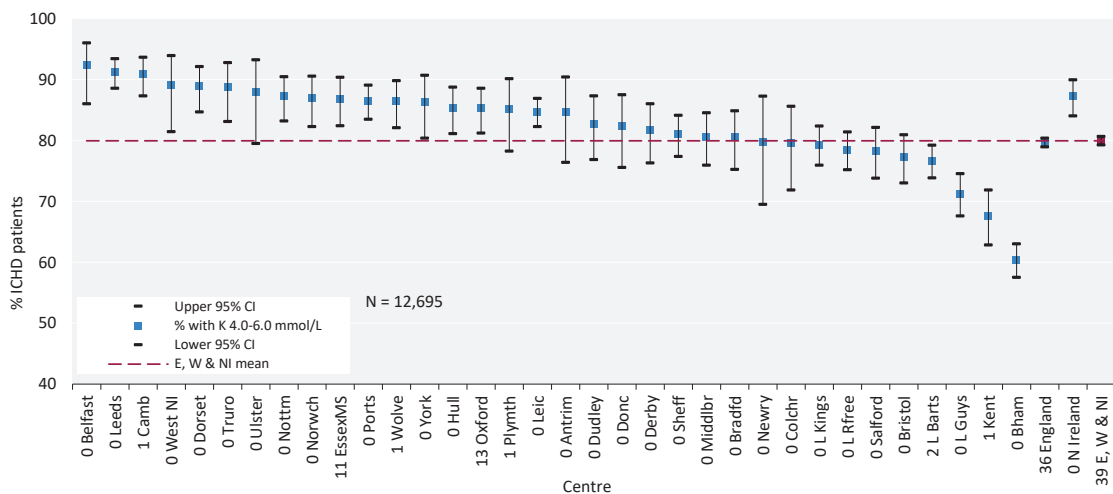


Figure 5.9 Percentage of adult patients prevalent to ICHD on 31/12/2021 with pre-dialysis potassium (K) within the target range (4.0–6.0 mmol/L) by centre
 CI – confidence interval
 K - Potassium

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

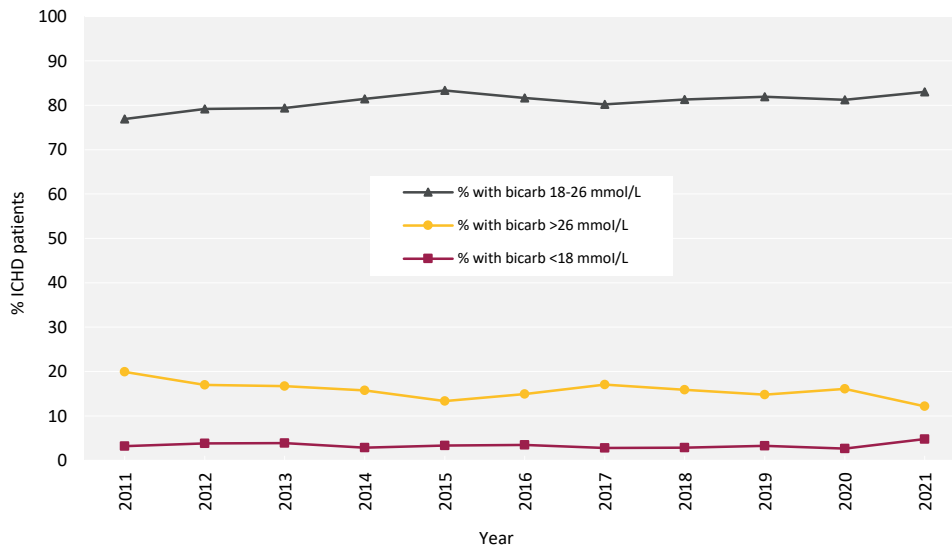


Figure 5.10 Change in percentage of prevalent adult ICHD patients within, above and below the target range for pre-dialysis bicarbonate (bicarb 18–26 mmol/L) between 2011 and 2021

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 31/12/2021 by centre

Centre	Haemoglobin			% data completeness	Ferritin		
	Median (g/L)	% <100 g/L	% >120 g/L		Median (µg/L)	% <200 µg/L	% data completeness
ENGLAND							
Bham	111	21.0	17.4	99.7	554	14.9	99.7
Bradfd	116	19.9	36.8	100.0	446	11.2	99.6
Brightn	110	22.3	23.0	100.0	490	6.4	99.0
Bristol	114	5.5	30.9	100.0	666	2.8	99.1
Camb	113	13.2	23.0	97.8			51.9
Carlis	112	16.3	19.4	100.0	618	12.2	100.0
Carsh	108	22.9	15.4	99.9	459	11.6	99.9
Colchr	111	18.2	16.7	100.0	494	6.1	100.0
Covnt	109	21.4	15.2	100.0	492	11.5	100.0
Derby	116	12.7	35.9	100.0	510	9.8	100.0
Donc	105	34.8	13.9	100.0	507	7.0	100.0
Dorset	111	15.5	17.2	82.9	735	3.2	99.6
Dudley	112	16.2	13.7	97.5			68.3
EssexMS	110	17.5	20.3	100.0	468	15.0	99.7
Exeter							
Glouc	110	20.7	18.2	100.0	425	13.3	96.1
Hull	111	21.3	20.7	100.0	445	8.8	99.1
Ipswi	110	23.0	13.1	97.6	434	25.4	97.6
Kent	111	20.9	22.3	99.3	555	12.2	98.6
L Barts	111	22.0	19.6	98.3	622	9.0	98.3
L Guys	110	19.6	18.5	100.0	513	9.6	99.5
L Kings	111	20.1	21.2	99.7	473	11.8	99.0
L Rfree	111	20.1	22.2	100.0	434	21.1	99.4
L St.G	108	30.7	17.9	99.0	644	3.4	99.0
L West	113	12.1	21.2	94.2	363	16.2	93.7
Leeds	110	20.5	18.2	100.0	339	27.4	100.0
Leic	112	17.7	24.5	99.9	401	15.2	99.7
Liv Ain				67.7	574	11.2	88.8
Liv Roy	110	17.6	18.4	76.9	506	8.3	97.9
M RI	111	24.4	26.4	86.5	405	10.6	81.0
Middlbr	113	15.1	31.1	100.0	812	11.7	94.5
Newc	114	17.9	29.3	99.7	575	14.2	100.0
Norwch	111	25.3	15.4	92.3	481	16.7	94.3
Nottm	109	24.7	12.2	99.7	453	13.1	100.0
Oxford	110	26.9	24.1	87.2	556	4.4	98.8
Plymth	114	16.3	30.5	99.3	314	26.4	98.6
Ports	109	26.3	18.7	100.0	343	28.7	99.1
Prestn	110	22.3	23.4	100.0	728	5.2	96.5
Redng	110	23.0	17.4	100.0	690	5.7	100.0
Salford	108	26.8	18.6	100.0	354	27.1	99.7
Sheff	108	33.6	20.4	99.8	446	9.4	99.6
Shrew	109	21.6	17.0	99.4	493	5.3	99.4
Stevng	108	23.1	11.1	99.8	382	19.0	99.4
Stoke	114	9.7	30.4	85.5	524	8.0	82.6
Sund	111	16.7	19.2	100.0	649	4.0	100.0
Truro	109	19.5	13.6	100.0	389	12.0	98.8

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
Wirral	114	18.2	24.5	89.3	590	11.5	97.8
Wolve	107	29.9	18.5	99.0	673	10.1	99.0
York	110	21.1	19.4	100.0	408	10.3	100.0
N IRELAND							
Antrim	110	15.5	10.7	99.0	389	9.6	100.0
Belfast	112	18.6	23.7	100.0	501	5.1	100.0
Newry	109	24.4	11.5	98.7	510	8.9	100.0
Ulster	111	17.6	22.0	100.0	660	4.4	100.0
West NI	111	19.8	21.8	100.0	856	4.0	100.0
SCOTLAND							
Abrdn	110	22.6	18.9	100.0			
Airdrie	112	18.5	17.9	93.9			
D&Gall	111	15.9	25.0	91.7			
Dundee	115	15.0	25.6	93.7			
Edinb	114	17.2	29.7	97.0			
Glasgw	112	17.3	25.1	96.8			
Inverns	112	17.5	28.6	72.4			
Klmarnk	110	17.1	17.1	96.1			
Krkldy	114	14.8	27.1	99.4			
WALES							
Bangor	113	6.8	16.4	100.0	582	11.0	100.0
Cardff	111	20.4	26.1	99.8	489	12.4	99.4
Clwyd	109	28.2	12.8	98.7	362	25.6	98.7
Swanse	108	22.5	16.8	100.0	434	24.3	100.0
Wrexm	112	17.3	21.4	99.0	558	11.3	98.0
TOTALS							
England	111	20.6	20.7	97.4	480	13.3	96.9
N Ireland	111	18.9	18.3	99.6	584	6.3	100.0
Scotland	113	16.9	24.8	95.4			
Wales	110	20.5	21.0	99.7	484	17.2	99.5
UK	111	20.3	20.9	97.4	483	13.3	97.1

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

UK National average for ferritin does not include Scotland

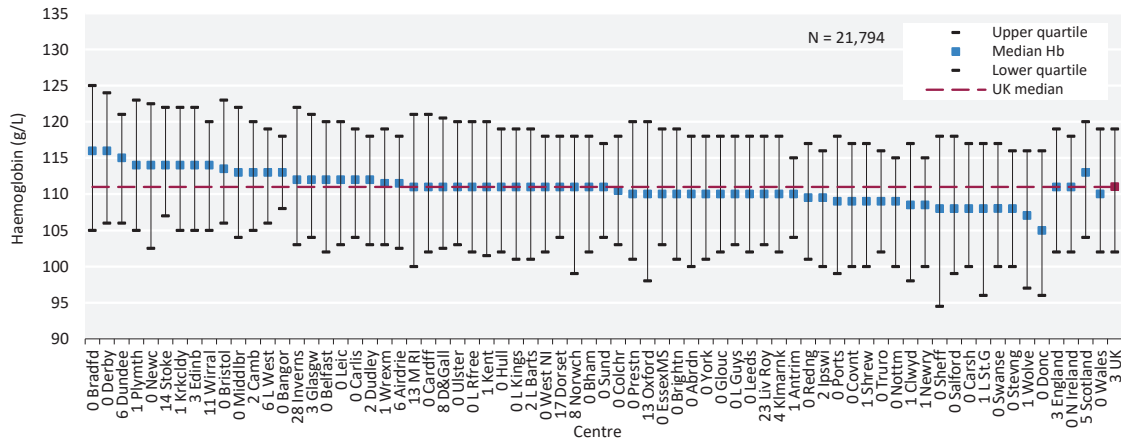


Figure 5.11 Median haemoglobin (Hb) in adult patients prevalent to ICHD on 31/12/2021 by centre

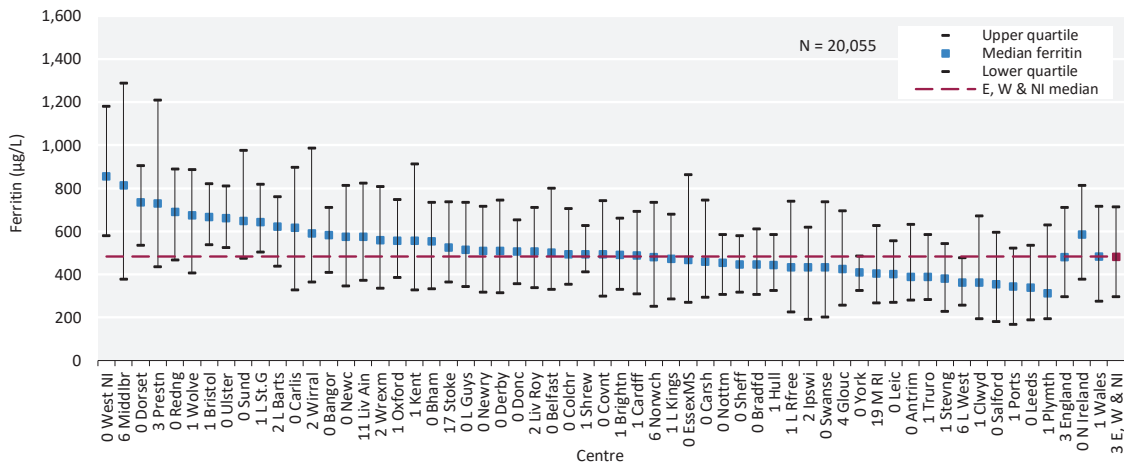


Figure 5.12 Median ferritin in adult patients prevalent to ICHD on 31/12/2021 by centre

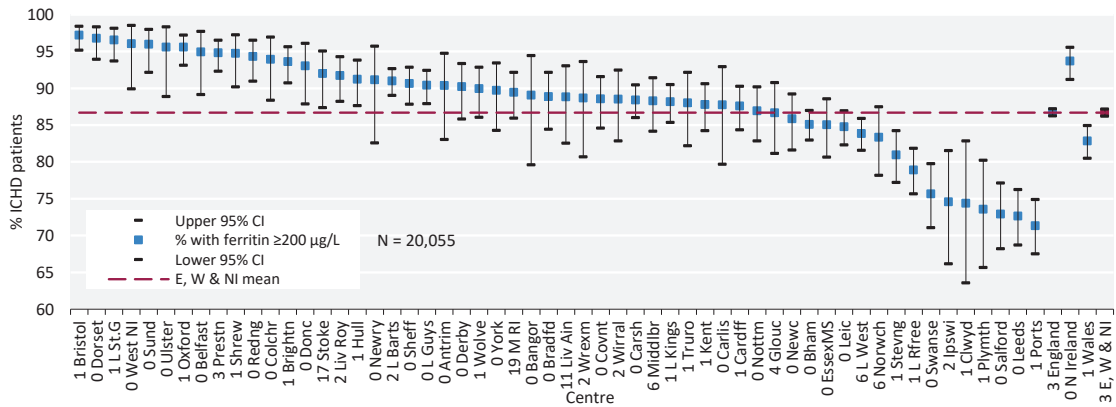


Figure 5.13 Percentage of adult patients prevalent to ICHD on 31/12/2021 with ferritin <200 µg/L by centre
CI – confidence interval

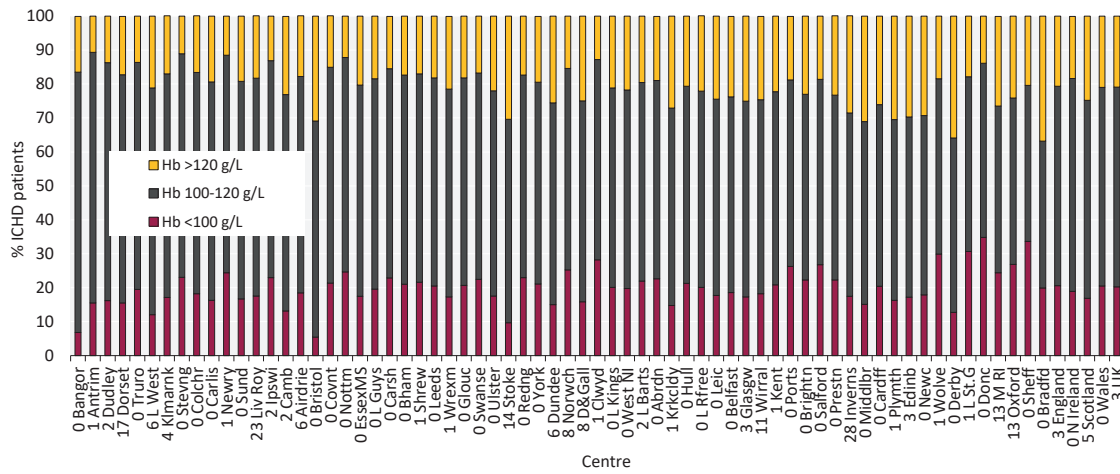


Figure 5.14 Distribution of haemoglobin (Hb) in adult patients prevalent to ICHD on 31/12/2021 by centre

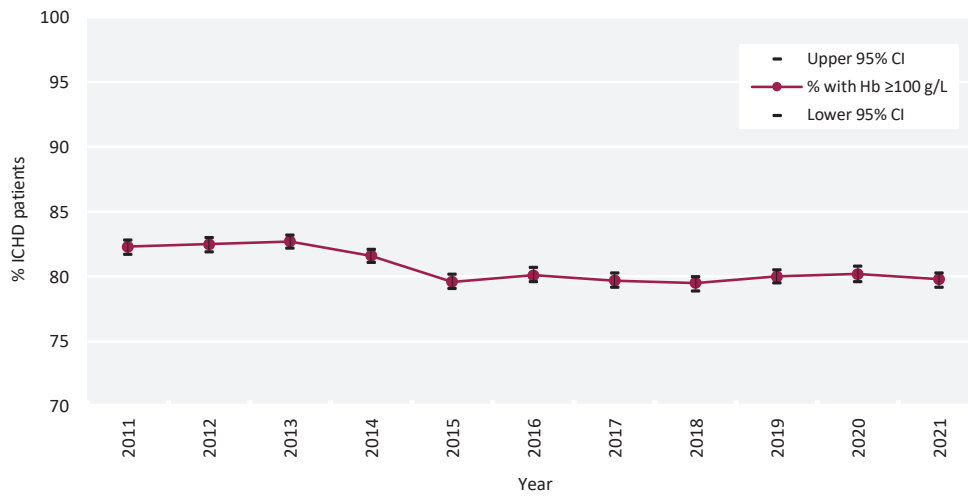


Figure 5.15 Percentage of prevalent adult ICHD patients with haemoglobin (Hb) ≥ 100 g/L between 2011 and 2021
CI – confidence interval

Dialysis access in prevalent adult dialysis patients

Scotland do not contribute dialysis session information or data via the audit, and therefore are not included in the analysis of prevalent patients. They submit access data for incident patients separately to the audit (see chapter 2). The type of prevalent dialysis access is presented in figure 5.16 for the 40 of centres in England, Northern Ireland and Wales that returned vascular access data on $\geq 70\%$ 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. .

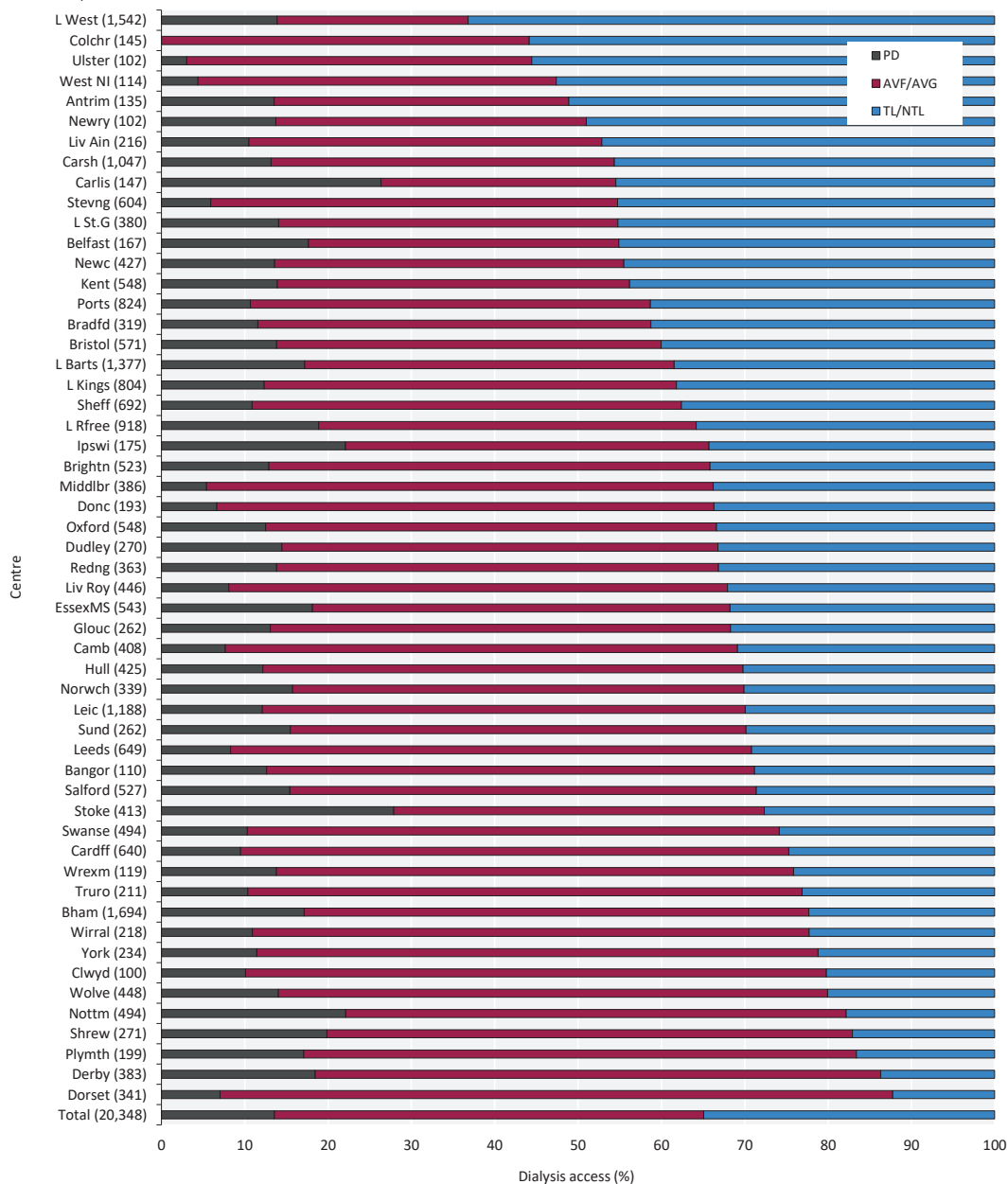


Figure 5.16 Dialysis access in adult patients prevalent to dialysis on 31/12/2021 by centre

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

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

Cause of death in adult ICHD patients

Cause of death was analysed in prevalent patients receiving ICHD on 31/12/2020 and followed-up for one year in 2021. The proportion of ICHD patients with each cause of death is shown for patients with cause of death data and these total 100% of patients with data. The proportion of patients with no cause of death data is shown on a separate line. Further detail on the survival of prevalent KRT patients is in chapter 3.

Table 5.9 Cause of death in adult patients prevalent to ICHD on 31/12/2020 followed-up in 2021 by age group

Cause of death	ICHD all ages		ICHD < 65 years		ICHD ≥ 65 years	
	N	%	N	%	N	%
Cardiac disease	523	20.3	196	26.1	327	17.9
Cerebrovascular disease	62	2.4	25	3.3	37	2.0
Infection	633	24.6	174	23.2	459	25.1
Malignancy	129	5.0	32	4.3	97	5.3
Treatment withdrawal	390	15.1	59	7.9	331	18.1
Other	651	25.3	199	26.5	452	24.8
Uncertain aetiology	189	7.3	66	8.8	123	6.7
Total (with data)	2,577	100.0	751	100.0	1,826	100.0
Missing	1,509	36.9	453	37.6	1,056	36.6

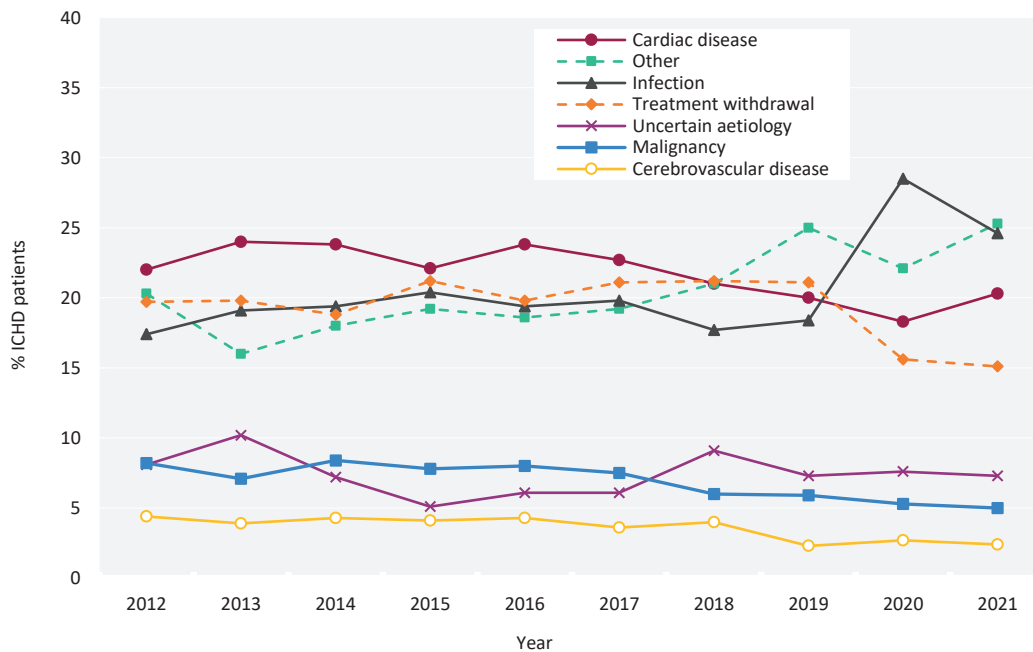


Figure 5.21 Cause of death between 2012 and 2021 for adult patients prevalent to ICHD at the beginning of the year

Chapter 6

Adults on peritoneal dialysis (PD) in the UK at the end of 2021

Contents

Introduction	130
Rationale for analyses	131
Key findings	133
Analyses	134
Changes to the prevalent adult PD population	134
Demographics of prevalent adult PD patients	137
Biochemistry parameters in prevalent adult PD patients	139
Anaemia in prevalent adult PD patients	142
Cause of death in adult PD patients	147

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 2021 (figure 6.1). This population comprises patients who were on PD at the end of 2020 and remained on PD throughout 2021, as well as patients who commenced/re-commenced PD in 2021. This latter group includes both incident kidney replacement therapy (KRT) patients who ended 2021 on PD and prevalent KRT patients who switched to PD from in-centre haemodialysis (ICHD), home haemodialysis (HHD) or a transplant (Tx) in 2021. 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.

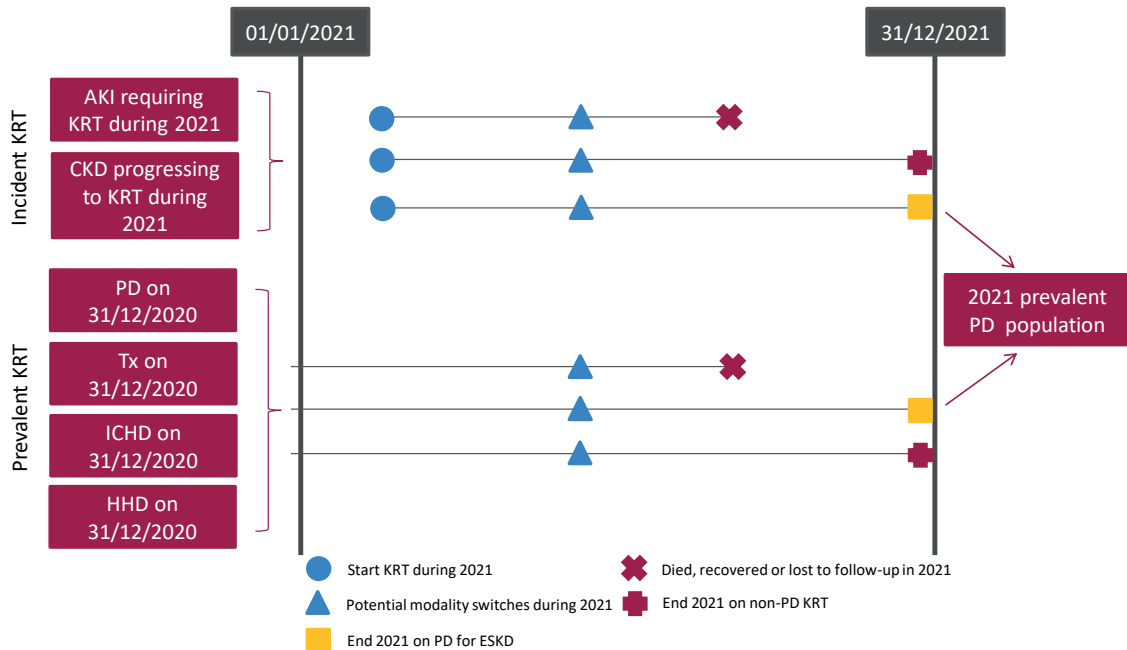


Figure 6.1 Pathways adult patients could follow to be included in the UK 2021 prevalent PD population

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 2021 or if they had been on KRT for ≥ 90 days and were on PD at the end of 2021
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 our website alongside the annual report when 2021 data are available.

Rationale for analyses

The analyses begin with a description of the 2021 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, where data permit, their attainment by UK kidney centres in 2021 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 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 PD patients they were excluded from some of the analyses, although their dialysis patients were included in the relevant dialysis population denominators.

Exeter was unable to submit patient level data for 2021. Aggregate numbers by modality were provided, enabling inclusion in Tables 6.2 and 6.3. Exeter is excluded from all other analyses.

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)
Planning, initiating and withdrawing KRT (2014)	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

- 3,903 adult patients were receiving PD for ESKD in the UK on 31/12/2021, compared to 3822 in 2020, which represented 5.6% of the KRT population.
- The median age of PD patients was 63.3 years and 60.3% were male.
- The median adjusted calcium for PD patients was 2.4 mmol/L and 14.3% were above the target range of 2.2–2.5 mmol/L.
- The median bicarbonate for PD patients was 24 mmol/L and 74.1% were within the target range of 22–30 mmol/L.
- The median haemoglobin for PD patients was 111 g/L and 8.8% had a ferritin <100 µg/L.
- The PD peritonitis rate in 2021 (England only) was 0.42/1 PD patient-year.
- There was no cause of death data available for 37.0% of deaths. For those with data, the leading cause of death was infection in both younger patients and those ≥65 years at 40.0% and 26.2% respectively with a likely contribution from COVID related deaths. Treatment withdrawal accounted for 11.0% of deaths in those ≥65 years.

Analyses

Changes to the prevalent adult PD population

For the 68 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

Centre	N on PD					% on PD					Estimated catchment population (millions)	2021 crude rate (pmp)
	2017	2018	2019	2020	2021	2017	2018	2019	2020	2021		
ENGLAND												
Bham	249	257	257	268	277	7.8	7.9	7.8	8.2	8.4	2.05	135
Bradfd	20	26	34	26	37	3.0	3.8	4.6	3.6	5.0	0.49	75
Brightn	59	60	55	65	69	5.8	5.7	5.2	6.0	6.3	1.08	64
Bristol	58	56	63	68	77	3.9	3.8	4.2	4.6	5.1	1.22	63
Camb	26	32	28	26	29	1.9	2.3	1.9	1.7	1.8	0.94	31
Carlis	27	30	35	32	30	9.6	10.2	11.6	10.8	9.8	0.26	117
Carsh	96	99	72	121	134	5.7	5.7	4.0	6.5	7.0	1.63	82
Colchr	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.29	0
Covnt	52	52	81	84	81	5.4	5.4	7.5	7.6	7.2	0.80	102
Derby	78	78	62	69	66	14.1	13.3	9.5	10.2	9.6	0.56	118
Donc	29	23	25	19	13	8.7	7.0	7.3	5.6	3.8	0.38	35
Dorset	35	38	33	34	23	4.8	5.0	4.3	4.3	2.9	0.73	32
Dudley	57	38	36	32	40	15.6	10.6	9.8	8.6	10.1	0.34	116
EssexMS	93	87	85	83	93	11.2	10.3	10.0	9.4	10.4	0.99	94
Exeter	75	77	84	84	73	7.1	7.1	7.7	7.7	6.8	0.95	77
Glouc	45	37	31	30	36	8.8	7.1	5.8	5.7	6.6	0.51	71
Hull	56	45	49	57	52	6.4	5.1	5.4	6.2	5.7	0.80	65
Ipswi	45	40	42	33	33	10.3	9.3	9.8	7.7	7.8	0.31	106
Kent	51	43	50	62	72	4.7	3.9	4.4	5.4	6.0	1.07	67
L Barts	236	237	228	266	258	9.4	9.1	8.6	9.9	9.4	1.59	162
L Guys	39	43	53	64	70	1.8	1.9	2.3	2.8	3.0	1.01	70
L Kings	97	89	95	101	98	8.4	7.5	7.6	8.1	7.3	0.93	105
L Rfree	143	163	165	179	173	6.5	7.3	7.0	7.7	7.3	1.33	130
L St.G	37	40	43	48	53	4.4	4.8	5.0	5.6	6.1	0.67	80
L West	120	135	155	200	214	3.5	3.8	4.3	5.7	6.0	1.96	109
Leeds	59	64	67	64	53	3.6	3.8	3.9	3.7	3.0	1.37	39
Leic	96	108	126	120	138	4.1	4.4	4.9	4.6	5.2	2.09	66
Liv Ain	21	25	22	25	22	10.0	11.5	9.7	10.3	8.3	0.43	51
Liv Roy	70	57	35	32	32	5.6	4.5	2.8	2.6	2.7	0.81	39
M RI	71	69	76	84	97	3.5	3.3	3.7	4.2	4.7	1.33	73
Middlbr	23	29	32	28	20	2.5	3.1	3.4	3.0	2.1	0.81	25
Newc	58	60	59	46	58	5.2	5.2	5.0	3.8	4.7	0.95	61
Norwch	43	36	46	45	45	5.5	4.6	5.7	5.6	5.7	0.69	65
Nottm	69	70	76	95	103	5.8	5.8	6.2	7.9	8.4	0.93	111
Oxford	67	70	58	68	66	3.6	3.6	2.9	3.4	3.3	1.45	46
Plymth	49	40	42	33	34	9.1	7.4	7.9	6.1	6.2	0.40	85
Ports	84	94	87	101	90	4.8	5.3	4.6	5.3	4.6	1.75	51
Prestn	35	39	43	50	55	2.8	3.0	3.2	3.7	4.0	1.23	45
Redng	39	40	56	61	50	4.9	4.9	6.5	7.0	5.7	0.70	72
Salford	117	115	120	106	84	10.5	9.8	9.7	8.4	6.9	1.15	73

Table 6.2 Continued

Centre	N on PD					% on PD					Estimated catchment population (millions)	2021 crude rate (pmp)
	2017	2018	2019	2020	2021	2017	2018	2019	2020	2021		
Sheff	55	61	60	77	82	3.8	4.1	4.0	5.2	5.5	1.13	72
Shrew	42	58	55	51	51	10.9	13.5	12.6	11.9	11.5	0.41	124
Stevng	23	28	37	25	36	2.6	3.0	3.9	2.6	3.6	1.11	32
Stoke	72	81	71	94	107	8.9	10.0	8.8	11.6	12.7	0.73	146
Sund	16	17	26	32	37	2.9	3.0	4.6	5.8	6.8	0.55	68
Truro	15	17	21	23	22	3.5	3.9	4.7	5.2	4.8	0.36	61
Wirral	20	20	18	18	20	5.1	5.0	4.3	4.3	4.9	0.47	43
Wolve	54	54	49	59	64	9.3	8.9	8.0	9.0	9.3	0.55	117
York	35	29	33	24	27	6.3	5.1	5.7	4.2	4.6	0.49	56
N IRELAND												
Antrim	14	20	19	12	18	5.5	7.3	6.7	4.2	6.1	0.25	73
Belfast	16	22	18	15	27	1.9	2.5	2.0	1.7	3.0	0.53	51
Newry	23	16	11	9	13	9.5	6.3	4.3	3.4	4.6	0.24	55
Ulster	6	10	8	3	3	3.3	5.2	4.3	1.5	1.5	0.20	15
West NI	9	9	14	7	6	2.9	2.8	4.3	2.0	1.8	0.25	24
SCOTLAND												
Abrdn	22	26	22	22	20	3.9	4.5	3.9	3.9	3.5	0.50	40
Airdrie	16	22	21	29	29	3.4	4.5	4.0	5.6	5.8	0.46	63
D&Gall	6	6	8	10	8	4.4	4.1	5.4	6.4	5.2	0.12	65
Dundee	18	22	21	13	16	4.1	4.9	4.7	3.0	3.9	0.37	43
Edinb	33	36	41	33	33	4.0	4.2	4.6	3.7	3.6	0.84	39
Glasgw	48	52	45	46	38	2.7	2.9	2.4	2.5	2.0	1.37	28
Inverns	10	13	12	9	11	3.8	4.7	4.3	3.3	4.0	0.22	49
Klmarnk	24	19	24	27	33	7.1	5.6	6.7	7.3	9.0	0.29	113
Krkldy	11	10	12	6	7	3.6	3.4	4.1	2.1	2.4	0.27	26
WALES												
Bangor	17	20	14	18	13	8.7	9.9	7.0	8.3	6.0	0.16	79
Cardff	71	59	63	67	58	4.2	3.4	3.6	4.0	3.4	1.16	50
Clwyd	12	15	13	13	11	6.7	7.9	6.3	6.4	5.4	0.18	61
Swanse	74	70	77	59	49	9.4	8.5	8.9	6.9	5.7	0.76	65
Wrexm	27	24	23	25	16	8.4	7.6	7.4	7.7	5.3	0.21	77
TOTALS												
England	3,056	3,106	3,176	3,412	3,494	5.6	5.5	5.5	5.9	5.9	44.77	78
N Ireland	68	77	70	46	67	3.7	4.0	3.6	2.3	3.3	1.47	46
Scotland	188	206	206	195	195	3.7	3.9	3.8	3.7	3.6	4.45	44
Wales	201	188	190	182	147	6.3	5.8	5.7	5.6	4.5	2.49	59
UK	3,513	3,577	3,642	3,835	3,903	5.4	5.4	5.3	5.6	5.6	53.19	73

Country PD populations were calculated by summing the PD patients from centres in each country. Estimated country populations were derived from Office for National Statistics figures (see appendix A for details on estimated catchment population by kidney centre)

Exeter was unable to submit 2021 patient level data, but provided aggregate numbers of patients on KRT at the end of 2021, by treatment modality

pmp – per million population

PD

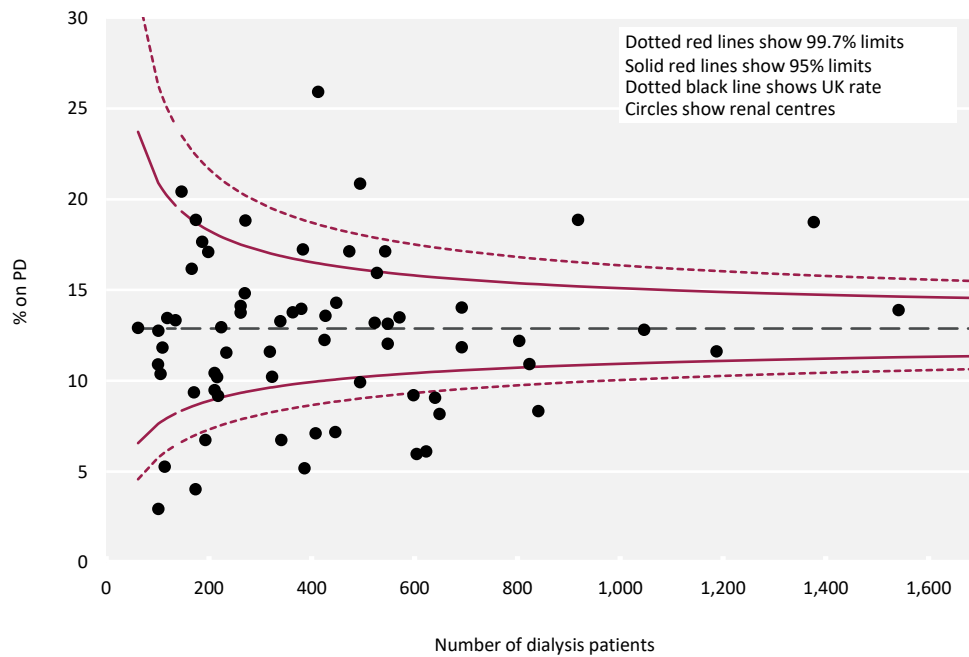


Figure 6.2 Percentage of adult patients prevalent to dialysis on 31/12/2021 who were on PD by centre

Demographics of prevalent adult PD patients

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

Table 6.3 Demographics of adult patients prevalent to PD on 31/12/2021 by centre

Centre	N on KRT	N on PD	% on PD	Median age (yrs)	% male	Ethnicity				
						% White	% Asian	% Black	% Other	% missing
ENGLAND										
Bham	3,309	277	8.4	62.1	61.4	57.8	29.3	11.5	1.5	2.5
Bradfd	735	37	5.0	62.1	64.9	64.9	29.7	0.0	5.4	0.0
Brightn	1,092	69	6.3	68.5	66.7	90.5	6.3	1.6	1.6	8.7
Bristol	1,497	77	5.1	59.9	66.2	94.5	1.4	1.4	2.7	5.2
Camb	1,629	29	1.8	62.2	72.4	96.3	3.7	0.0	0.0	6.9
Carlis	305	30	9.8	69.6	60.0	100.0	0.0	0.0	0.0	0.0
Carsh	1,907	134	7.0	63.8	61.2	66.1	16.1	8.1	9.7	7.5
Colchr	145	0	0.0							
Covnt	1,119	81	7.2	71.5	70.4	88.9	4.9	6.2	0.0	0.0
Derby	689	66	9.6	69.0	59.1	90.8	7.7	1.5	0.0	1.5
Donc	339	13	3.8	61.1	38.5	100.0	0.0	0.0	0.0	0.0
Dorset	786	23	2.9	69.5	69.6	95.7	0.0	0.0	4.3	0.0
Dudley	398	40	10.1	65.9	60.0	80.0	15.0	5.0	0.0	0.0
EssexMS	895	93	10.4	70.2	67.7	89.7	5.7	2.3	2.3	6.5
Exeter	1,077	73	6.8							
Glouc	546	36	6.6	57.3	58.3	82.4	5.9	2.9	8.8	5.6
Hull	919	52	5.7	66.8	57.7	94.2	3.8	1.9	0.0	0.0
Ipswi	421	33	7.8	75.3	66.7	83.3	0.0	4.2	12.5	27.3
Kent	1,192	72	6.0	62.4	56.9	87.9	1.5	6.1	4.5	8.3
L Barts	2,750	258	9.4	61.5	58.5	26.3	42.2	25.5	6.0	2.7
L Guys	2,322	70	3.0	56.3	45.7	49.2	14.3	31.7	4.8	10.0
L Kings	1,334	98	7.3	57.0	63.3	47.4	12.4	34.0	6.2	1.0
L Rfree	2,380	173	7.3	63.6	60.7	33.5	29.0	23.2	14.2	10.4
L St.G	866	53	6.1	57.5	58.5	38.6	22.7	15.9	22.7	17.0
L West	3,556	214	6.0	67.0	54.2	38.0	44.1	16.0	1.9	0.5
Leeds	1,784	53	3.0	58.9	47.2	69.8	17.0	11.3	1.9	0.0
Leic	2,640	138	5.2	64.8	55.8	80.6	14.0	3.9	1.6	6.5
Liv Ain	264	22	8.3	69.6	63.6	90.5	0.0	9.5	0.0	4.5
Liv Roy	1,207	32	2.7	54.3	43.8	86.7	3.3	3.3	6.7	6.3
M RI	2,077	97	4.7	59.9	60.8	67.5	15.7	13.3	3.6	14.4
Middlbr	955	20	2.1	64.0	65.0	100.0	0.0	0.0	0.0	0.0
Newc	1,226	58	4.7	57.2	65.5	87.7	5.3	3.5	3.5	1.7
Norwch	784	45	5.7	72.6	71.1	97.7	2.3	0.0	0.0	2.2
Nottm	1,220	103	8.4	57.5	69.9	77.5	14.7	6.9	1.0	1.0
Oxford	2,003	66	3.3	65.6	51.5					34.8
Plymth	548	34	6.2	64.5	67.6	100.0	0.0	0.0	0.0	0.0
Ports	1,941	90	4.6	66.8	62.2	92.8	5.8	0.0	1.4	23.3
Prestn	1,379	55	4.0	65.1	56.4	78.2	21.8	0.0	0.0	0.0
Redng	877	50	5.7	59.4	62.0	75.6	13.3	4.4	6.7	10.0
Salford	1,215	84	6.9	61.8	58.3	82.1	14.3	1.2	2.4	0.0
Sheff	1,496	82	5.5	63.0	63.4	97.5	2.5	0.0	0.0	2.4
Shrew	442	51	11.5	68.5	56.9	91.3	6.5	0.0	2.2	9.8
Stevng	1,014	36	3.6	60.8	52.8	68.8	15.6	9.4	6.3	11.1
Stoke	845	107	12.7	64.3	56.1	87.4	6.3	4.2	2.1	11.2
Sund	547	37	6.8	57.8	51.4	94.6	5.4	0.0	0.0	0.0
Truro	461	22	4.8	57.1	59.1	100.0	0.0	0.0	0.0	0.0
Wirral	412	20	4.9	61.5	50.0	100.0	0.0	0.0	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
Wolve	691	64	9.3	58.1	50.0	67.2	12.5	15.6	4.7	0.0
York	581	27	4.6	62.7	63.0	96.3	3.7	0.0	0.0	0.0
N IRELAND										
Antrim	296	18	6.1	75.7	72.2					38.9
Belfast	911	27	3.0	71.4	70.4					40.7
Newry	281	13	4.6	78.1	76.9	100.0	0.0	0.0	0.0	7.7
Ulster	203	3	1.5	76.8	66.7	100.0	0.0	0.0	0.0	0.0
West NI	339	6	1.8	74.4	66.7	100.0	0.0	0.0	0.0	0.0
SCOTLAND										
Abrdn	578	20	3.5	63.2	75.0					100.0
Airdrie	504	29	5.8	65.7	55.2					62.1
D&Gall	154	8	5.2	58.3	50.0					75.0
Dundee	411	16	3.9	66.6	81.3					100.0
Edinb	926	33	3.6	60.4	66.7					97.0
Glasgw	1,865	38	2.0	57.3	63.2					84.2
Inverns	278	11	4.0	65.5	54.5					90.9
Klmarnk	365	33	9.0	67.2	39.4					84.8
Krkldy	295	7	2.4	50.2	85.7					100.0
WALES										
Bangor	217	13	6.0	70.0	84.6					30.8
Cardff	1,700	58	3.4	62.7	51.7	94.5	3.6	1.8	0.0	5.2
Clwyd	204	11	5.4	66.2	81.8	100.0	0.0	0.0	0.0	18.2
Swanse	853	49	5.7	67.4	69.4	95.9	4.1	0.0	0.0	0.0
Wrexm	300	16	5.3	63.9	68.8	93.3	0.0	6.7	0.0	6.3
TOTALS										
England	58,817	3,494	5.9	63.1	59.8	69.8	16.8	9.7	3.7	5.8
N Ireland	2,030	67	3.3	75.0	71.6	100.0	0.0	0.0	0.0	28.4
Scotland	5,376	195	3.6	62.4	61.0					86.7
Wales	3,274	147	4.5	65.7	64.6	95.6	2.9	1.5	0.0	6.8
UK	69,497	3,903	5.6	63.3	60.3	71.4	15.9	9.2	3.5	10.3

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 was unable to submit 2021 patient level data, but provided aggregate numbers of patients on KRT at the end of 2021, by treatment modality

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.

PD

Table 6.4 Primary renal diseases (PRDs) of adult patients prevalent to PD on 31/12/2021

PRD	N on PD	% PD population	Age <65 yrs		Age ≥65 yrs		M/F ratio
			N	%	N	%	
Diabetes	867	24.6	458	24.0	409	25.3	1.8
Glomerulonephritis	580	16.5	388	20.3	192	11.9	1.6
Hypertension	262	7.4	134	7.0	128	7.9	2.0
Polycystic kidney disease	297	8.4	198	10.4	99	6.1	1.0
Pyelonephritis	215	6.1	103	5.4	112	6.9	1.9
Renal vascular disease	148	4.2	28	1.5	120	7.4	2.7
Other	546	15.5	325	17.0	221	13.7	1.0
Uncertain aetiology	609	17.3	274	14.4	335	20.7	1.4
Total (with data)	3,524	100.0	1,908	100.0	1,616	100.0	
Missing	306	8.0	151	7.3	155	8.8	1.7

Biochemistry parameters in prevalent adult PD 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. 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 31/12/2021 by centre

Centre	Adjusted calcium				Bicarbonate				
	Median (mmol/L)	% 2.2–2.5 mmol/L	% >2.5 mmol/L	% data completeness	Median (mmol/L)	% <22 mmol/L	% 22–30 mmol/L	% >30 mmol/L	% data completeness
ENGLAND									
Bham	2.4	78.3	18.9	99.2					58.6
Bradfd	2.5	74.1	25.9	100.0	27	7.4	81.5	11.1	100.0
Brightn	2.4	81.0	12.7	100.0	24	20.6	77.8	1.6	100.0
Bristol	2.4	76.7	21.7	100.0	23	28.3	70.0	1.7	100.0
Camb	2.4	80.0	16.0	100.0	26	12.0	88.0	0.0	100.0
Carlis	2.3	81.5	3.7	100.0	22	48.2	51.9	0.0	100.0
Carsh	2.3	78.5	4.7	95.5					0.0
Colchr									
Covnt	2.3	88.2	10.3	98.6	25	22.1	76.5	1.5	98.6
Derby	2.4	81.3	17.2	100.0	23	26.6	73.4	0.0	100.0
Donc	2.4	90.9	9.1	100.0	24	27.3	72.7	0.0	100.0
Dorset	2.3	72.2	16.7	90.0	22	50.0	45.0	5.0	100.0
Dudley	2.5	69.4	30.6	100.0	23	25.0	75.0	0.0	100.0
EssexMS	2.4	84.0	6.7	93.8	27	5.3	82.7	12.0	93.8
Exeter									
Glouc	2.3	81.8	6.1	100.0	22	42.4	57.6	0.0	100.0
Hull	2.4	78.3	13.0	100.0	27	4.4	89.1	6.5	100.0
Ipswi	2.3	80.0	13.3	96.8	25	14.3	85.7	0.0	90.3
Kent	2.5	67.3	25.5	94.8	23	23.2	73.2	3.6	96.6
L Barts	2.3	81.0	4.6	87.1	23	29.4	70.1	0.5	86.6
L Guys	2.4	75.8	19.4	100.0	24	14.5	83.9	1.6	100.0
L Kings	2.3	78.4	11.4	98.9	23	34.1	62.5	3.4	98.9
L Rfree	2.4	81.8	13.6	98.1	24	22.0	76.7	1.3	95.5
L St.G	2.5	70.7	29.3	89.1	25	25.7	74.3	0.0	76.1

Table 6.5 Continued

Centre	Adjusted calcium				Bicarbonate				
	Median (mmol/L)	% 2.2- 2.5 mmol/L	% >2.5 mmol/L	% data completeness	Median (mmol/L)	% <22 mmol/L	% 22-30 mmol/L	% >30 mmol/L	% data completeness
L West				33.5					29.9
Leeds	2.4	91.8	4.1	100.0	28	4.1	77.6	18.4	100.0
Leic	2.4	82.9	13.5	97.4	24	13.5	86.5	0.0	97.4
Liv Ain	2.5	68.4	26.3	100.0	26	10.5	84.2	5.3	100.0
Liv Roy	2.5	88.5	11.5	96.3	25	15.4	80.8	3.9	96.3
M RI	2.4	72.8	24.7	100.0	24	22.2	77.8	0.0	100.0
Middlbr	2.4	68.8	12.5	94.1	27	6.3	75.0	18.8	94.1
Newc	2.4	79.6	18.2	93.6	24	25.0	70.5	4.6	93.6
Norwch	2.4	82.5	15.0	97.6	23	36.6	63.4	0.0	100.0
Nottm	2.3	79.5	5.1	100.0					29.5
Oxford	2.4	72.9	12.5	81.4					61.0
Plymth	2.4	77.4	19.4	100.0	23	14.3	85.7	0.0	90.3
Ports	2.4	74.0	19.5	100.0	25	15.8	79.0	5.3	98.7
Prestn	2.3	76.6	4.3	100.0	25	18.2	77.3	4.6	93.6
Redng	2.4	75.6	19.5	100.0	24	14.6	82.9	2.4	100.0
Salford	2.4	78.2	15.4	100.0					0.0
Sheff	2.3	84.9	4.6	97.1	22	49.2	50.8	0.0	95.6
Shrew	2.4	86.4	9.1	100.0	21	54.6	45.5	0.0	100.0
Stoke	2.4	77.9	18.6	96.6	26	6.7	88.8	4.5	100.0
Sund	2.4	85.3	14.7	97.1					0.0
Truro	2.4	75.0	15.0	100.0	25	10.0	90.0	0.0	100.0
Wirral	2.4	85.7	0.0	100.0	22	28.6	64.3	7.1	100.0
Wolve	2.5	72.0	24.0	94.3	22	46.9	53.1	0.0	92.5
York	2.5	72.7	22.7	100.0	26	4.6	95.5	0.0	100.0
N IRELAND									
Antrim	2.4	62.5	25.0	100.0	26	6.3	93.8	0.0	100.0
Belfast	2.3	85.0	5.0	100.0	25	10.0	90.0	0.0	100.0
Newry	2.4	91.7	0.0	100.0	24	8.3	91.7	0.0	100.0
Ulster				100.0					100.0
West NI				100.0					100.0
WALES									
Bangor				100.0					100.0
Cardff	2.4	80.8	17.3	100.0	25	21.2	76.9	1.9	100.0
Clwyd				100.0					88.9
Swanse	2.4	88.9	8.9	100.0	25	22.2	71.1	6.7	100.0
Wrexm	2.4	93.3	6.7	100.0	28	6.7	80.0	13.3	100.0
TOTALS									
England	2.4	78.7	14.5	92.7	24	24.0	73.5	2.6	78.9
N Ireland	2.3	78.9	11.5	100.0	25	7.7	92.3	0.0	100.0
Wales	2.4	86.1	11.6	100.0	25	17.2	77.3	5.5	99.2
E, W & NI	2.4	79.0	14.3	93.1	24	23.3	74.1	2.7	80.1

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

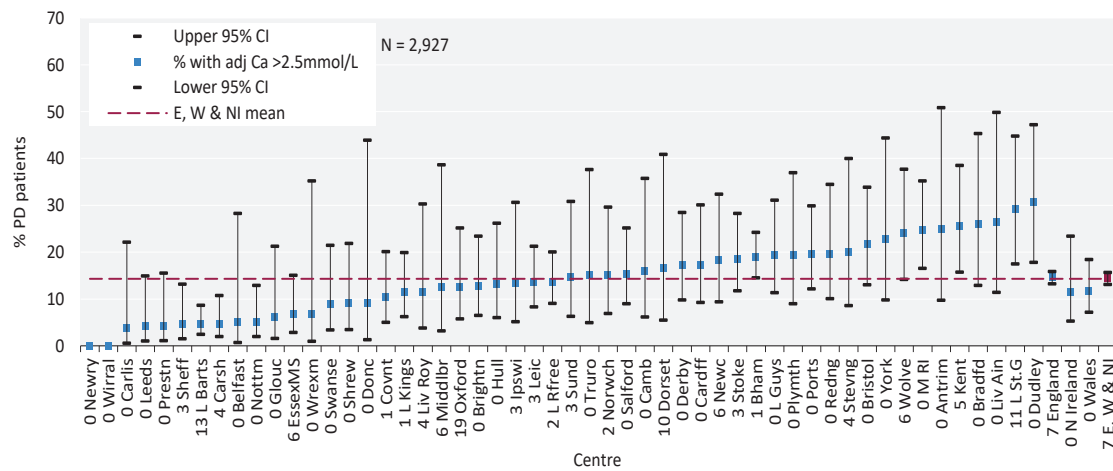


Figure 6.3 Percentage of adult patients prevalent to PD on 31/12/2021 with adjusted calcium (Ca) above the target range (>2.5 mmol/L) by centre
 CI – confidence interval

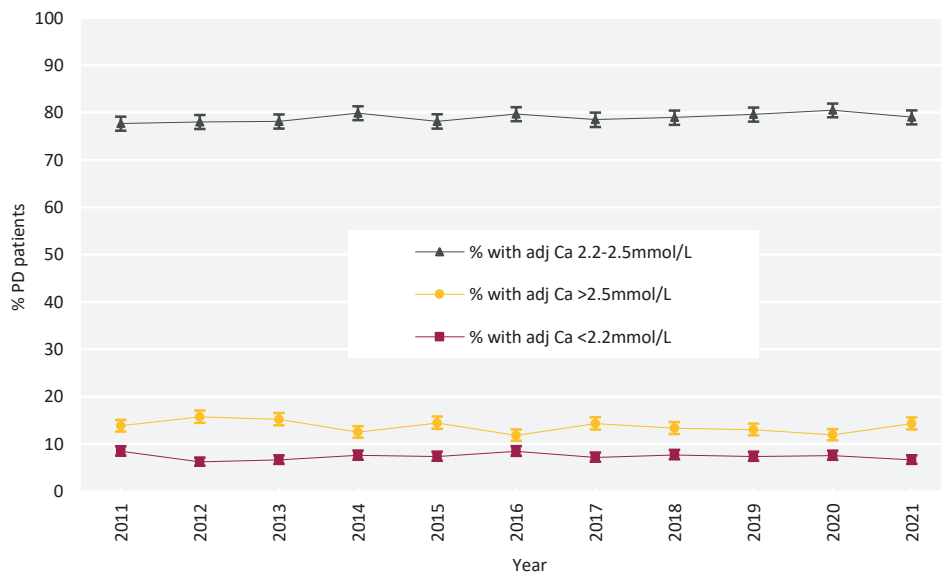


Figure 6.4 Change in percentage of prevalent adult PD patients within, above and below the target range for adjusted calcium (Ca 2.2–2.5 mmol/L) between 2011 and 2021

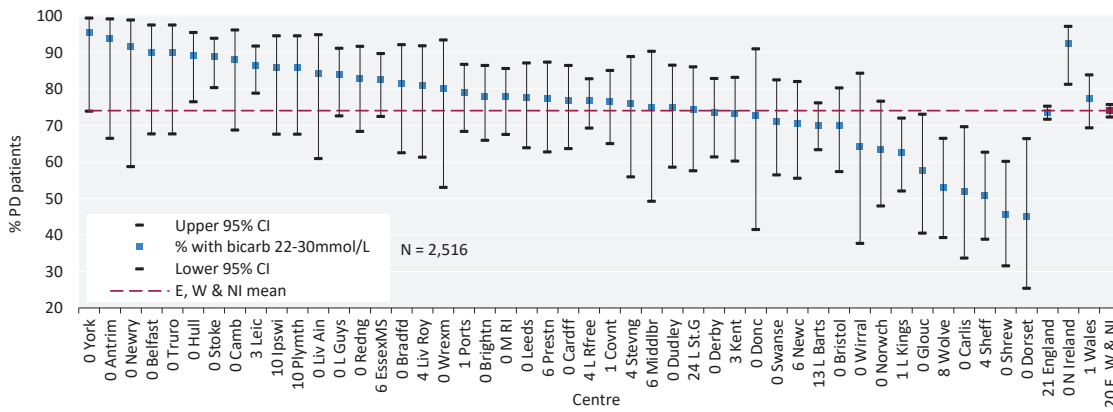


Figure 6.5 Percentage of adult patients prevalent to PD on 31/12/2021 with bicarbonate (bicarb) within the target range (22–30 mmol/L) by centre
CI – confidence interval

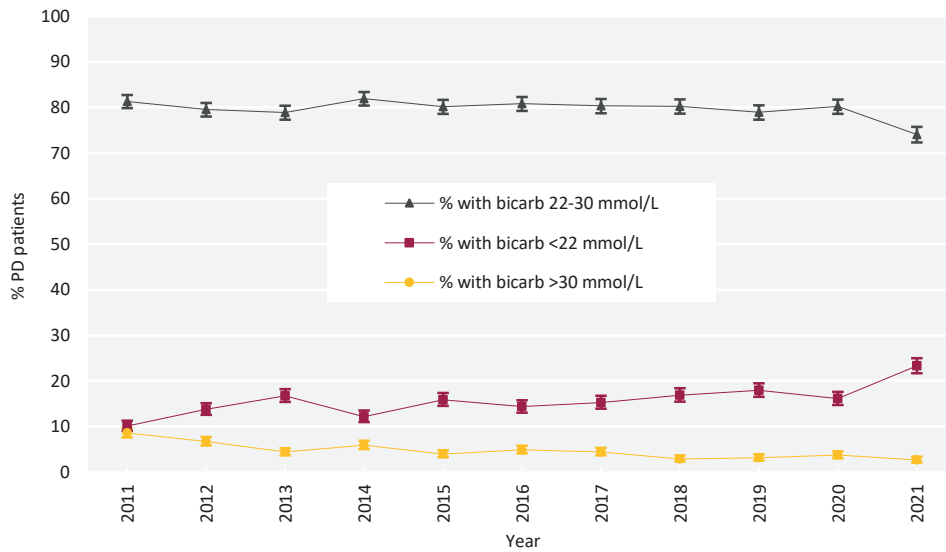


Figure 6.6 Percentage of prevalent adult PD patients within, above and below the target range for bicarbonate (bicarb) 22–30 mmol/L) between 2011 and 2021

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 31/12/2021 by centre

Centre	Haemoglobin				Ferritin		
	Median (g/L)	% <100 g/L	% >120 g/L	% data completeness	Median (µg/L)	% <100 µg/L	% data completeness
ENGLAND							
Bham	108	28.6	17.3	98.8	365	5.6	98.8
Bradfd	122	7.4	55.6	100.0	424	3.7	100.0
Brightn	116	6.3	31.7	100.0	372	1.6	100.0
Bristol	113	13.3	21.7	100.0	357	6.7	100.0
Camb	120	8.0	40.0	100.0	359	4.3	92.0
Carlis	110	18.5	14.8	100.0	266	16.7	88.9
Carsh	110	24.8	18.3	97.3	273	6.4	97.3
Colchr							
Covnt	113	20.3	29.0	100.0	284	11.9	97.1
Derby	115	21.9	34.4	100.0	472	1.6	100.0
Donc	117	9.1	36.4	100.0	394	10.0	90.9
Dorset	108	25.0	10.0	100.0	281	5.0	100.0
Dudley	115	11.8	29.4	94.4			8.3
EssexMS	113	12.8	23.1	97.5	315	13.5	92.5
Exeter							
Glouc	109	36.4	18.2	100.0	205	7.4	81.8
Hull	115	6.5	32.6	100.0	444	8.9	97.8
Ipswi	109	16.7	26.7	96.8	288	17.2	93.6
Kent	115	21.8	29.1	94.8	351	5.6	93.1
L Barts	110	24.5	25.0	85.7	282	13.5	79.5
L Guys	104	37.1	9.7	100.0	281	8.3	96.8
L Kings	113	21.8	29.9	97.8	255	14.1	95.5
L Rfree	110	27.1	22.6	98.7	582	7.7	98.7
L St.G	105	39.0	14.6	89.1	359	9.8	89.1
L West				35.1			28.4
Leeds	109	24.5	16.3	100.0	389	8.2	100.0
Leic	114	13.4	30.4	98.3	272	10.8	97.4
Liv Ain				36.8	536	5.6	94.7
Liv Roy	112	10.5	10.5	70.4	379	11.5	96.3
M RI	111	29.6	23.5	100.0	325	6.2	100.0
Middlbr	119	12.5	50.0	94.1	224	0.0	88.2
Newc	111	31.1	17.8	95.7	432	13.3	95.7
Norwch	114	26.8	29.3	100.0	287	7.3	100.0
Nottm	110	23.1	19.2	100.0	403	5.1	100.0
Oxford	110	21.6	23.5	86.4	378	3.5	96.6
Plymth	115	12.9	35.5	100.0	339	9.7	100.0
Ports	116	13.0	26.0	100.0	377	6.5	100.0
Prestn	112	29.8	19.1	100.0	619	4.3	97.9
Redng	110	12.2	36.6	100.0	378	9.8	100.0
Salford	111	19.2	19.2	100.0	497	6.4	100.0
Sheff	110	24.2	24.2	97.1	548	3.1	94.1
Shrew	112	27.3	25.0	100.0	272	7.0	97.7
Stevng	107	40.0	8.0	96.2	202	16.7	92.3
Stoke	111	15.7	23.6	100.0	346	8.0	97.8
Sund	113	17.6	38.2	97.1	314	12.5	91.4
Truro	112	25.0	25.0	100.0	184	17.6	85.0
Wirral	107	40.0	20.0	71.4	361	0.0	100.0
Wolve	106	28.0	18.0	94.3	160	27.1	90.6
York	110	13.6	27.3	100.0	233	9.1	100.0
N IRELAND							
Antrim	113	12.5	31.3	100.0	592	0.0	100.0
Belfast	119	5.0	35.0	100.0	480	10.0	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
Newry	109	25.0	25.0	100.0	409	16.7	100.0
Ulster				100.0			100.0
West NI				100.0			100.0
WALES							
Bangor				100.0			100.0
Cardff	113	23.1	30.8	100.0	180	21.6	98.1
Clwyd				100.0			100.0
Swanse	107	17.8	35.6	100.0	261	15.6	100.0
Wrexm	116	0.0	26.7	100.0	373	6.7	100.0
TOTALS							
England	111	22.5	23.7	92.4	350	8.4	90.0
N Ireland	115	11.5	30.8	100.0	432	7.7	100.0
Wales	113	18.6	31.8	100.0	244	18.0	99.2
UK	111	22.1	24.2	92.8	346	8.8	90.6

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

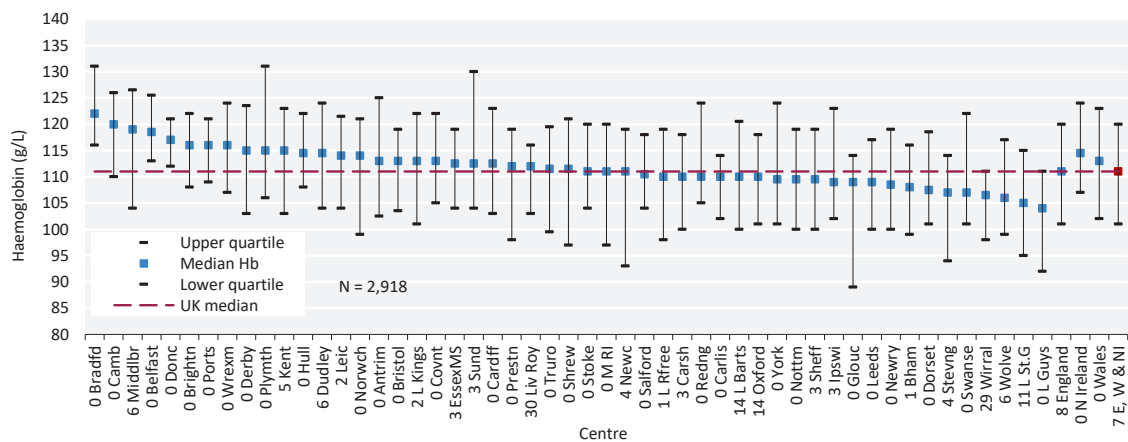


Figure 6.7 Median haemoglobin (Hb) in adult patients prevalent to PD on 31/12/2021 by centre

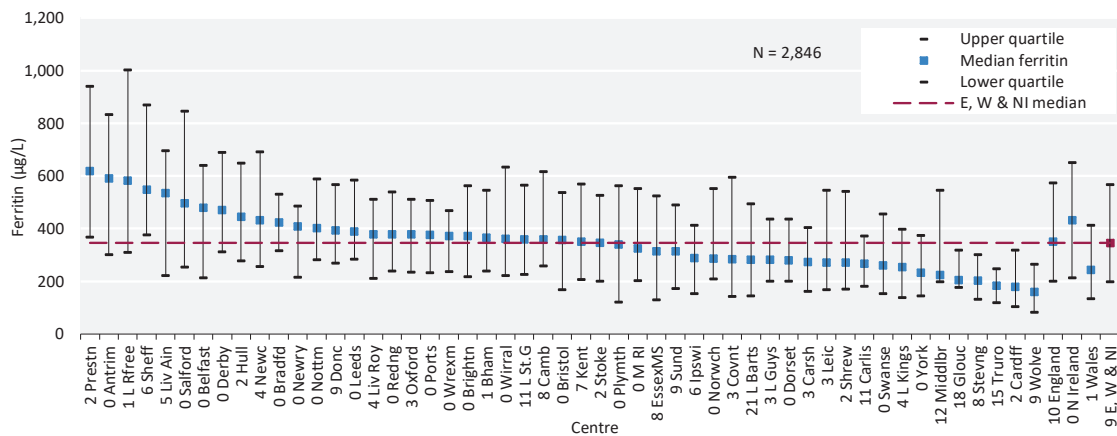


Figure 6.8 Median ferritin in adult patients prevalent to PD on 31/12/2021 by centre

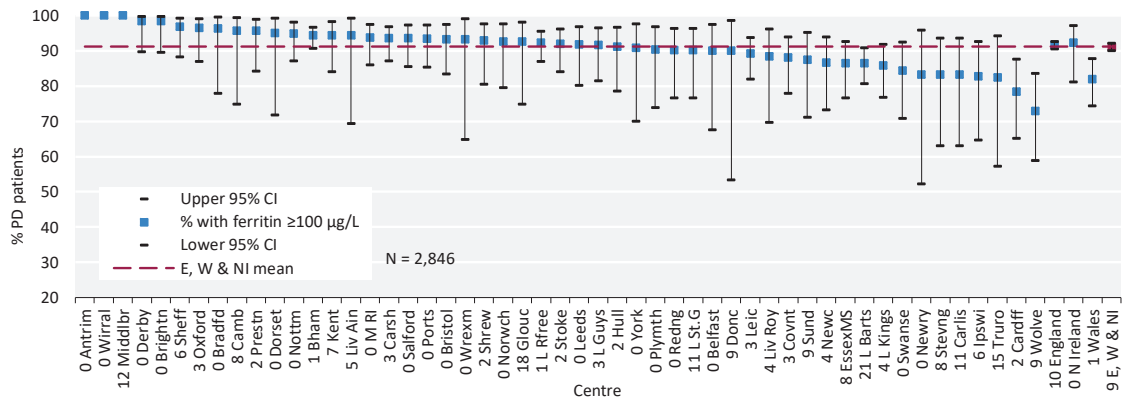


Figure 6.9 Percentage of adult patients prevalent to PD on 31/12/2021 with ferritin $\geq 100 \mu\text{g/L}$ by centre
CI – confidence interval

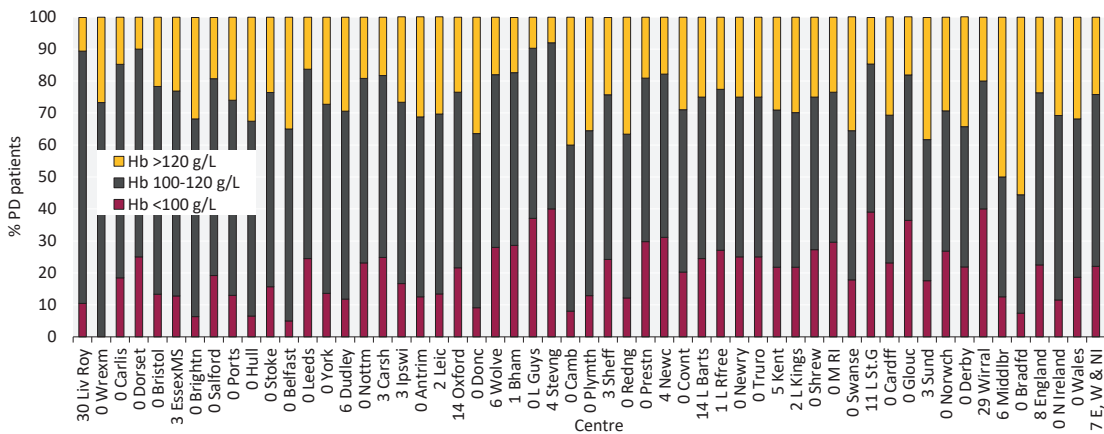


Figure 6.10 Distribution of haemoglobin (Hb) in adult patients prevalent to PD on 31/12/2021 by centre

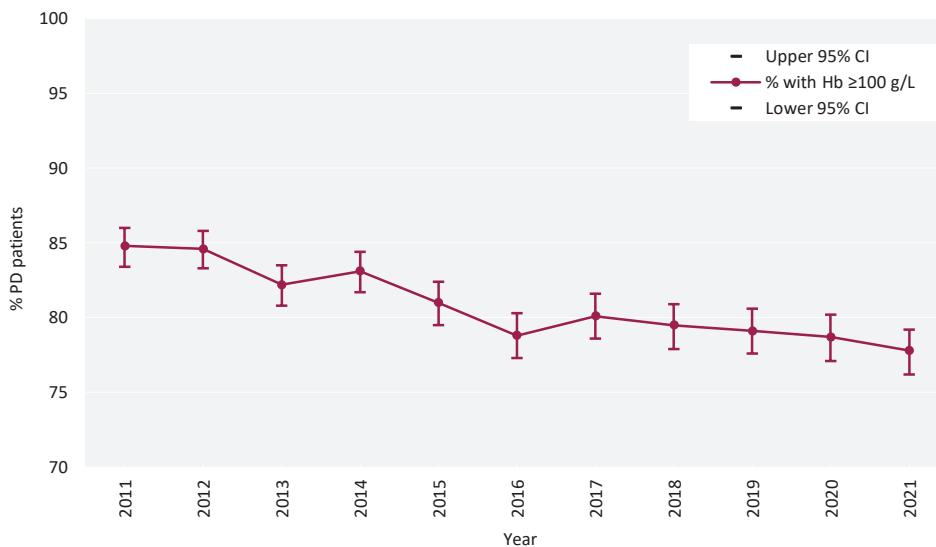


Figure 6.11 Percentage of prevalent adult PD patients with haemoglobin (Hb) $\geq 100 \text{ g/L}$ between 2011 and 2021
CI – confidence interval

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 2021 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 2021 by centre in England

Centre	PD patient years	Peritonitis rate per 1 PD patient year
Bham	283	0.35
Bradfd	32	0.48
Brightn	67	0.18
Bristol	81	0.66
Camb	28	0.44
Carlis	23	0.17
Carsh	129	0.50
Covnt	83	0.64
Derby	67	0.32
Donc	17	0.29
Dorset	27	1.92
Dudley	36	0.25
EssexMS	82	0.28
Exeter	75	0.43
Glouc	38	0.24
Hull	55	0.36
Ipswi	36	0.28
Kent	67	0.09
L Barts	259	0.34
L Guys	66	0.50
L Kings	105	0.35
L Rfree	187	0.29
L St.G	58	0.50
L West	214	0.38
Leeds	58	0.48
Leic	104	0.29
Liv Ain	24	0.21
Liv Roy	31	0.80
M RI	90	0.36
Middlbr	23	0.97
Newc	52	0.47
Norwch	56	0.52
Nottm	102	0.82
Oxford	72	0.43
Plymth	30	0.23
Ports	97	0.40
Prestn	42	0.60
Redng	55	0.60
Salford	98	0.43
Sheff	75	0.11
Shrew	59	0.58
Stevng	39	0.41
Stoke	79	0.57
Sund	41	0.34
Truro	23	0.30
Wirral	18	0.28
Wolve	57	0.59
York	25	0.36
TOTAL		
England	3,465	0.42

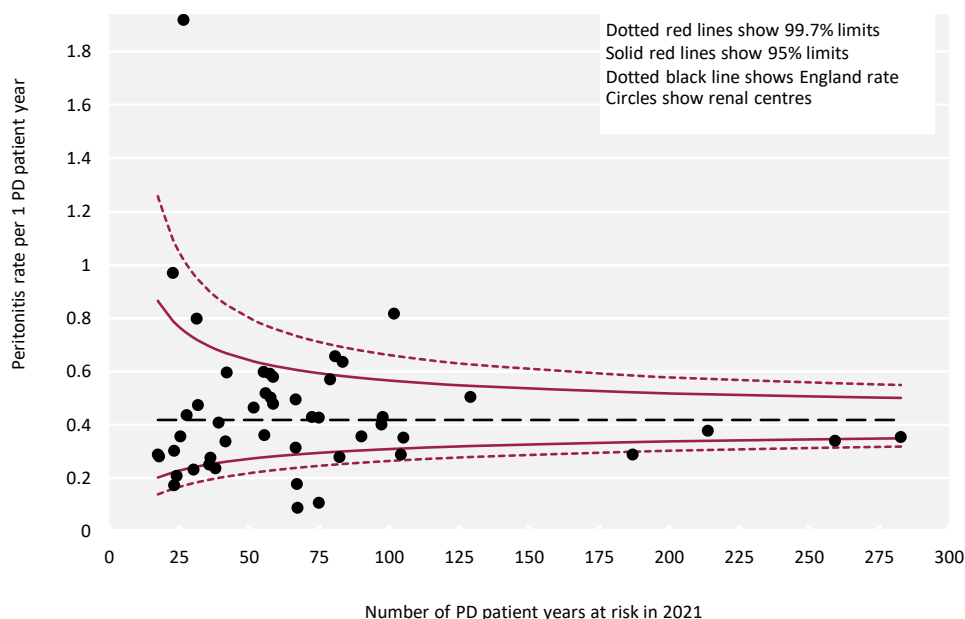


Figure 6.12 PD peritonitis rates in adult patients receiving PD in 2021 per 1 PD patient-year by centre in England
Please visit the UKRR data portal (ukkidney.org/audit-research/data-portals) to identify individual kidney centres

Cause of death in adult PD patients

Cause of death was analysed in prevalent patients receiving PD on 31/12/2020 and followed-up for one year in 2021. The proportion of PD patients with each cause of death is shown for patients with cause of death data and these total 100% of patients with data. The proportion of patients with no cause of death data is shown on a separate line. Further detail on the survival of prevalent KRT patients is in chapter 3.

Table 6.8 Cause of death in adult patients prevalent to PD on 31/12/2020 followed-up in 2021 by age group

Cause of death	PD all ages		PD < 65 years		PD ≥ 65 years	
	N	%	N	%	N	%
Cardiac disease	64	21.3	21	23.3	43	20.5
Cerebrovascular disease	11	3.7	2	2.2	9	4.3
Infection	91	30.3	36	40.0	55	26.2
Malignancy	10	3.3	1	1.1	9	4.3
Treatment withdrawal	25	8.3	2	2.2	23	11.0
Other	72	24.0	19	21.1	53	25.2
Uncertain aetiology	27	9.0	9	10.0	18	8.6
Total (with data)	300	100.0	90	100.0	210	100.0
Missing	176	37.0	44	32.8	132	38.6

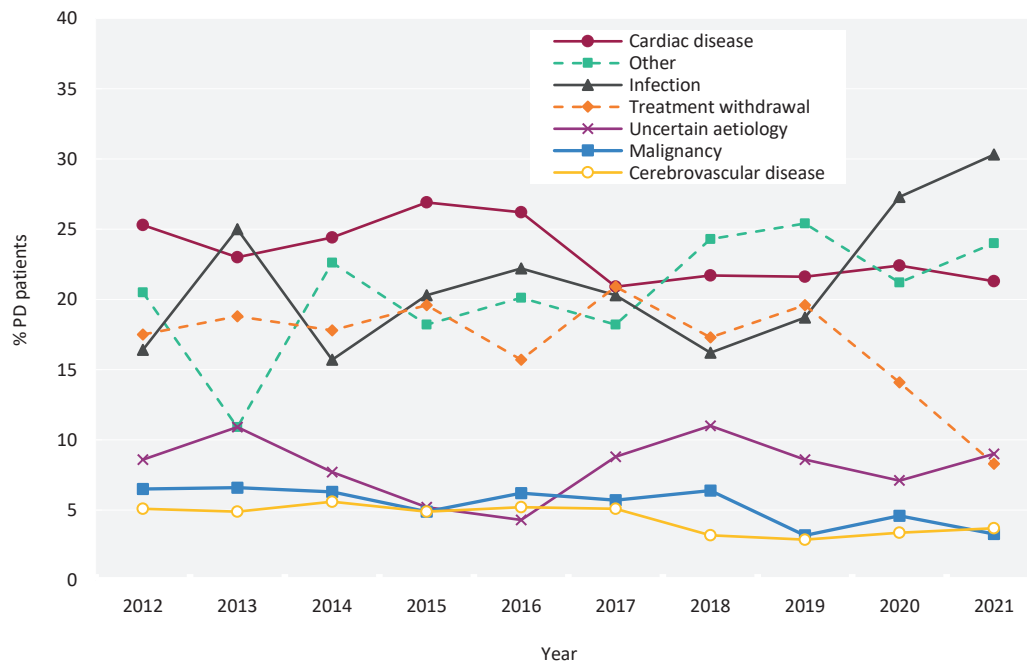


Figure 6.13 Cause of death between 2012 and 2021 for adult patients prevalent to PD at the beginning of the year

Chapter 7

Adults on home haemodialysis (HHD) in the UK at the end of 2021

Contents

Introduction	151
Rationale for analyses	152
Key findings	153
Analyses	154
Changes to the prevalent adult HHD population	154
Demographics of prevalent adult HHD patients	157
Biochemistry parameters in prevalent adult HHD patients	159
Anaemia in prevalent adult HHD patients	164
Cause of death in adult HHD patients	168

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 2021 (figure 7.1). This population comprises patients who were on HHD at the end of 2020 and remained on HHD throughout 2021, as well as patients who commenced/re-commenced HHD in 2021. This latter group includes both incident kidney replacement therapy (KRT) patients who ended 2021 on HHD and prevalent KRT patients who switched to HHD from in-centre haemodialysis (ICHD), peritoneal dialysis (PD), or a transplant (Tx) in 2021. 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.

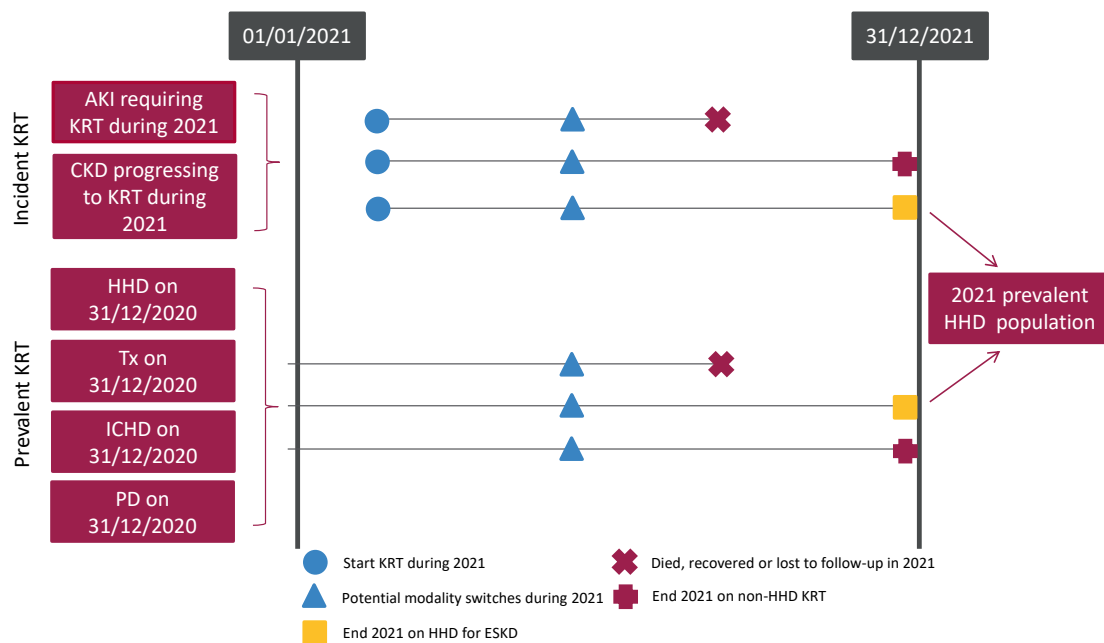


Figure 7.1 Pathways adult patients could follow to be included in the UK 2021 prevalent HHD population

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 2021 or if they had been on KRT for ≥ 90 days and were on HHD at the end of 2021
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 UKRR data portal (ukkidney.org/audit-research/data-portals).

Rationale for analyses

The analyses begin with a description of the 2021 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, where data permit, their attainment by UK kidney centres in 2021 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 Kidney Association 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	
Planning, initiating and withdrawing KRT (2014)	Number of patients withdrawing from HHD as a proportion of all deaths on HHD	Table 7.9, figure 7.10

ESA – erythropoiesis stimulating agent

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

Exeter was unable to submit patient level data for 2021. Aggregate numbers by modality were provided, enabling inclusion in Tables 7.2 and 7.3. Exeter is excluded from all other analyses.

Key findings

- 1,396 adult patients were receiving HHD for ESKD in the UK on 31/12/2021, which represented 2.0% of the KRT population.
- The median age of HHD patients was 56.0 years and 62.8% were male.
- The median adjusted calcium for HHD patients was 2.4 mmol/L and 14.6% were above the target range 2.2–2.5 mmol/L.
- The median pre-dialysis bicarbonate for HHD patients was 23 mmol/L and 77.3% were within the target range 18–26 mmol/L.
- The median pre-dialysis potassium for HHD patients was 4.9 mmol/L and 78.6% were within the target range 4.0–6.0 mmol/L.
- The median ferritin for HHD patients was 344 µg/L and 28.8% had a ferritin <200 µg/L.
- The median haemoglobin for HHD patients was 109 g/L and 24.6% had a haemoglobin <100 g/L.
- There was no cause of death data available for 38.3% of deaths. For those with data, the leading cause of death in patients less than 65 years and those older than 65 years was cardiac disease at 35.6% and 29.4% respectively.

Analyses

Changes to the prevalent adult HHD population

For the 68 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

Centre	N on HHD					% on HHD					Estimated catchment population (millions)	2021 crude rate (pmp)
	2017	2018	2019	2020	2021	2017	2018	2019	2020	2021		
ENGLAND												
Bham	75	68	76	76	69	2.4	2.1	2.3	2.3	2.1	2.05	34
Bradfd	9	9	6	6	7	1.3	1.3	0.8	0.8	1.0	0.49	14
Brightn	41	39	32	31	30	4.1	3.7	3.0	2.9	2.7	1.08	28
Bristol	17	15	16	17	18	1.2	1.0	1.1	1.2	1.2	1.22	15
Camb	26	32	32	26	24	1.9	2.3	2.2	1.7	1.5	0.94	26
Carlis	0	0	0	2	3	0.0	0.0	0.0	0.7	1.0	0.26	12
Carsh	27	29	35	28	28	1.6	1.7	2.0	1.5	1.5	1.63	17
Colchr	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.29	0
Covnt	14	22	20	20	22	1.4	2.3	1.9	1.8	2.0	0.80	28
Derby	52	53	58	63	55	9.4	9.0	8.9	9.3	8.0	0.56	98
Donc	9	9	5	5	5	2.7	2.7	1.5	1.5	1.5	0.38	13
Dorset	10	13	15	16	14	1.4	1.7	1.9	2.0	1.8	0.73	19
Dudley	13	12	12	9	10	3.6	3.3	3.3	2.4	2.5	0.34	29
EssexMS	15	17	24	29	21	1.8	2.0	2.8	3.3	2.3	0.99	21
Exeter	13	19	21	19	16	1.2	1.8	1.9	1.7	1.5	0.95	17
Glouc	5	0	0	0	0	1.0	0.0	0.0	0.0	0.0	0.51	0
Hull	6	5	7	7	12	0.7	0.6	0.8	0.8	1.3	0.80	15
Ipswi	8	5	4	3	2	1.8	1.2	0.9	0.7	0.5	0.31	6
Kent	21	18	20	18	18	1.9	1.6	1.8	1.6	1.5	1.07	17
L Barts	31	36	20	25	25	1.2	1.4	0.8	0.9	0.9	1.59	16
L Guys	42	38	45	48	41	1.9	1.7	1.9	2.1	1.8	1.01	41
L Kings	20	17	17	22	34	1.7	1.4	1.4	1.8	2.5	0.93	36
L Rfree	17	12	11	10	10	0.8	0.5	0.5	0.4	0.4	1.33	8
L St.G	5	6	6	6	5	0.6	0.7	0.7	0.7	0.6	0.67	8
L West	12	20	29	35	36	0.3	0.6	0.8	1.0	1.0	1.96	18
Leeds	23	23	26	22	16	1.4	1.4	1.5	1.3	0.9	1.37	12
Leic	72	64	54	50	48	3.1	2.6	2.1	1.9	1.8	2.09	23
Liv Ain	14	18	15	13	13	6.7	8.3	6.6	5.4	4.9	0.43	30
Liv Roy	39	39	39	47	44	3.1	3.1	3.1	3.9	3.6	0.81	54
M RI	77	74	75	71	84	3.8	3.6	3.7	3.6	4.0	1.33	63
Middlbr	12	13	19	18	17	1.3	1.4	2.0	1.9	1.8	0.81	21
Newc	21	22	19	15	18	1.9	1.9	1.6	1.3	1.5	0.95	19
Norwch	14	13	14	13	10	1.8	1.6	1.7	1.6	1.3	0.69	14
Nottm	34	34	31	32	28	2.9	2.8	2.5	2.6	2.3	0.93	30
Oxford	16	21	25	17	19	0.9	1.1	1.3	0.8	0.9	1.45	13
Plymth	10	10	7	0	0	1.8	1.9	1.3	0.0	0.0	0.40	0
Ports	65	70	70	83	85	3.7	4.0	3.7	4.4	4.4	1.75	49
Prestn	49	43	49	47	42	3.9	3.3	3.7	3.4	3.0	1.23	34
Redng	6	9	8	8	9	0.8	1.1	0.9	0.9	1.0	0.70	13
Salford	41	35	41	40	31	3.7	3.0	3.3	3.2	2.6	1.15	27
Sheff	50	49	55	61	56	3.5	3.3	3.7	4.1	3.7	1.13	49

Table 7.2 Continued

Centre	N on HHD					% on HHD					Estimated catchment population (millions)	2021 crude rate (pmp)
	2017	2018	2019	2020	2021	2017	2018	2019	2020	2021		
Shrew	22	20	27	36	37	5.7	4.7	6.2	8.4	8.4	0.41	90
Stevng	30	43	36	31	39	3.4	4.6	3.7	3.2	3.8	1.11	35
Stoke	29	25	31	39	41	3.6	3.1	3.8	4.8	4.9	0.73	56
Sund	21	22	12	9	10	3.9	3.9	2.1	1.6	1.8	0.55	18
Truro	9	3	4	4	5	2.1	0.7	0.9	0.9	1.1	0.36	14
Wirral	9	8	8	7	6	2.3	2.0	1.9	1.7	1.5	0.47	13
Wolve	33	34	33	31	38	5.7	5.6	5.4	4.7	5.5	0.55	69
York	13	17	16	18	17	2.3	3.0	2.7	3.1	2.9	0.49	35
N IRELAND												
Antrim	4	4	4	4	2	1.6	1.5	1.4	1.4	0.7	0.25	8
Belfast	8	10	13	10	8	0.9	1.1	1.5	1.1	0.9	0.53	15
Newry	3	2	2	4	3	1.2	0.8	0.8	1.5	1.1	0.24	13
Ulster	1	0	0	0	0	0.5	0.0	0.0	0.0	0.0	0.20	0
West NI	3	2	1	3	3	1.0	0.6	0.3	0.9	0.9	0.25	12
SCOTLAND												
Abrdn	4	4	3	2	2	0.7	0.7	0.5	0.4	0.3	0.50	4
Airdrie	2	0	0	0	0	0.4	0.0	0.0	0.0	0.0	0.46	0
D&Gall	2	1	2	1	1	1.5	0.7	1.3	0.6	0.6	0.12	8
Dundee	2	8	7	6	6	0.5	1.8	1.6	1.4	1.5	0.37	16
Edinb	4	3	2	3	7	0.5	0.3	0.2	0.3	0.8	0.84	8
Glasgw	15	18	18	11	10	0.8	1.0	1.0	0.6	0.5	1.37	7
Inverns	5	7	7	3	2	1.9	2.5	2.5	1.1	0.7	0.22	9
Klmarnk	10	13	14	14	16	3.0	3.8	3.9	3.8	4.4	0.29	55
Krkldy	0	0	2	3	3	0.0	0.0	0.7	1.0	1.0	0.27	11
WALES												
Bangor	11	13	15	13	21	5.6	6.4	7.5	6.0	9.7	0.16	128
Cardff	38	34	33	34	51	2.3	2.0	1.9	2.0	3.0	1.16	44
Clwyd	2	2	2	0	0	1.1	1.1	1.0	0.0	0.0	0.18	0
Swanse	34	36	45	44	40	4.3	4.4	5.2	5.2	4.7	0.76	53
Wrexm	5	6	7	7	3	1.5	1.9	2.3	2.2	1.0	0.21	14
TOTALS												
England	1,197	1,203	1,225	1,233	1,218	2.2	2.1	2.1	2.1	2.1	44.77	27
N Ireland	19	18	20	21	16	1.0	0.9	1.0	1.1	0.8	1.47	11
Scotland	44	54	55	43	47	0.9	1.0	1.0	0.8	0.9	4.45	11
Wales	90	91	102	98	115	2.8	2.8	3.1	3.0	3.5	2.49	46
UK	1,350	1,366	1,402	1,395	1,396	2.1	2.1	2.1	2.0	2.0	53.19	26

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

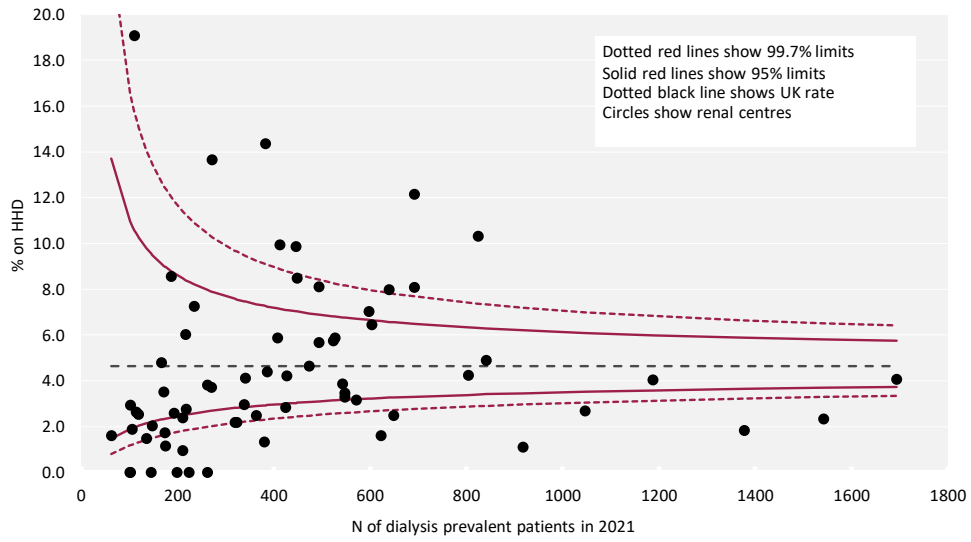


Figure 7.2 Percentage of adult patients prevalent to dialysis on 31/12/2021 who were on HHD by centre

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 31/12/2021 by centre

Centre	N on KRT	N on HHD	% on HHD	Median age (yrs)	% male	Ethnicity				
						% White	% Asian	% Black	% Other	% missing
ENGLAND										
Bham	3,309	69	2.1	55.0	73.9	64.7	19.1	10.3	5.9	1.4
Bradfd	735	7	1.0	57.1	57.1	100.0	0.0	0.0	0.0	0.0
Brightn	1,092	30	2.7	58.6	66.7	96.6	3.4	0.0	0.0	3.3
Bristol	1,497	18	1.2	59.8	38.9	100.0	0.0	0.0	0.0	0.0
Camb	1,629	24	1.5	56.8	79.2	91.7	0.0	8.3	0.0	0.0
Carlis	305	3	1.0	52.2	66.7	100.0	0.0	0.0	0.0	0.0
Carsh	1,907	28	1.5	59.1	67.9	82.1	7.1	10.7	0.0	0.0
Colchr	145	0	0.0							
Covnt	1,119	22	2.0	54.3	72.7	81.8	13.6	4.5	0.0	0.0
Derby	689	55	8.0	63.1	70.9	83.6	14.5	1.8	0.0	0.0
Donc	339	5	1.5	54.3	60.0	100.0	0.0	0.0	0.0	0.0
Dorset	786	14	1.8	65.2	78.6	100.0	0.0	0.0	0.0	0.0
Dudley	398	10	2.5	55.2	70.0	100.0	0.0	0.0	0.0	0.0
EssexMS	895	21	2.3	58.4	47.6	89.5	10.5	0.0	0.0	9.5
Exeter	1,077	16	1.5							
Glouc	546	0	0.0							
Hull	919	12	1.3	45.0	66.7	91.7	0.0	0.0	8.3	0.0
Ipswi	421	2	0.5	56.5	0.0	100.0	0.0	0.0	0.0	0.0
Kent	1,192	18	1.5	55.9	55.6	94.4	0.0	0.0	5.6	0.0
L Barts	2,750	25	0.9	56.2	48.0	48.0	12.0	36.0	4.0	0.0
L Guys	2,322	41	1.8	49.5	53.7	53.7	9.8	36.6	0.0	0.0
L Kings	1,334	34	2.5	54.9	67.6	50.0	2.9	44.1	2.9	0.0
L Rfree	2,380	10	0.4	52.2	80.0	50.0	10.0	40.0	0.0	0.0
L St.G	866	5	0.6	47.4	60.0	80.0	0.0	20.0	0.0	0.0
L West	3,556	36	1.0	55.3	50.0	38.9	16.7	38.9	5.6	0.0
Leeds	1,784	16	0.9	49.2	68.8	100.0	0.0	0.0	0.0	0.0
Leic	2,640	48	1.8	57.4	72.9	84.4	11.1	4.4	0.0	6.3
Liv Ain	264	13	4.9	56.7	69.2	100.0	0.0	0.0	0.0	0.0
Liv Roy	1,207	44	3.6	51.2	47.7	90.7	0.0	2.3	7.0	2.3
M RI	2,077	84	4.0	52.5	65.5	62.8	7.7	26.9	2.6	7.1
Middlbr	955	17	1.8	53.7	47.1	88.2	0.0	0.0	11.8	0.0
Newc	1,226	18	1.5	61.2	66.7	94.4	5.6	0.0	0.0	0.0
Norwch	784	10	1.3	62.5	50.0	100.0	0.0	0.0	0.0	0.0
Nottm	1,220	28	2.3	55.7	32.1	82.1	3.6	10.7	3.6	0.0
Oxford	2,003	19	0.9	62.5	47.4	88.9	0.0	11.1	0.0	5.3
Plymth	548	0	0.0							
Ports	1,941	85	4.4	58.9	65.9	93.5	3.9	1.3	1.3	9.4
Prestn	1,379	42	3.0	55.3	54.8	90.5	7.1	2.4	0.0	0.0
Redng	877	9	1.0	54.7	55.6	50.0	0.0	37.5	12.5	11.1
Salford	1,215	31	2.6	53.7	64.5	90.3	0.0	9.7	0.0	0.0
Sheff	1,496	56	3.7	56.0	51.8	87.5	5.4	3.6	3.6	0.0
Shrew	442	37	8.4	62.1	70.3	94.6	0.0	2.7	2.7	0.0
Stevng	1,014	39	3.8	57.5	64.1	79.5	7.7	10.3	2.6	0.0
Stoke	845	41	4.9	55.7	70.7	92.5	0.0	5.0	2.5	2.4
Sund	547	10	1.8	59.1	70.0	100.0	0.0	0.0	0.0	10.0
Truro	461	5	1.1	56.3	40.0	100.0	0.0	0.0	0.0	0.0
Wirral	412	6	1.5	52.7	100.0	83.3	16.7	0.0	0.0	0.0
Wolve	691	38	5.5	52.4	78.9	86.8	10.5	2.6	0.0	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	581	17	2.9	55.2	82.4	100.0	0.0	0.0	0.0	0.0
N IRELAND										
Antrim	296	2	0.7	65.3	100.0	100.0	0.0	0.0	0.0	0.0
Belfast	911	8	0.9	55.2	75.0	100.0	0.0	0.0	0.0	0.0
Newry	281	3	1.1	67.8	100.0	100.0	0.0	0.0	0.0	0.0
Ulster	203	0	0.0							
West NI	339	3	0.9	53.5	33.3	100.0	0.0	0.0	0.0	0.0
SCOTLAND										
Abrdn	578	2	0.3	44.3	0.0					50.0
Airdrie	504	0	0.0							
D&Gall	154	1	0.6	56.3	0.0					100.0
Dundee	411	6	1.5	66.3	66.7					66.7
Edinb	926	7	0.8	36.6	57.1					57.1
Glasgw	1,865	10	0.5	54.2	80.0					60.0
Inverns	278	2	0.7	54.8	50.0					50.0
Klmarnk	365	16	4.4	63.0	56.3					81.3
Krkldy	295	3	1.0	78.5	66.7					100.0
WALES										
Bangor	217	21	9.7	49.0	76.2	100.0	0.0	0.0	0.0	9.5
Cardff	1,700	51	3.0	60.8	54.9	94.0	2.0	4.0	0.0	2.0
Clwyd	204	0	0.0							
Swanse	853	40	4.7	56.9	60.0	100.0	0.0	0.0	0.0	0.0
Wrexm	300	3	1.0	63.8	33.3	100.0	0.0	0.0	0.0	0.0
TOTALS										
England	58,817	1,218	2.1	55.6	63.1	81.5	6.3	10.1	2.1	2.2
N Ireland	2,030	16	0.8	58.6	75.0	100.0	0.0	0.0	0.0	0.0
Scotland	5,376	47	0.9	60.0	59.6					70.2
Wales	3,274	115	3.5	57.6	60.0	97.3	0.9	1.8	0.0	2.6
UK	69,497	1,396	2.0	56.0	62.8	83.2	5.8	9.2	1.9	4.5

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

Breakdown by ethnicity is not shown for centres with <70% data completeness, but these centres were included in national averages
Exeter was unable to submit patient level data but provided aggregate numbers of patients on KRT at the end of 2021 by treatment modality

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 31/12/2021

PRD	N on HHD	% HHD population	Age <65 yrs		Age ≥65 yrs		M/F ratio
			N	%	N	%	
Diabetes	186	14.1	124	12.4	62	19.0	1.6
Glomerulonephritis	344	26.0	293	29.4	51	15.6	2.1
Hypertension	73	5.5	52	5.2	21	6.4	3.1
Polycystic kidney disease	149	11.3	110	11.0	39	12.0	1.6
Pyelonephritis	135	10.2	101	10.1	34	10.4	1.3
Renal vascular disease	22	1.7	8	0.8	14	4.3	2.1
Other	266	20.1	207	20.8	59	18.1	1.4
Uncertain aetiology	148	11.2	102	10.2	46	14.1	1.6
Total (with data)	1,323	100.0	997	100.0	326	100.0	
Missing	57	4.1	41	3.9	16	4.7	1.6

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 31/12/2021 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	2.4	72.3	20.0	100.0
Bradfd				100.0
Brightn	2.4	73.3	20.0	100.0
Bristol	2.4	88.9	11.1	100.0
Camb	2.3	79.2	8.3	100.0
Carlis				100.0
Carsh	2.3	85.7	3.6	100.0
Colchr				
Covnt	2.3	59.1	13.6	100.0
Derby	2.4	67.3	27.3	100.0
Donc				100.0
Dorset	2.4	76.9	23.1	100.0
Dudley	2.5	80.0	10.0	100.0
EssexMS	2.4	58.8	35.3	85.0
Exeter				
Glouc				
Hull	2.4	83.3	8.3	100.0
Ipswi				100.0
Kent	2.3	61.1	5.6	100.0
L Barts	2.3	84.0	4.0	100.0
L Guys	2.3	78.1	2.4	100.0
L Kings	2.3	86.2	6.9	90.6
L Rfree	2.4	60.0	20.0	100.0
L St.G				100.0
L West				66.7
Leeds	2.3	87.5	12.5	100.0
Leic	2.4	77.1	6.3	100.0
Liv Ain	2.5	75.0	25.0	92.3
Liv Roy	2.5	65.1	27.9	100.0

Table 7.5 Continued

Centre	Median adj Ca (mmol/L)	% adj Ca 2.2-2.5 mmol/L	% adj Ca >2.5 mmol/L	% data completeness
M RI	2.5	65.0	31.3	100.0
Middlbr	2.3	94.1	0.0	100.0
Newc	2.4	88.9	5.6	100.0
Norwch	2.3	90.0	0.0	100.0
Nottm	2.4	85.7	14.3	100.0
Oxford				68.4
Plymth				
Ports	2.4	84.2	7.3	98.8
Prestn	2.3	90.2	7.3	100.0
Redng				100.0
Salford	2.4	64.5	25.8	100.0
Sheff	2.3	76.4	9.1	100.0
Shrew	2.4	75.9	10.3	96.7
Stoke	2.4	92.5	5.0	100.0
Sund	2.3	60.0	20.0	100.0
Truro				100.0
Wirral				100.0
Wolve	2.4	68.6	25.7	94.6
York	2.3	94.1	0.0	100.0
N IRELAND				
Antrim				100.0
Belfast				100.0
Newry				100.0
Ulster				
West NI				100.0
WALES				
Bangor	2.4	76.2	14.3	100.0
Cardff	2.4	76.0	16.0	100.0
Clwyd				
Swanse	2.4	82.5	12.5	100.0
Wrexm				100.0
TOTALS				
England	2.4	76.0	14.7	97.4
N Ireland	2.4	87.5	6.3	100.0
Wales	2.4	79.0	14.0	100.0
E, W & NI	2.4	76.4	14.6	97.6

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

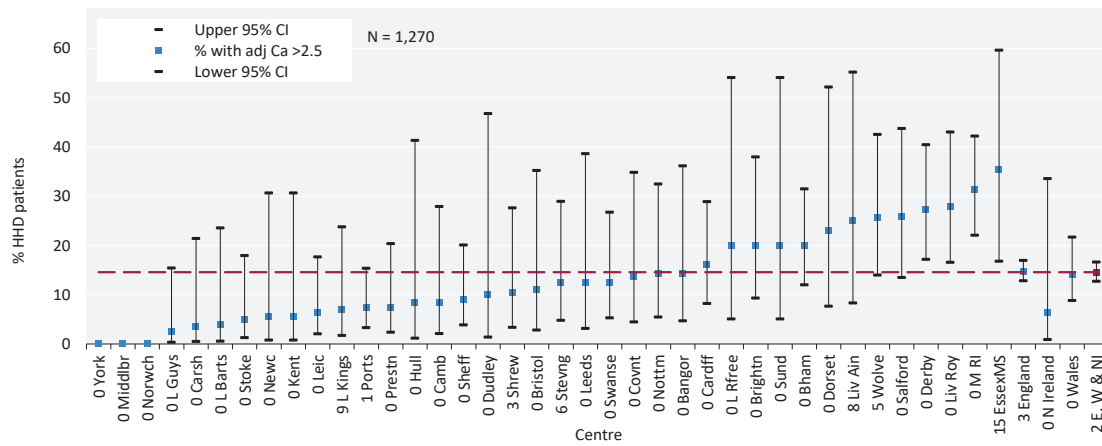


Figure 7.3 Percentage of adult patients prevalent to HHD on 31/12/2021 with adjusted calcium (Ca) above the target range (>2.5 mmol/L) by centre

CI – confidence interval

Table 7.6 Median pre-dialysis potassium and bicarbonate and percentage attaining target ranges in adult patients prevalent to HHD on 31/12/2021 by centre

Centre	Pre-dialysis potassium					Pre-dialysis bicarbonate				
	Median (mmol/L)	% <4.0 mmol/L	% 4.0–6.0 mmol/L	% >6.0 mmol/L	% data complete	Median (mmol/L)	% <18 mmol/L	% 18–26 mmol/L	% >26 mmol/L	% data complete
ENGLAND										
Bham	4.6	20.0	76.9	3.1	100.0					69.2
Bradfd					100.0					100.0
Brightn					0.0	27	0.0	39.3	60.7	93.3
Bristol	4.7	11.1	88.9	0.0	100.0	21	5.6	83.3	11.1	100.0
Camb	5.0	4.2	83.3	12.5	100.0	27	0.0	50.0	50.0	100.0
Carlis					0.0					100.0
Carsh					0.0					0.0
Colchr										
Covnt					0.0	24	9.1	81.8	9.1	100.0
Derby	4.5	16.4	83.6	0.0	100.0	23	7.3	87.3	5.5	100.0
Donc					100.0					100.0
Dorset	5.1	0.0	92.3	7.7	100.0	22	0.0	100.0	0.0	100.0
Dudley	5.0	0.0	100.0	0.0	100.0	23	0.0	100.0	0.0	100.0
EssexMS	4.0	45.0	55.0	0.0	100.0	27	0.0	35.3	64.7	85.0
Exeter										
Glouc										
Hull	5.2	8.3	91.7	0.0	100.0	24	0.0	91.7	8.3	100.0
Ipswi					0.0					100.0
Kent	3.8	61.1	38.9	0.0	100.0	20	5.6	94.4	0.0	100.0
L Barts	5.4	12.0	76.0	12.0	100.0	20	8.0	92.0	0.0	100.0
L Guys	4.4	22.0	73.2	4.9	100.0	24	2.6	82.1	15.4	95.1
L Kings	5.1	3.6	67.9	28.6	87.5	21	12.5	83.3	4.2	75.0
L Rfree	5.6	20.0	40.0	40.0	100.0					80.0
L St.G					0.0					60.0
L West					0.0					30.6
Leeds	5.0	0.0	81.3	18.8	100.0	23	0.0	87.5	12.5	100.0
Leic	5.2	14.6	77.1	8.3	100.0	24	0.0	79.6	20.5	91.7
Liv Ain					0.0	23	0.0	100.0	0.0	92.3
Liv Roy					0.0	24	2.3	72.1	25.6	100.0
M RI					0.0	24	1.3	78.8	20.0	100.0
Middlbr	5.2	11.8	82.4	5.9	100.0	34	0.0	0.0	100.0	100.0
Newc					0.0	24	0.0	83.3	16.7	100.0

Table 7.6 Continued

Centre	Pre-dialysis potassium					Pre-dialysis bicarbonate				
	Median (mmol/L)	% <4.0 mmol/L	% 4.0–6.0 mmol/L	% >6.0 mmol/L	% data complete	Median (mmol/L)	% <18 mmol/L	% 18–26 mmol/L	% >26 mmol/L	% data complete
Norwch	5.4	0.0	80.0	20.0	100.0	23	0.0	100.0	0.0	100.0
Nottm	5.1	3.6	89.3	7.1	100.0					32.1
Oxford					68.4					68.4
Plymth										
Ports	4.6	17.1	80.5	2.4	98.8	24	1.2	80.5	18.3	98.8
Prestn					0.0	23	10.5	68.4	21.1	92.7
Redng					0.0					100.0
Salford	4.6	16.1	80.7	3.2	100.0					0.0
Sheff	5.2	3.6	89.1	7.3	100.0	22	7.3	83.6	9.1	100.0
Shrew					0.0	21	3.5	96.6	0.0	96.7
Sthend										
Stoke					0.0	27	0.0	47.5	52.5	100.0
Sund					0.0	22	10.0	70.0	20.0	100.0
Truro					100.0					100.0
Wirral					0.0					100.0
Wolve	4.9	11.4	82.9	5.7	94.6	19	17.1	77.1	5.7	94.6
York	5.5	0.0	76.5	23.5	100.0	23	0.0	88.2	11.8	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
WALES										
Bangor					0.0	24	0.0	71.4	28.6	100.0
Cardff					0.0	23	0.0	85.7	14.3	98.0
Clwyd										
Swanse					0.0	23	5.0	87.5	7.5	100.0
Wrexm					0.0					100.0
TOTALS										
England	4.9	14.0	78.7	7.3	60.5	23	3.8	76.5	19.7	86.2
N Ireland	5.2	12.5	75.0	12.5	100.0	23	0.0	87.5	12.5	100.0
Wales					0.0	23	1.8	83.2	15.0	99.1
E, W & NI	4.9	14.0	78.6	7.5	55.7	23	3.5	77.3	19.2	87.5

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

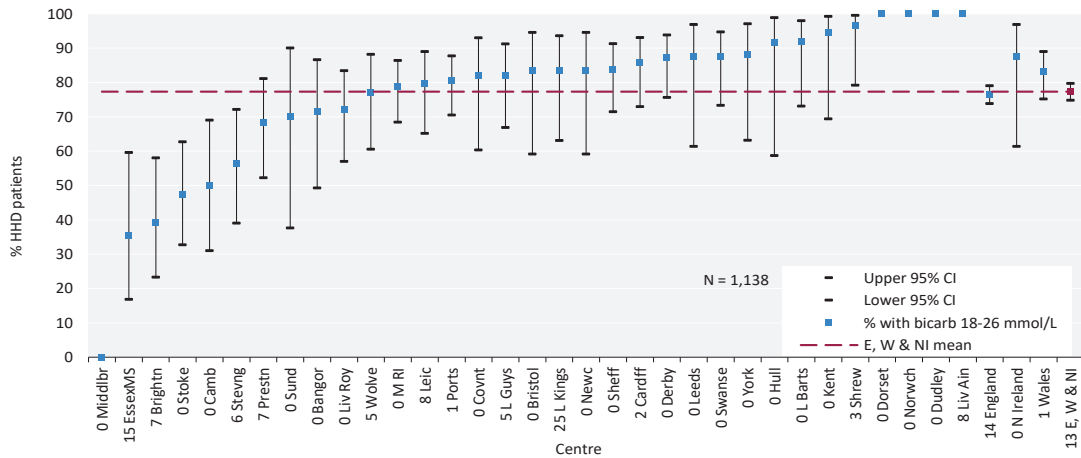


Figure 7.4 Percentage of adult patients prevalent to HHD on 31/12/2021 with pre-dialysis bicarbonate (bicarb) within the target range (18–26 mmol/L) by centre
 CI – confidence interval

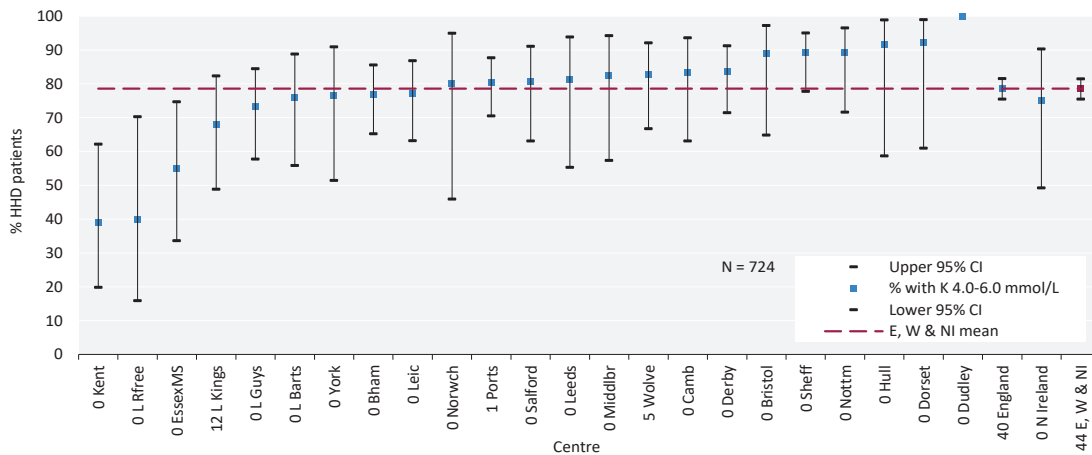


Figure 7.5 Percentage of adult patients prevalent to HHD on 31/12/2021 with pre-dialysis potassium (K) within the target range (4.0–6.0 mmol/L) by centre
 CI – confidence interval

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 31/12/2021 by centre

Centre	Haemoglobin				Ferritin		
	Median (g/L)	% <100 g/L	% >120 g/L	% data completeness	Median (µg/L)	% <200 µg/L	% data completeness
ENGLAND							
Bham	112	16.9	23.1	100.0	526	21.5	100.0
Bradfd				100.0			100.0
Brightn	103	36.7	20.0	100.0	417	13.3	100.0
Bristol	111	5.6	16.7	100.0	454	16.7	100.0
Camb				8.3			4.2
Carlis				100.0			100.0
Carsh	108	14.3	25.0	100.0	359	17.9	100.0
Colchr							
Covnt	105	27.3	27.3	100.0	340	22.7	100.0
Derby	113	9.1	29.1	100.0	556	7.3	100.0
Donc				100.0			100.0
Dorset	113	15.4	15.4	100.0	340	23.1	100.0
Dudley	114	20.0	10.0	100.0			0.0
EssexMS	109	30.0	30.0	100.0	208	47.4	95.0
Exeter							
Glouc							
Hull	118	8.3	33.3	100.0	370	25.0	100.0
Ipswi				100.0			100.0
Kent	108	27.8	16.7	100.0	161	61.1	100.0
L Barts	107	24.0	12.0	100.0	718	4.0	100.0
L Guys	107	29.3	19.5	100.0	430	22.5	97.6
L Kings	103	34.5	17.2	90.6	487	13.8	90.6
L Rfree	111	10.0	30.0	100.0	450	20.0	100.0
L St.G				100.0			100.0
L West	105	30.8	15.4	72.2	220	40.7	75.0
Leeds	101	50.0	6.3	100.0	260	43.8	100.0
Leic	111	16.7	18.8	100.0	245	31.3	100.0
Liv Ain				69.2	180	61.5	100.0
Liv Roy				67.4	287	34.9	100.0
M RI	110	28.8	27.5	100.0	239	37.5	100.0
Middlbr	107	23.5	11.8	100.0	669	17.6	100.0
Newc	113	22.2	22.2	100.0	607	5.6	100.0
Norwch	112	10.0	30.0	100.0	235	50.0	100.0
Nottm	106	28.6	7.1	100.0	349	32.1	100.0
Oxford	114	28.6	14.3	73.7	555	10.5	100.0
Plymth							
Ports	112	26.8	25.6	98.8	328	33.7	100.0
Prestn	112	14.6	12.2	100.0	487	9.8	100.0
Redng				100.0			100.0
Salford	109	16.1	12.9	100.0	176	56.7	96.8
Sheff	106	36.4	10.9	100.0	479	23.6	100.0
Shrew	111	20.7	24.1	96.7	317	31.0	96.7
Stevng	116	33.3	36.4	97.1	402	11.8	100.0
Stoke	112	17.5	25.0	100.0	347	22.5	100.0
Sund	114	20.0	0.0	100.0	453	20.0	100.0
Truro				100.0			100.0

Table 7.7 Continued

Centre	Haemoglobin			Ferritin			
	Median (g/L)	% <100 g/L	% >120 g/L	% data completeness	Median (µg/L)	% <200 µg/L	% data completeness
Wirral				83.3			100.0
Wolve	112	28.6	17.1	94.6	240	42.9	94.6
York	106	35.3	11.8	100.0	351	23.5	100.0
N IRELAND							
Antrim				100.0			100.0
Belfast				100.0			100.0
Newry				100.0			100.0
Ulster							
West NI				66.7			100.0
SCOTLAND							
Abrdn				100.0			
Airdrie							
D&Gall				100.0			
Dundee				100.0			
Edinb				85.7			
Glasgw				90.0			
Inverns				100.0			
Klmarnk	104	37.5	0.0	100.0			
Krkldy				100.0			
WALES							
Bangor	111	19.0	33.3	100.0	164	57.1	100.0
Cardff	109	24.0	24.0	100.0	224	44.9	98.0
Clwyd							
Swanse	112	25.0	27.5	100.0	314	40.0	100.0
Wrexm				100.0			100.0
TOTALS							
England	109	25.1	20.0	94.5	357	27.1	95.6
N Ireland	111	13.3	26.7	93.8	321	31.3	100.0
Scotland	110	21.1	21.1	95.7			0.0
Wales	111	22.8	27.2	100.0	225	45.1	99.1
UK	109	24.6	20.7	95.0	344	28.8	96.0

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

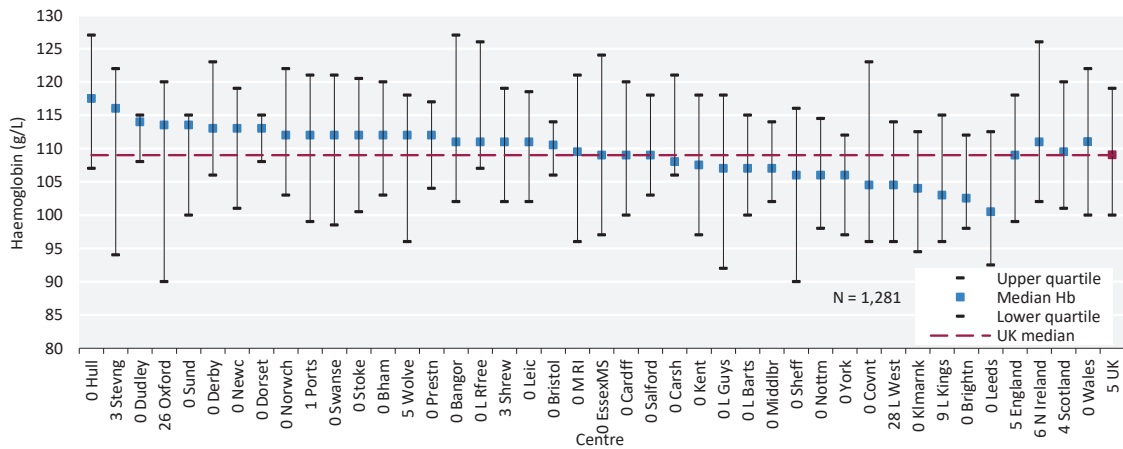


Figure 7.6 Median haemoglobin (Hb) in adult patients prevalent to HHD on 31/12/2021 by centre

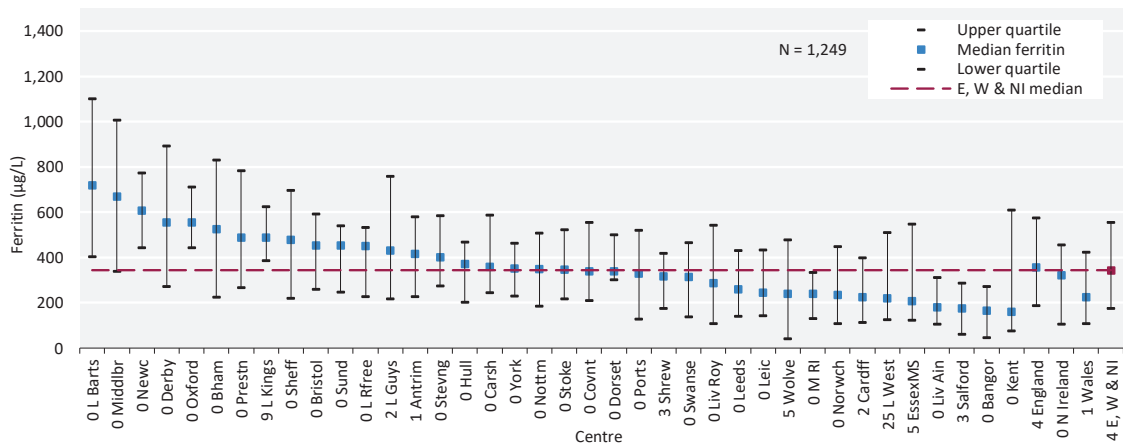


Figure 7.7 Median ferritin in adult patients prevalent to HHD on 31/12/2021 by centre

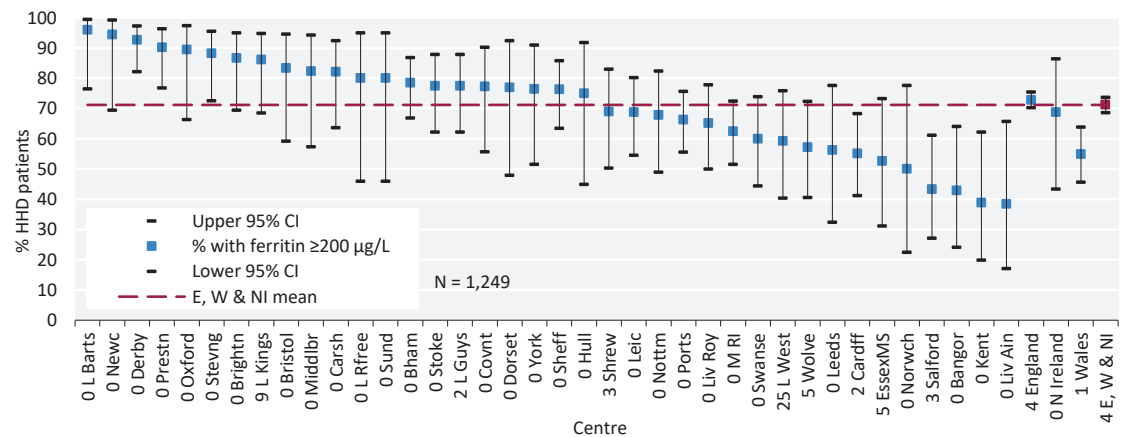


Figure 7.8 Percentage of adult patients prevalent to HHD on 31/12/2021 with ferritin <200 µg/L by centre
CI – confidence interval

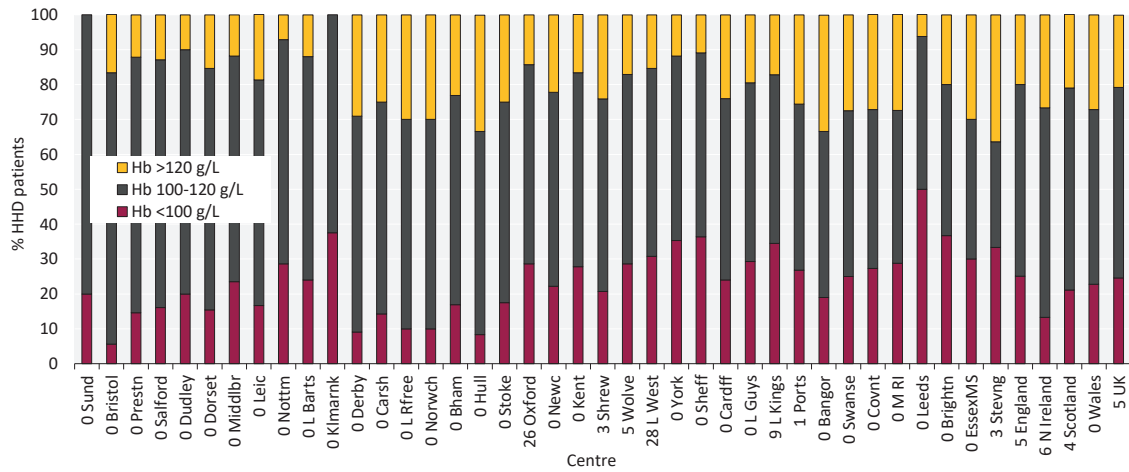


Figure 7.9 Distribution of haemoglobin (Hb) in adult patients prevalent to HHD on 31/12/2021 by centre

Cause of death in adult HHD patients

Cause of death was analysed in prevalent patients receiving HHD on 31/12/2020 and followed-up for one year in 2021. The proportion of HHD patients with each cause of death is shown for patients with cause of death data and these total 100% of patients with data. The proportion of patients with no cause of death data is shown on a separate line. Further detail on the survival of prevalent KRT patients is in chapter 3.

Table 7.8 Cause of death in adult patients prevalent to HHD on 31/12/2020 followed-up in 2021 by age group

Cause of death	HHD all ages		HHD < 65 years		HHD ≥ 65 years	
	N	%	N	%	N	%
Cardiac disease	26	32.9	16	35.6	10	29.4
Cerebrovascular disease	0	0.0	0	0.0	0	0.0
Infection	11	13.9	7	15.6	4	11.8
Malignancy	5	6.3	2	4.4	3	8.8
Treatment withdrawal	7	8.9	4	8.9	3	8.8
Other	24	30.4	12	26.7	12	35.3
Uncertain aetiology	6	7.6	4	8.9	2	5.9
Total (with data)	79	100.0	45	100.0	34	100.0
Missing	49	38.3	25	35.7	24	41.4

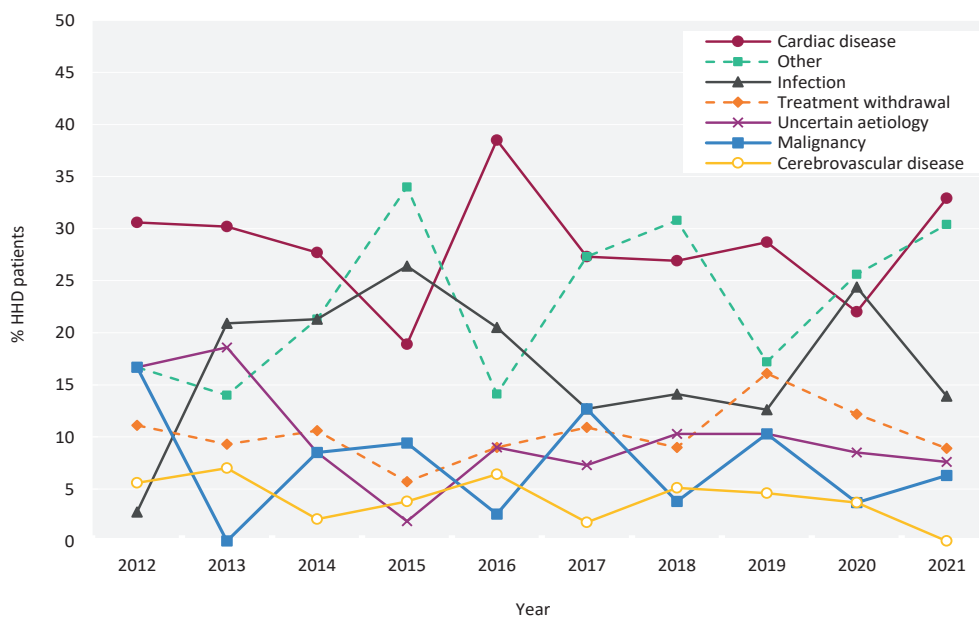


Figure 7.10 Cause of death between 2012 and 2021 for adult patients prevalent to HHD at the beginning of the year

Chapter 8

Children and young people on kidney replacement therapy (KRT) for end-stage kidney disease (ESKD) in the UK in 2021

Contents

Introduction	171
Rationale for analyses	173
Key findings	175
Children	175
Young people	175
Analyses – children	176
Data completeness for prevalent paediatric KRT patients.....	176
Changes to the incident paediatric KRT population.....	177
Start modality of incident paediatric KRT patients.....	178
Pre-emptive transplantation in incident paediatric KRT patients	179
Demographics of prevalent paediatric KRT patients	180
Treatment modality in prevalent paediatric KRT patients.....	180
Causes of ESKD in prevalent paediatric KRT patients	181
Growth of prevalent paediatric KRT patients.....	182
Cardiovascular risk factor evaluation in prevalent paediatric KRT patients	185
Biochemistry parameters in prevalent paediatric KRT patients.....	188
Transfer to adult kidney services for prevalent paediatric KRT patients	189
Survival in paediatric KRT patients.....	190
Analyses – young people	191
KRT incidence and prevalence in young people	191
Transplant parameters in young people.....	192
Biochemical and blood pressure measures in young people.....	193

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 2021 (figure 8.1). This included patients with a transplant (Tx) and patients on dialysis – in-centre haemodialysis (ICHHD), 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.

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.

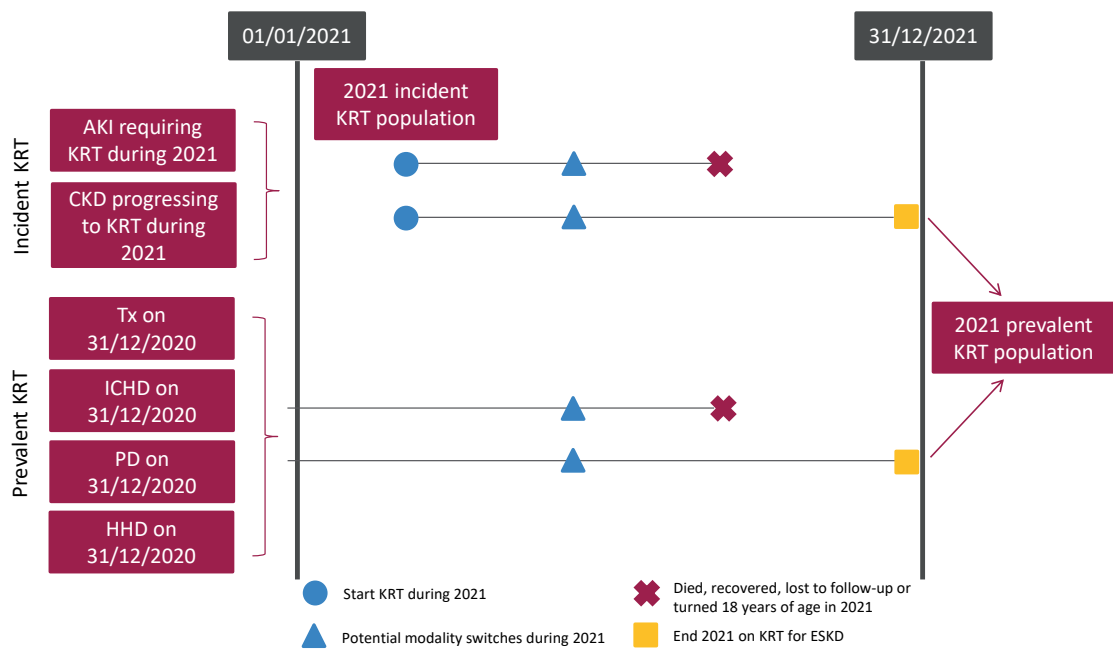


Figure 8.1 Pathways children and young people could follow to be included in the UK 2021 incident and/or prevalent KRT populations

Note that patients who recovered kidney function before 90 days on dialysis are not included in this chapter.

CKD – chronic kidney disease

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

- **Incident population:** patients who started KRT during 2021 and remained on KRT for at least 90 days.
- **Prevalent population:** patients who were on KRT at the end of 2021 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 2007–2011, 2012–2016 and 2017–2021.

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

- **Incident population:** patients who started KRT during 2021 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 2021 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 8.2 and 8.3) use a restricted prevalent cohort. Children who have moved centre, changed or started treatment in the quarter are not included.

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.

Rationale for analyses

For both the children and young people sections, the analyses begin with a description of the 2021 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 2021 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 <90 th percentile for age, sex and height. Blood pressure in Tx patients to be maintained at <90 th percentile for age, sex and height	Tables 8.14–8.15, figures 8.14–8.15
	Serum phosphate and calcium should be kept within the normal range. Parathyroid hormone (PTH) levels should be maintained within twice the upper limit of the normal range but, contrary to adult standards, may be kept within the normal range if growth is normal	Table 8.17
	Serum bicarbonate concentrations should be 20–26 mmol/L	Table 8.17
	Typically maintain the aspirational haemoglobin range 100–120 g/L for young people and children aged ≥2 years and 95–115 g/L for children <2 years, reflecting the lower normal range in that age group	Table 8.17
National Heart Lung and Blood Institute and Kidney Disease Improving Global Outcomes (KDIGO) (2013)	Screening children at risk of secondary dyslipidaemias including those with CKD is recommended	Tables 8.2–8.3, 8.15

Detail about the completeness of data returned to the UK Renal Registry (UKRR) is available through the UKRR data portal (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 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. 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

- 110 patients aged <16 years started KRT for ESKD in the UK in 2021 compared to 106 patients in 2020.
- KRT incidence in patients aged <16 years was 8.9 pmarp compared to 8.3 pmarp in 2020.
- 842 patients aged <16 years were receiving KRT at UK paediatric kidney centres on 31/12/2021, an increase from 812 patients in 2020.
- KRT prevalence in patients aged <16 years was 68.4 pmarp. 76.4% had a functioning Tx (49.8% living donor and 26.6% deceased donor), 11.0% were receiving HD and 12.6% were receiving PD.
- Tubulointerstitial disease accounted for approximately 50% of all primary renal diseases (PRDs) in prevalent paediatric patients, with a high male:female ratio (2.8:1).
- Between 2007 and 2021, about a third of patients aged <16 years who were referred early received a pre-emptive Tx.
- At the time of transfer to adult services, 84.2% of paediatric patients had a functioning kidney Tx.
- The median height z-score for children on dialysis was -1.5 compared with -0.9 for those with a functioning Tx.
- The median weight z-score for children on dialysis was -1.0 compared with 0.1 for those with a functioning Tx.
- The overall median eGFR of the 611 children with a kidney transplant on 31/12/2021 was 61 mL/min/1.73m² and 5.6% had an eGFR of <30 mL/min/1.73m².
- Of those with complete data, 74.9% of the prevalent paediatric KRT population had 1 or more risk factors for cardiovascular disease; 4.6% had 3 risk factors.
- 59.6% and 63.4% of prevalent HD patients achieved systolic blood pressure (SBP) and diastolic blood pressure (DBP) values <90th percentile, respectively.
- 60.4% and 65.9% of prevalent PD patients achieved SBP and DBP values <90th percentile, respectively.
- 77.0% and 80.8% of prevalent Tx patients achieved SBP and DBP values <90th percentile, respectively.

Young people

- 26 patients aged 16 to <18 years started KRT for ESKD in the UK in 2021.
- KRT incidence in young people was 17.1 pmarp.
- 225 patients aged 16 to <18 years were receiving KRT on 31/12/2021, of whom the majority (83.6%) were managed in paediatric kidney centres.
- KRT prevalence in patients aged 16 to <18 years was 147.7 pmarp.
- Tubulointerstitial disease accounted for 42.0% of all PRDs in prevalent young people, followed by familial/hereditary nephropathies (22.6%) and glomerular disease (16.5%).
- The overall median eGFR of young people with a kidney transplant on 31/12/2021 was 71 mL/min/1.73m² and 6.1% had an eGFR of <30 mL/min/1.73m².
- The proportion of young people prevalent to KRT on 31/12/2021 with a blood pressure within the 'normal' range (<130/80 mmHg) was 50.0% of dialysis and 66.4% of transplanted patients.

Analyses – children

Data completeness for prevalent paediatric KRT patients

Data returns of key variables for Tx and dialysis patients <16 years old at the end of 2021 are shown in tables 8.2 and 8.3, respectively, with further detail available through the UKRRR data portal (ukkidney.org/audit-research/data-portals).

Table 8.2 Data completeness for paediatric patients (<16 years old) prevalent to Tx on 31/12/2021 by centre

Centre	N with Tx	Data completeness (%)											
		Height	Weight	BMI	SBP	DBP	Hb	Creat	Chol	Bicarb	PTH	Ca	Phos
Bham_P	69	98.6	100.0	98.6	100.0	98.6	100.0	100.0	95.7	100.0	65.2	100.0	100.0
Blfst_P	23	34.8	95.7	34.8	34.8	34.8	100.0	100.0	87.0	100.0	100.0	100.0	100.0
Brstl_P	36	0.0	94.4	0.0	91.7	80.6	100.0	100.0	36.1	100.0	86.1	100.0	100.0
Cardf_P	20	0.0	100.0	0.0	100.0	5.0	100.0	100.0	90.0	100.0	75.0	100.0	100.0
Glasg_P	41	100.0	100.0	100.0	100.0	100.0	82.9	82.9	26.8	87.8	78.1	82.9	82.9
L Eve_P	65	100.0	100.0	100.0	100.0	100.0	100.0	100.0	58.5	100.0	98.5	100.0	100.0
L GOSH_P	110	93.6	100.0	93.6	50.9	50.9	40.0	42.7	10.0	6.4	19.1	0.0	42.7
Leeds_P	42	100.0	100.0	100.0	100.0	88.1	100.0	100.0	7.1	100.0	100.0	100.0	100.0
Livpl_P	26	0.0	11.5	0.0	7.7	3.9	0.0	96.2	69.2	96.2	92.3	96.2	96.2
Manch_P	65	0.0	0.0	0.0	100.0	98.5	100.0	100.0	89.2	100.0	93.9	100.0	100.0
Newc_P	25	0.0	0.0	0.0	100.0	4.0	100.0	100.0	80.0	100.0	88.0	100.0	100.0
Nottm_P	59	86.4	94.9	86.4	89.8	86.4	98.3	98.3	44.1	98.3	83.1	98.3	98.3
Soton_P	30	100.0	100.0	100.0	86.7	73.3	100.0	100.0	3.3	100.0	100.0	100.0	100.0
UK	611	66.8	80.5	66.8	82.7	72.7	83.6	88.2	49.6	82.0	75.1	80.5	88.2

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

Table 8.3 Data completeness for paediatric patients (<16 years old) prevalent to dialysis on 31/12/2021 by centre

Centre	N on dialysis	Data completeness (%)											
		Height	Weight	BMI	SBP	DBP	Hb	Chol	Bicarb	PTH	Ca	Phos	
Bham_P	22	95.5	95.5	95.5	95.5	90.9	95.5	95.5	95.5	95.5	95.5	95.5	95.5
Blfst_P	1	0.0	100.0	0.0	0.0	0.0	100.0	0.0	100.0	100.0	100.0	100.0	100.0
Brstl_P	9	0.0	100.0	0.0	100.0	33.3	100.0	88.9	100.0	100.0	100.0	100.0	100.0
Cardf_P	6	0.0	100.0	0.0	66.7	16.7	100.0	33.3	100.0	100.0	100.0	100.0	100.0
Glasg_P	12	100.0	100.0	100.0	91.7	91.7	100.0	50.0	100.0	100.0	100.0	100.0	100.0
L Eve_P	11	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
L GOSH_P	32	90.6	100.0	90.6	81.3	81.3	93.8	50.0	34.4	84.4	0.0	96.9	96.9
Leeds_P	13	76.9	100.0	76.9	100.0	46.2	100.0	53.9	100.0	100.0	100.0	100.0	100.0
Livpl_P	12	0.0	0.0	0.0	0.0	0.0	33.3	41.7	100.0	100.0	100.0	100.0	100.0
Manch_P	15	0.0	33.3	0.0	93.3	33.3	100.0	40.0	100.0	93.3	100.0	100.0	100.0
Newc_P	8	0.0	0.0	0.0	75.0	12.5	100.0	50.0	100.0	100.0	100.0	100.0	100.0
Nottm_P	23	91.3	91.3	91.3	87.0	60.9	100.0	30.4	100.0	100.0	100.0	100.0	100.0
Soton_P	11	100.0	100.0	100.0	81.8	72.7	90.9	45.5	90.9	90.9	90.9	90.9	90.9
UK	175	65.7	81.1	65.7	82.3	60.6	93.1	56.0	86.9	95.4	80.6	98.3	98.3

Bicarb – bicarbonate; BMI – body mass index; Ca – calcium; Chol – cholesterol; DBP – diastolic blood pressure; Hb – haemoglobin; Phos – phosphate; PTH – parathyroid hormone; SBP – systolic blood pressure

Changes to the incident paediatric KRT population

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

Table 8.4 Paediatric patients (<16 years old) incident to KRT in 2021 by age and sex

Age group (yrs)	All patients		Male		Female	
	N	pmarp	N	pmarp	N	pmarp
0-<2	16	11.6	11	15.6	5	7.4
2-<4	11	7.6	9	12.1	2	2.8
4-<8	16	5.2	10	6.4	6	4.0
8-<12	29	8.9	18	10.8	11	6.9
12-<16	38	12.0	20	12.3	18	11.7
<16 yrs	110	8.9	68	10.8	42	7.0

pmarp – per million age-related population

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

Age group (yrs)	2007-2011		2012-2016		2017-2021	
	N	pmarp	N	pmarp	N	pmarp
0-<2	94	12.0	118	15.0	93	12.6
2-<4	55	7.3	75	9.1	58	7.3
4-<8	89	6.4	119	7.5	90	5.5
8-<12	124	8.7	137	9.5	140	8.5
12-<16	217	14.2	181	12.7	181	11.8
<16 yrs	579	9.8	630	10.4	562	8.9

pmarp – per million age-related population

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

Ethnicity	2007-2011		2012-2016		2017-2021	
	N	%	N	%	N	%
White	423	73.4	434	69.2	329	65.1
Asian	94	16.3	123	19.6	110	21.8
Black	28	4.9	30	4.8	33	6.5
Other	31	5.4	40	6.4	33	6.5
<16 yrs	576	100.0	627	100.0	505	100.0

3 children in 2007–2011, 3 in 2012–2016 and 57 in 2017–2021 with no ethnicity recorded were excluded

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

Centre	2007-2011		2012-2016		2017-2021	
	N	%	N	%	N	%
Bham_P	62	10.7	73	11.6	75	13.3
Blfst_P	29	5.0	15	2.4	9	1.6
Brstl_P	36	6.2	30	4.8	34	6.0
Cardf_P	14	2.4	26	4.1	21	3.7
Glasg_P	48	8.3	40	6.3	45	8.0
L Eve_P	65	11.2	70	11.1	55	9.8
L GOSH_P	107	18.5	110	17.5	97	17.3
Leeds_P	47	8.1	54	8.6	38	6.8
Livpl_P	22	3.8	34	5.4	34	6.0
Manch_P	48	8.3	72	11.4	57	10.1
Newc_P	24	4.1	26	4.1	22	3.9
Nottm_P	59	10.2	59	9.4	47	8.4
Soton_P	18	3.1	21	3.3	28	5.0
<16 yrs	579	100.0	630	100.0	562	100.0

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

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

PRD	2007-2011		2012-2016		2017-2021	
	N	%	N	%	N	%
Tubulointerstitial disease	263	45.9	299	48.0	223	45.2
- CAKUT	254	44.3	290	46.5	206	41.8
- Non-CAKUT	9	1.6	9	1.4	17	3.4
Glomerular disease	78	13.6	99	15.9	91	18.5
Familial/hereditary nephropathies	122	21.3	102	16.4	87	17.6
Systemic diseases affecting the kidney	33	5.8	19	3.0	22	4.5
Miscellaneous renal disorders	77	13.4	104	16.7	70	14.2

6 children in 2007–2011, 7 in 2012–2016 and 69 in 2017–2021 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 2007 and 2021 was grouped by five year time periods.

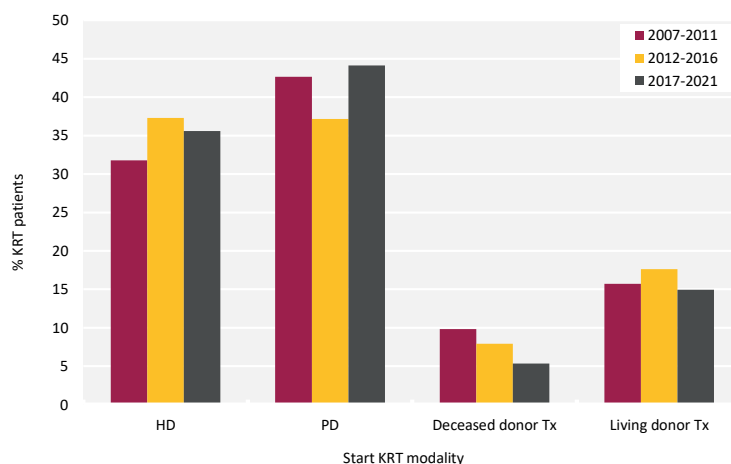


Figure 8.2 Start KRT modality for paediatric patients (<16 years old) incident to KRT by 5 year time period

Pre-emptive transplantation in incident paediatric KRT patients

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

Table 8.9 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 (2007-2021)	1,330	418 (31.4)
Time period		
2007-2011	414	147 (35.5)
2012-2016	468	157 (33.5)
2017-2021	448	114 (25.4)
Sex		
Male	847	291 (34.4)
Female	483	127 (26.3)
Ethnicity		
White	890	320 (36.0)
Asian	245	49 (20.0)
Black	63	12 (19.0)
Other	79	20 (25.3)
Age at start of KRT (yrs)		
3 mths-<2	162	6 (3.7)
2-<4	163	50 (30.7)
4-<8	240	100 (41.7)
8-<12	316	104 (32.9)
12-<16	449	158 (35.2)
PRD		
Tubulointerstitial disease	647	276 (42.7)
Glomerular disease	191	7 (3.7)
Familial/hereditary nephropathies	232	63 (27.2)
Miscellaneous renal disorders	148	37 (25.0)
Systemic diseases affecting the kidney	42	16 (38.1)

86 children were excluded because they were aged <3 months; 355 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 grouped by age, sex and ethnicity.

Table 8.10 Age and sex breakdown of paediatric patients (<16 years old) prevalent to KRT on 31/12/2021

Age group (yrs)	All patients		Male		Female		M/F pmarp ratio
	N	pmarp	N	pmarp	N	pmarp	
0-<2	17	12.3	11	15.6	6	8.9	1.7
2-<4	44	30.3	27	36.3	17	24.0	1.5
4-<8	151	49.2	98	62.3	53	35.4	1.8
8-<12	261	80.4	179	107.6	82	51.8	2.1
12-<16	369	116.5	203	125.1	166	107.5	1.2
<16 yrs	842	68.4	518	82.1	324	53.9	1.5

pmarp – per million age-related population

Table 8.11 Age and ethnicity breakdown of paediatric patients (<16 years old) prevalent to KRT on 31/12/2021

Age group (yrs)	N			
	White	Asian	Black	Other
0-<4	39	7	4	3
4-<8	96	28	10	10
8-<12	177	40	10	25
12-<16	220	78	20	26
<16 yrs	532	153	44	64

49 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 8.12 breaks down current modality for prevalent patients by age group.

Table 8.12 KRT modality used by paediatric patients (<16 years old) prevalent to KRT on 31/12/2021 by age group

Age group (yrs)	Total N	HD		PD		Living donor Tx		Deceased donor Tx	
		N	%	N	%	N	%	N	%
0-<2	17	2	11.8	15	88.2	0	0.0	0	0.0
2-<4	44	9	20.5	17	38.6	14	31.8	4	9.1
4-<8	151	17	11.3	16	10.6	90	59.6	28	18.5
8-<12	261	26	10.0	21	8.0	139	53.3	75	28.7
12-<16	369	39	10.6	37	10.0	176	47.7	117	31.7
<16 yrs	842	93	11.0	106	12.6	419	49.8	224	26.6

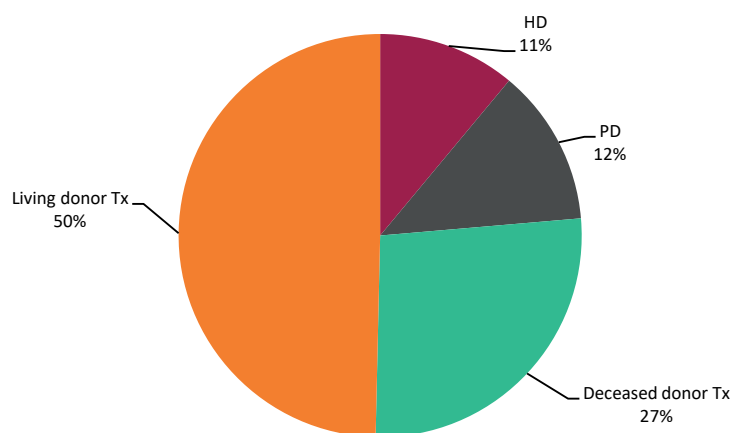


Figure 8.3 KRT modality used by paediatric patients (<16 years old) prevalent to KRT on 31/12/2021

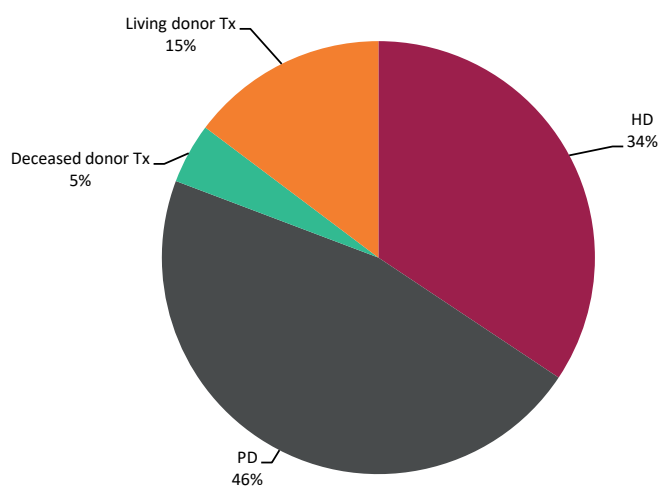


Figure 8.4 KRT modality used at the start of KRT by paediatric patients (<16 years old) prevalent to KRT on 31/12/2021

Causes of ESKD in prevalent paediatric KRT patients

PRDs were grouped into categories as shown in table 8.13.

Table 8.13 Primary renal diseases (PRDs) of paediatric patients (<16 years old) prevalent to KRT on 31/12/2021 by sex and ethnicity

PRD	N	%	N male	N female	% non-White
Tubulointerstitial disease	385	49.4	284	101	29.2
- CAKUT	370	47.4	277	93	28.8
- Non-CAKUT	15	1.9	7	8	40.0
Glomerular disease	119	15.3	60	59	35.9
Familial/hereditary nephropathies	133	17.1	60	73	39.8
Systemic diseases affecting the kidney	37	4.7	20	17	16.7
Miscellaneous renal disorders	106	13.6	53	53	34.0
Total (with data)	780	100.0	477	303	32.1
Missing	62	7.4	41	21	55.2

CAKUT – congenital anomalies of the kidneys and urinary tract

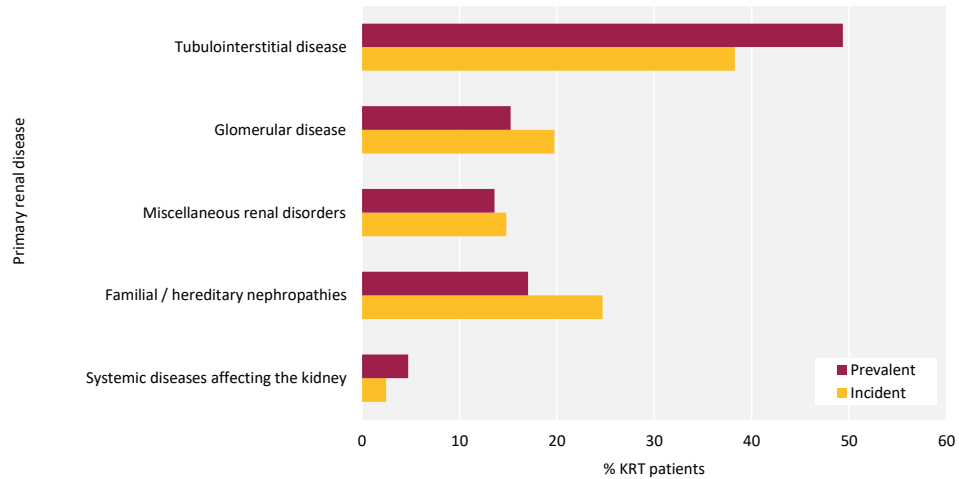


Figure 8.5 Comparison of primary renal diseases for paediatric patients (<16 years old) incident and prevalent to KRT in 2021 with no missing data

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

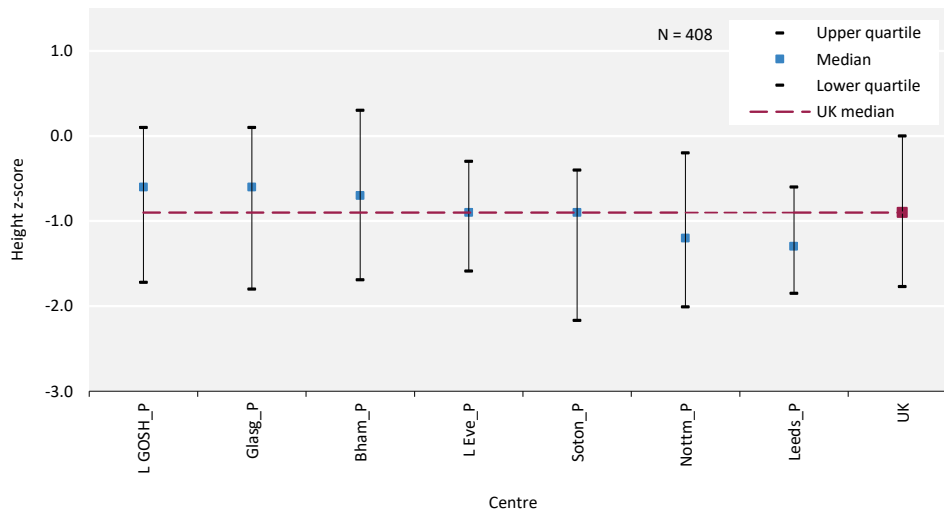


Figure 8.6 Median height z-scores for paediatric patients (<16 years old) prevalent to Tx on 31/12/2021 by centre

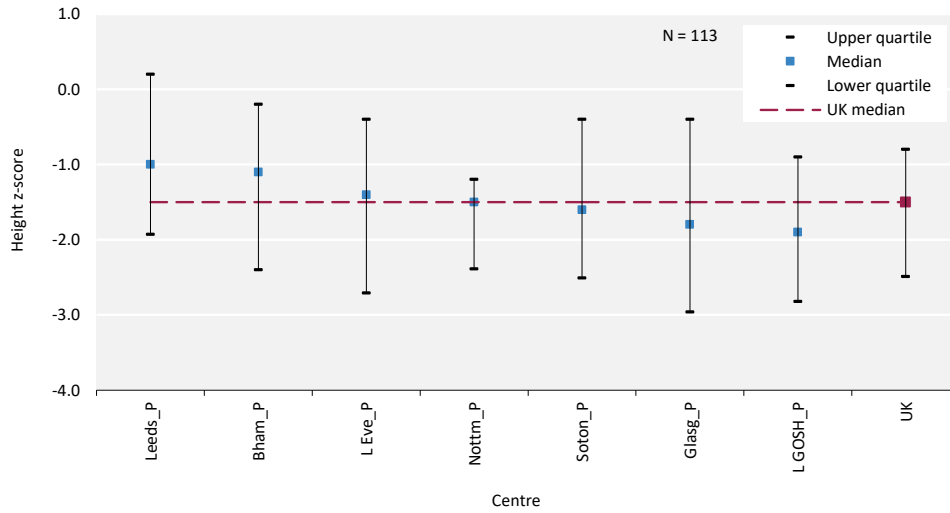


Figure 8.7 Median height z-scores for paediatric patients (<16 years old) prevalent to dialysis on 31/12/2021 by centre

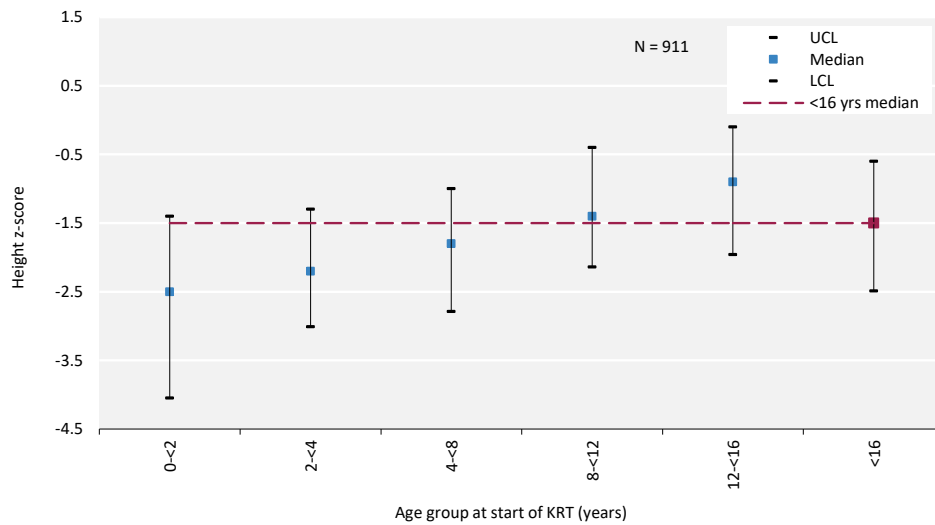


Figure 8.8 Median height z-scores at start of KRT for incident paediatric KRT patients (<16 years old) between 2007 and 2021 by age group at start of KRT

Weight of paediatric KRT patients

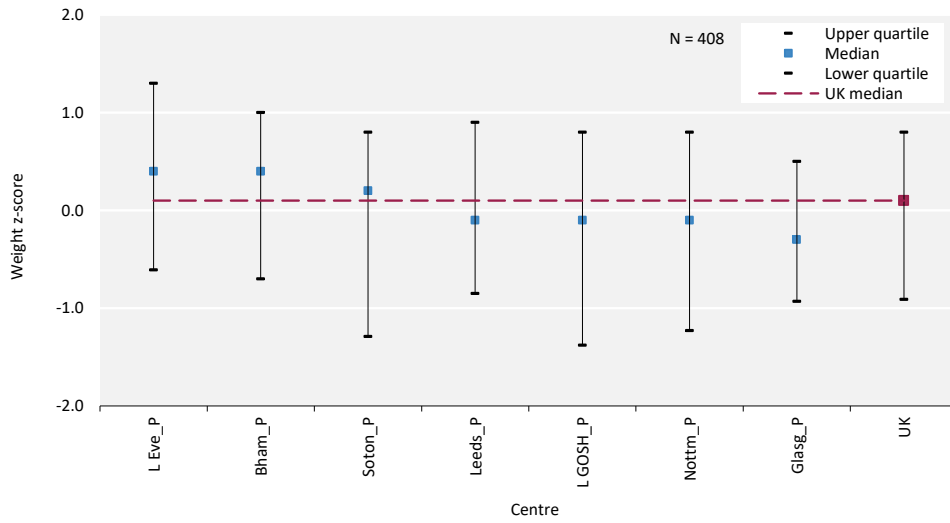


Figure 8.9 Median weight z-scores for paediatric patients (<16 years old) prevalent to Tx on 31/12/2021 by centre

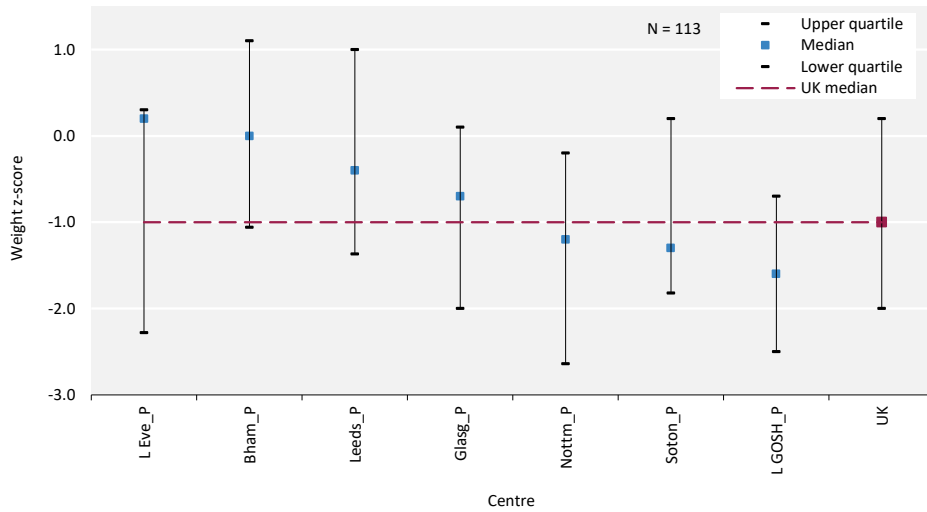


Figure 8.10 Median weight z-scores for paediatric patients (<16 years old) prevalent to dialysis on 31/12/2021 by centre

Cardiovascular risk factor evaluation in prevalent paediatric KRT patients

Obesity in paediatric KRT patients

BMI was calculated using the formula $BMI = \text{weight (kg)}/\text{height}^2 \text{ (m)}$. 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.

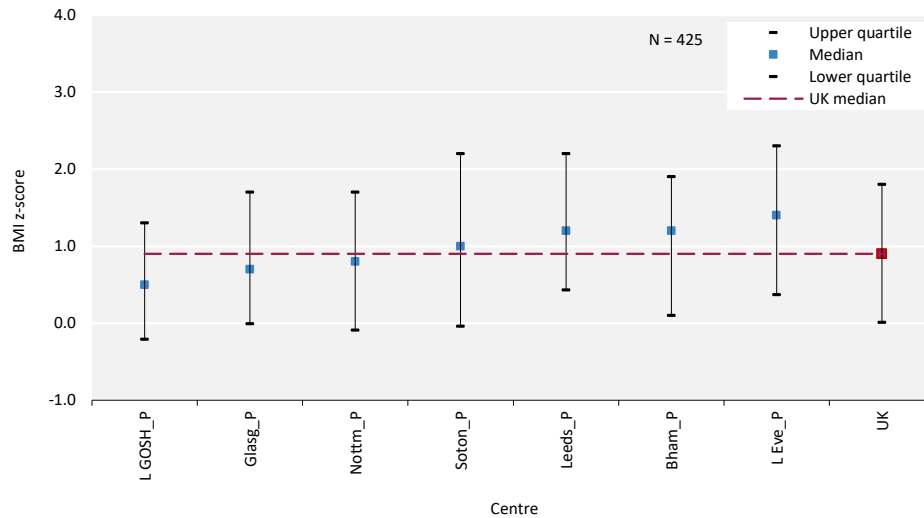


Figure 8.11 Median body mass index (BMI) z-scores for paediatric patients (<16 years old) prevalent to Tx on 31/12/2021 by centre

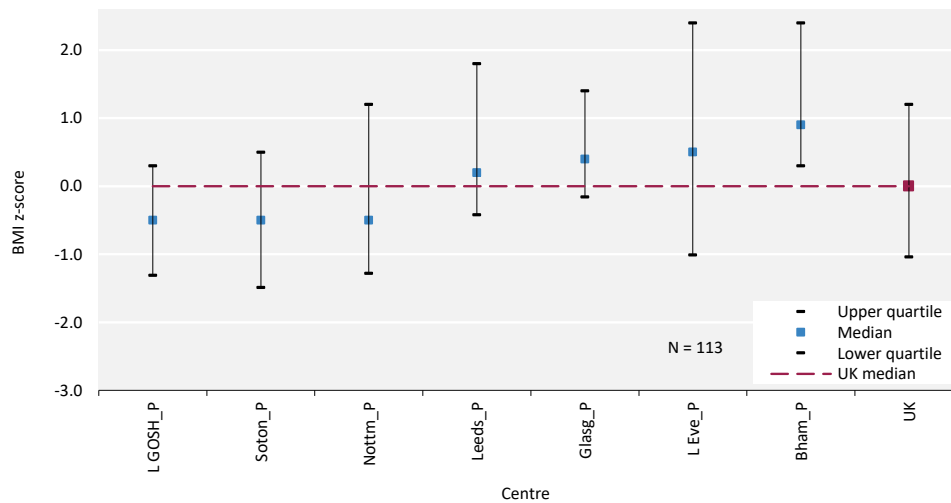


Figure 8.12 Median body mass index (BMI) z-scores for paediatric patients (<16 years old) prevalent to dialysis on 31/12/2021 by centre

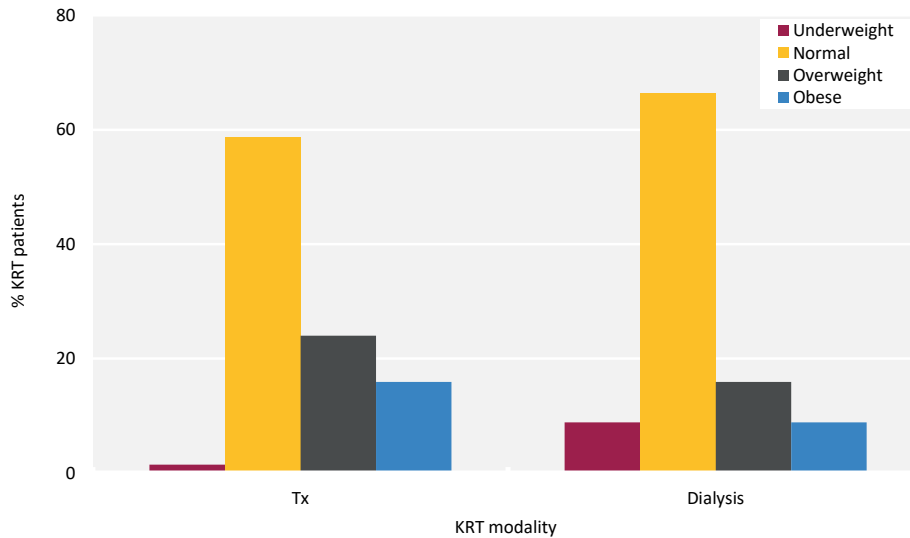


Figure 8.13 Body mass index categorisation of paediatric patients (<16 years old) prevalent to KRT on 31/12/2021 by KRT modality

Hypertension in paediatric KRT patients

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

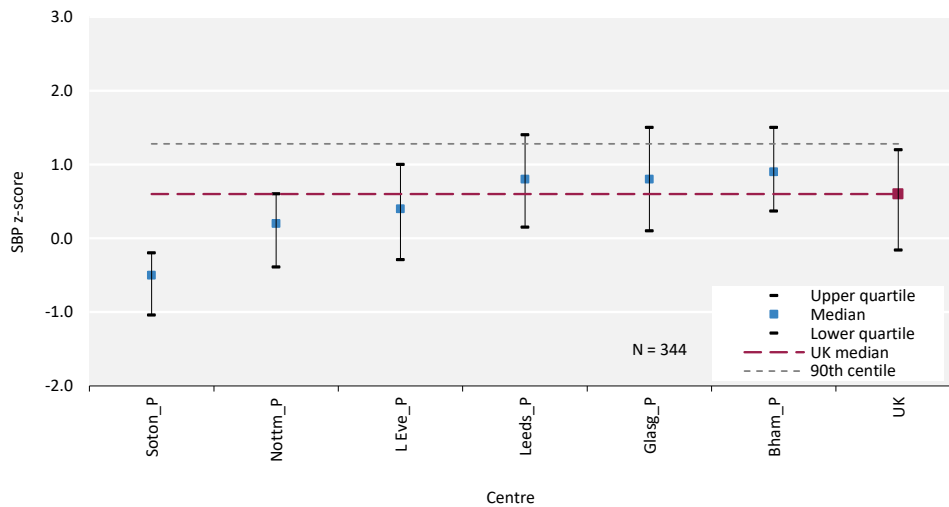


Figure 8.14 Median systolic blood pressure (SBP) z-scores for paediatric patients (<16 years old) prevalent to Tx on 31/12/2021 by centre

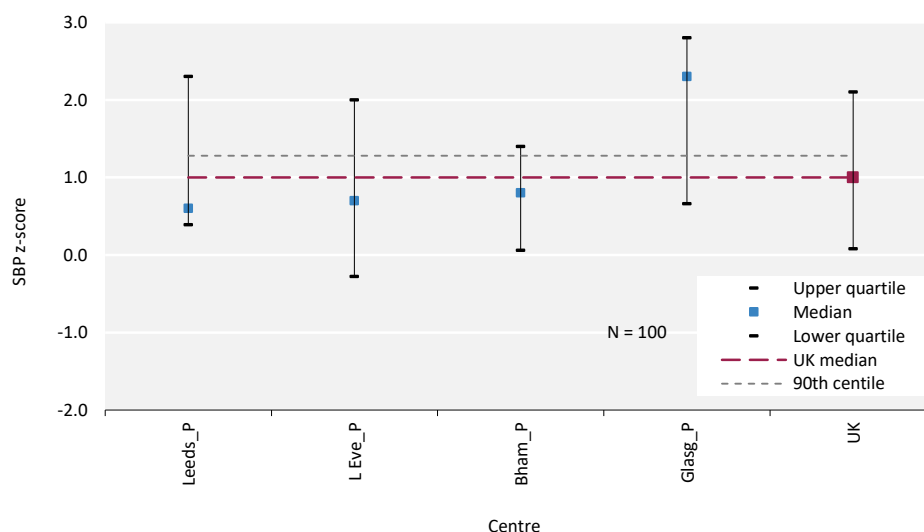


Figure 8.15 Median systolic blood pressure (SBP) z-scores for paediatric patients (<16 years old) prevalent to dialysis on 31/12/2021 by centre

Table 8.14 Percentage of paediatric patients (<16 years old) prevalent to KRT on 31/12/2021 achieving the standards for blood pressures

Characteristic	SBP		DBP	
	N	% <90th percentile	N	% <90th percentile
Total	444	73.2	398	77.4
Age group (yrs)				
0-<5	40	70.0	29	65.5
5-<12	201	73.6	177	77.4
12-<16	203	73.4	192	79.2
Sex				
Male	265	74.3	236	79.2
Female	179	71.5	162	74.7
Ethnicity				
White	261	74.3	234	79.9
Asian	95	66.3	81	72.8
Black	26	73.1	25	76.0
Other	37	75.7	35	74.3
Modality				
HD	47	59.6	41	63.4
PD	53	60.4	44	65.9
Tx	344	77.0	313	80.8

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 223 of the 786 patients (28.4%) with data for all three risk factors.

Table 8.15 Frequency of number of cardiovascular risk factors in paediatric patients (<16 years old) prevalent to KRT on 31/12/2021

N cardiovascular risk factors	Hypertensive	Overweight/Obese	Hypercholesterolaemic	N	%	Total %
0	No	No	No	56	25.1	25.1
1	Yes	No	No	43	19.3	48.4
	No	Yes	No	42	18.8	
	No	No	Yes	23	10.3	
2	Yes	Yes	No	18	8.1	22.0
	Yes	No	Yes	12	5.4	
	No	Yes	Yes	19	8.5	
3	Yes	Yes	Yes	10	4.5	4.5
				223		
Total N with the risk factor	83	89	64			
Total % with the risk factor	37.2	39.9	28.7			

Biochemistry parameters in prevalent paediatric KRT patients

The median values and the percentage with eGFR <30 mL/min/1.73m² for prevalent 2021 paediatric Tx patients are presented in table 8.16.

Table 8.16 Median estimated glomerular filtration rate (eGFR) and percentage with eGFR <30 mL/min/1.73m² in paediatric patients (<16 years old) prevalent to Tx on 31/12/2021 by centre

Centre	N with Tx	Median eGFR (mL/min/1.73m ²)	% eGFR <30 mL/ min/1.73m ²	% data completeness
Bham_P	69	52	7.4	98.6
Blfst_P	23			34.8
Brstl_P	36			0.0
Cardf_P	20			0.0
Glasg_P	41	74	0.0	100.0
L Eve_P	65	56	3.1	100.0
L GOSH_P	110			33.6
Leeds_P	42	75	0.0	100.0
Livpl_P	26			0.0
Manch_P	65			0.0
Newc_P	25			0.0
Nottm_P	59	51	13.7	86.4
Soton_P	30	73	3.3	100.0
UK	611	61	5.6	56.0

Blank cells – centres with <70% data completeness or <10 patients

For most of the centres with missing data, completeness of creatinine data was good. Height data completeness was very low (heights are needed to calculate eGFRs from creatinine)

Table 8.17 Attainment of targets for haemoglobin, calcium, phosphate, parathyroid hormone and bicarbonate in paediatric patients (<16 years old) (a) prevalent to dialysis on 31/12/2021 by centre and (b) prevalent to Tx on 31/12/2021 with estimated glomerular filtration rate (eGFR) <30 mL/min/1.73 m² 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	22	4.8	57.1	0.0	71.4	4.8	38.1	47.6	0.0	66.7
Blfst_P	1									
Brstl_P	9									
Cardf_P	6									
Glasg_P	12	8.3	50.0	0.0	100.0	33.3	33.3	16.7	0.0	83.3
L Eve_P	11	45.5	36.4	9.1	45.5	0.0	54.6	18.2	27.3	72.7
L GOSH_P	32	16.7	50.0			16.1	45.2	66.7		
Leeds_P	13	7.7	69.2	0.0	84.6	0.0	38.5	15.4	7.7	84.6
Livpl_P	12			0.0	66.7	8.3	41.7	25.0	8.3	58.3
Manch_P	15	6.7	60.0	0.0	26.7	26.7	53.3	42.9	0.0	86.7
Newc_P	8									
Nottm_P	23	17.4	47.8	0.0	82.6	0.0	47.8	26.1	0.0	78.3
Soton_P	11	20.0	70.0	0.0	50.0	0.0	60.0	70.0	0.0	70.0
UK	175	16.6	50.9	0.7	68.8	9.3	47.7	40.1	8.6	73.7
TX PATIENTS WITH EGFR <30 ML/MIN/1.73 M²										
UK	19	22.2	77.8	6.7	93.3	5.3	79.0	50.0	26.7	73.3

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 8.18 Median estimated glomerular filtration rate (eGFR) in paediatric patients (<16 years old) prevalent to Tx on 31/12/2021 by time since transplantation and age group

Time since transplantation	Age group (yrs)					
	0-<5		5-<12		12-<16	
	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					1	
0.25-<2 years	17	75	38	68	29	64
2-<4 years	3		50	72	24	59
4-<7 years			57	60	36	54
≥ 7 years			19	57	65	49
Total (IQR)	20	79 (68-99)	166	62 (47-81)	156	55 (40-70)

IQR – interquartile range

This table includes 342 individuals with eGFR (as seen in table 8.16, completeness is 56% of N=611)

Transfer to adult kidney services for prevalent paediatric KRT patients

One-hundred and forty-six paediatric patients transitioned to adult kidney centres in 2021. The median age of patients at transfer was 18.0 years with an IQR of 17.6–18.4 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, 1,643 started KRT between 2007 and 2020 at paediatric kidney centres and were included in survival analyses, to allow at least one year follow-up. At the end of 2021, 119 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 7.1 years (range 9 days to 14.8 years).

Table 8.19 Unadjusted Kaplan-Meier survival (from day 90) of incident paediatric KRT patients (<16 years old) between

	Age group (yrs)				
	0-<2	2-<4	4-<8	8-<12	12-<16
Survival at 1 year (%)	94.3	98.8	98.2	99.2	99.6
95% CI	90.9-96.5	95.4-99.7	95.8-99.3	97.5-99.7	98.5-99.9
Survival at 2 years (%)	92.5	98.2	95.2	98.0	98.4
95% CI	88.7-95	94.6-99.4	91.9-97.2	95.8-99	96.9-99.2
Survival at 3 years (%)	89.7	97.6	94.4	97.7	97.8
95% CI	85.4-92.8	93.7-99.1	90.9-96.6	95.4-98.8	96.1-98.8
Survival at 5 years (%)	86.2	96.1	93.5	95.9	96.3
95% CI	81.3-89.8	91.4-98.2	89.7-95.9	93-97.6	94.2-97.7
Survival at 10 years (%)	84.0	95.3	89.9	94.5	93.7
95% CI	78.5-88.2	90.2-97.7	84.7-93.4	90.8-96.8	90.6-95.8

CI – confidence interval

2007 and 2020 by age group at start of KRT

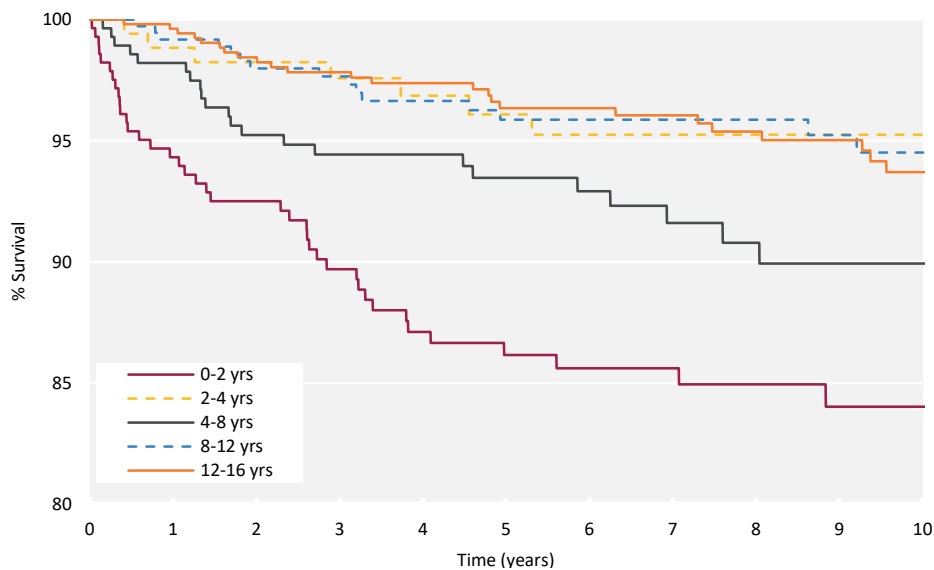


Figure 8.16 Unadjusted Kaplan-Meier survival (from day 90) of incident paediatric KRT patients (<16 years old) between 2007 and 2020 by age group at start of KRT

Analyses – young people

KRT incidence and prevalence in young people

Table 8.20 reports the numbers of young people who started KRT in 2021 (incidence) as well as those on KRT as of 31/12/2021 (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 8.20 Demographics of young people (16–<18 years) incident to KRT in 2021 and/or prevalent to KRT on 31/12/2021, by care setting

Characteristic	Incident			Prevalent		
	Paediatric centres	Adult centres	All	Paediatric centres	Adult centres	All
N	12	14	26	188	37	225
pmarp			17.1			147.7
Median age (yrs)	16.6	16.8	16.7	16.8	17.6	17.0
% male	66.7	50.0	57.7	62.8	67.6	63.6
Ethnicity¹ (%)						
White	70.0	64.3	66.7	71.8	58.3	69.6
Asian	20.0	28.6	25.0	18.8	25.0	19.8
Black	0.0	0.0	0.0	3.9	8.3	4.6
Other	10.0	7.1	8.3	5.5	8.3	6.0
Missing ethnicity	16.7	0.0	7.7	3.7	2.7	3.6
PRD¹ (%)						
Tubulointerstitial disease	30.0	9.1	19.1	41.0	47.1	42.0
Glomerular disease	0.0	27.3	14.3	17.4	11.8	16.5
Familial/hereditary nephropathies	40.0	36.4	38.1	21.9	26.5	22.6
Systemic diseases affecting the kidney	10.0	0.0	4.8	3.4	2.9	3.3
Diabetes	0.0	0.0	0.0	0.0	0.0	0.0
Miscellaneous renal disorders	20.0	27.3	23.8	16.3	11.8	15.6
Missing PRD	16.7	21.4	19.2	5.3	8.1	5.8
Modality (%)						
HD	33.3	71.4	53.9	15.4	13.5	15.1
PD	25.0	28.6	26.9	9.0	18.9	10.7
Tx	41.7	0.0	19.2	75.5	67.6	74.2

¹Percentages 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 8.21 details the number and type of centres (adult or paediatric) that have contributed to the incident and prevalent numbers reported. The small proportion of adult centres identified may reflect that young people are often directed to centres with an established transition programme for early adult care; however, under-reporting of young people may also account for this finding.

Table 8.21 Number of centres that submitted data for young people (16–<18 years) incident to KRT in 2021 and/or prevalent to KRT on 31/12/2021, by care setting

	Incident	Prevalent
Paediatric centres	6 out of 13	13 out of 13
Adult centres	10 out of 68	21 out of 68

Transplant parameters in young people

The median values for age, creatinine and eGFR, and the proportion with an eGFR <30 mL/min/1.73 m² for young people prevalent to Tx on 31/12/2021 are presented by care setting (adult or paediatric centre).

Table 8.22 Measures of graft function in young people (16–<18 years) prevalent to Tx on 31/12/2021, 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	142	16.8	127	105	70	4.7	89.4
Adult centres	25	17.7	21	107	73	14.3	84.0

Table 8.23 reports the median eGFR for all young people prevalent to Tx on 31/12/2021 by time since transplantation. Small numbers preclude further analysis by care setting (adult or paediatric centre).

Table 8.23 Estimated glomerular filtration rate (eGFR) in young people (16–<18 years) prevalent to Tx on 31/12/2021 by time since transplantation

Time since transplantation	N	Median FAS-eGFR (mL/min/1.73m ²)
< 3 months	4	
0.25–<2 years	23	73
2–<4 years	25	78
4–<7 years	30	73
≥ 7 years	62	64
Total (IQR)	144	71 (54-85)

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

Biochemical and blood pressure measures in young people

Table 8.24 shows attainment of biochemical and blood pressure measures for young people prevalent to dialysis and transplant on 31/12/2021 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 8.24 Attainment of biochemical and blood pressure measures in young people (16–<18 years) prevalent to KRT on 31/12/2021, by modality and care setting

Characteristic	Dialysis			Tx		
	Paediatric centres	Adult centres	All	Paediatric centres	Adult centres	All
N	46	12	58	142	25	167
Median (IQR) Hb (g/L)	114 (103-121)	99 (88-109.5)	110 (102-121)	126 (115.5-137)	134 (111-139)	126 (114-137)
% Hb <100g/L	9.1	50.0	17.9	9.2	9.1	9.2
Median (IQR) Ca (mmol/L)	2.5 (2.4-2.6)	2.4 (2.3-2.6)	2.5 (2.4-2.6)	2.4 (2.4-2.5)	2.4 (2.4-2.5)	2.4 (2.4-2.5)
% Ca in range	56.8	66.7	59.2	86.7	86.4	86.7
Median (IQR) Phos (mmol/L)	1.7 (1.4-2.0)	1.9 (1.6-2.0)	1.7 (1.5-2.0)	1.2 (1.0-1.3)	1.2 (0.9-1.4)	1.2 (1.0-1.3)
% phos in range	46.7	41.7	45.6	70.4	57.1	68.5
Median (IQR) bicarb (mmol/L)	24 (22-26)	24 (22-25)	24 (22-26)	23 (21-25)	24 (21-25)	23 (21-25)
% bicarb in range	62.2	81.8	66.7	73.9	68.2	72.9
Median (IQR) SBP (mmHg)	118 (112-132)	127 (121-135)	121 (113-134)	118 (110-125)	122 (116-126)	118 (110-125)
Median (IQR) DBP (mmHg)	72 (62-81)	81 (79-89)	78 (65-83)	70 (64-80)	76 (70-81)	71 (64-80)
% 'normal' BP range (<130/80 mmHg)	54.1	33.3	50.0	67.4	58.3	66.4
% high BP (≥140/90 mmHg)	13.5	22.2	15.2	10.5	8.3	10.3

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

Abbreviations

UK kidney centre abbreviations and other shortened forms used in the 25th Annual Report

UK kidney centre abbreviations

Adult kidney centres

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

Adult kidney centres Continued

Abbreviation	City	Hospital
Wolve	Wolverhampton	New Cross Hospital
York	York	York District General Hospital
NORTHERN IRELAND		
Antrim	Antrim	Antrim Hospital (Northern Trust)
Belfast	Belfast	Belfast City Hospital
Newry	Newry	Daisy Hill Hospital (Southern Trust)
Ulster	Belfast	Ulster Hospital
West NI	Londonderry and Omagh	Tyrone County Hospital (Western Trust)
SCOTLAND		
Abrdn	Aberdeen	Aberdeen Royal Infirmary
Airdrie	Airdrie	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
Krkldy	Kirkcaldy	Victoria Hospital
WALES		
Bangor	Bangor	Ysbyty Gwynedd
Cardff	Cardiff	University Hospital of Wales
Clwyd	Clwyd	Ysbyty Glan Clwyd Hospital
Swanse	Swansea	Morrison 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

AKI	acute kidney injury
APD	automated peritoneal dialysis
AVF	arteriovenous fistula
AVG	arteriovenous graft
Bicarb	bicarbonate
BMI	body mass index
Ca	calcium
CAKUT	congenital abnormalities of the kidneys and urinary tract
CAPD	continuous ambulatory peritoneal dialysis
CC	conservative care
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
eGFR	estimated glomerular filtration rate
ESA	erythropoiesis stimulating agent
ESKD	end-stage kidney disease
FAS	Full Age Spectrum
Ferr	ferritin
GIRFT	Getting It Right First Time
Hb	haemoglobin
HbA1c	glycated haemoglobin
HD	haemodialysis
HES	Hospital Episode Statistics
HHD	home haemodialysis
ICHD	in-centre haemodialysis
IQR	interquartile range
K	potassium
KDIGO	Kidney Disease: Improving Global Outcomes
KRT	kidney replacement therapy
LKD	living kidney donor
MRSA	methicillin-resistant <i>Staphylococcus aureus</i>
MSSA	methicillin-sensitive <i>Staphylococcus aureus</i>

NHS	NAtional Health Service
NHSBT	NHS Blood and Transplant
NI	Northern Ireland
NICE	National Institute for Clinical Excellence
NTL	non-tunnelled line
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
PTH	parathyroid hormone
SBP	systolic blood pressure
SD	standard deviation
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

Prepared by UK Kidney Association staff

Management team

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

Biostatisticians

Dr Anna Casula
Winnie Magadi
David Pitcher
Dr Shalini Santhakumaran
Esther Wong
Aisha Bello
Lewis Downward
Dr Julie Gilg (consultant biostatistician)

Research

Dr Zoe Plummer
Dr Sherry Masoud
Dr Katie Wong
Dr Lucy Plumb

Data managers

Fran Benoy-Deeney
Beth Carter-Crosby
Sarika Dahiya
Sarah Evans
Jacqueline Laken
Jo Wilson

Informatics and operations

Andrew Atterton
Fiona Braddon
Dr Joel Collins
Philip Main
Garry King
Dr Andre Ortega Alban
George Swinnerton
Kate Osmaston
Michael Ruston

Business support

Sarah Crimp
Caitlin Sewell
Dexter Jones
Jennifer Barwell
Sharece Charles
Tom Gray
Kareen Heal
Siobhan Klaus
Stephanie Lock
Amy Robinson
Laura Williams

UK Renal Registry 25th Annual Report

Data to 31/12/2021

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. The UKRR team manages data collection, analysis and reporting on both new and existing patients on KRT each year. The UK Kidney Association 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.



©The UK Kidney Association 2023

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