

Chapter 2

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

Contents

Introduction	2
Rationale for analyses	4
Key findings	6
Analyses	7
Changes to the incident adult RRT population	7
Demographics and start modality of incident adult RRT patients	10
Modality changes of incident adult RRT patients	15
Late presentation to nephrology services of incident adult RRT patients	19
Start estimated glomerular filtration rate in incident adult RRT patients	22
Anaemia in incident adult RRT patients	23
Biochemistry parameters in incident adult RRT patients	26
Dialysis access in incident adult dialysis patients	28
Survival in incident adult RRT patients	34
Cause of death in incident adult RRT patients	41

Introduction

This chapter describes the population of patients who developed end-stage kidney disease (ESKD) and started renal replacement therapy (RRT) in the UK in 2019 (figure 2.1). This includes patients starting dialysis therapies – haemodialysis (HD) and peritoneal dialysis (PD) – and patients who received a pre-emptive kidney transplant (Tx). Patients with a failed Tx who returned to dialysis are not included. Patients who received dialysis for acute kidney injury (AKI), as coded by their reporting renal centre, were only included if their dialysis was subsequently recoded as being for ESKD, when they failed to recover native renal function. Recoding is automatically applied at 90 days for individuals still on RRT (unless advised otherwise by the renal centre – see appendix A for details), but can be applied earlier by reporting centres that identify ESKD before day 90. Individuals who commenced dialysis for AKI and subsequently recovered renal function, died or withdrew from dialysis within the first 90 days of treatment are being analysed separately to this report and are therefore not included in this chapter (although they are shown in figure 2.1). Patients who died, or withdrew from dialysis after being coded as ESKD are included in this chapter, but patients who recovered renal function are not included if they recovered before 90 days on dialysis.

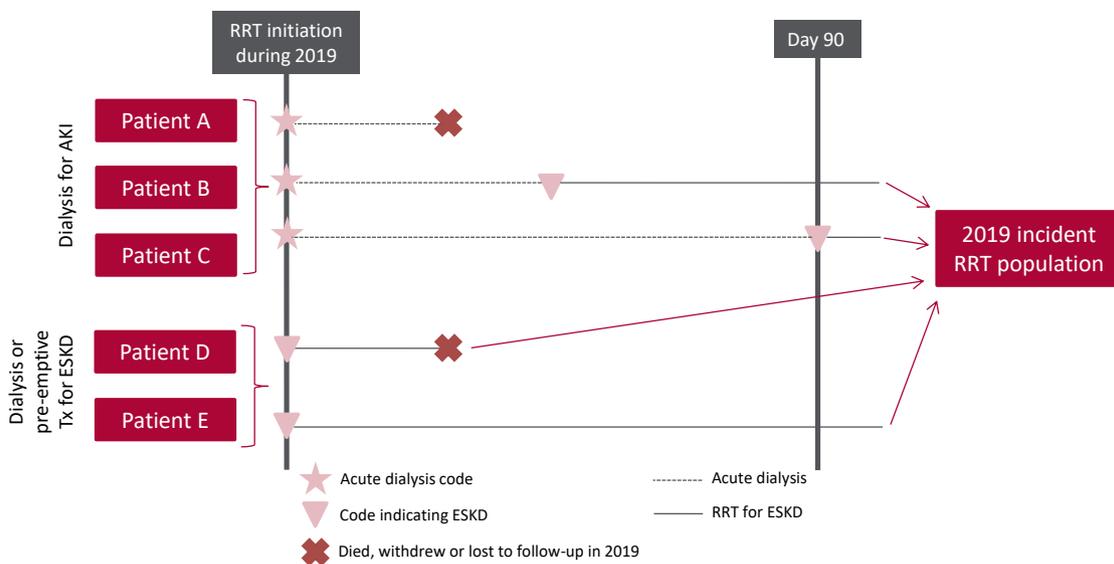


Figure 2.1 Example histories for patients starting RRT, illustrating the use of timeline codes to define dialysis as being ‘acute’ or for ESKD

Note that patients who recovered renal function before 90 days on dialysis are not included in this chapter, whether they were coded as AKI or ESKD.

Note that patients who followed patterns B–E received RRT for ESKD and are counted as ‘incident to RRT’ throughout this report. Patients who followed pattern A are not counted as ‘incident to RRT’ and do not feature in this chapter.

Survival and cause of death analyses were undertaken on historic incident cohorts to allow sufficient follow-up time and numbers of patients. Dialysis access data were collected separately to the main UKRR quarterly data returns via the 2019 Multisite Dialysis Access Audit. This year, fewer data items were collected to reduce the burden on centres and, in future years, the audit will be stopped entirely in centres that provide the data in their regular data returns to the UKRR.

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

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

Rationale for analyses

The analyses begin with a description of the 2019 incident adult RRT population, including the incident number on RRT per million population (pmp). The inclusion of centre-specific reports on the survival of RRT patients reflects the need for transparency following the Francis and Keogh enquiries and the ongoing Care Quality Commission inspections of patient care and outcomes at a number of hospital trusts. Survival analyses have been adjusted for age, sex and comorbidity using renal centre data. Comorbidity data have been augmented using Hospital Episode Statistics (HES) for English renal centres and Patient Episode Database for Wales (PEDW) for Welsh renal centres.

The Renal Association guidelines (renal.org/health-professionals/guidelines/guidelines-commentaries) provide audit measures relevant to the care of patients incident to RRT and, where data permit, their attainment by UK renal centres in 2019 is reported in this chapter (table 2.1). Audit measures in guidelines that have been archived are not included.

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

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

Table 2.1 The Renal Association audit measures relevant to RRT incidence that are reported in this chapter

The Renal Association guideline	Audit criteria	Related analysis/analyses
Planning, initiating and withdrawing RRT (2014)	Proportion of patients commencing PD or HHD	Table 2.3
	Proportion of patients remaining on initial treatment modality 3 and 12 months post initiation of RRT	Tables 2.6–2.8, figures 2.6–2.7
	Percentage of patients commencing RRT referred <3 months and <12 months before date of starting RRT	Tables 2.9–2.12, figure 2.8
	Proportion of patients on UK Tx waiting list at RRT initiation	Table 2.3
	Proportion of RRT patients transplanted pre-emptively from living and deceased donors	Table 2.3, figure 2.6 (partly addressed)
	Estimated glomerular filtration rate (eGFR) at start of RRT and at time of pre-emptive Tx	Figure 2.9
	Proportion of planned initiations with established access or pre-emptive Tx	Table 2.16, figure 2.16
Anaemia (2017)	Number of patients withdrawing from dialysis as a proportion of all deaths on dialysis	Table 2.21
	Proportion of patients initiating RRT with haemoglobin <100 g/L not on erythropoiesis stimulating agent (ESA)	Table 2.13, figure 2.11 (ESA data completeness poor so not included)
Chronic kidney disease (CKD) mineral bone disorder (2018)	Percentage of RRT patients with serum calcium above the normal reference range of 2.2–2.5 mmol/L	Table 2.14, figure 2.12
Vascular access (2015)	>60% of all patients with established ESKD commencing planned HD should receive dialysis via a functioning AVF or AVG	Table 2.16, figure 2.17
Peritoneal access (2009)	>80% of catheters should be patent at 1 year (censoring for death and elective modality change)	Figure 2.7 shows the RRT modality of PD patients at 1 year

AVF – arteriovenous fistula; AVG – arteriovenous graft

Key findings

- 7,945 adult patients started RRT for ESKD in the UK in 2019, a decrease of 1.6% from 2018
- RRT incidence in adults was 151 pmp, comparable to the rate of 152 pmp in 2018
- The median age of incident RRT patients was 64.2 years, but this was dependent on ethnicity (White 66.3 years, Asian 62.3 years and Black 56.3 years)
- 63.5% of incident RRT patients were male
- Diabetes remained the most common identifiable primary renal disease (PRD) for patients starting RRT (30.4%)
- By 90 days, 66.2% of patients were on HD (including HHD), 19.6% on PD, 9.3% had a functioning Tx and 5.0% had died or stopped treatment
- The mean eGFR at the start of RRT was 7.3 mL/min/1.73m² (HD 7.1 mL/min/1.73m², PD 7.4 mL/min/1.73m² and pre-emptive Tx 10.0 mL/min/1.73m²)
- Late presentation was 16.2%
- Of the 5,890 incident dialysis patients with dialysis access data, 54.4% started dialysis with definitive access (23.1% PD and 31.3% HD with an AVF or AVG), 29.4% with a TL and 16.2% with an NTL
- Short-term (90 day) age-adjusted survival of incident RRT patients in a combined 2 year cohort (2017–2018) was 96.7%, which was the same as in the analysis of the 2016–2017 cohort
- 1 year after 90 day age-adjusted survival for incident RRT patients in a combined 2 year cohort (2017–2018) was 91.0% (compared to 90.9% in the previous analysis of the 2016–2017 cohort)
- There were 8 outlying centres in the funnel plot showing 1 year after 90 day age-adjusted survival for incident RRT patients in a combined 4 year cohort (2015–2018): 4 centres below the lower 95% limit and 4 centres above the upper 95% limit. After further adjustment for sex and comorbidities, only 1 centre (Preston) remained below the lower 95% limit and 2 centres (London King's and London Barts) above the upper 95% limit. It is expected that 3 centres would be outside the limits by chance
- There was no cause of death data available for 42.5% of deaths in the first 90 days of RRT. For those with data, the leading causes of death in the first 90 days were cardiac disease (24.0%) and infection (20.3%).

Analyses

Changes to the incident adult RRT population

For the 70 adult renal centres, the number of incident patients on RRT was calculated as a proportion of the estimated centre catchment population (calculated as detailed in appendix A).

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

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

Table 2.2 Continued

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

Country RRT populations were calculated by summing the RRT patients from centres in each country. Estimated country populations were derived from Office for National Statistics figures. See appendix A for details on estimated catchment population by renal centre.

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

pmp – per million population

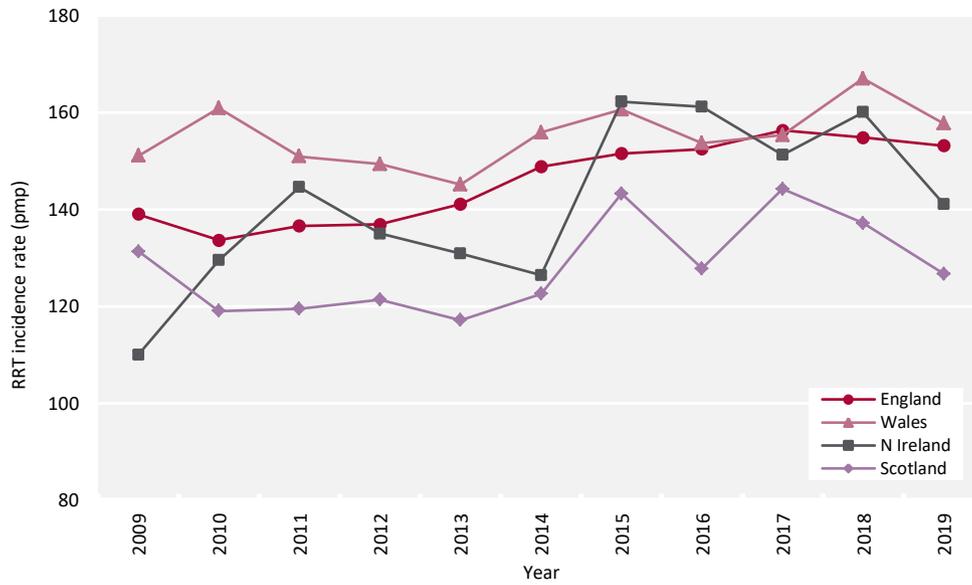


Figure 2.2 Adult RRT incidence rates by country between 2009 and 2019
pmp – per million population

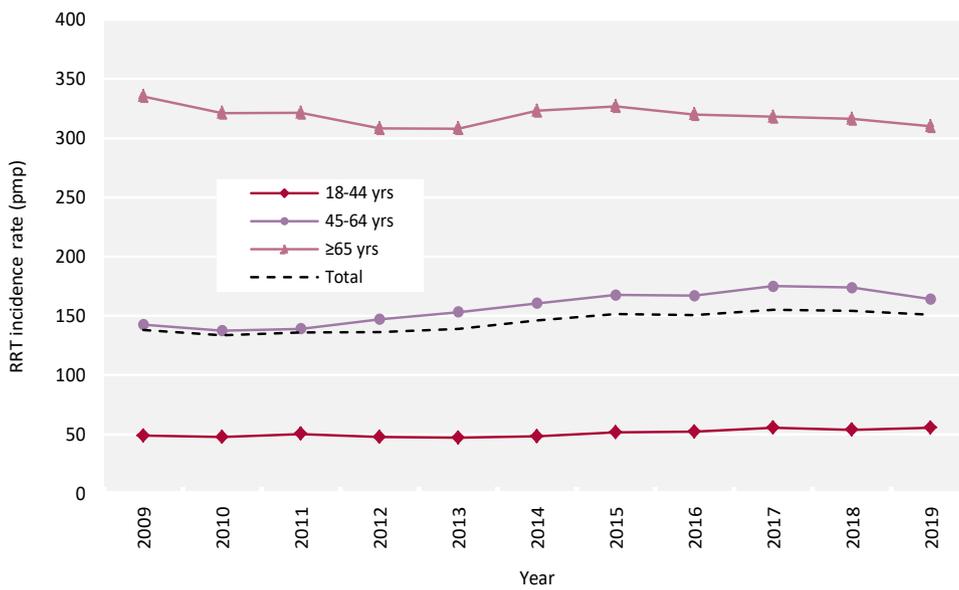


Figure 2.3 Adult RRT incidence rates by age group between 2009 and 2019
pmp – per million population

Demographics and start modality of incident adult RRT patients

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

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

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

Table 2.3 Continued

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

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

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

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

PRDs were grouped into categories as shown in table 2.4, with the mapping of disease codes into groups explained in more detail in appendix A. The proportion of RRT patients in each ethnic group and with each PRD is shown for patients with ethnicity and PRD data, respectively, and these total 100% of patients with data. The proportions of patients with no ethnicity and no PRD data are shown on separate lines.

The longitudinal trend of the PRD distribution, showing an increase in diabetes as the PRD, is presented in table 2.5.

Table 2.4 Demographics, primary renal diseases (PRDs), referral time and start modality of adult patients incident to RRT in 2019 by age group

Characteristic	Age group (yrs)							Total	Median age (yrs)
	18-34	35-44	45-54	55-64	65-74	75-84	≥85		
Total									
N	636	646	1,161	1,665	2,025	1,566	246	7,945	64.2
%	8.0	8.1	14.6	21.0	25.5	19.7	3.1		
Sex (%)									
Male	56.0	61.9	60.8	62.2	63.8	68.6	74.0	63.5	65.2
Female	44.0	38.1	39.2	37.8	36.2	31.4	26.0	36.5	62.7
Ethnicity (%)									
White	71.5	65.6	68.7	70.4	80.8	81.8	86.8	75.3	66.3
Asian	14.5	16.3	15.3	16.8	13.0	11.1	8.2	14.0	62.3
Black	9.2	12.8	12.1	9.1	3.9	5.3	3.2	7.5	56.3
Other	4.8	5.4	3.9	3.8	2.3	1.8	1.8	3.2	57.7
Missing	7.3	6.9	7.7	7.7	7.0	8.1	7.6	7.5	64.5
PRD (%)									
Diabetes	21.3	26.2	33.3	38.0	31.8	25.5	17.1	30.4	62.9
Glomerulonephritis	24.1	21.4	15.4	12.9	9.1	9.1	7.6	13.0	57.1
Hypertension	5.2	7.4	8.0	6.8	7.1	8.0	7.6	7.2	64.5
Polycystic kidney disease	3.3	10.3	12.6	9.7	4.5	3.6	0.5	6.9	56.7
Pyelonephritis	7.6	4.1	4.0	4.7	5.7	6.5	6.6	5.4	66.8
Renal vascular disease	0.3	1.9	0.7	2.9	6.8	11.5	18.5	5.4	75.7
Other	24.3	16.4	16.1	13.7	18.9	15.4	16.1	16.8	64.5
Uncertain aetiology	13.9	12.5	9.9	11.3	16.0	20.5	26.1	14.8	69.5
Missing	9.3	9.4	9.0	9.5	10.3	11.0	14.2	10.0	65.8
Referral time (%)									
<90 days	23.0	21.3	15.0	15.1	16.4	13.9	17.3	16.4	63.0
≥90 days	77.0	78.7	85.0	84.9	83.6	86.1	82.7	83.6	64.9
Missing	6.1	10.0	6.8	6.3	5.9	6.3	5.5	6.5	62.4
Start modality (%)									
ICHD	56.6	59.1	61.0	71.2	76.3	80.7	82.5	71.1	66.5
HHD	0.2	0.3	0.8	0.5	0.5	0.2	0.4	0.5	61.0
PD	27.7	26.5	23.7	18.6	17.1	17.7	17.1	20.1	60.6
Tx	15.6	14.1	14.6	9.6	6.0	1.4	0.0	8.3	53.6

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

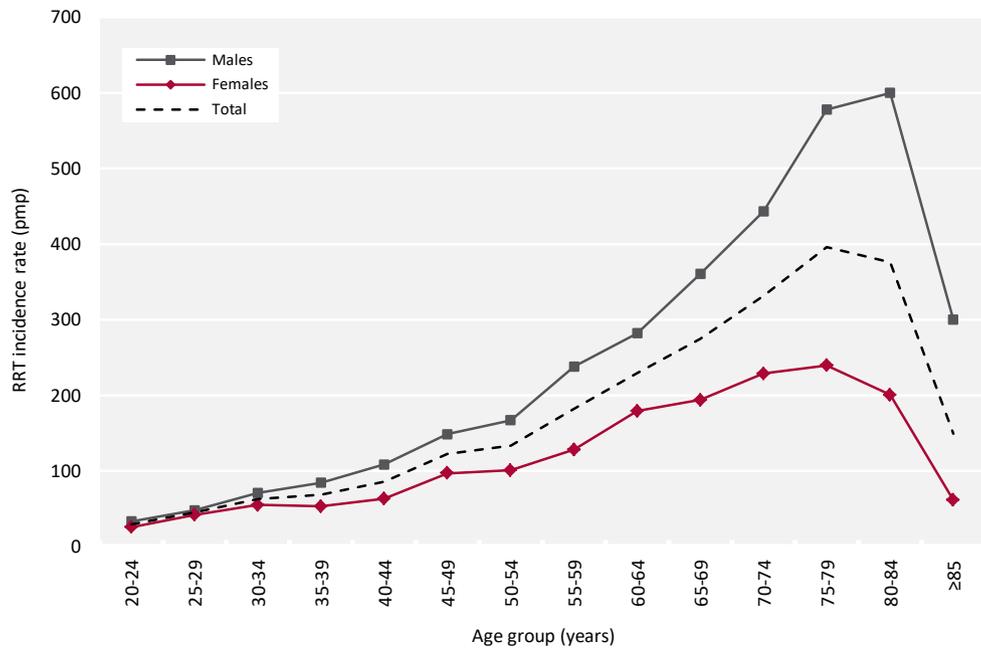


Figure 2.4 Incidence rates for adult patients starting RRT in 2019 by age group and sex
pmp – per million population

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

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

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

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

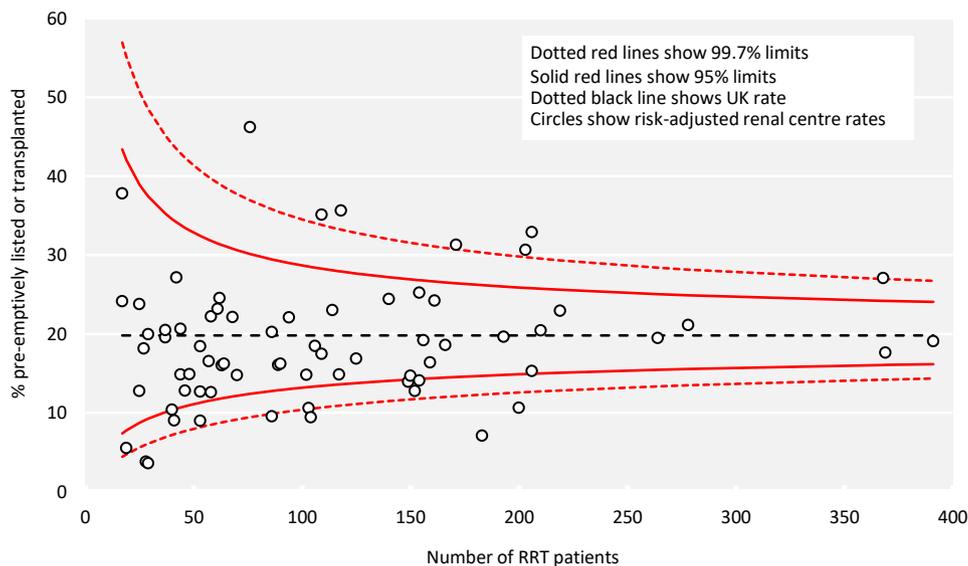


Figure 2.5 Transplant-status (listed or transplanted) at the start of RRT for adult patients incident to RRT in 2019 by centre. Analysis is adjusted for age, sex and PRD (diabetes versus non-diabetes).

Modality changes of incident adult RRT patients

Many patients start on HD, but then switch to other modalities, so the modality in use at 90 days may be more representative of the first elective modality. The analysis of the proportion of patients by treatment modality at three months post-RRT initiation is shown over time (table 2.6) and by UK country (table 2.7). Changes from start modality and deaths during the first five years are shown by start modality (table 2.8). Due to small numbers, the percentage of incident patients on HHD and ICHD at start and 90 days after start of RRT is shown at a UK level (table 2.6), but all HD patients are combined for other analyses.

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

RRT start year	% on ICHD	% on HHD	% on PD	% with Tx
Day 0 modality				
2014	71.4	0.4	19.9	8.3
2015	72.7	0.2	19.2	7.9
2016	71.9	0.4	20.0	7.7
2017	71.6	0.4	19.1	8.9
2018	71.8	0.4	19.6	8.3
2019	71.1	0.5	20.1	8.3
Day 90 modality				
Oct 2013 - Sept 2014	68.7	0.9	20.1	10.3
Oct 2014 - Sept 2015	70.6	0.6	19.2	9.6
Oct 2015 - Sept 2016	68.7	0.9	20.3	10.1
Oct 2016 - Sept 2017	68.6	0.8	20.0	10.6
Oct 2017 - Sept 2018	69.2	0.9	19.8	10.1
Oct 2018 - Sept 2019	68.7	1.0	20.6	9.7

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

Table 2.7 RRT modality at 90 days for adult patients incident to RRT between 01/10/2018 and 30/09/2019 by country

Country	N	Patients who started RRT					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	6,510	66.2	19.8	8.8	1.1	4.1	69.8	20.9	9.3
N Ireland	225	58.1	17.5	20.5	1.7	2.1	60.4	18.2	21.3
Scotland	516	65.8	18.7	12.0	0.6	3.0	68.2	19.4	12.4
Wales	398	72.6	18.1	6.9	0.3	2.2	74.4	18.6	7.0
UK	7,649	66.2	19.6	9.3	1.1	3.9	69.7	20.6	9.7

¹HD included 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 RRT modalities for adult patients incident to RRT in 2014 by time after start

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

Shading indicates proportion of individuals maintained on their initial modality.

¹HD included ICHD and HHD.

²Other is discontinued, recovered, moved away or currently transferring between centres.

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

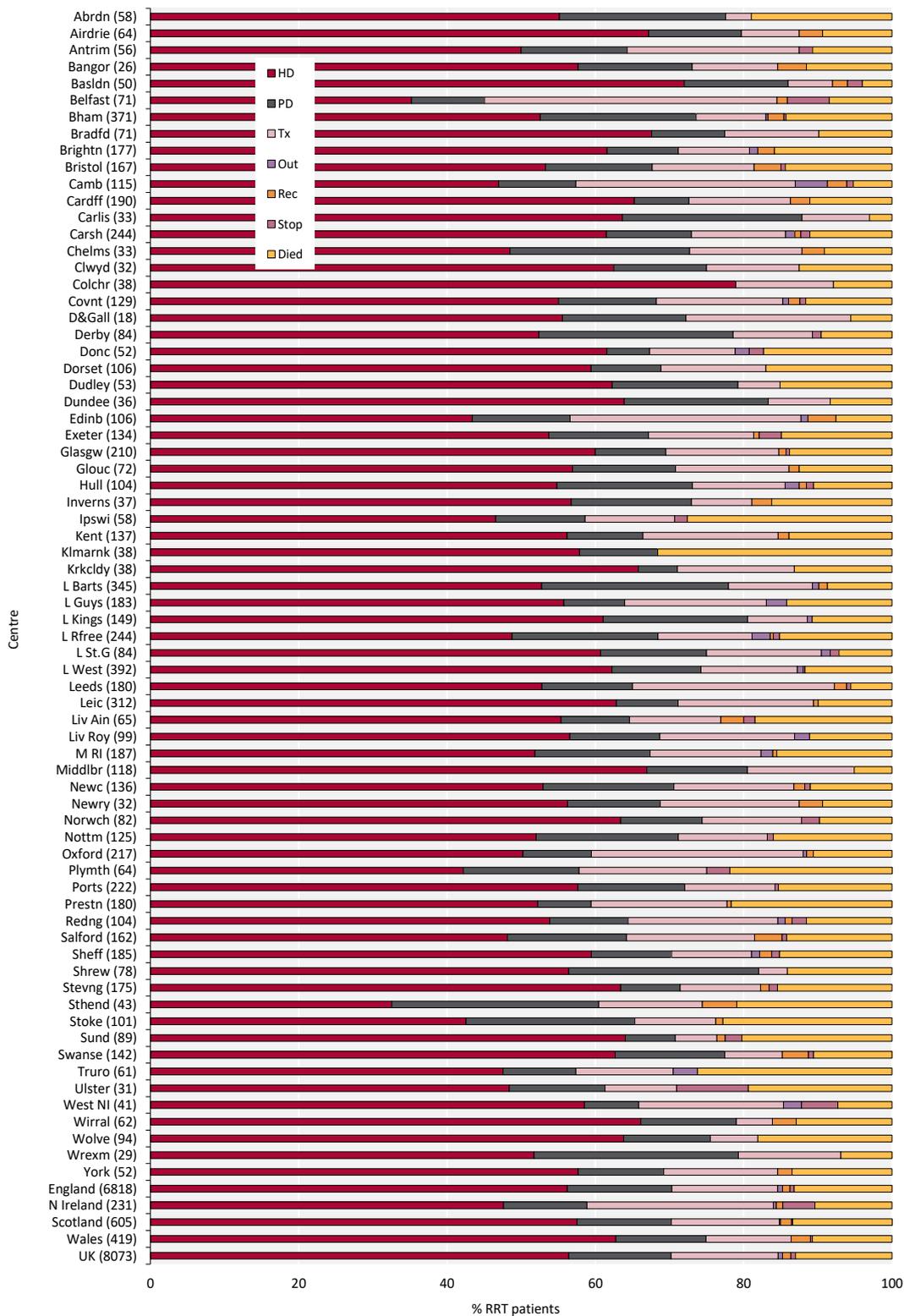


Figure 2.6 RRT modality at 1 year for incident adult RRT patients who started RRT in 2018 by centre

Number of patients in a centre in brackets.

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

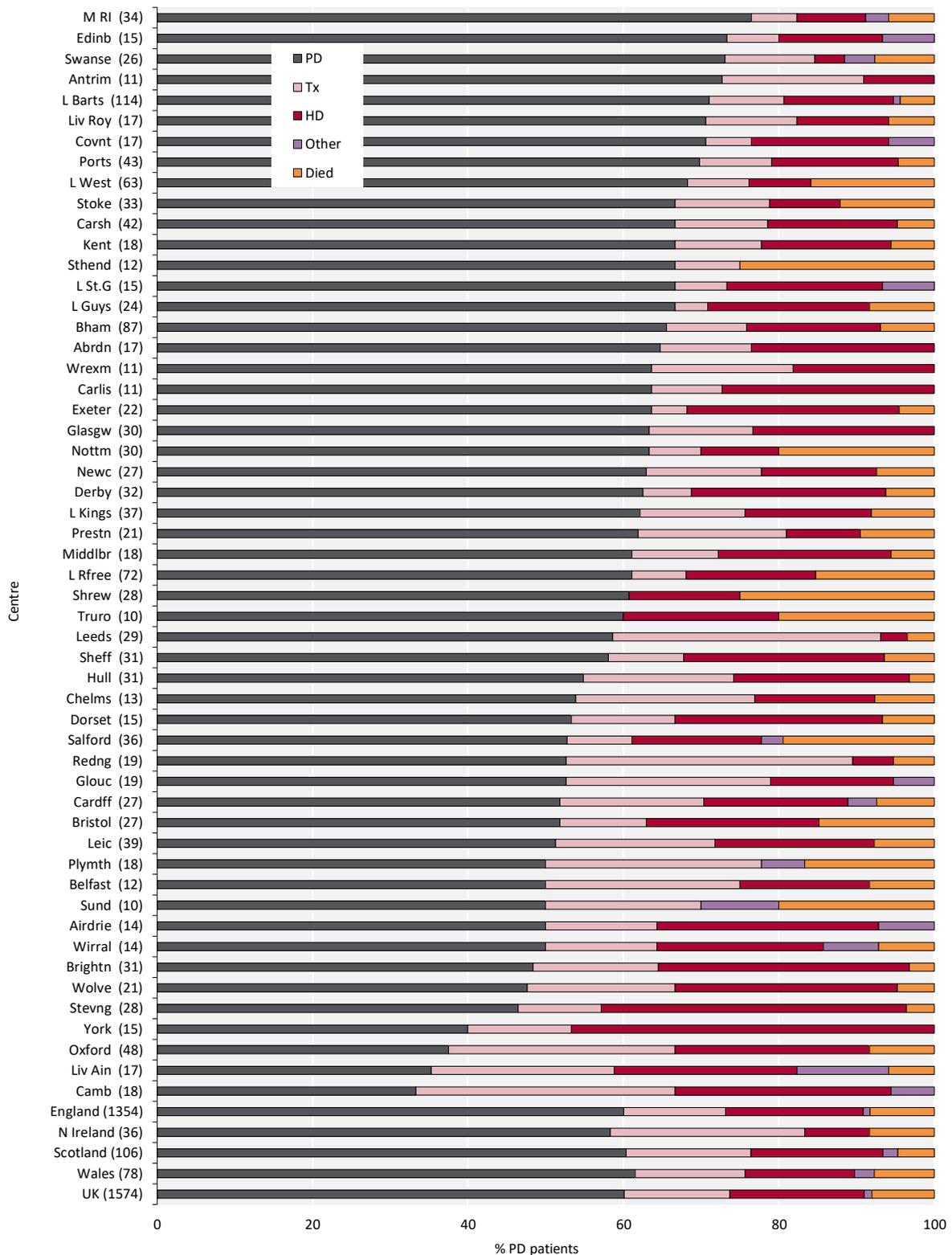


Figure 2.7 RRT modality at 1 year for incident adult PD patients who started RRT in 2018 by centre

Number of patients in a centre in brackets.

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

Late presentation to nephrology services of incident adult RRT patients

Late presentation to a nephrologist is defined as a patient being seen by the renal service for the first time within 90 days of starting RRT and is used interchangeably with referral time in this report. However, the Scottish Renal Registry provided date of referral to nephrology by general practitioner (GP) rather than the date first seen by renal services. Scottish centres are included in this section, but late referral will be underestimated compared to the rest of the UK and Scotland was therefore excluded from the totals. Due to small numbers, a two year cohort (2018–2019) was used at a centre level to estimate late referral to a nephrologist and centres with a completeness of <70% were excluded. Scottish referral data are submitted mid-year to mid-year and so the two year cohort is July 2017 to June 2019 – there are therefore discrepancies between tables 2.3 and table 2.9. A seven year cohort was used to show national longitudinal trends (table 2.12).

Table 2.9 Referral times of incident adult RRT patients by centre (2018–2019 2 year cohort)

Centre	N on RRT		N with referral data	% data completeness		% presenting <90 days before RRT start		% presenting <1 yr before RRT start
	2018	2019		2018	2019	Non-diabetes		All PRDs
						All PRDs	PRDs	
ENGLAND								
Basldn	50	53	103	100.0	100.0	18.4	18.8	41.7
Bham	371	369	739	99.7	100.0	18.5	22.6	30.2
Bradfd	71	104	175	100.0	100.0	14.3	20.2	24.6
Brightn	177	149	326	100.0	100.0	21.5	23.4	34.4
Bristol	167	159	166	99.4	63.5	21.1	25.2	30.7
Camb	115	118	233	100.0	100.0	20.2	21.2	33.5
Carlis	33	41	74	100.0	100.0	8.1	12.0	16.2
Carsh	244	200	442	100.0	99.0	20.6	20.4	34.6
Chelms	33	48	81	100.0	100.0	14.8	16.0	38.3
Colchr	38	40	31	81.6	7.5	12.9	11.1	48.4
Covnt	129	140	245	87.6	94.3	14.7	14.3	26.5
Derby	84	89	173	100.0	100.0	19.1	23.0	29.5
Donc	52	53	96	98.1	84.9	9.4	11.9	18.8
Dorset	106	90	194	100.0	97.8	11.9	11.1	22.2
Dudley	53	53	106	100.0	100.0	9.4	11.1	19.8
Exeter	134	152	286	100.0	100.0	18.5	20.8	29.0
Glouc	72	61	133	100.0	100.0	11.3	11.2	21.8
Hull	104	106	210	100.0	100.0	22.9	28.5	34.3
Ipswi	58	57	45	17.2	78.9	20.0		26.7
Kent	137	150	285	99.3	99.3	14.0	15.8	20.4
L Barts	345	278		4.6	1.8			
L Guys	183	210	387	98.4	98.6	17.8	22.6	32.6
L Kings	149	183	330	100.0	98.9	15.8	18.8	24.5
L Rfree	244	264	497	98.0	97.7	14.3	16.9	26.0
L St.G	84	102	167	81.0	97.1	31.7	35.6	50.3
L West	392	391	780	99.5	99.7	16.2	19.1	33.2
Leeds	180	161	341	100.0	100.0	16.4	18.9	31.7
Leic	312	368	679	99.7	100.0	14.7	10.8	23.7
Liv Ain	65	37	101	98.5	100.0	15.8	18.9	27.7
Liv Roy	99	68	159	98.0	91.2	21.4	21.0	32.7
M RI	187	206	386	97.9	98.5	17.9	16.5	31.9
Middlbr	118	109	226	100.0	99.1	15.0	18.1	33.2
Newc	136	114	250	100.0	100.0	16.8	20.6	27.2
Norwch	82	103	167	96.3	85.4	32.9	31.8	46.7
Nottm	125	125	249	99.2	100.0	14.1	17.8	23.7
Oxford	217	206	423	100.0	100.0	14.4	16.5	24.3

Table 2.9 Continued

Centre	N on RRT		N with referral data	% data completeness		% presenting <90 days before RRT start		% presenting <1 yr before RRT start
	2018	2019		2018	2019	Non-diabetes		All PRDs
			All PRDs			PRDs		
Plymth	64	62	123	98.4	96.8	19.5	19.6	28.5
Ports	222	219	436	99.1	98.6	8.9		25.5
Prestn	180	154	334	100.0	100.0	17.7	21.4	32.0
Redng	104	117	221	100.0	100.0	13.1	16.7	18.6
Salford	162	171	331	99.4	99.4	16.6	20.4	29.0
Sheff	185	154	339	100.0	100.0	19.5	24.5	28.0
Shrew	78	64	142	100.0	100.0	16.2	17.5	31.0
Stevng	175	193	368	100.0	100.0	9.0	10.1	14.1
Sthend	43	44	83	95.3	95.5	25.3	31.6	38.6
Stoke	101	94	177	99.0	81.9	17.5	19.4	33.3
Sund	89	86	175	100.0	100.0	17.1	21.1	32.6
Truro	61	58	118	98.4	100.0	16.9	20.0	34.7
Wirral	62	63	125	100.0	100.0	12.0	15.1	24.8
Wolve	94	86	180	100.0	100.0	12.8	17.5	26.7
York	52	58	110	100.0	100.0	10.0	10.3	26.4
N IRELAND								
Antrim	56	42	93	96.4	92.9	16.1	17.4	25.8
Belfast	71	76	128	88.7	85.5	10.9	15.1	13.3
Newry	32	25	57	100.0	100.0	26.3	28.9	38.6
Ulster	31	25	56	100.0	100.0	16.1	21.4	26.8
West NI	41	37	78	100.0	100.0	19.2	22.0	24.4
SCOTLAND								
Abrdn	54	50	87	90.7	76.0	13.8	16.9	23.0
Airdrie	78	58	131	100.0	91.4	11.5	14.9	22.9
D&Gall	14	20	13	92.9	65.0	15.4	28.6	30.8
Dundee	42	29	60	81.0	89.7	16.7	22.5	38.3
Edinb	114	109	184	85.1	79.8	10.9	13.0	21.2
Glasgw	202	200	356	92.6	84.5	11.2	16.8	17.7
Inverns	31	24	49	96.8	79.2	20.4	30.0	30.6
Klmarnk	45	35	77	97.8	94.3	16.9	21.8	22.1
Krkldy	41	36	70	92.7	88.9	15.7	19.6	25.7
WALES								
Bangor	26	19	45	100.0	100.0	11.1	14.3	20.0
Cardff	190	166	356	100.0	100.0	9.6	12.4	17.4
Clwyd	32	29	61	100.0	100.0	16.4	21.4	41.0
Swanse	142	156	298	100.0	100.0	9.7	14.0	18.8
Wrexm	29	28	56	100.0	96.4	8.9	8.3	26.8
TOTALS								
England	6,818	6,780	12,682	93.4	93.1	16.5	18.8	28.9
N Ireland	231	205	412	95.7	93.2	16.5	20.1	23.5
Scotland	621	561	1,040	91.8	83.8	13.1	17.6	22.4
Wales	419	398	816	100.0	99.7	10.2	13.5	20.5
E, W & NI	7,468	7,383	13,910	93.8	93.5	16.2	18.5	28.2

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

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

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

PRD – primary renal disease

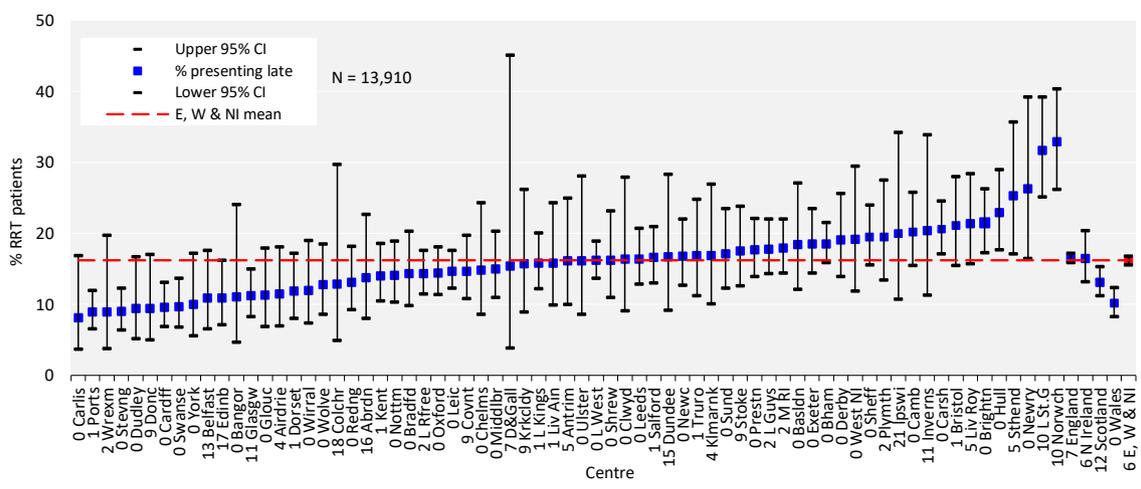


Figure 2.8 Percentage of incident adult RRT patients presenting late (<90 days) to a nephrologist (2018–2019 2 year cohort)
 CI – confidence interval

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

Characteristic	Referral time	
	<90 days	≥90 days
Median age (yrs)	63.4	64.5
% male	64.7	63.2
% starting on PD	7.0	21.2
% on PD at 90 days	9.8	21.2
Mean haemoglobin at RRT start (g/L)	92	100
Mean eGFR at RRT start (mL/min/1.73m ²) ¹	6.6	7.5

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

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

Table 2.11 Referral time of incident adult RRT patients by primary renal disease (PRD) (2018–2019 2 year cohort)

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

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

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

Start estimated glomerular filtration rate in incident adult RRT patients

Start eGFR was calculated using the CKD Epidemiology Collaboration method for incident RRT patients by age group and by start modality. Care needs to be taken in interpreting these data because (i) start eGFR data completeness is poor (50% overall), (ii) if the date of RRT start is incorrect, the documented start eGFR may have been taken after the patient had started RRT.

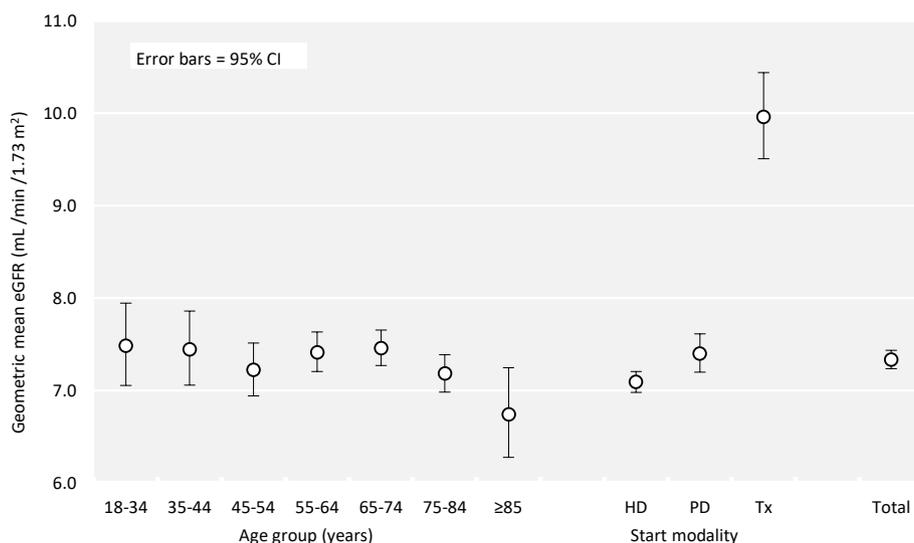


Figure 2.9 Geometric mean estimated glomerular filtration rates (eGFR) for adult patients incident to RRT in 2019 by age group and start modality

CI – confidence interval

Anaemia in incident adult RRT patients

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

Table 2.13 Haemoglobin (Hb) data for adult patients incident to RRT in 2019 by centre

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

Table 2.13 Continued

Centre	All RRT patients		Median Hb (g/L) by modality			Median Hb (g/L) by presentation time		% data completeness
	Median Hb (g/L)	% Hb \geq 100 g/L	Tx	PD	HD	\geq 90 days	<90 days	
Stevng	92	29.6		103	90	92	87	97.9
Sthend	100	50.0		108	89	102		95.5
Stoke	105	63.3		113	100	105		95.7
Sund	101	51.2		110	98	103	92	95.4
Truro	99	45.6		111	95	100		98.3
Wirral	94	40.4			91	96		82.5
Wolve	99	48.0		110	97	102	82	84.9
York	100	52.9		113	93	102		87.9
N IRELAND								
Antrim	98	42.9			93	98		100.0
Belfast	107	62.0	109	114	95	108		93.4
Newry	94	47.8			94	94		92.0
Ulster	99	47.8			99	99		92.0
West NI	109	66.7			106	110		89.2
SCOTLAND								
Abrdn	97	40.7			91	94		93.1
Airdrie	94	35.7			93	96		80.0
D&Gall	109	75.0			108			94.1
Dundee	100	50.0			99	98		74.1
Edinb	106	67.8	112	112	103	102	88	82.6
Glasgw	97	44.1	101	107	94	94	92	91.6
Inverns	100	53.9			98	103		76.5
Klmarnk	96	29.7		100	96	95		84.1
Krkldy	102	57.6			99	105		71.7
WALES								
Bangor	110	68.4			99	113		100.0
Cardff	101	55.8	105	106	99	102	92	99.4
Clwyd	96	25.9			96	96		93.1
Swanse	101	55.5	105	116	98	102	91	99.4
Wrexm	98	38.5			93	98		92.9
TOTALS								
England	98	47.4	108	106	95	99	91	94.2
N Ireland	104	55.2	110	111	97	104	97	93.7
Scotland	99	48.7	104	107	96	98	92	85.1
Wales	100	53.1	105	114	98	101	91	98.5
UK¹	99	48.0	108	107	95	100	91	93.8

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

¹Scottish data were not used to calculate the UK average by presentation time because of a difference in definition (see appendix A).

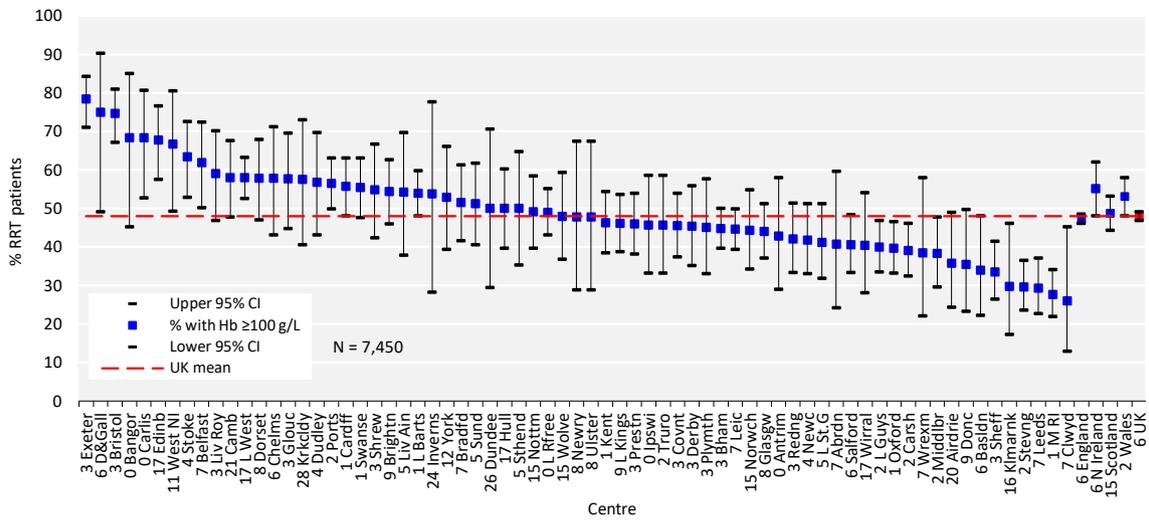


Figure 2.10 Percentage of adult patients incident to RRT in 2019 with haemoglobin (Hb) ≥ 100 g/L at start of RRT treatment by centre
 CI – confidence interval

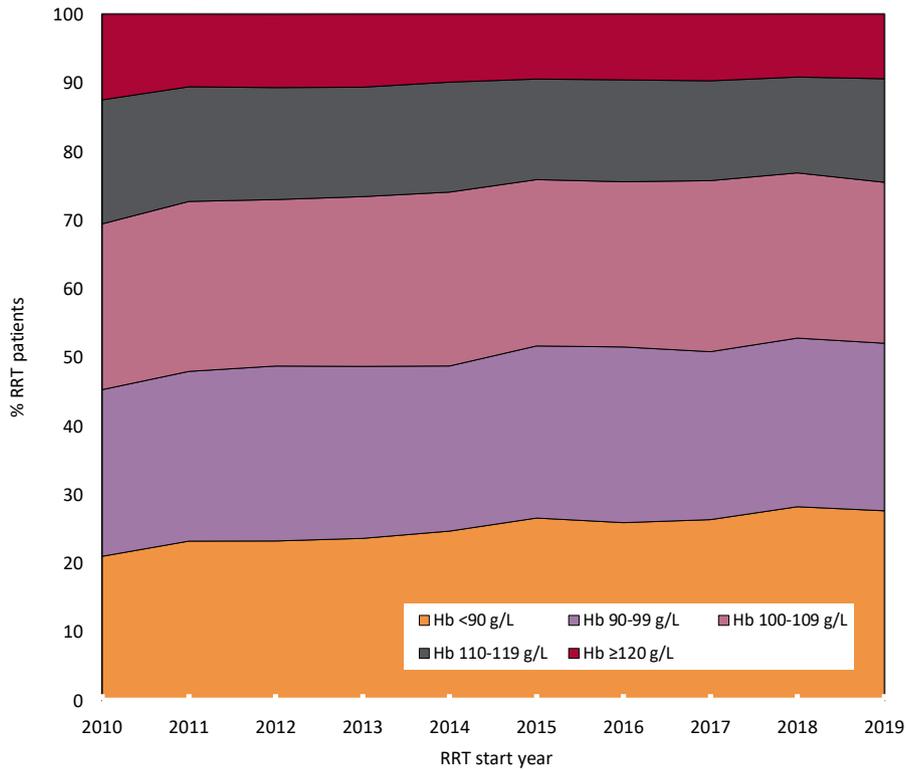


Figure 2.11 Distribution of haemoglobin (Hb) in incident adult RRT patients by year of start between 2010 and 2019

Biochemistry parameters in incident adult RRT patients

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

Table 2.14 Median adjusted calcium (Ca) and percentage with adjusted Ca within and above the target range (2.2–2.5 mmol/L) in adult patients incident to RRT in 2019 by centre

Centre	Median adj Ca (mmol/L)	% adj Ca 2.2–2.5 mmol/L	% adj Ca >2.5 mmol/L	% data completeness
ENGLAND				
Basldn	2.4	84.0	12.0	94.3
Bham	2.3	83.2	7.1	99.7
Bradfd	2.4	79.4	6.2	93.3
Brightn	2.3	77.6	6.8	98.7
Bristol	2.3	89.3	8.8	100.0
Camb	2.4	81.2	12.8	99.2
Carlis	2.2	75.6	2.4	100.0
Carsh	2.3	76.2	4.7	96.5
Chelms	2.3	83.0	4.3	97.9
Colchr	2.3	80.0	5.7	87.5
Covnt	2.3	82.6	3.6	98.6
Derby	2.4	86.5	9.0	100.0
Donc	2.3	86.5	7.7	98.1
Dorset	2.3	83.3	5.6	100.0
Dudley	2.4	88.5	5.8	98.1
Exeter	2.3	86.8	6.0	99.3
Glouc	2.3	83.6	3.3	100.0
Hull	2.4	83.3	10.8	96.2
Ipswi	2.3	84.2	8.8	100.0
Kent	2.3	75.3	12.0	100.0
L Barts	2.3	82.0	3.6	99.6
L Guys	2.4	78.5	12.4	99.5
L Kings	2.2	76.7	5.0	98.4
L Rfree	2.3	84.5	5.7	100.0
L St.G	2.4	82.8	9.1	97.1
L West	2.4	75.3	11.6	81.8
Leeds	2.3	82.6	9.3	100.0
Leic	2.3	82.2	6.7	97.6
Liv Ain	2.3	75.7	10.8	100.0
Liv Roy	2.4	85.3	10.3	100.0
M RI	2.4	74.8	13.6	100.0
Middlbr	2.2	56.9	3.7	100.0
Newc	2.4	83.3	8.8	100.0
Norwch	2.4	78.3	9.8	89.3
Nottm	2.3	73.6	8.0	100.0
Oxford	2.4	78.9	12.8	99.0
Plymth	2.3	85.3	3.3	98.4
Ports	2.3	83.0	7.8	99.1
Prestn	2.3	73.8	2.8	91.6
Redng	2.3	88.9	4.3	100.0
Salford	2.4	84.9	6.0	97.1
Sheff	2.2	74.7	3.9	100.0
Shrew	2.3	92.2	6.3	100.0
Stevng	2.3	82.9	6.7	100.0
Sthend	2.4	86.4	2.3	100.0

Table 2.14 Continued

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

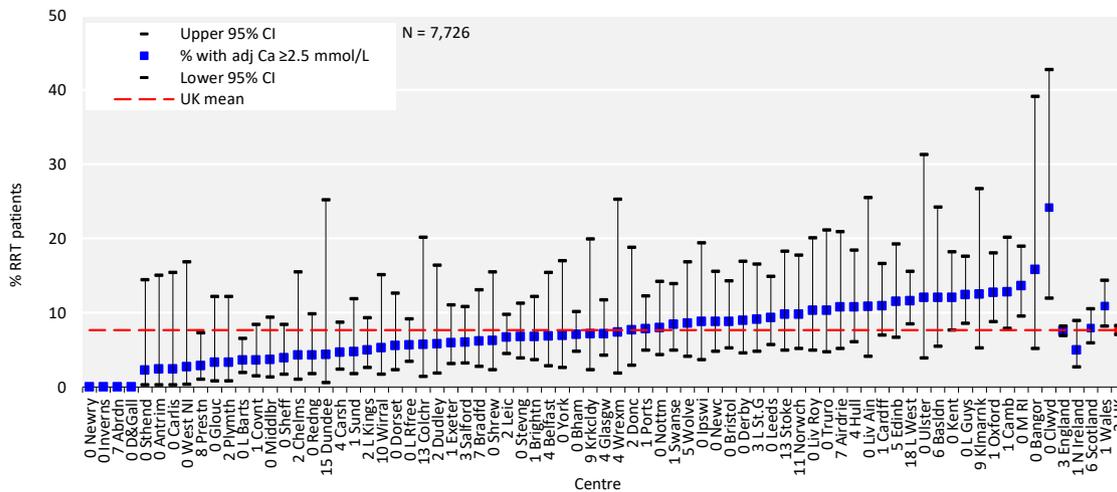


Figure 2.12 Percentage of adult patients incident to RRT in 2019 with adjusted calcium (Ca) above the normal range (>2.5 mmol/L) by centre
 CI – confidence interval

Dialysis access in incident adult dialysis patients

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

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

Characteristic	HD – first dialysis access type				PD		
	N	AVF/AVG	TL	NTL	N	Total	
Total							
N	4,530	1,842	1,733	955	1,360	5,890	
%		40.7	38.3	21.1			
Age (%)	Median (yrs)	66	68	64	67	61	65
	IQR (yrs)	55,75	58,76	51,74	53,75	47,73	53,75
	<45 yrs	571	22.6	53.8	23.6	297	868
	45–54 yrs	583	36.4	40.8	22.8	237	820
	55–64 yrs	965	44.8	37.4	17.8	258	1,223
	65–74 yrs	1,252	42.7	35.3	22.0	293	1,545
	≥75 yrs	1,159	46.1	33.2	20.7	275	1,434
PRD (%)	Diabetes	1,278	43.7	37.9	18.5	335	1,613
	Glomerulonephritis	438	39.7	42.9	17.4	218	656
	Hypertension	293	44.4	37.2	18.4	76	369
	Polycystic kidney disease	200	66.0	27.5	6.5	92	292
	Pyelonephritis	208	43.3	38.5	18.3	46	254
	Renal vascular disease	243	48.6	35.8	15.6	66	309
	Other	684	23.4	42.1	34.5	157	841
	Uncertain aetiology	550	40.0	40.4	19.6	190	740
	Missing	171	36.3	37.4	26.3	38	209
Referral time (%)	<90 days	827	4.0	49.6	46.4	79	906
	90–179 days	194	22.2	54.1	23.7	62	256
	180–364 days	344	37.8	43.6	18.6	116	460
	≥365 days	2,727	53.6	32.6	13.8	992	3,719
	Missing	35	20.0	42.9	37.1	18	53
Sex (%)	Male	2,911	41.6	37.5	20.9	853	3,764
	Female	1,619	39.0	39.7	21.4	507	2,126
Ethnicity (%)	White	2,835	41.8	36.4	21.8	895	3,730
	Asian	525	41.1	39.2	19.6	152	677
	Black	265	34.3	41.9	23.8	73	338
	Other	94	31.9	53.2	14.9	30	124
	Missing	279	31.5	44.4	24.0	66	345
eGFR at start¹	Median	7	7	7	7	7	7
	IQR (yrs)	6,9	6,9	6,9	5,9	6,9	6,9
Diabetes² (%)	Yes	635	44.4	34.3	21.3	143	778
	No	771	39.0	35.0	25.9	268	1,039
	Missing	127	28.3	46.5	25.2	21	148

¹eGFR units are mL/min/1.73m².

²Diabetes at start of dialysis as per the Multisite Dialysis Access Audit, or as a comorbidity or PRD from the UKRR database.

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

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

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

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

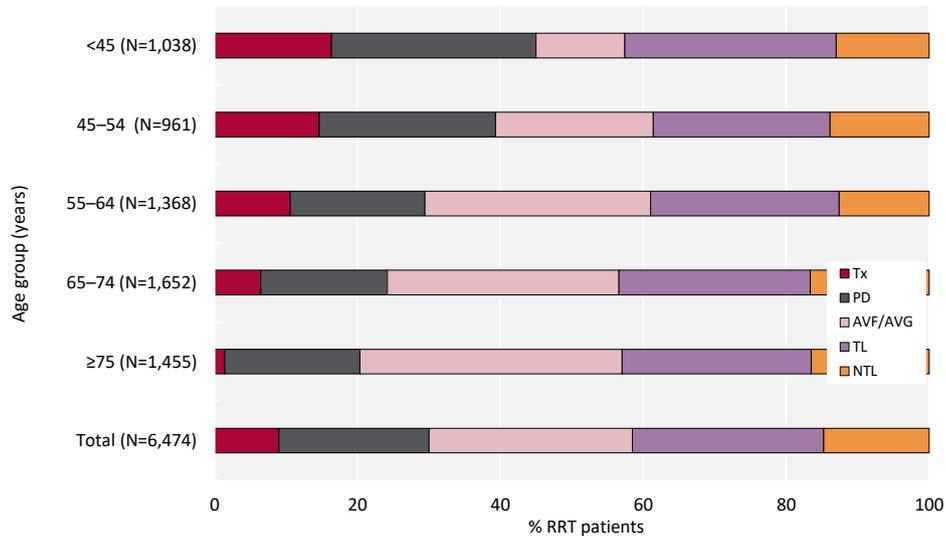


Figure 2.13 Dialysis access used for adult patients incident to RRT in 2019 by age group (2019 Multisite Dialysis Access Audit)

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

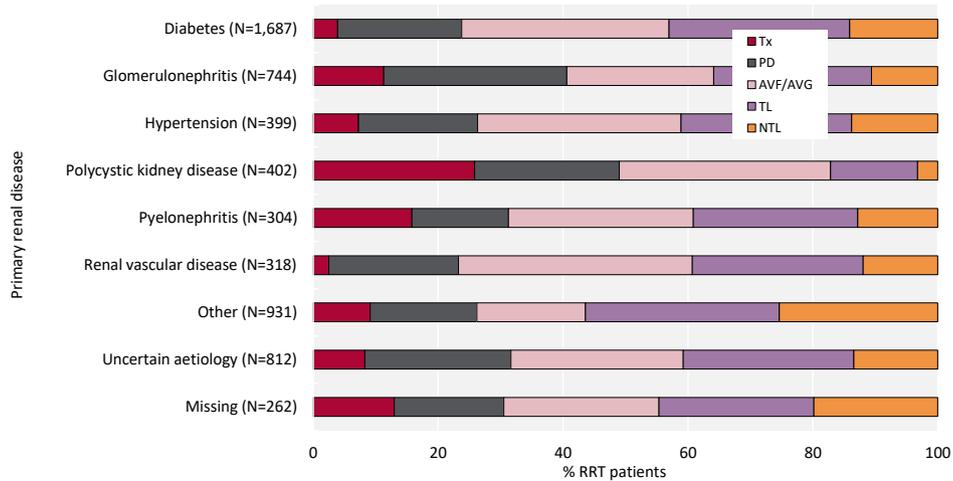


Figure 2.14 Dialysis access used for adult patients incident to RRT in 2019 by primary renal disease (2019 Multisite Dialysis Access Audit)

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

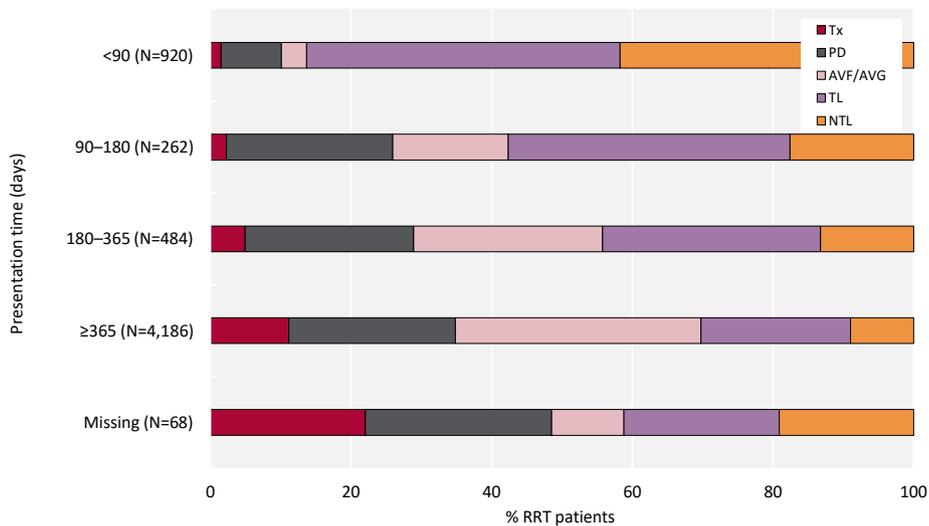


Figure 2.15 Dialysis access used for adult patients incident to RRT in 2019 by presentation time (2019 Multisite Dialysis Access Audit)
 AVF – arteriovenous fistula; AVG – arteriovenous graft; NTL – non-tunnelled line; TL – tunnelled line

The audit measures related to dialysis access at RRT start include the proportion of planned starts on RRT with a pre-emptive Tx or with definitive access. In addition, at least 60% of the planned HD starts should be with either an AVF or an AVG. The proportions of patients who commenced dialysis with definitive access (AVF/AVG/ PD catheter) were reported for centres returning adequate data. West NI is two centres combined, but only one submitted vascular access data. The number of patients on dialysis at West NI is therefore lower than presented elsewhere in the report.

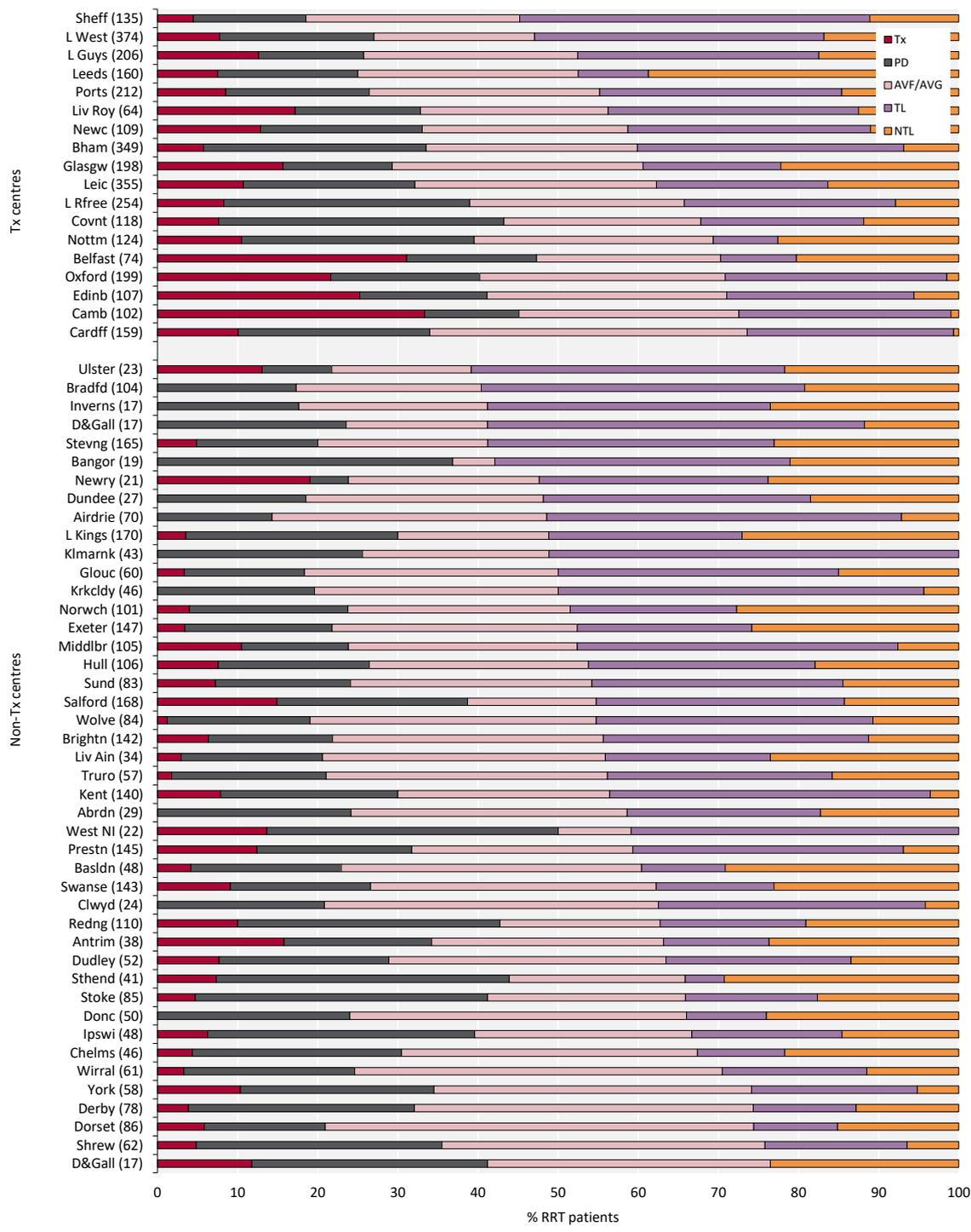


Figure 2.16 First dialysis access used for adult patients incident to RRT in 2019 by centre (2019 Multisite Dialysis Access Audit)

Number of incident patients on RRT in a centre in brackets.

Centres are ordered by decreasing use of lines.

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

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

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

Centres with <70% access or time of referral data were excluded. Start modality breakdown includes patients with missing referral time.

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

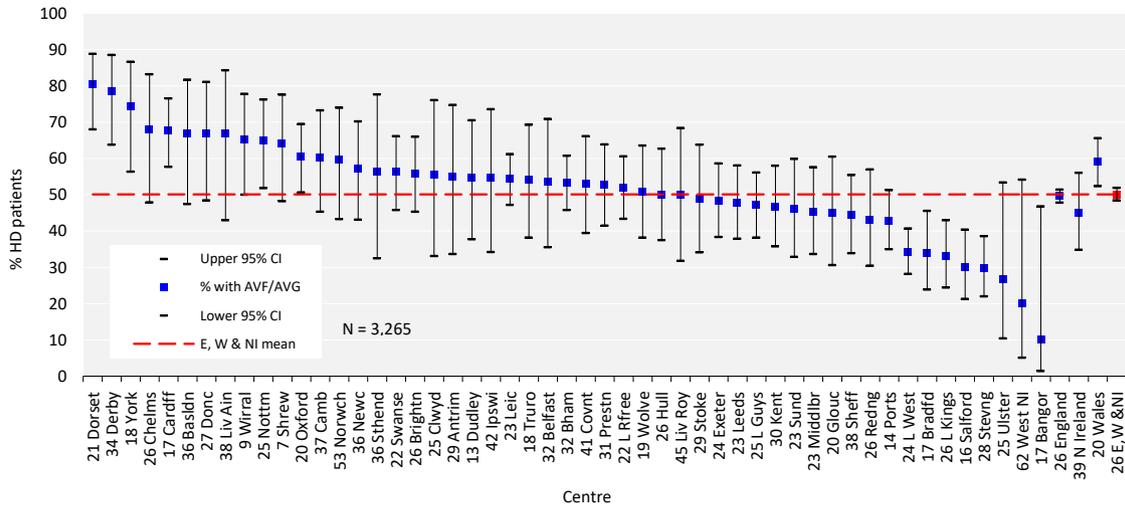


Figure 2.17 Percentage of adult patients incident to HD in 2019 who started dialysis using either an arteriovenous fistula (AVF) or an arteriovenous graft (AVG) by centre, excluding late presenters (2019 Multisite Dialysis Access Audit)

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

CI – confidence interval

Survival in incident adult RRT patients

The survival of patients who started RRT for ESKD is described, with primary focus on the one year incident to RRT in 2018 cohort, followed up for a year. Some analyses used rolling incident cohorts over several years (two years or more as stated) to increase cohort patient numbers and more reliably identify survival differences between compared countries or centres. Analyses included patients who were coded as being on chronic dialysis for ESKD who died during the first 90 days (unless stated otherwise), provided that data were returned to the UKRR. Analyses were often adjusted to age 60 years to allow comparisons between centres with different age distributions and one analysis was also adjusted for sex and comorbidity. However, analyses were not generally adjusted for differences in ethnicity, PRD, socioeconomic status or comorbidity.

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

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

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

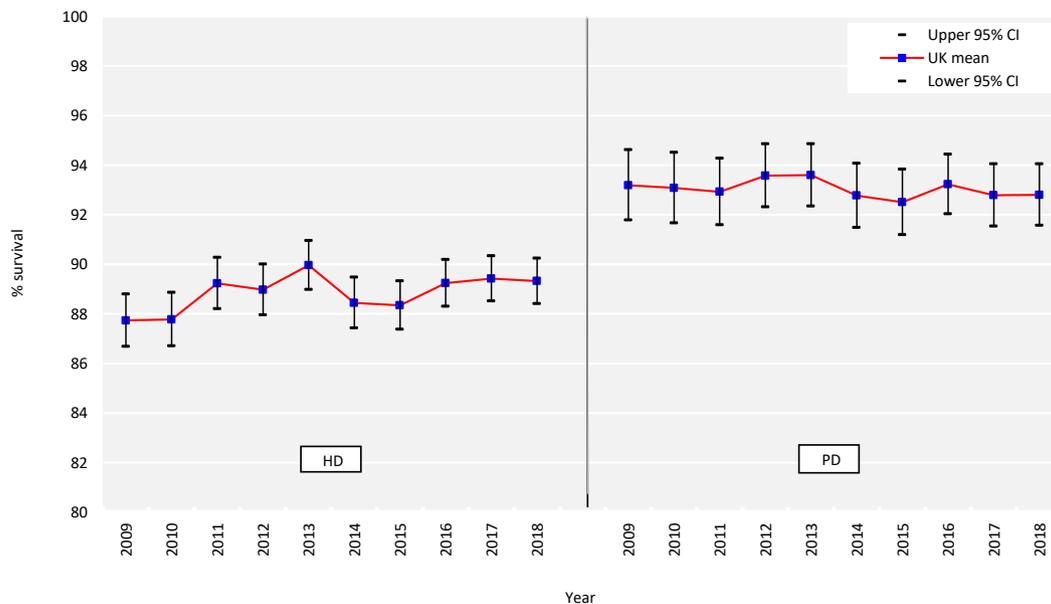


Figure 2.18 1 year after 90 days survival (adjusted to age 60 years) of incident adult RRT patients by start modality between 2009 and 2018
 CI – confidence interval

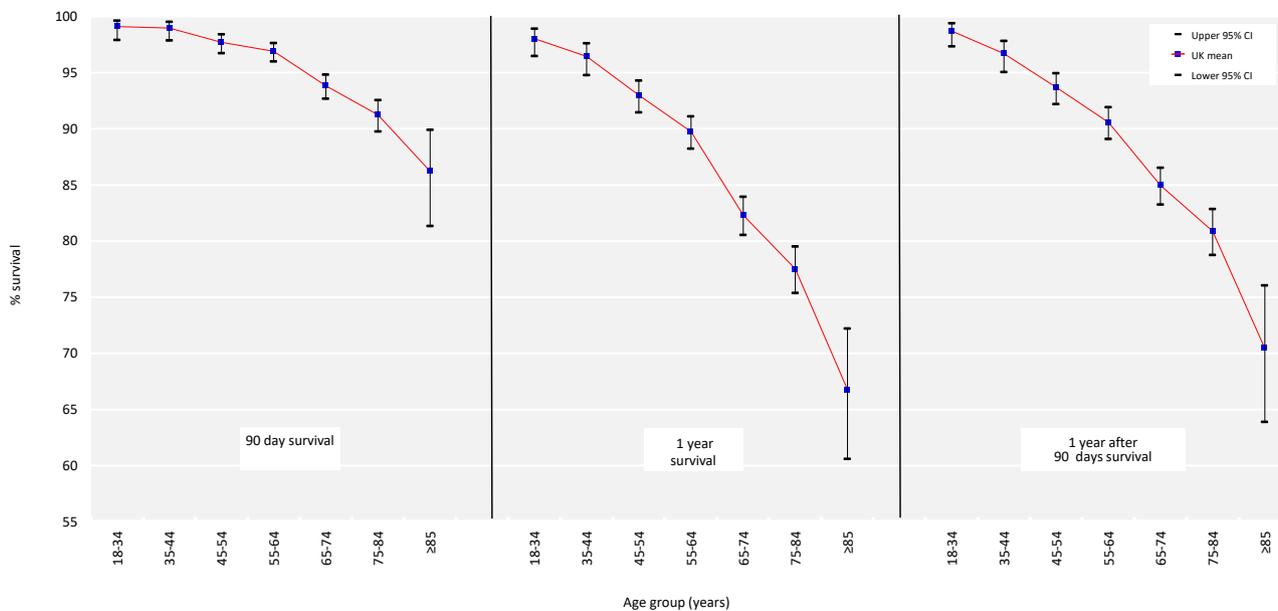


Figure 2.19 90 days, 1 year and 1 year after 90 days survival of incident adult RRT patients by age group (2018 cohort)
 CI – confidence interval

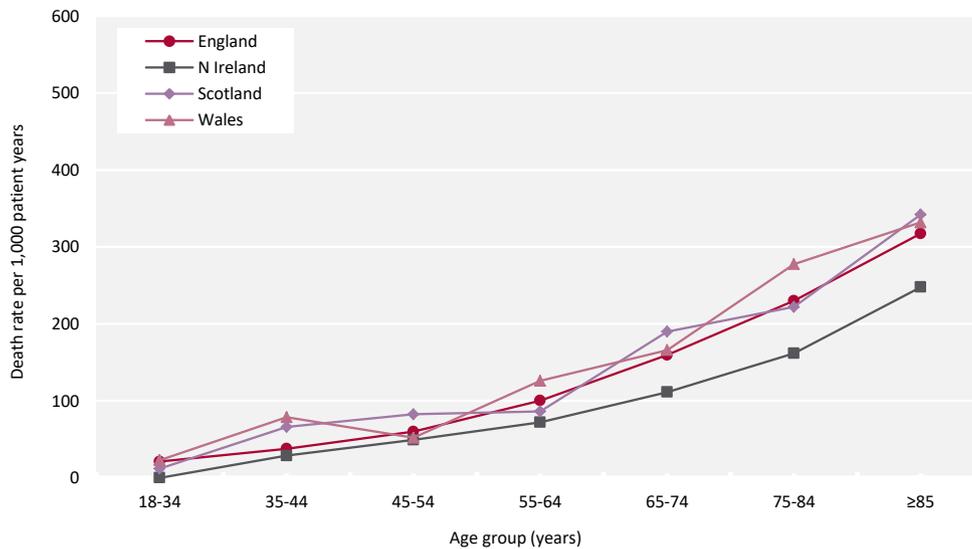


Figure 2.20 1 year after 90 days death rate per 1,000 incident RRT adult patient years by age group and country (2015–2018 4 year cohort)

A ten year rolling cohort was used to analyse the long term survival of incident patients from start of RRT (day 0), according to age at RRT start (figure 2.21), with median survival identifiable from the y-axis. The same cohort was used in analyses of the monthly and six monthly hazard of death on RRT by age group (figures 2.22 and 2.23).

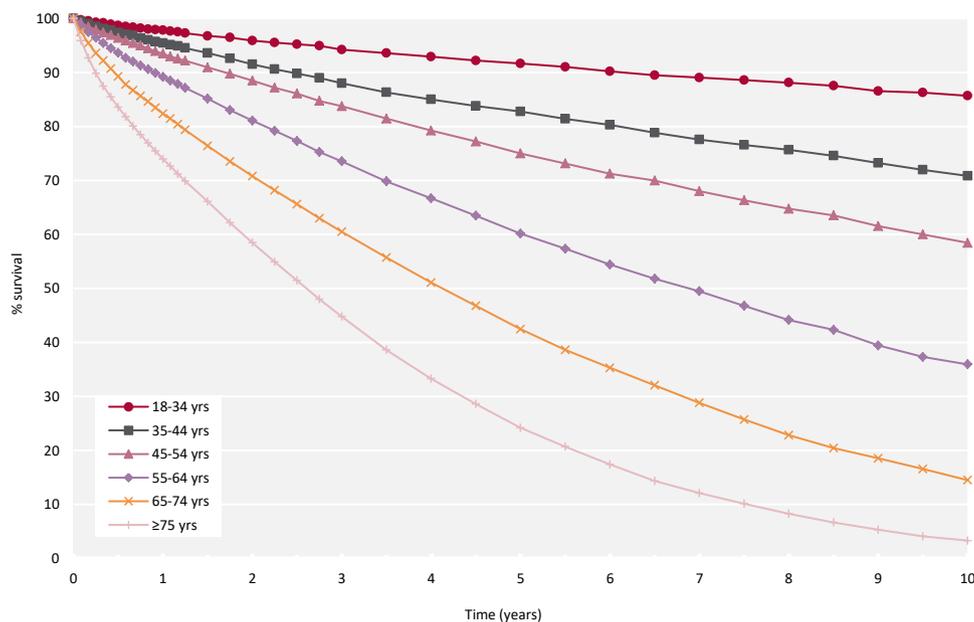


Figure 2.21 Survival (unadjusted) of incident adult RRT patients from day 0 by age group (2009–2018 10 year cohort)

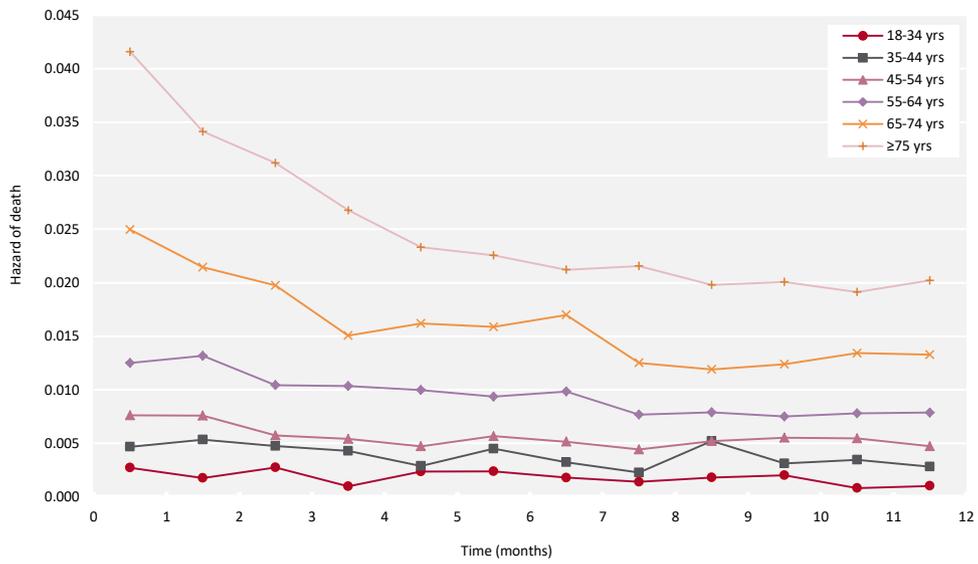


Figure 2.22 Monthly hazard of death (unadjusted) of incident adult RRT patients from day 0 to 1 year by age group (2009–2018 10 year cohort)

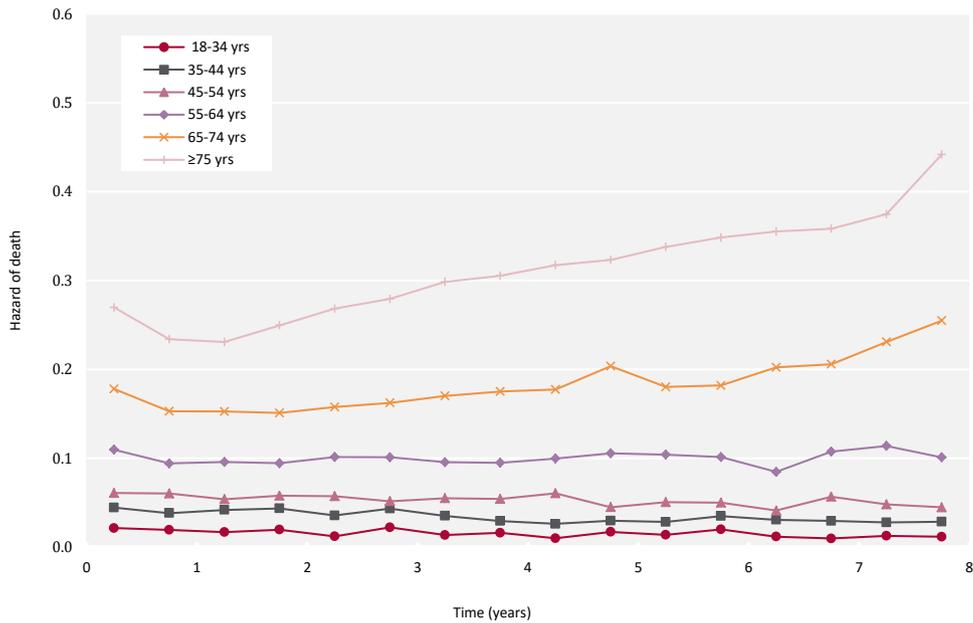


Figure 2.23 6 monthly hazard of death (unadjusted) of incident adult RRT patients from day 0 to 8 years by age group (2008–2017 10 year cohort)

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

Cohort	Unadjusted survival (%)										95% CI for latest year	N	
	1 yr	2 yr	3 yr	4 yr	5 yr	6 yr	7 yr	8 yr	9 yr	10 yr			
2018	92.9											92.1-93.6	4,253
2017	93.0	87.2										86.1-88.2	4,230
2016	92.9	87.5	82.1									80.8-83.2	4,007
2015	92.3	86.5	81.4	76.9								75.5-78.2	3,927
2014	92.8	86.8	81.4	76.9	73.3							71.8-74.7	3,673
2013	93.7	88.2	83.1	77.7	73.2	68.6						67.0-70.1	3,573
2012	93.1	87.4	82.0	76.9	72.6	68.6	64.9					63.3-66.4	3,522
2011	93.2	88.6	83.6	79.0	74.5	70.9	67.7	64.7				63.0-66.3	3,341
2010	92.2	86.6	81.7	77.3	72.8	69.6	66.4	62.5	59.5			57.8-61.2	3,362
2009	91.3	85.1	80.4	76.3	71.1	67.0	63.8	60.4	57.4	54.6		52.8-56.3	3,388
2008	91.5	86.0	81.2	76.8	73.2	69.5	65.6	62.3	59.4	56.4		54.7-58.1	3,447
2007	92.5	87.0	81.8	76.8	73.1	69.3	66.0	62.6	59.3	56.3		54.6-58.0	3,327
2006	90.6	85.0	80.1	75.6	71.9	68.1	63.9	61.0	58.0	55.4		53.6-57.1	3,156
2005	89.6	83.5	78.5	73.8	69.1	65.6	62.5	59.5	56.5	53.9		52.0-55.7	2,829
2004	89.6	83.4	78.0	72.5	67.9	64.1	61.0	57.1	54.6	53.0		51.0-55.0	2,548
2003	89.4	82.6	77.2	72.3	67.1	62.9	59.2	56.4	53.8	51.4		49.2-53.5	2,225
2002	88.7	80.9	75.0	69.4	65.3	61.3	57.8	54.8	51.7	49.6		47.4-51.8	1,991
2001	88.0	81.1	75.4	69.9	65.0	60.2	56.3	52.9	50.0	47.8		45.4-50.2	1,694
2000	89.0	80.9	74.0	68.8	63.4	58.6	55.1	52.0	49.6	47.1		44.5-49.6	1,492
1999	87.0	80.8	73.2	67.7	62.1	58.1	53.9	50.9	48.5	46.8		44.1-49.5	1,312

CI – confidence interval

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

Cohort	Unadjusted survival (%)										95% CI for latest year	N	
	1 yr	2 yr	3 yr	4 yr	5 yr	6 yr	7 yr	8 yr	9 yr	10 yr			
2018	79.3											78.0-80.5	3,816
2017	79.3	67.4										65.9-68.8	3,824
2016	80.0	65.1	52.7									51.1-54.3	3,760
2015	78.2	64.8	52.2	41.9								40.4-43.5	3,809
2014	78.5	64.2	52.2	41.3	32.9							31.3-34.4	3,589
2013	78.5	64.6	53.2	43.0	34.6	27.7						26.2-29.2	3,438
2012	77.2	65.1	54.2	44.0	35.4	27.6	21.8					20.4-23.3	3,326
2011	77.1	62.7	51.2	41.1	32.3	24.7	18.9	14.4				13.2-15.7	3,350
2010	76.0	63.1	51.2	41.8	32.2	25.4	19.7	14.5	11.3			10.2-12.4	3,280
2009	76.4	63.1	52.4	41.4	32.8	26.1	20.0	15.3	11.2	8.2		7.3-9.2	3,374
2008	74.6	61.0	49.7	40.4	32.0	25.6	20.5	16.1	12.1	9.0		8.0-10.0	3,177
2007	74.9	61.1	49.6	40.3	31.8	25.3	20.1	15.4	11.8	9.2		8.2-10.2	3,219
2006	72.0	58.2	46.9	37.2	28.9	23.0	17.5	13.4	10.6	8.5		7.5-9.5	3,113
2005	71.1	57.3	45.4	36.3	27.9	21.2	16.6	12.5	9.9	7.8		6.8-8.8	2,942
2004	68.9	53.9	42.3	33.9	26.7	20.8	16.2	12.8	9.8	7.5		6.5-8.6	2,613
2003	68.3	53.5	41.5	31.6	24.1	18.0	13.9	10.8	8.1	6.4		5.5-7.5	2,260
2002	65.8	50.8	40.4	31.9	24.0	18.4	13.7	10.9	8.1	6.4		5.4-7.5	2,059
2001	66.1	51.6	38.3	28.7	21.5	15.9	11.9	8.7	7.0	5.4		4.4-6.6	1,660
2000	66.2	52.0	39.6	28.8	22.2	17.0	12.9	9.4	7.3	5.4		4.3-6.7	1,441
1999	67.9	51.3	38.8	29.2	21.7	15.6	11.3	8.2	5.9	4.6		3.5-6.0	1,168

CI – confidence interval

Due to small numbers of incident patients in a given year, centre one year after the first 90 days survival is compared using a rolling four year cohort (table 2.20). Centre-specific one year survival rates were adjusted for not only age (figure 2.24), but also sex and comorbidities for centres with at least 85% completeness (figure 2.25). UKRR comorbidity data have been augmented using diagnostic and procedure codes from HES in England and PEDW in Wales (see appendix A for details). Centres can be identified in the funnel plots using the number of patients in the centre in table 2.20. Given there are 70 centres with data, it would be expected that three centres would fall outside the 95% (1 in 20) confidence limits, entirely by chance.

Table 2.20 1 year after 90 days adjusted survival (60 years, male and median comorbidity score) of incident adult RRT patients by centre (2015–2018 4 year cohort)

Centre	Age-adjusted survival				Case-mix adjusted survival ¹¹			
	N on RRT	1 yr after 90 days (%)	Lower 95% limit	Upper 95% limit	N on RRT	1 yr after 90 days (%)	Lower 95% limit	Upper 95% limit
D&Gall	56	89.2	79.9	96.0				
Clwyd	88	87.3	82.7	95.3	88	87.3	81.5	94.6
Bangor	96	89.4	83.1	95.1	96	89.9	82.0	94.5
Inverns	107	89.6	83.6	95.0				
Newry	108	92.7	83.7	95.0	108	89.4	82.5	94.3
Ulster	124	92.9	84.2	94.7	124	90.6	83.1	94.0
Colchr	133	89.7	84.5	94.6	133	88.5	83.4	93.9
West NI	148	95.6	84.9	94.5	148	93.6	83.8	93.8
Wrexm	150	92.6	85.0	94.5	150	91.2	83.9	93.7
Krkldy	152	90.6	85.0	94.4				
Sthend	154	93.2	85.1	94.4	154	91.6	83.9	93.7
Carlis	159	92.4	85.2	94.4	156	91.7	84.0	93.7
Antrim	167	92.3	85.3	94.3	159	89.5	84.1	93.6
Klmarnk	167	88.9	85.3	94.3				
Chelms	180	94.5	85.6	94.2	179	93.2	84.5	93.5
Dundee	184	90.2	85.6	94.2				
Basldn	193	91.1	85.8	94.1	192	90.7	84.7	93.4
Ipswi	193	93.1	85.8	94.1	184	92.6	84.5	93.4
Dudley	202	92.4	85.9	94.0	202	92.2	84.8	93.3
Donc	206	90.7	86.0	94.0	204	89.3	84.8	93.3
Abrdn	217	91.0	86.1	94.0				
Liv Ain	218	85.8	86.1	93.9	218	86.0	85.0	93.2
Truro	225	91.0	86.2	93.9	225	90.0	85.1	93.1
Wirral	226	89.2	86.2	93.9	225	89.4	85.1	93.1
York	239	89.7	86.4	93.8	239	89.0	85.3	93.1
Plymth	243	87.5	86.4	93.8	239	86.1	85.3	93.1
Airdrie	247	88.3	86.5	93.8				
Shrew	253	87.7	86.5	93.8	252	86.7	85.4	93.0
Glouc	289	92.4	86.8	93.6	286	91.3	85.7	92.8
Belfast	314	93.4	87.0	93.5				
Derby	317	90.9	87.0	93.5	317	90.1	86.0	92.7
Bradfd	318	89.6	87.0	93.5	318	89.4	86.0	92.7
Wolve	318	86.5	87.0	93.5	318	86.0	86.0	92.7
Sund	322	88.4	87.1	93.5	320	87.6	86.0	92.7
Dorset	333	89.7	87.1	93.4	332	88.2	86.1	92.6
L St.G	352	91.8	87.3	93.4	338	90.9	86.1	92.6
Norwch	356	91.8	87.3	93.4	356	90.4	86.2	92.6
Camb	375	92.8	87.4	93.3	375	91.2	86.3	92.5
Redng	377	91.8	87.4	93.3	377	91.1	86.3	92.5
Hull	388	90.9	87.4	93.3	388	90.0	86.4	92.5
Edinb	400	92.5	87.5	93.2				
Stoke	424	87.5	87.6	93.2	422	86.9	86.5	92.4
Covnt	438	89.8	87.7	93.1	425	87.6	86.6	92.3
Middlbr	453	90.6	87.7	93.1	453	91.2	86.7	92.3

Table 2.20 Continued

Centre	Age-adjusted survival				Case-mix adjusted survival ¹¹			
	N on RRT	1 yr after 90 days (%)	Lower 95% limit	Upper 95% limit	N on RRT	1 yr after 90 days (%)	Lower 95% limit	Upper 95% limit
Liv Roy	458	90.8	87.7	93.1	446	90.9	86.6	92.3
Nottm	488	90.0	87.8	93.0	488	89.1	86.8	92.2
Swanse	506	88.9	87.9	93.0	506	88.5	86.9	92.2
Newc	509	89.7	87.9	93.0	508	90.0	86.9	92.2
Kent	526	89.4	88.0	93.0	526	87.7	86.9	92.1
Exeter	538	92.0	88.0	92.9	535	91.1	86.9	92.1
Stevng	555	91.7	88.0	92.9	555	90.3	87.0	92.1
Brightn	560	89.6	88.1	92.9	547	88.0	87.0	92.1
Bristol	589	89.5	88.1	92.8	585	88.4	87.1	92.0
Sheff	611	91.3	88.2	92.8	609	90.6	87.1	92.0
L Kings	622	92.9	88.2	92.8	619	92.5	87.2	92.0
Prestn	624	87.5	88.2	92.8	596	86.8	87.1	92.0
Leeds	646	92.4	88.3	92.8	645	91.9	87.2	91.9
L Guys	652	92.4	88.3	92.8	652	91.3	87.2	91.9
Cardff	658	89.7	88.3	92.7	658	88.7	87.3	91.9
Salford	664	90.1	88.3	92.7	659	89.3	87.3	91.9
M RI	756	90.4	88.5	92.6	735	89.7	87.4	91.8
Glasgw	778	89.4	88.5	92.6				
Oxford	780	91.9	88.5	92.6	771	90.7	87.5	91.8
Ports	819	91.1	88.6	92.6	807	89.6	87.5	91.7
L Rfree	906	91.0	88.7	92.5	886	90.2	87.6	91.6
Carsh	920	91.4	88.7	92.5	891	89.8	87.6	91.6
Leic	1,095	91.3	88.9	92.3	1,077	90.4	87.9	91.5
L Barts	1,221	92.8	89.0	92.3	1,183	92.1	88.0	91.4
Bham	1,425	89.7	89.1	92.2	1,420	88.4	88.1	91.3
L West	1,464	91.7	89.2	92.1	1,429	90.5	88.1	91.3

¹¹Centres excluded if <85% comorbidity data were available – this included Belfast and all Scottish renal centres.

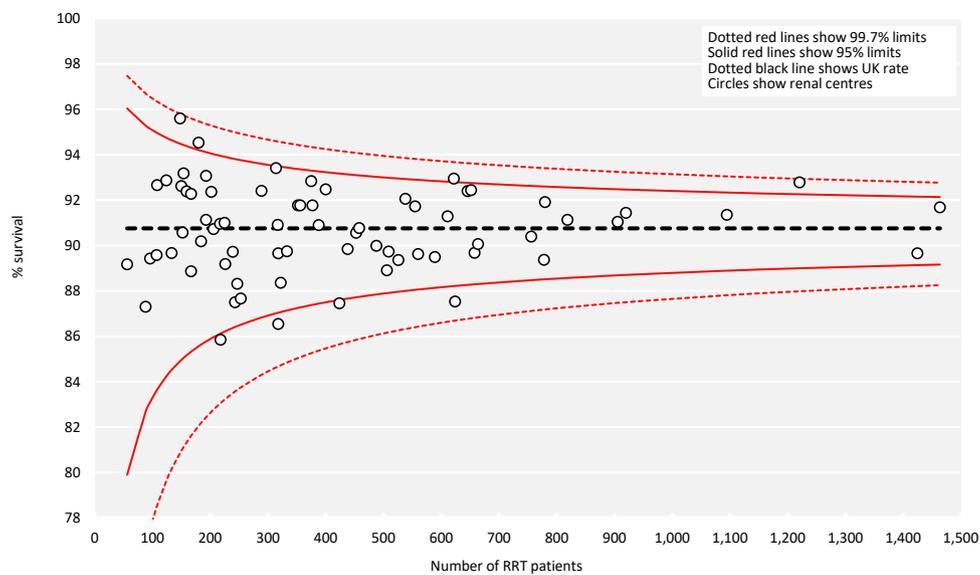


Figure 2.24 1 year after 90 days survival (adjusted to age 60 years) of incident adult RRT patients by centre (2015–2018 4 year cohort)

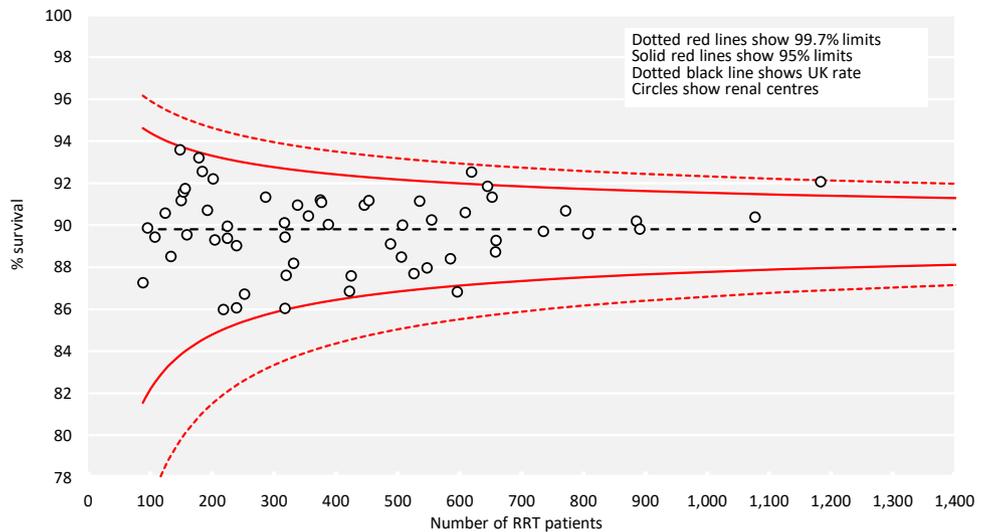


Figure 2.25 1 year after 90 days survival (adjusted to age 60 years, male and median comorbidity score) of incident adult RRT patients by centre (2015–2018 4 year cohort)

Cause of death in incident adult RRT patients

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

Table 2.21 Cause of death in the first 90 days and one year after 90 days in incident adult RRT patients by age group (2015–2018 4 year cohort)

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	211	24.0	25.2	23.7	502	21.5	27.0	19.2
Cerebrovascular disease	27	3.1	4.8	2.5	105	4.5	5.6	4.1
Infection	178	20.3	21.0	20.1	445	19.1	18.9	19.1
Malignancy	74	8.4	11.0	7.6	251	10.7	10.4	10.9
Treatment withdrawal	155	17.7	8.6	20.5	446	19.1	12.6	21.8
Other	180	20.5	23.8	19.5	423	18.1	19.1	17.7
Uncertain aetiology	53	6.0	5.7	6.1	163	7.0	6.5	7.2
Total (with data)	878	100.0	100.0	100.0	2,335	100.0	100.0	100.0
Missing	649	42.5	42.9	42.9	1,169	33.4	33.3	33.4