THE RENAL ASSOCIATION
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Chapter 1

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

Contents

Introduction

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

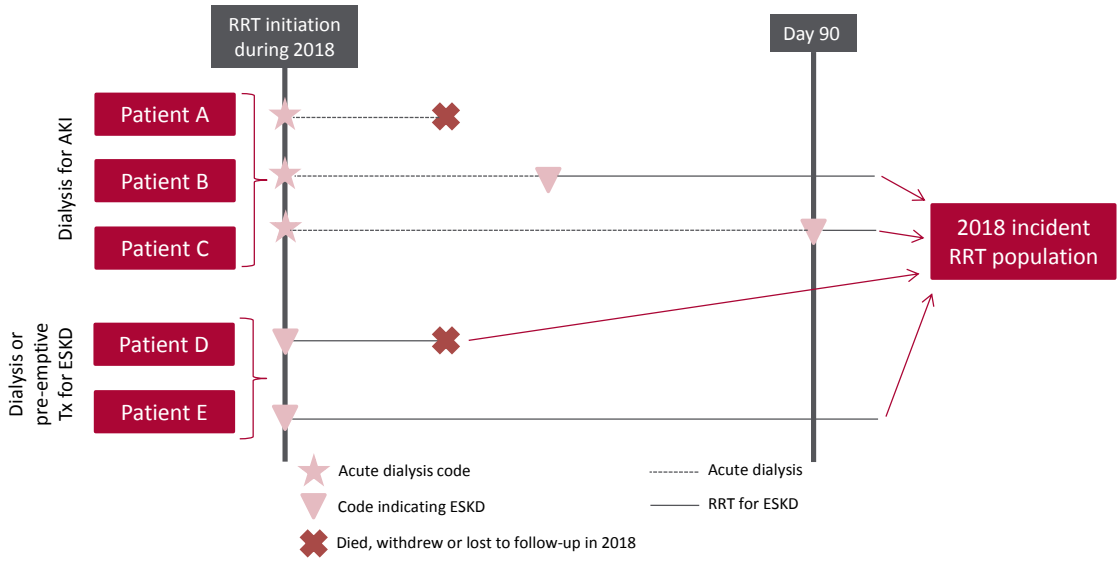

Figure 1.1 Example histories for patients starting RRT, illustrating the use of timeline codes to define dialysis as being 'acute' or for ESKD

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

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

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

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

Rationale for analyses

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

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

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

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

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

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

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

AVF – arteriovenous fistula; AVG – arteriovenous graft

Key findings

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

Analyses

Changes to the incident adult RRT population

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

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

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

Table 1.2 Continued

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

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

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

pmp – per million population

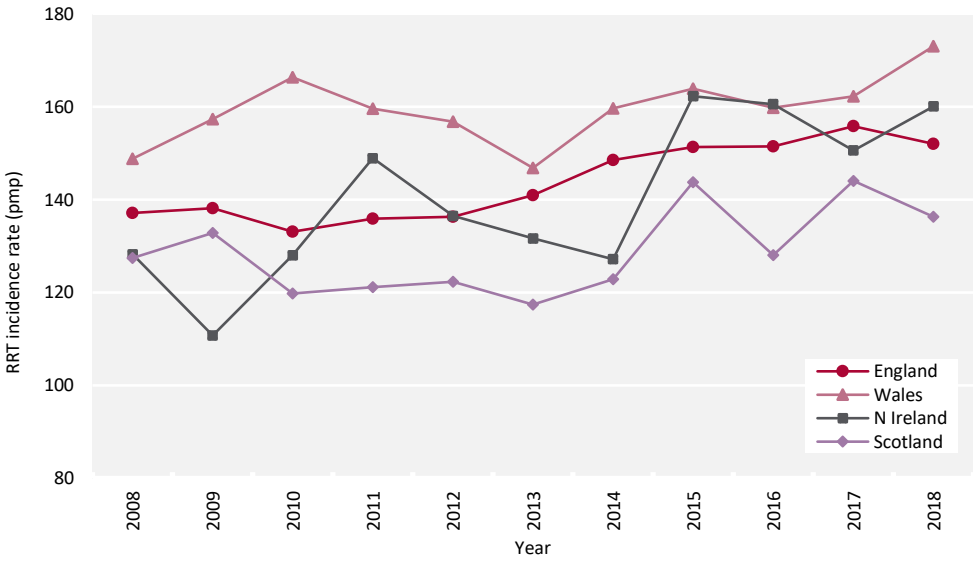

Figure 1.2 Adult RRT incidence rates by country between 2008 and 2018

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

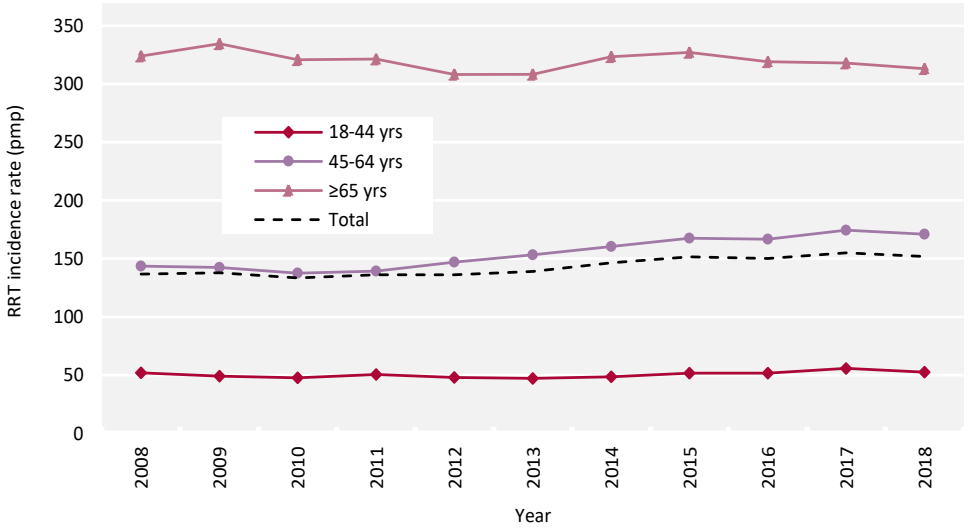

Figure 1.3 Adult RRT incidence rates by age group between 2008 and 2018

pmp – per million population

Demographics and start modality of incident adult RRT patients

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

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

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

Table 1.3 Continued

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

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

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

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

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

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

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

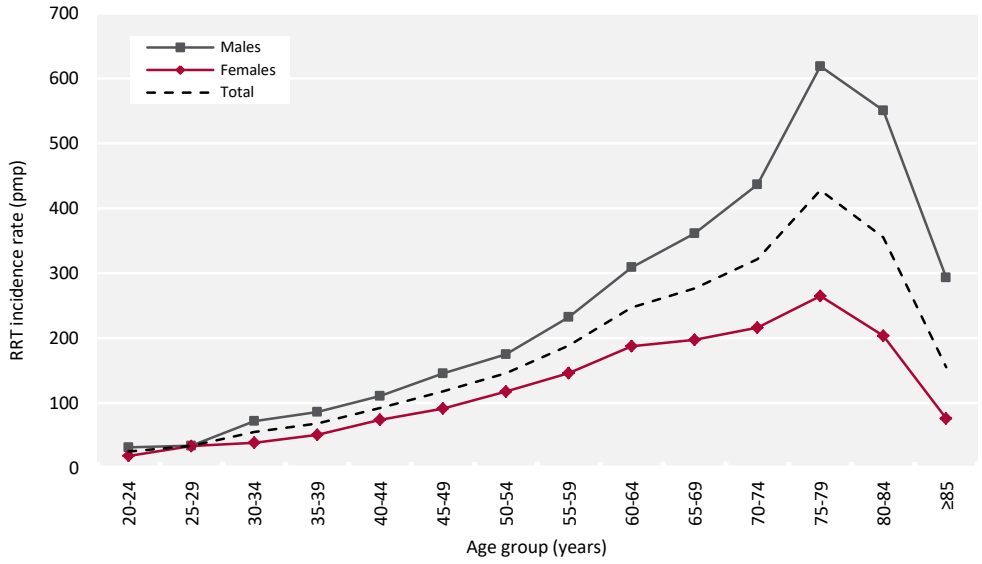

Figure 1.4 Incidence rates for adult patients starting RRT in 2018 by age group and sex
pmp – per million population

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

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

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

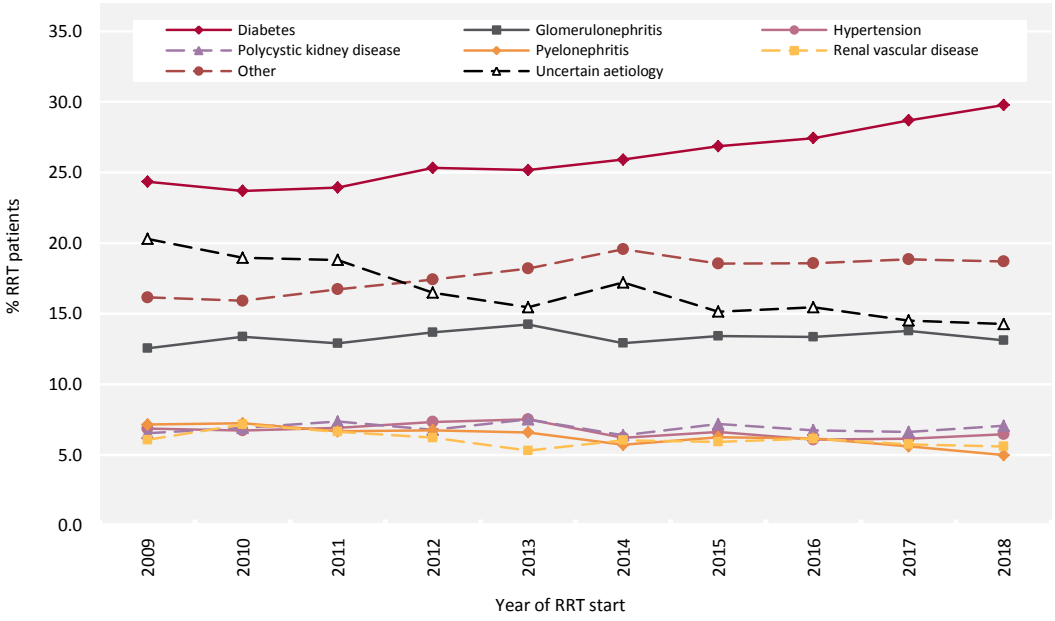

Figure 1.5 Change in primary renal disease (PRD) of adult patients incident to RRT from 2009 to 2018

Modality changes of incident adult RRT patients

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

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

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

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

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

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

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

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

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

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

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

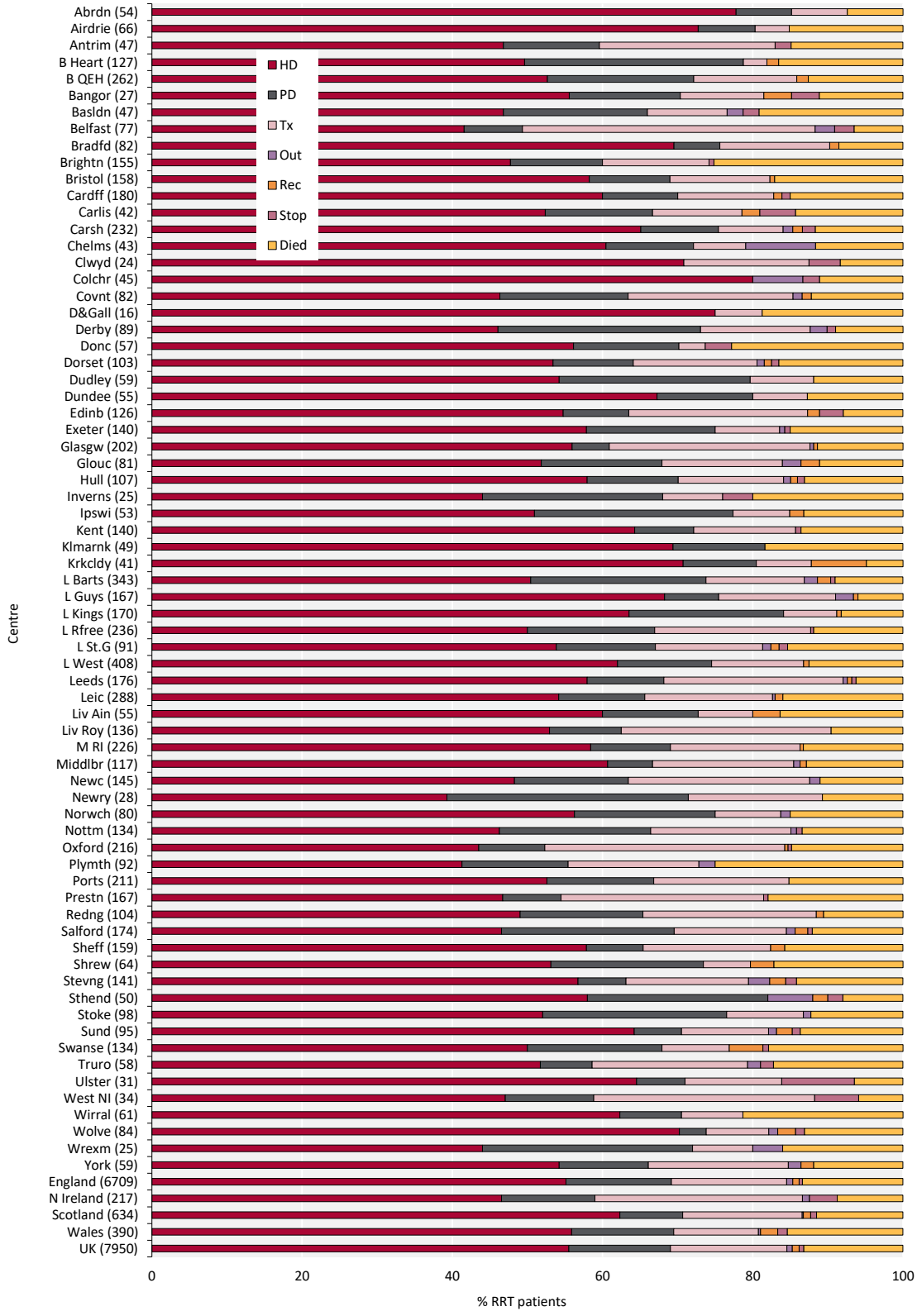

Figure 1.6 RRT modality at 1 year for incident adult RRT patients who started RRT in 2017 by centre

Number of patients in a centre in brackets.

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

Late presentation to nephrology services of incident adult RRT patients

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

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

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

Table 1.9 Continued

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

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

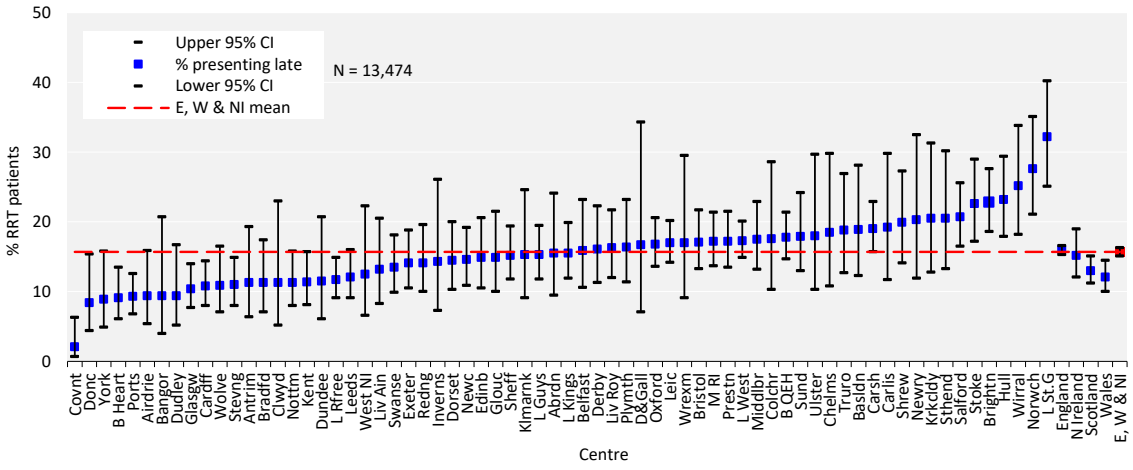

Figure 1.7 Percentage of incident adult RRT patients presenting late (<90 days) to a nephrologist (2017–2018 2 year cohort)

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

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

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

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

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

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

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

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

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

Start estimated glomerular filtration rate in incident adult RRT patients

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

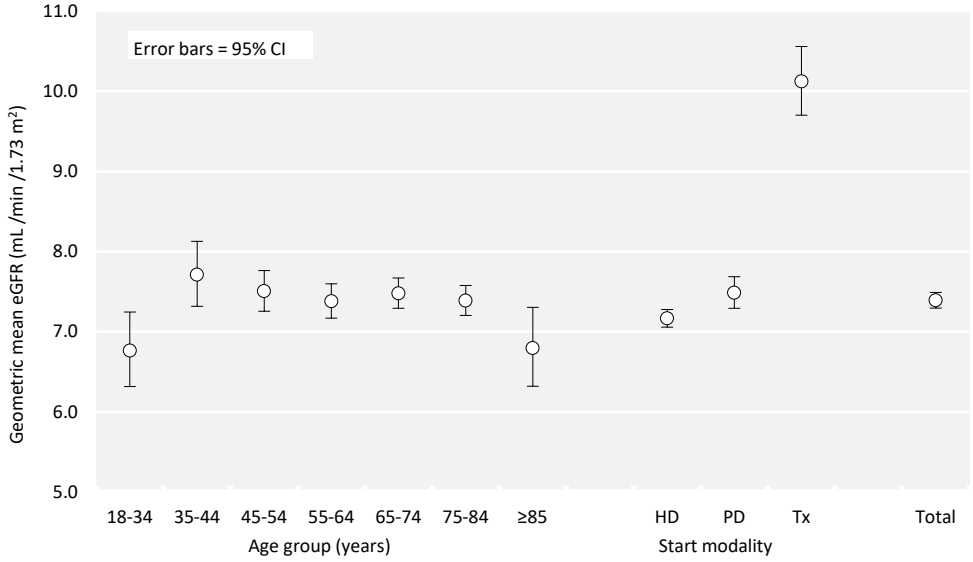

Figure 1.8 Geometric mean estimated glomerular filtration rates (eGFR) for adult patients incident to RRT in 2018 by age group and start modality
CI – confidence interval

Management of anaemia in incident adult RRT patients

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

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

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

Table 1.13 Continued

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

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

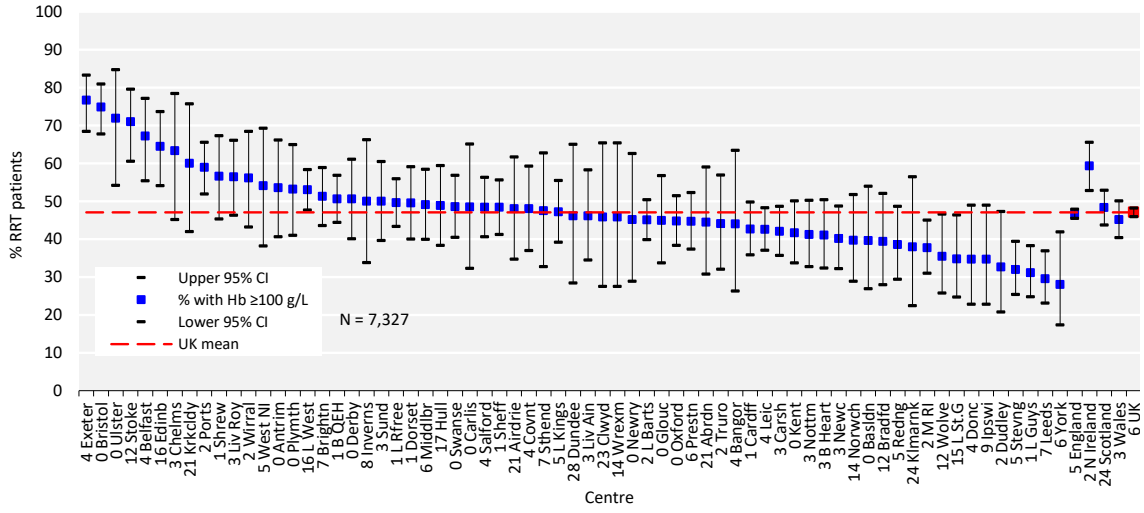

Figure 1.9 Percentage of adult patients incident to RRT in 2018 with haemoglobin (Hb) ≥100 g/L at start of RRT treatment by centre.
CI – confidence interval

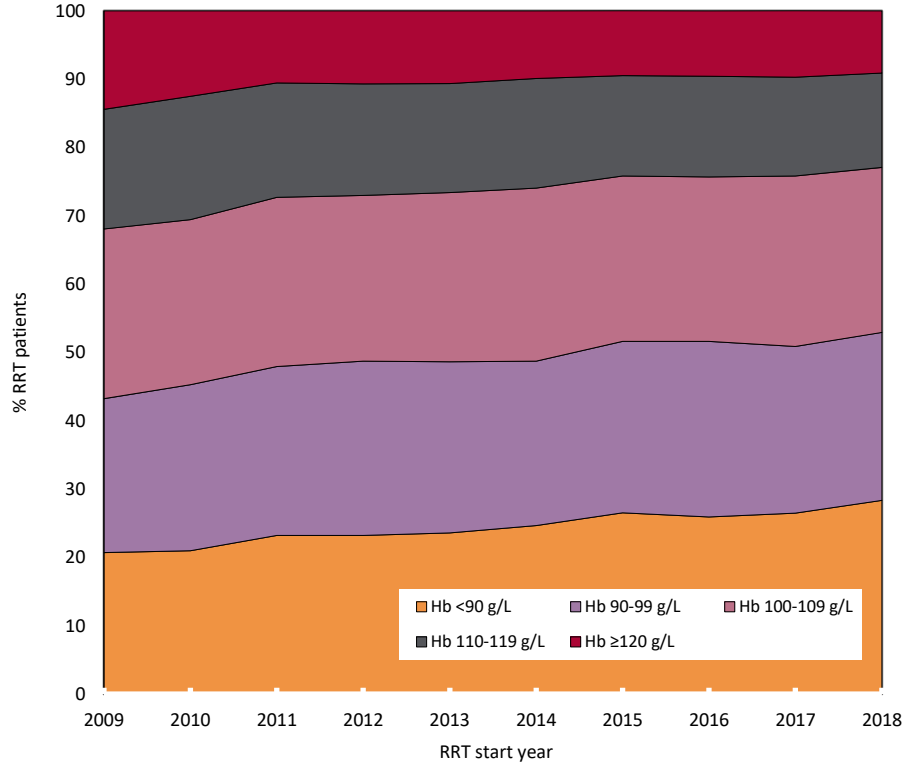

Figure 1.10 Distribution of haemoglobin (Hb) in incident adult RRT patients by year of start between 2009 and 2018

Biochemistry parameters in incident adult RRT patients

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

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

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

Table 1.14 Continued

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

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

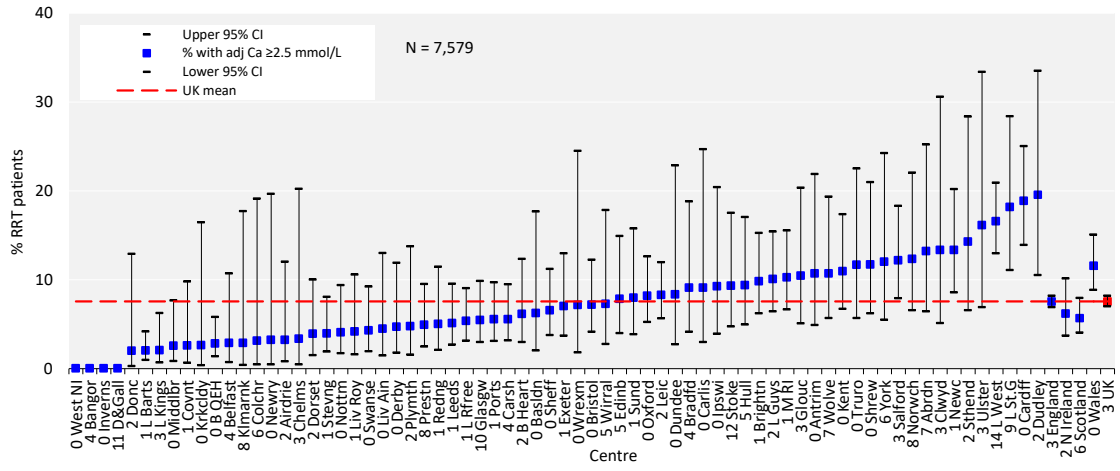

Figure 1.11 Percentage of adult patients incident to RRT in 2018 with adjusted calcium (Ca) above the normal range (>2.5 mmol/L) by centre
CI – confidence interval

Dialysis access in incident adult dialysis patients

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

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

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

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

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

Table 1.15 Continued

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

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

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

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

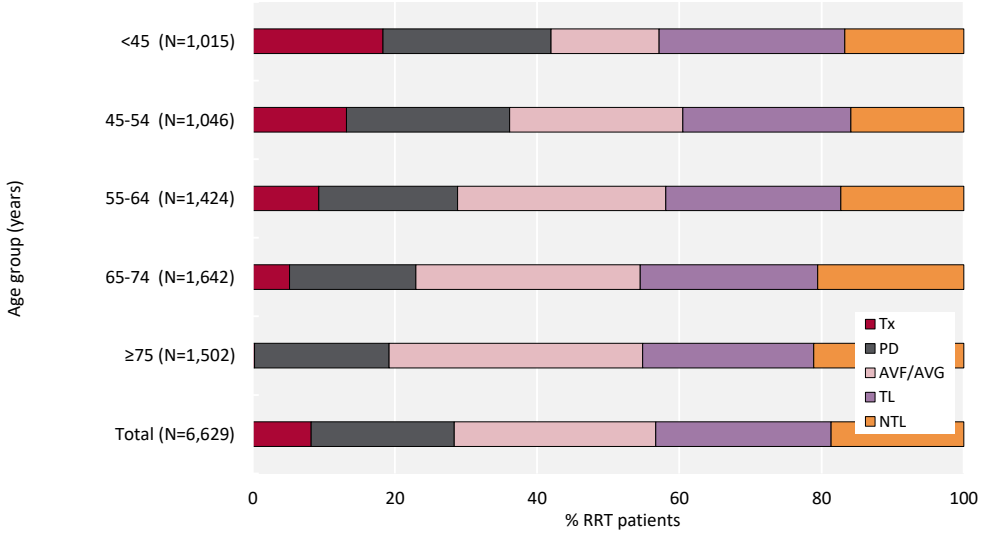

Figure 1.12 Dialysis access used for adult patients incident to RRT in 2018 by age group (2018 Multisite Dialysis Access Audit)
AVF – arteriovenous fistula; AVG – arteriovenous graft; NTL – non-tunnelled line; TL – tunnelled line

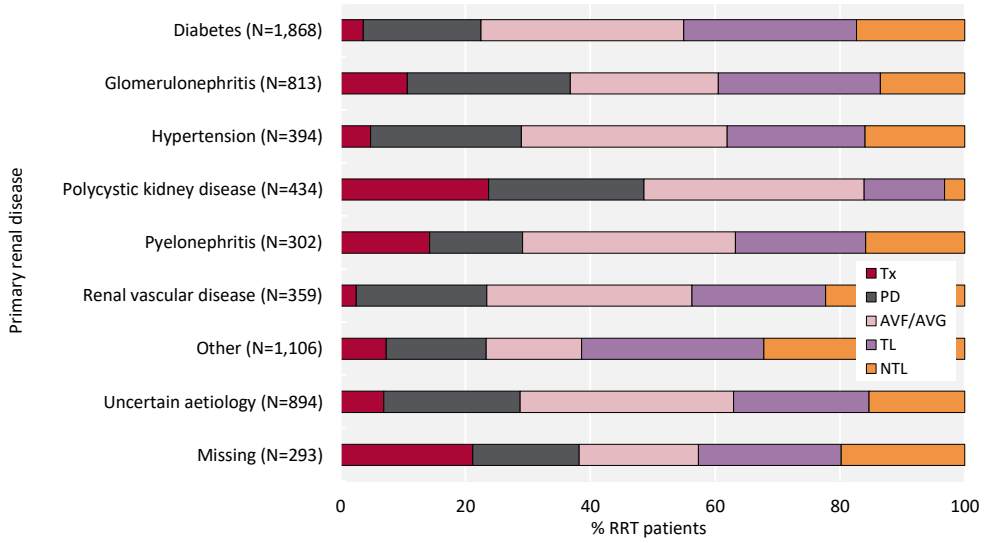

Figure 1.13 Dialysis access used for adult patients incident to RRT in 2018 by primary renal disease (2018 Multisite Dialysis Access Audit)
AVF – arteriovenous fistula; AVG – arteriovenous graft; NTL – non-tunnelled line; TL – tunnelled line

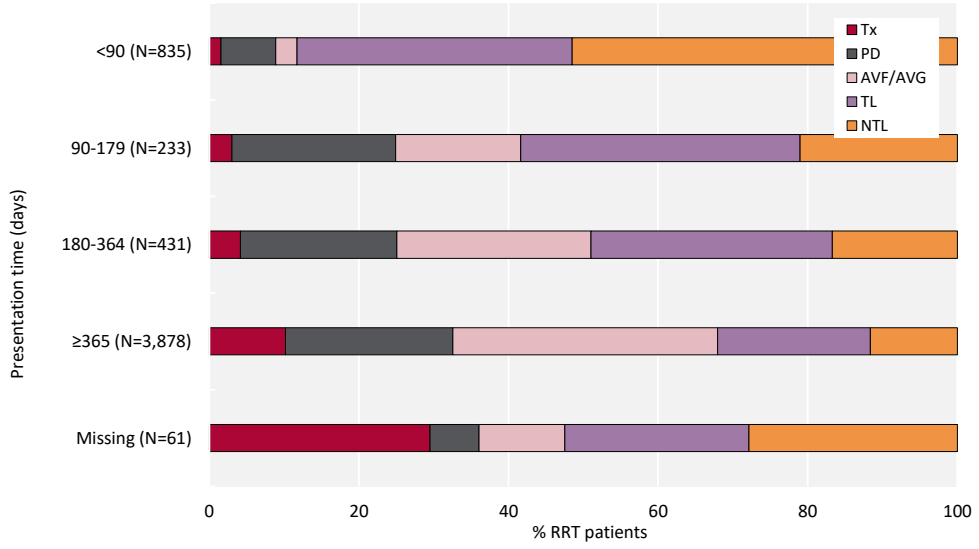

Figure 1.14 Dialysis access used for adult patients incident to RRT in 2018 by presentation time (2018 Multisite Dialysis Access Audit)
AVF – arteriovenous fistula; AVG – arteriovenous graft; NTL – non-tunnelled line; TL – tunnelled line

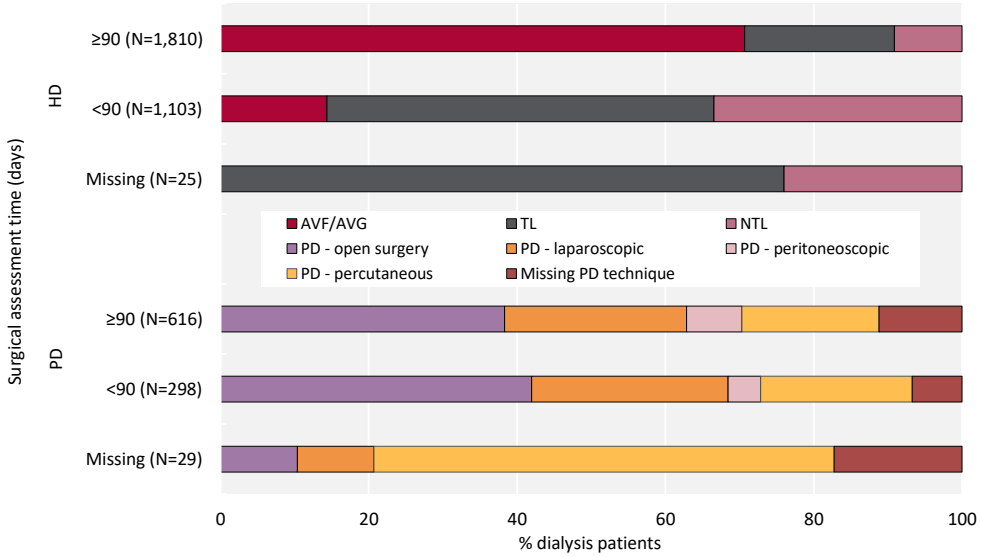

Figure 1.15 Dialysis access used for adult patients incident to dialysis in 2018 by surgical assessment time (2018 Multisite Dialysis Access Audit)

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

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

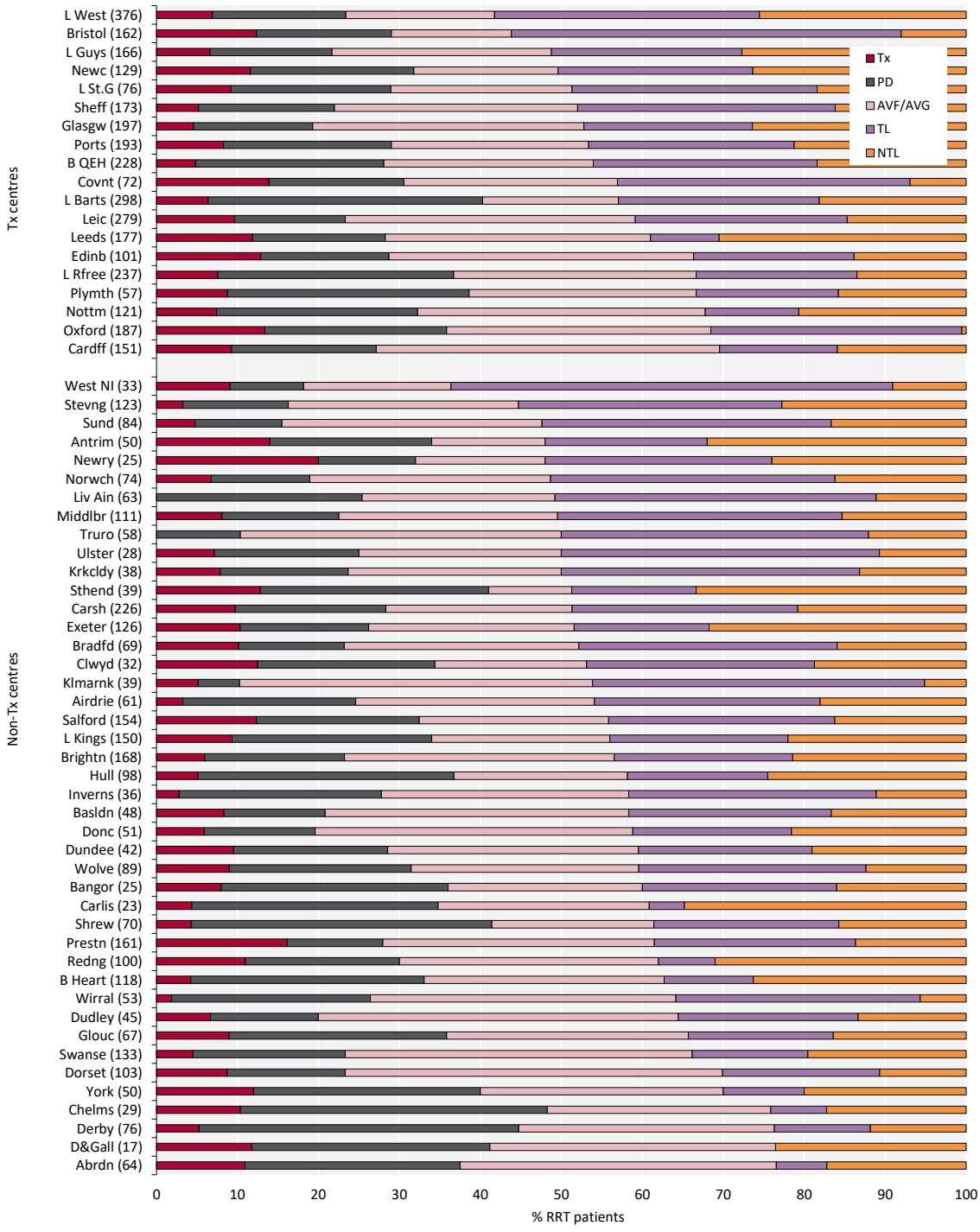

Figure 1.16 First dialysis access used for adult patients incident to RRT in 2018 by centre (2018 Multisite Dialysis Access Audit)

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

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

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

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

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

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

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

Table 1.17 Continued

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

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

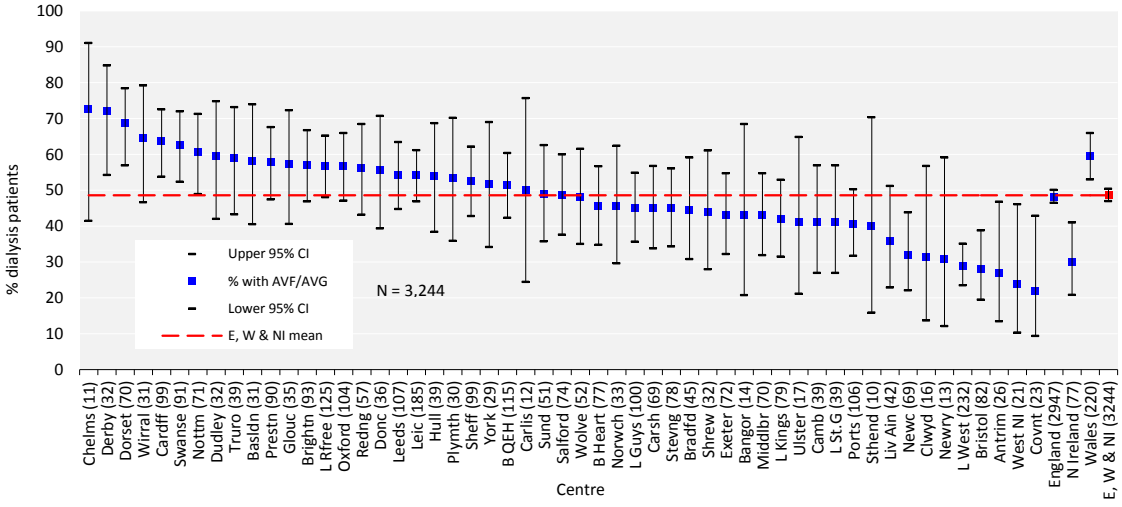

Figure 1.17 Percentage of adult patients incident to dialysis in 2018 who started dialysis using either an arteriovenous fistula (AVF) or an arteriovenous graft (AVG) by centre (2018 Multisite Dialysis Access Audit)

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

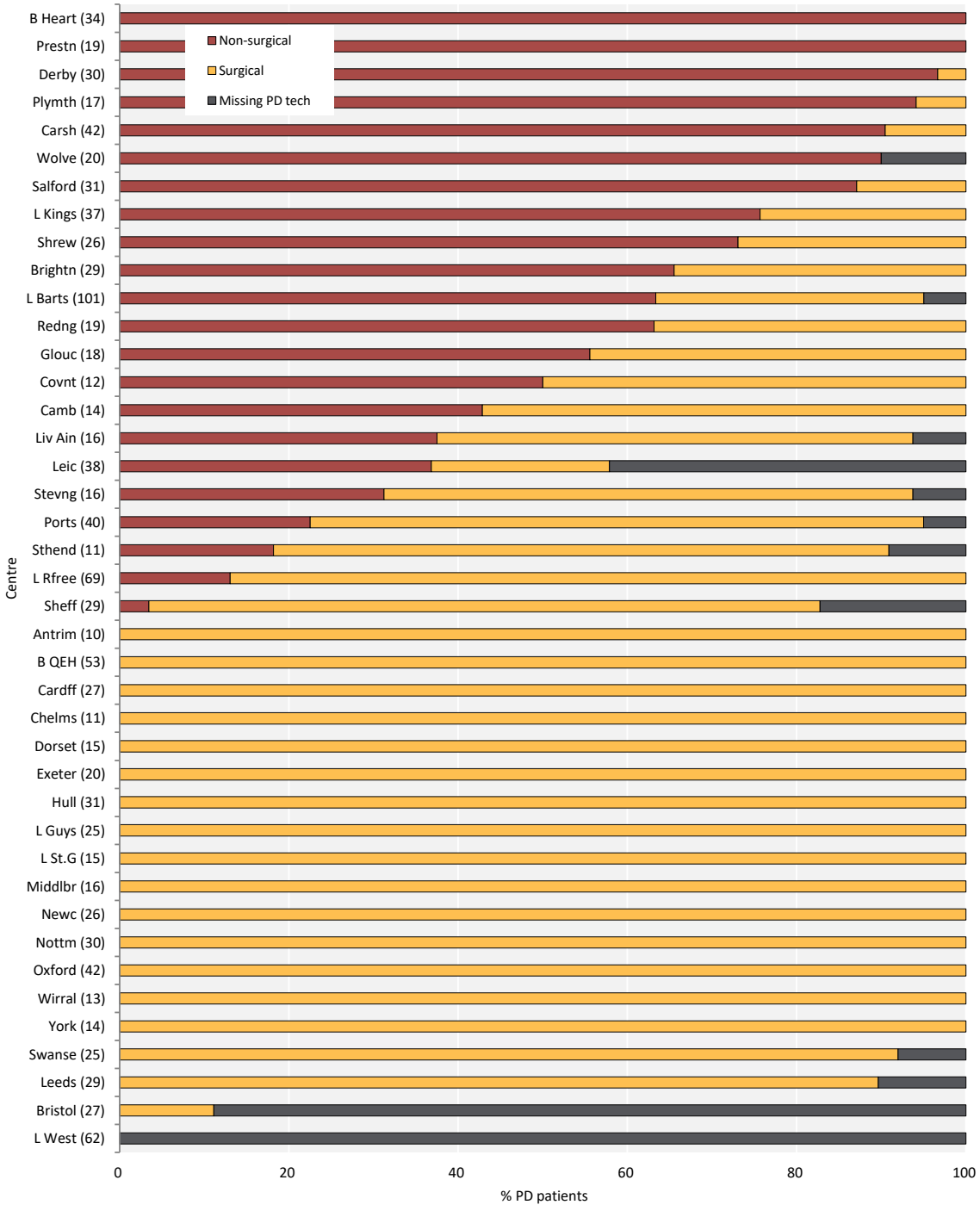

Figure 1.18 PD catheter insertion technique for adult patients incident to PD in 2018 by centre (2018 Multisite Dialysis Access Audit)

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

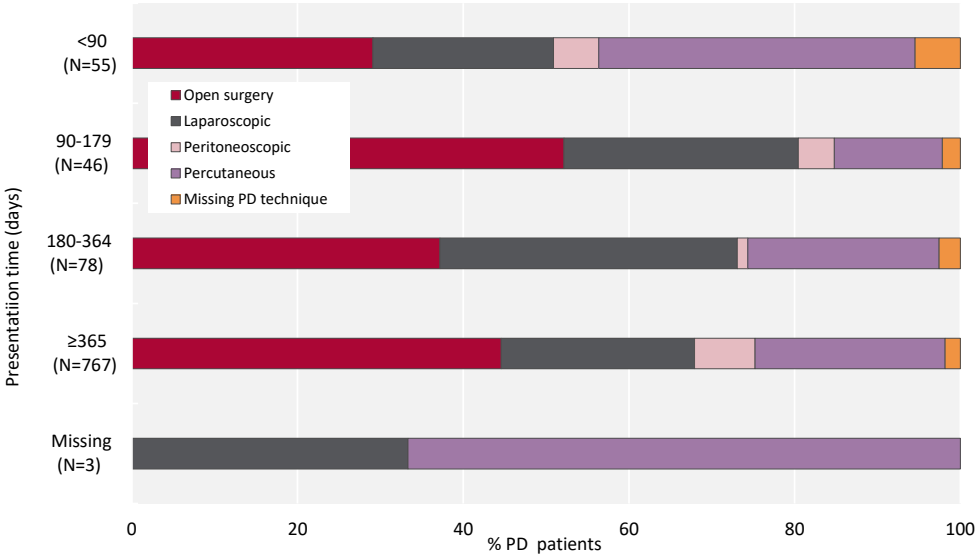

Figure 1.19 PD catheter insertion technique for adult patients incident to PD in 2018 by presentation time (2018 Multisite Dialysis Access Audit)

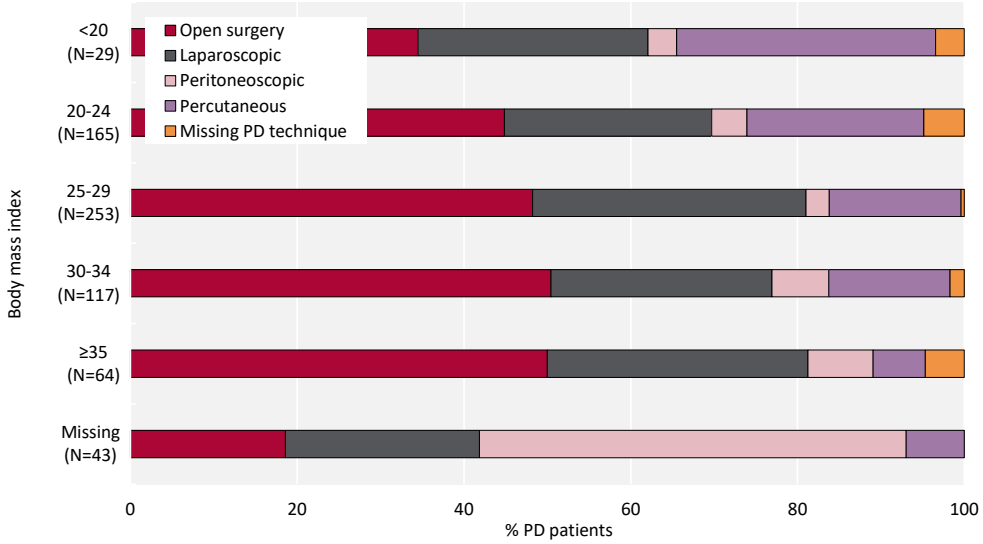

Figure 1.20 PD catheter insertion technique for adult patients incident to PD in 2018 by body mass index (2018 Multisite Dialysis Access Audit)

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

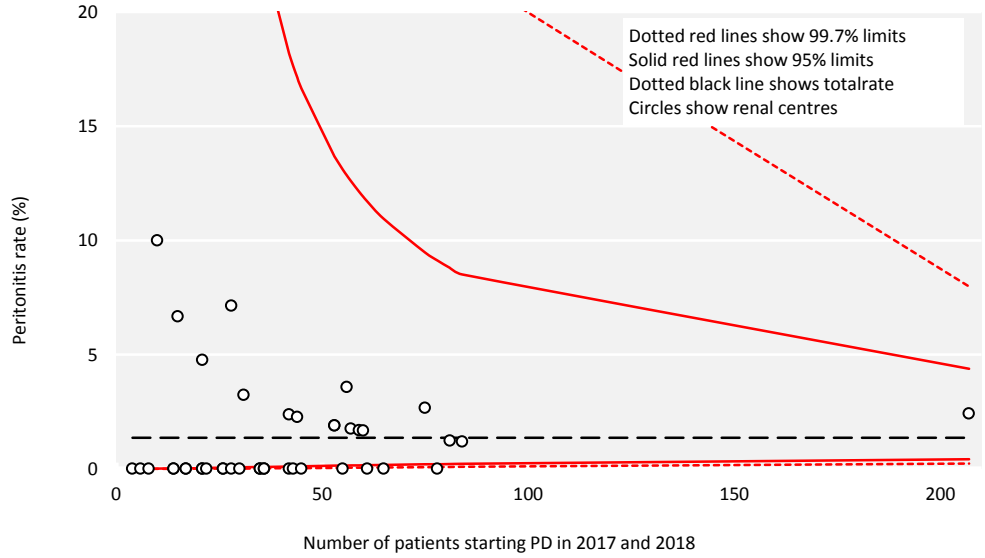

Figure 1.21 Peritonitis within 2 weeks of catheter insertion for adult patients incident to PD in 2017 and 2018 (2017 and 2018 Multisite Dialysis Access Audits)

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

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

Table 1.18 Continued

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

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

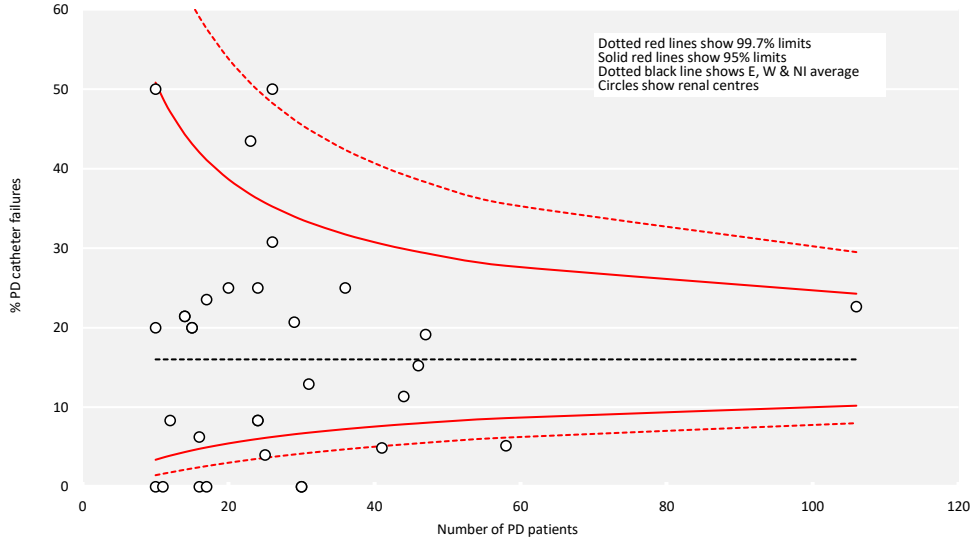

Figure 1.22 Percentage of PD catheter failures within 1 year of first ever PD session for adult patients incident to PD in 2017 (2018 Multisite Dialysis Access Audit)
Centres with follow-up data for <10 PD patients were excluded.

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

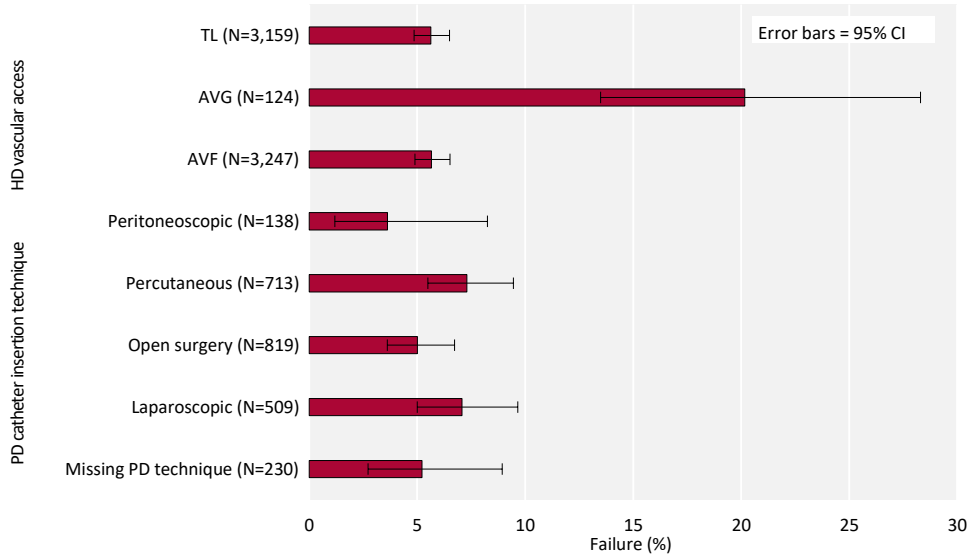

Figure 1.23 Percentage of incident adult dialysis patients experiencing failure of first access within 3 months by type of first access (2017 and 2018 Multisite Dialysis Access Audits)
AVF – arteriovenous fistula; AVG – arteriovenous graft; CI – confidence interval; TL – tunnelled line

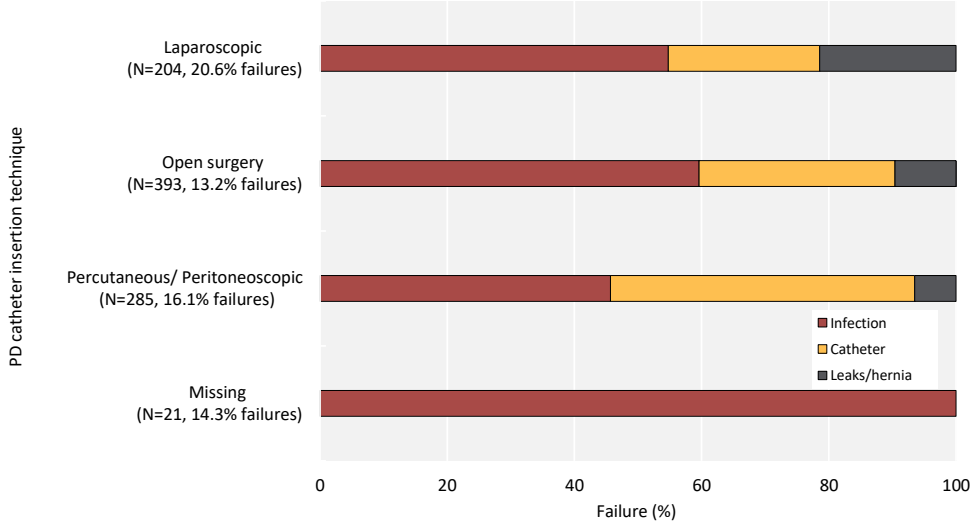

Figure 1.24 Cause of PD catheter access failure within 1 year of first ever PD session for adult patients incident to PD in 2017 (2018 Multisite Dialysis Access Audit)

Survival in incident adult RRT patients

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

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

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

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

CI – confidence interval

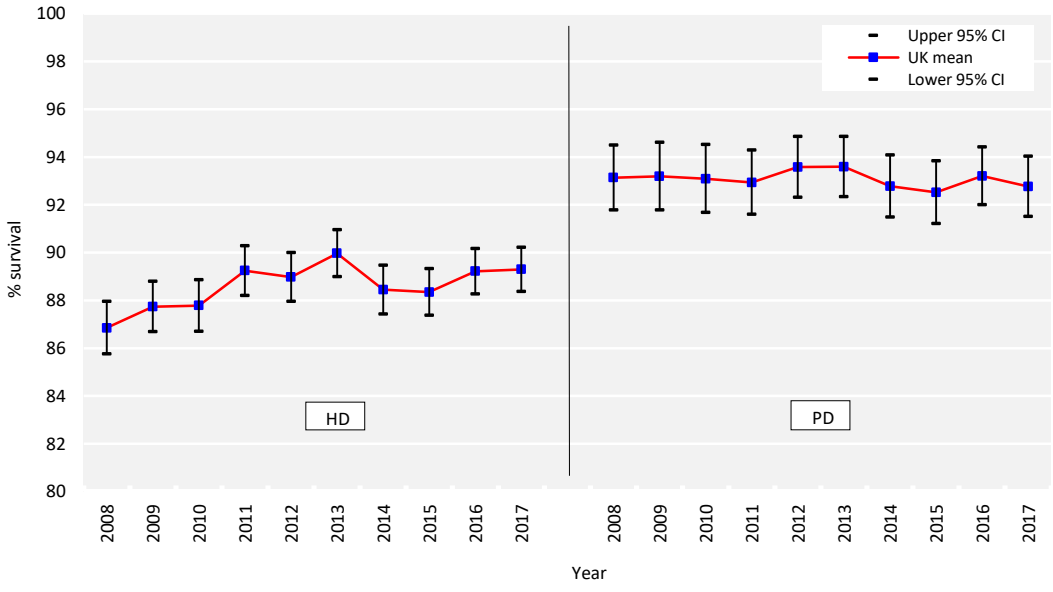

Figure 1.25 1 year after 90 days survival (adjusted to age 60 years) of incident adult RRT patients by start modality between 2008 and 2017

CI – confidence interval

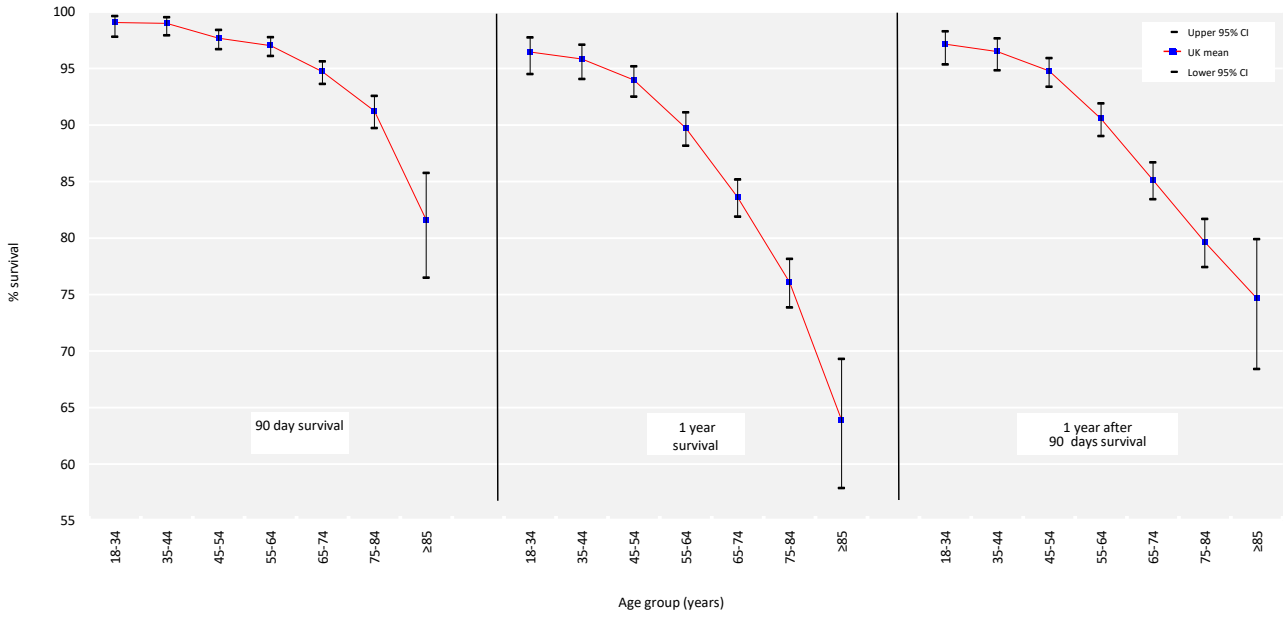

Figure 1.26 90 days, 1 year and 1 year after 90 days survival of incident adult RRT patients by age group (2017 cohort)
CI – confidence interval

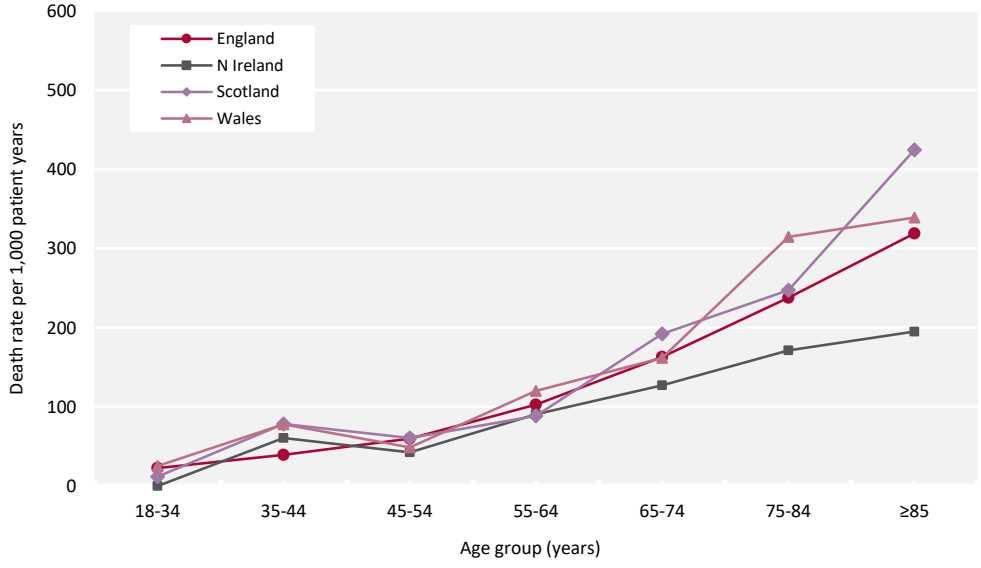

Figure 1.27 1 year after 90 days death rate per 1,000 incident RRT adult patient years by age group and country (2014–2017 4 year cohort)

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

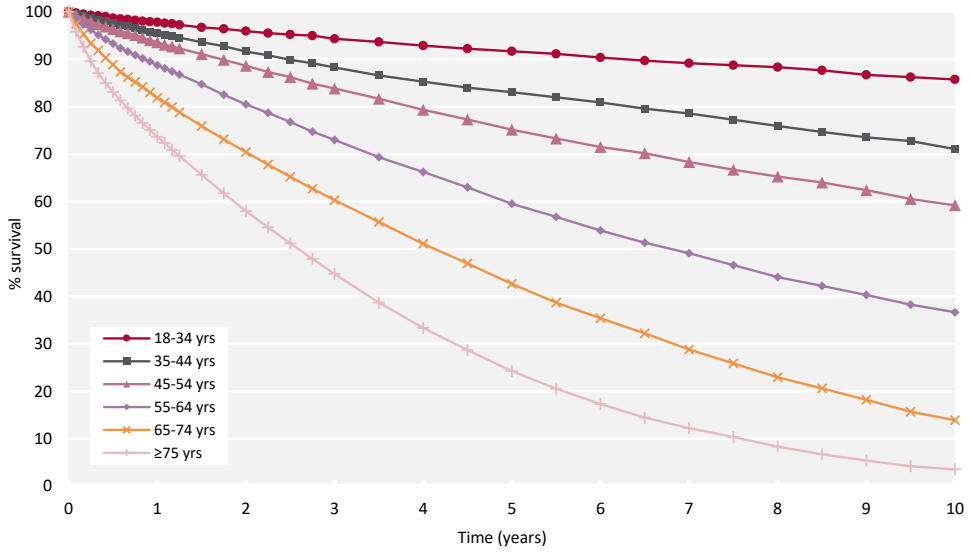

Figure 1.28 Survival (unadjusted) of incident adult RRT patients from day 0 by age group (2008–2017 10 year cohort)

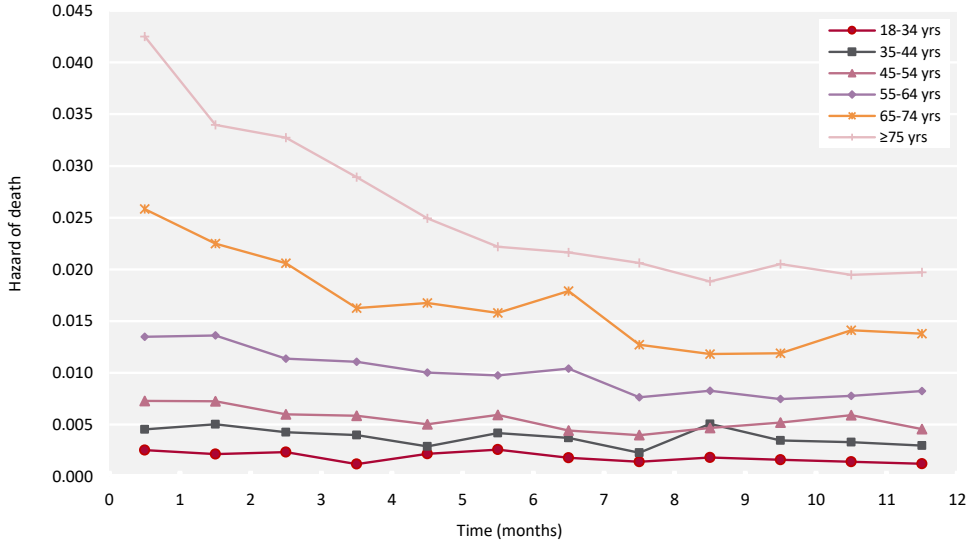

Figure 1.29 Monthly hazard of death (unadjusted) of incident adult RRT patients from day 0 to 1 year by age group (2008–2017 10 year cohort)

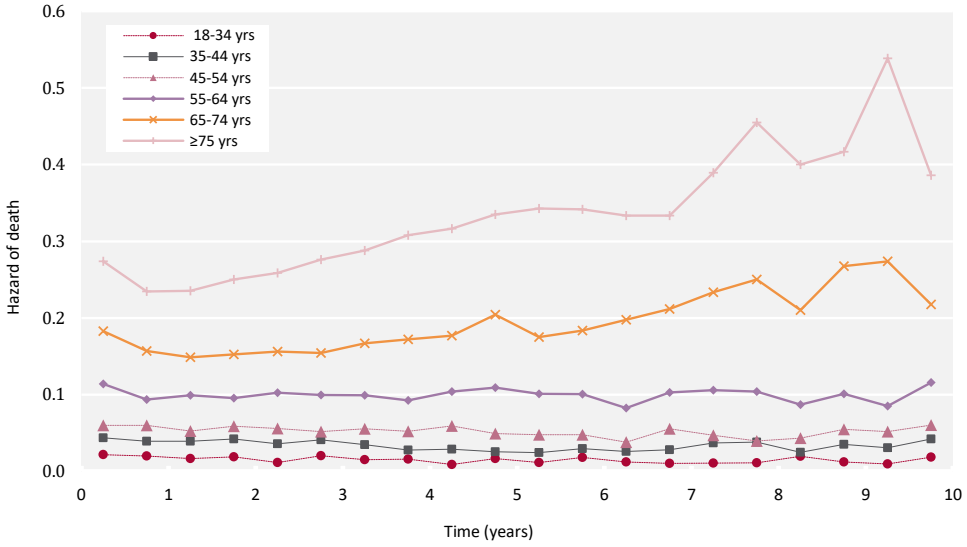

Figure 1.30 6 monthly hazard of death (unadjusted) of incident adult RRT patients from day 0 to 10 years by age group (2008–2017 10 year cohort)

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

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

CI – confidence interval

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

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

CI – confidence interval

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

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

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

Table 1.22 Continued

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

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

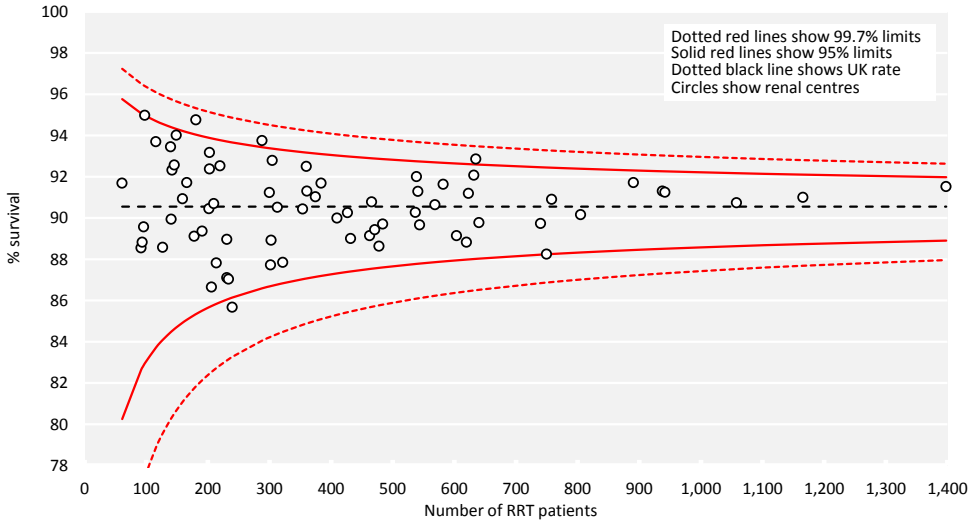

Figure 1.31 1 year after 90 days survival (adjusted to age 60 years) of incident adult RRT patients by centre (2014–2017 4 year cohort)

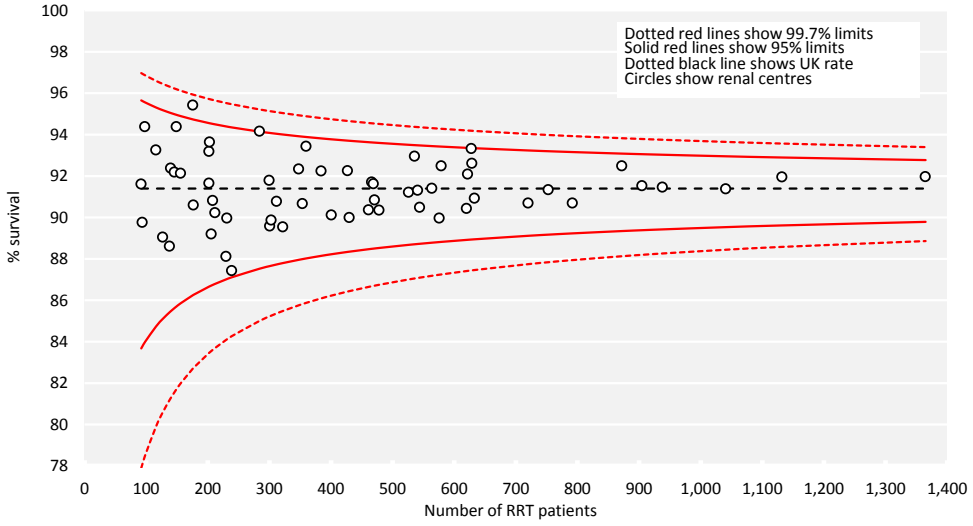

Figure 1.32 1 year after 90 days survival (adjusted to age 60 years, male and median comorbidity score) of incident adult RRT patients by centre (2014–2017 4 year cohort)

Cause of death in incident adult RRT patients

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

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

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