THE RENAL ASSOCIATION
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Chapter 2

Adults on renal replacement therapy (RRT) in the UK at the end of 2018

Contents

Introduction

This chapter describes the population of adult patients with end-stage kidney disease (ESKD) who were on renal replacement therapy (RRT) in the UK at the end of 2018 (figure 2.1). Patients may have started RRT prior to 2018 or during 2018. Three RRT modalities are available to patients with ESKD – haemodialysis (HD), peritoneal dialysis (PD) and kidney transplantation. HD may be undertaken in-centre (ICHD) or at home (HHD).

The size of the prevalent population on each RRT modality reflects uptake to the modality by new RRT patients (chapter 1); the number of patients switching from one modality to another; and the length of time patients remain on a modality before they switch to another, withdraw from RRT or die.

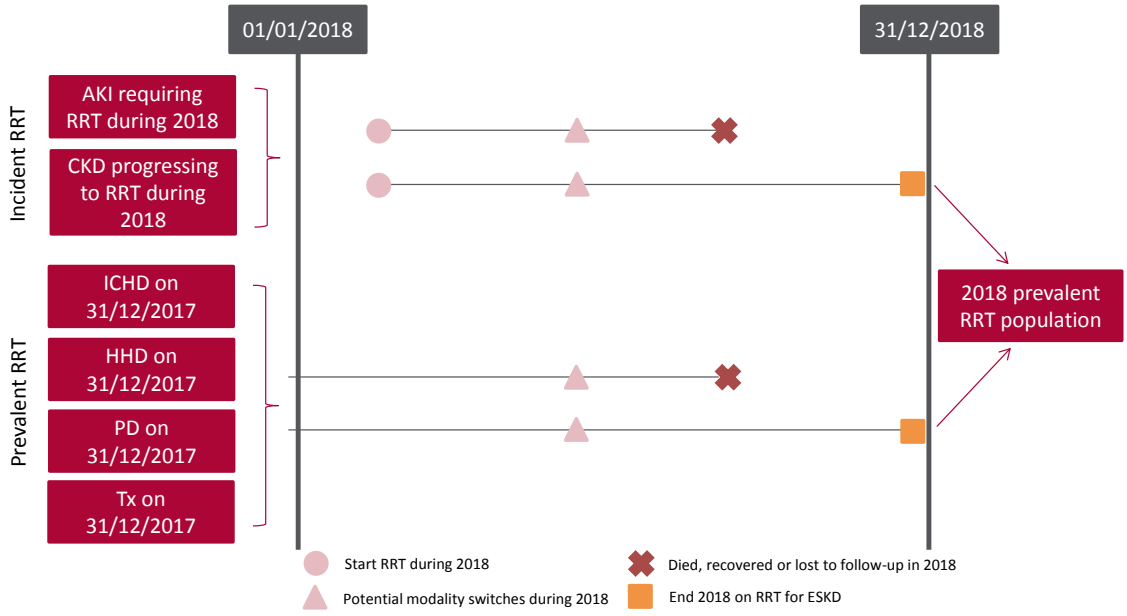

Figure 2.1 Pathways adult patients could follow to be included in the UK 2018 prevalent RRT population

Note that patients receiving dialysis for acute kidney injury (AKI) are only included in this chapter if they had a timeline or RRT modality code for chronic RRT at the end of 2018 or if they had been on RRT for ≥90 days and were on RRT at the end of 2018.

CKD – chronic kidney disease; Tx – transplant

Survival and cause of death analyses were undertaken on historic prevalent cohorts to allow sufficient follow-up time.

Rationale for analyses

The analyses focus on a description of the 2018 prevalent adult RRT population, including the number on RRT per million population (pmp). These analyses are performed annually to help clinicians and policy makers plan future RRT requirements in the UK. Variation in case-mix is also reported to aid understanding of how to improve equity of RRT provision in the UK.

The Renal Association guidelines (renal.org/guidelines) provide audit measures relevant to the care of patients on RRT, but these are treatment-specific – for further details see the guideline tables in each chapter.

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

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 on 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 the analyses on treatment rates could be corrected using the late submitted data.

Key findings

- 66,612 adult patients were receiving RRT for ESKD in the UK on 31/12/2018, an increase of 2.8% from 2017
- RRT prevalence was 1,272 pmp for adults and the prevalence in the total population was 1,018 pmp, in trend with a 2.0% increase in recent years
- The median age of RRT patients was 59.5 years (ICHD 67.4 years, HHD 56.0 years, PD 64.3 years and Tx 55.2 years). In 2000 the median age was 54.8 years (HD 63.3 years, PD 58.5 years and Tx 48.6 years)
- 61.1% of RRT patients were male
- Tx continued as the most common treatment modality (55.7%) – ICHD comprised 36.8%, PD 5.5% and HHD 2.0% of the RRT population
- The most common identifiable primary renal disease was glomerulonephritis (19.5%), followed by diabetes (18.0%)
- There was only 1 outlying centre in the funnel plots showing 1 year survival for prevalent dialysis patients – London West was above the upper 95% limit in both the age adjusted and sex and comorbidities adjusted funnel plots. It would be expected that up to 3 centres would be outside the limits by chance
- There was no cause of death data available for 31.2% of deaths. For those with data, the leading cause of death in younger patients (<65 years) was cardiac disease (25.3%) and in older patients (≥65 years) was treatment withdrawal (20.6%).

Analyses

Changes to the prevalent adult RRT population

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

Table 2.1 Number of prevalent adult RRT patients by year and by centre; number of RRT patients as a proportion of the catchment population

Centre	N on RRT					Estimated catchment population (millions)	2018 crude rate (pmp)
	2014	2015	2016	2017	2018		
ENGLAND							
B Heart	635	652	652	655	679	0.61	1,110
B QEH	2,133	2,249	2,390	2,513	2,569	1.41	1,824
Basldn	278	274	274	301	314	0.34	913
Bradfd	548	583	636	673	686	0.54	1,269
Brightn	915	950	992	1,011	1,055	1.07	981
Bristol	1,458	1,477	1,468	1,472	1,469	1.19	1,231
Camb	1,234	1,306	1,327	1,420	1,417	0.96	1,476
Carlis	250	281	281	282	293	0.27	1,102
Carsh	1,550	1,581	1,641	1,685	1,736	1.59	1,095
Chelms	262	282	271	277	270	0.42	638
Colchr	119	120	123	129	121	0.25	488
Covnt	960	959	974	965	1,042	0.74	1,409
Derby	514	538	542	556	589	0.58	1,012
Donc	284	302	331	333	332	0.34	977
Dorset	665	681	686	734	765	0.71	1,071
Dudley	305	315	346	369	361	0.37	986
Exeter	945	968	1,013	1,058	1,088	0.90	1,205
Glouc	428	444	472	507	510	0.49	1,048
Hull	802	856	854	873	883	0.85	1,044
Ipswi	367	401	413	433	428	0.33	1,294
Kent	1,014	1,040	1,073	1,091	1,114	1.01	1,098
L Barts	2,208	2,279	2,369	2,492	2,610	1.52	1,721
L Guys	1,916	2,012	2,098	2,159	2,225	0.90	2,480
L Kings	1,023	1,084	1,109	1,149	1,186	0.97	1,222
L Rfree	2,006	2,093	2,175	2,192	2,234	1.26	1,775
L St.G	791	843	849	838	837	0.66	1,266
L West	3,215	3,294	3,392	3,475	3,566	1.99	1,794
Leeds	1,503	1,525	1,550	1,618	1,687	1.38	1,219
Leic	2,142	2,177	2,297	2,370	2,468	2.02	1,222
Liv Ain	217	222	227	209	218	0.40	543
Liv Roy	1,257	1,237	1,214	1,252	1,277	0.83	1,541
M RI	1,791	1,880	1,971	2,045	2,073	1.27	1,633
Middlbr	855	901	890	905	925	0.83	1,111
Newc	977	1,009	1,050	1,114	1,155	0.93	1,243
Norwch	686	721	770	776	786	0.65	1,206
Nottm	1,060	1,113	1,153	1,175	1,196	0.90	1,327
Oxford	1,650	1,690	1,766	1,873	1,940	1.40	1,385
Plymth	501	503	513	540	539	0.39	1,384
Ports	1,592	1,669	1,690	1,748	1,764	1.68	1,052
Prestn	1,171	1,215	1,204	1,270	1,322	1.24	1,068
Redng	761	775	789	795	810	0.75	1,074

Table 2.1 Continued

Centre	N on RRT					Estimated catchment population (millions)	2018 crude rate (pmp)
	2014	2015	2016	2017	2018		
Salford	971	974	1,019	1,114	1,173	1.24	950
Sheff	1,360	1,383	1,421	1,439	1,481	1.14	1,303
Shrew	349	369	377	384	424	0.41	1,022
Stevng	783	813	886	890	957	1.00	959
Sthend	238	246	236	254	260	0.26	990
Stoke	775	788	826	810	808	0.74	1,096
Sund	450	459	507	542	557	0.51	1,087
Truro	380	413	426	424	437	0.34	1,276
Wirral	278	281	337	385	395	0.47	833
Wolve	575	582	571	583	602	0.55	1,086
York	462	490	535	555	568	0.41	1,392
N IRELAND							
Antrim	231	241	252	255	274	0.23	1,166
Belfast	745	769	812	837	877	0.51	1,728
Newry	207	225	236	241	249	0.21	1,196
Ulster	149	169	166	182	190	0.21	896
West NI	274	293	307	313	324	0.28	1,155
SCOTLAND							
Abrdn	501	531	555	563	573	0.50	1,148
Airdrie	395	425	439	467	487	0.46	1,060
D&Gall	130	130	131	135	145	0.12	1,174
Dundee	401	419	418	435	445	0.39	1,155
Edinb	747	769	777	825	862	0.80	1,075
Glasgw	1,607	1,710	1,754	1,774	1,812	1.35	1,341
Inverns	225	253	259	263	279	0.22	1,242
Klmarnk	299	310	317	337	342	0.30	1,137
Krkcldy	277	295	294	303	300	0.26	1,139
WALES							
Bangor	107	182	179	195	202	0.19	1,090
Cardff	1,593	1,613	1,627	1,683	1,721	1.21	1,427
Clwyd	170	185	177	180	190	0.16	1,179
Swanse	705	765	774	796	824	0.75	1,096
Wrexm	283	293	310	322	315	0.20	1,544
TOTALS							
England	**49,609**	**51,299**	**52,976**	**54,712**	**56,201**	**44.02**	**1,277**
N Ireland	**1,606**	**1,697**	**1,773**	**1,828**	**1,914**	**1.44**	**1,326**
Scotland	**4,582**	**4,842**	**4,944**	**5,102**	**5,245**	**4.41**	**1,190**
Wales	**2,858**	**3,038**	**3,067**	**3,176**	**3,252**	**2.51**	**1,296**
UK	**58,655**	**60,876**	**62,760**	**64,818**	**66,612**	**52.38**	**1,272**

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 83 prevalent patients after the closing date. Results shown here and in table 2.2 were corrected using the additional data.

pmp – per million population

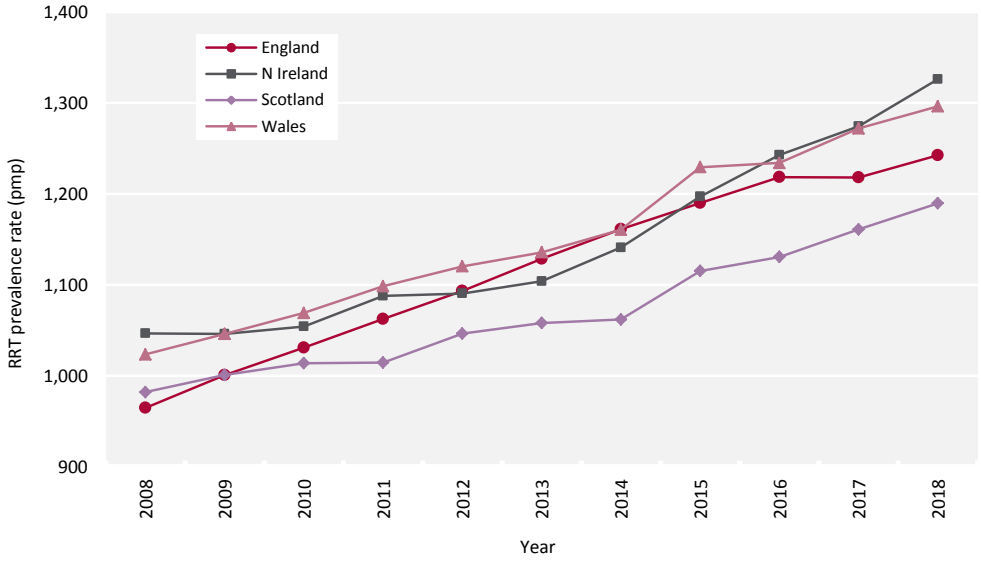

Figure 2.2 Adult RRT prevalence rates by country between 2008 and 2018

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

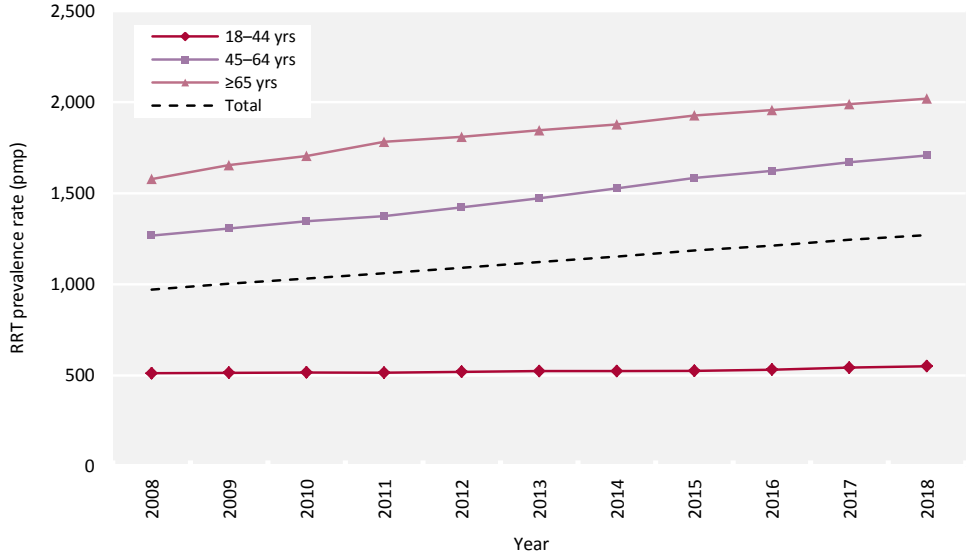

Figure 2.3 Adult RRT prevalence rates by age group between 2008 and 2018

pmp – per million population

Demographics and treatment modality of prevalent adult RRT patients

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

Table 2.2 Demographics and treatment modality of adult patients prevalent to RRT on 31/12/2018 by centre

								Ethnicity				
Centre	N on RRT	% on ICHD	% on PD	% on HHD	% with Tx	Median age (yrs)	% male	% White	% South Asian	% Black	% Other	% missing
ENGLAND												
B Heart	679	56.1	14.0	3.1	26.8	62.8	61.9	56.2	31.0	11.1	1.8	0.1
B QEH	2,569	37.4	6.3	1.8	54.5	57.7	58.7	59.1	26.9	10.2	3.8	1.9
Basldn	314	54.5	8.9	3.2	33.4	61.7	67.8	84.9	4.5	5.8	4.8	0.6
Bradfd	686	37.9	3.8	1.3	57.0	56.7	60.2	51.3	43.9	2.7	2.2	1.3
Brightn	1,055	42.2	5.7	3.7	48.4	61.5	62.9	90.2	5.7	1.9	2.1	2.4
Bristol	1,469	32.3	3.8	1.0	62.8	58.7	61.7	88.5	3.8	5.5	2.1	0.2
Camb	1,417	22.4	3.1	*	74.5							
Carlis	293	34.5	10.6	0.0	54.9	60.9	63.8	98.6	1.4	0.0	0.0	1.0
Carsh	1,736	48.7	5.6	1.7	44.0	61.8	62.0	68.5	14.8	11.0	5.7	2.8
Chelms	270	41.5	12.2	0.7	45.6	64.7	69.6	90.3	2.2	3.0	4.5	0.7
Colchr	121	100.0	0.0	0.0	0.0	73.0	61.2	96.7	0.8	1.7	0.8	0.0
Covnt	1,042	36.5	5.7	2.1	55.8	58.7	61.9	78.2	15.6	5.3	0.8	0.3
Derby	589	33.4	13.8	9.0	43.8	60.0	61.1	82.3	11.2	3.1	3.4	0.2
Donc	332	53.9	7.2	2.7	36.1	64.3	62.7	93.7	3.0	0.9	2.4	0.0
Dorset	765	38.0	5.0	1.7	55.3	65.2	59.7	96.6	1.2	0.4	1.8	0.8
Dudley	361	56.8	10.2	3.0	29.9	63.8	62.3	82.3	11.9	4.7	1.1	0.0
Exeter	1,088	41.3	7.2	1.9	49.6	63.4	62.4	96.7	0.5	0.8	2.0	0.1
Glouc	510	46.1	7.1	0.6	46.3	64.0	62.0	93.1	3.4	1.8	1.8	0.6
Hull	883	39.8	5.3	0.6	54.4	58.9	63.5	97.0	1.7	0.3	0.9	1.1
Ipswi	428	35.3	9.3	1.2	54.2	62.3	65.7	83.1	1.9	3.4	11.6	3.0
Kent	1,114	37.5	3.9	1.6	56.9	61.3	59.4	93.5	3.7	1.0	1.8	0.8
L Barts	2,610	40.9	9.1	1.4	48.6	57.0	60.6	32.6	31.2	22.7	13.5	0.1
L Guys	2,225	31.1	1.9	1.7	65.3	55.5	59.2	60.4	8.0	25.5	6.0	1.8
L Kings	1,186	50.3	7.6	1.4	40.6	59.5	61.2	44.4	12.2	37.0	6.4	0.1
L Rfree	2,234	30.6	7.4	0.5	61.5	58.3	59.4	45.1	21.7	23.2	10.0	3.4
L St.G	837	35.1	4.8	0.7	59.4	59.8	57.9	46.1	23.3	23.7	7.0	4.1
L West	3,566	40.1	3.8	0.5	55.6	60.6	60.6	39.4	33.7	18.4	8.5	0.0
Leeds	1,687	32.3	3.9	1.4	62.5	57.0	60.7	77.5	15.3	5.0	2.1	0.3
Leic	2,468	37.2	4.5	2.6	55.8	59.5	59.6	73.5	19.8	4.5	2.1	3.4
Liv Ain	218	71.1	11.9	8.3	8.7	65.4	61.0	98.1	0.0	1.4	0.5	0.9
Liv Roy	1,277	28.2	4.5	3.1	64.3	57.3	61.2	91.1	1.8	3.1	4.0	1.0
M RI	2,073	24.5	3.3	3.5	68.7	56.8	60.3	69.3	14.2	13.5	3.0	0.9
Middlbr	925	37.2	3.0	1.4	58.4	59.8	63.8	93.7	5.1	0.4	0.8	0.0
Newc	1,155	29.4	5.2	1.9	63.5	59.0	61.6	92.9	4.0	1.1	2.0	0.1
Norwch	786	37.7	4.6	1.7	56.1	62.4	61.8	96.7	1.1	0.6	1.5	0.1
Nottm	1,196	29.3	6.0	2.8	61.9	57.8	60.3	81.3	8.8	6.9	3.1	0.1
Oxford	1,940	23.2	3.6	0.9	72.3	57.3	63.0	80.7	10.2	4.4	4.7	9.5
Plymth	539	23.7	7.4	1.9	67.0	62.2	67.2	96.7	0.4	0.4	2.6	0.2
Ports	1,764	29.9	5.3	4.0	60.8	59.8	61.9	93.0	3.6	1.2	2.2	3.5
Prestn	1,322	39.4	2.9	3.3	54.5	60.4	61.7	84.9	13.8	0.8	0.5	0.0
Redng	810	36.2	5.1	1.0	57.8	62.5	61.7	67.2	24.5	5.8	2.5	6.3
Salford	1,173	34.0	9.8	3.0	53.2	58.4	59.3	81.0	14.2	2.9	2.0	0.1
Sheff	1,481	37.1	4.1	3.4	55.4	59.2	63.1	88.6	5.6	2.7	3.1	1.2
Shrew	424	48.6	13.9	4.7	32.8	64.0	64.4	94.3	2.8	0.9	1.9	0.2

Table 2.2. Continued

Centre	N on RRT	% on ICHD	% on PD	% on HHD	% with Tx	Median age (yrs)	% male	Ethnicity				
								% White	% South Asian	% Black	% Other	% missing
Stevng	957	51.4	2.9	4.5	41.2	60.7	61.3	71.2	15.4	8.3	5.2	6.9
Sthend	260	49.2	11.5	0.4	38.8	63.0	58.8	83.5	5.4	4.6	6.5	0.0
Stoke	808	35.3	10.0	2.7	52.0	60.4	62.0	91.8	4.8	1.4	2.0	2.2
Sund	557	43.6	3.1	3.9	49.4	61.2	60.9	95.9	2.9	0.7	0.5	0.0
Truro	437	38.4	3.9	0.7	57.0	62.5	58.8	98.6	0.2	0.0	1.1	0.0
Wirral	395	51.4	4.8	2.0	41.8	61.5	58.5	95.9	1.8	0.8	1.5	0.0
Wolve	602	52.3	9.1	5.5	33.1	59.5	61.6	64.1	22.9	10.9	2.2	0.5
York	568	32.4	5.1	3.0	59.5	61.3	63.0	97.3	1.1	0.7	0.9	3.9
N IRELAND												
Antrim	274	43.4	7.3	1.5	47.8	63.2	62.4	99.6	0.0	0.4	0.0	0.0
Belfast	877	19.7	2.6	1.1	76.5	56.6	59.7	97.6	1.1	0.6	0.7	6.2
Newry	249	32.5	6.4	0.8	60.2	62.1	55.8	98.4	0.4	0.8	0.4	0.0
Ulster	190	55.8	5.3	0.0	38.9	68.6	56.8	95.8	1.6	1.1	1.6	0.0
West NI	324	34.6	2.8	0.6	62.0	59.4	58.6	98.5	0.9	0.3	0.3	0.0
SCOTLAND												
Abrdn	573	37.3	4.5	0.7	57.4	58.0	58.6					65.8
Airdrie	487	39.4	4.3	0.0	56.3	57.5	58.9	96.3	2.5	0.6	0.6	27.3
D&Gall	145	37.9	4.1	0.7	57.2	60.7	62.1					76.6
Dundee	445	35.7	4.9	1.8	57.5	59.3	59.8					67.0
Edinb	862	34.8	4.2	0.3	60.7	58.2	62.1					75.3
Glasgw	1,812	32.4	2.9	1.0	63.7	58.5	59.3					79.9
Inverns	279	32.3	4.7	2.5	60.6	58.7	55.9					46.2
Klmarnk	342	41.2	6.4	3.8	48.5	59.7	59.9					60.8
Krkcldy	300	45.0	3.7	0.0	51.3	61.2	58.0					80.0
WALES												
Bangor	202	34.7	9.9	6.4	49.0	62.7	65.3	98.5	0.0	0.5	1.0	0.0
Cardff	1,721	32.2	3.5	2.0	62.3	58.5	62.5	92.0	5.2	0.5	2.3	1.0
Clwyd	190	39.5	7.9	1.1	51.6	64.0	65.8	97.9	1.6	0.0	0.5	1.6
Swanse	824	45.3	8.5	4.2	42.0	63.8	63.0	97.8	1.5	0.2	0.5	1.0
Wrexm	315	36.2	7.6	1.6	54.6	60.2	62.9	96.8	0.6	1.0	1.6	0.0
TOTALS												
England	**56,201**	**37.2**	**5.7**	**2.1**	**55.1**	**59.5**	**61.2**	**73.3**	**13.8**	**8.8**	**4.1**	**1.6**
N Ireland	**1,914**	**30.9**	**4.1**	**0.9**	**64.1**	**59.5**	**59.1**	**98.0**	**0.9**	**0.6**	**0.6**	**2.8**
Scotland	**5,245**	**35.7**	**4.0**	**1.0**	**59.3**	**58.6**	**59.6**					**68.5**
Wales	**3,252**	**36.5**	**5.8**	**2.7**	**55.0**	**60.6**	**63.0**	**94.7**	**3.3**	**0.5**	**1.6**	**0.9**
UK	**66,612**	**36.8**	**5.5**	**2.0**	**55.7**	**59.5**	**61.1**	**75.4**	**12.6**	**8.1**	**3.9**	**7.0**

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 by modality, with ICHD being the total HD percentage. Coventry submitted only aggregate data by modality for 83 prevalent patients after the closing date. Additional data from Cambridge and Coventry were included in country totals only for the number on RRT.

PRDs were grouped into categories as shown in table 2.3, with the mapping of disease codes into groups explained in more detail in appendix A. The proportion of RRT patients in each ethnic group and with each PRD is shown for patients with ethnicity and PRD data, respectively, and these total 100% of patients with data. The proportions of patients with no ethnicity and no PRD data are shown on separate lines.

Table 2.3 Demographics, primary renal diseases (PRDs) and prevalent treatment modality of adult patients prevalent to RRT on 31/12/2018 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 on RRT	5,140	7,228	13,044	15,651	13,804	8,507	1,738	65,112	59.5
% on RRT	7.9	11.1	20.0	24.0	21.2	13.1	2.7		.
Sex (%)									
Male	7.7	10.9	19.8	24.2	21.2	13.4	2.9	61.1	59.7
Female	8.2	11.5	20.4	23.8	21.2	12.5	2.3	38.9	59.0
Ethnicity (%)									
White	7.8	10.5	19.9	23.2	21.9	13.9	3.0	75.4	59.9
South Asian	9.4	13.8	17.8	25.1	21.8	10.6	1.5	12.6	59.2
Black	6.2	12.7	25.9	28.2	13.6	11.0	2.3	8.1	56.6
Other	10.5	14.5	20.9	23.0	19.3	10.3	1.5	3.9	56.4
Missing	7.1	9.5	18.6	26.8	22.6	12.9	2.5	7.0	60.6
PRD (%)									
Diabetes	2.3	8.8	19.4	28.2	25.0	14.1	2.2	18.0	61.9
Glomerulonephritis	9.4	13.9	22.7	25.7	18.7	8.5	1.2	19.5	56.5
Hypertension	2.9	8.4	19.9	23.8	21.7	18.7	4.7	6.2	62.5
Polycystic kidney disease	1.7	5.8	21.7	33.2	26.9	9.8	0.9	10.4	61.1
Pyelonephritis	10.9	14.7	24.9	21.2	15.7	10.1	2.5	9.9	54.8
Renal vascular disease	1.8	2.5	5.5	12.7	29.0	39.0	9.6	2.9	74.6
Other	15.6	13.8	18.4	20.0	19.0	11.0	2.1	18.0	56.0
Uncertain aetiology	7.8	11.2	18.1	20.5	20.7	16.7	4.9	15.0	61.1
Missing	14.5	9.9	17.7	19.3	20.3	14.6	3.7	2.6	59.5
Modality (%)									
ICHD	4.3	6.3	13.6	20.5	24.8	24.3	6.3	36.8	67.4
HHD	9.0	12.5	25.8	27.2	18.2	7.1	0.2	2.0	56.0
PD	6.6	7.8	15.2	21.8	23.7	21.1	3.8	5.5	64.3
Tx	10.4	14.5	24.5	26.5	18.7	5.1	0.2	55.7	55.2

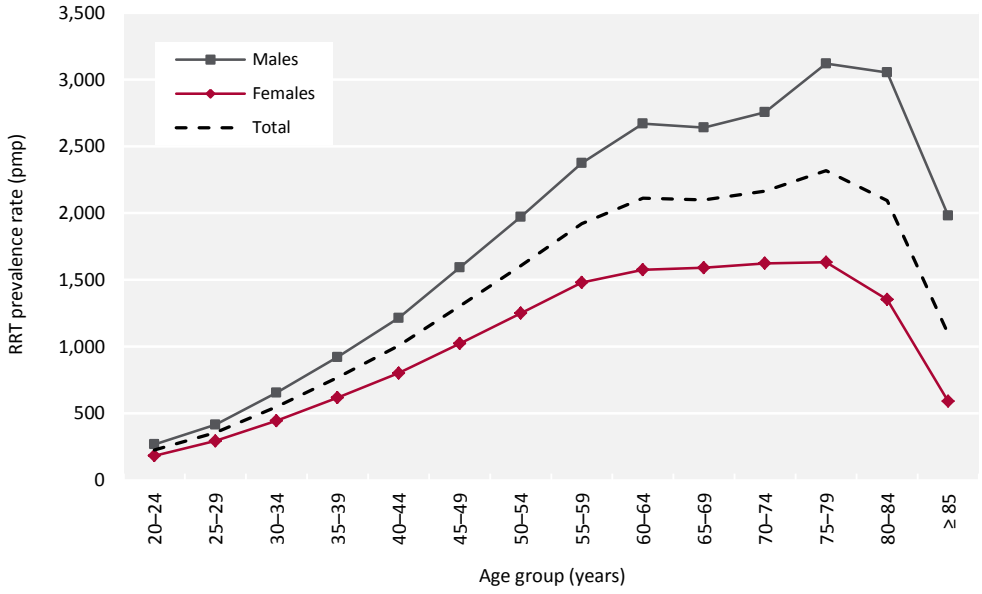

Figure 2.4 Prevalence rates for adult patients on RRT on 31/12/2018 by age group and sex

For each modality, the percentage of patients of each year of age is shown in figure 2.5, with the totals of each modality adding to 100%.

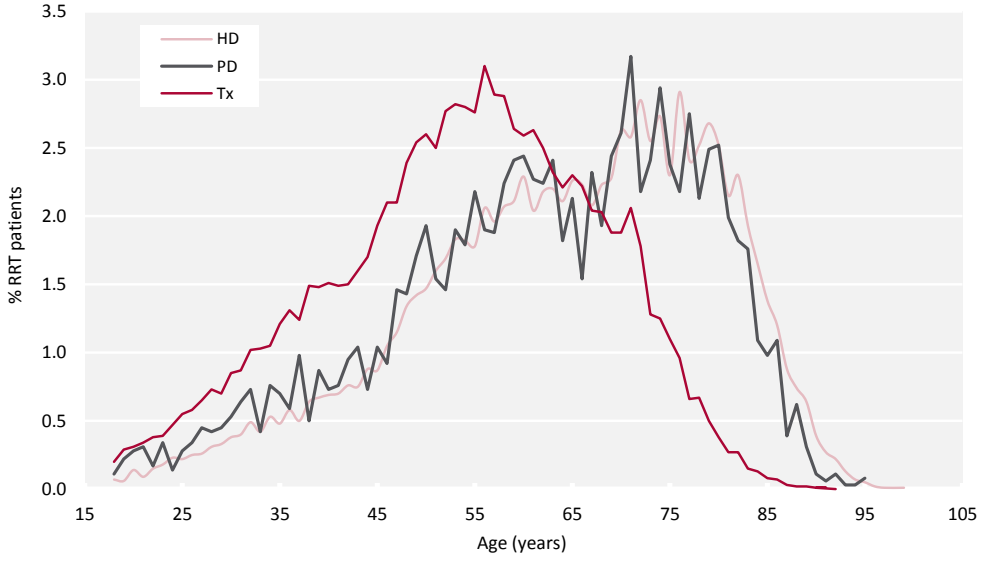

Figure 2.5 Age profile of adult patients prevalent to RRT on 31/12/2018 by RRT modality

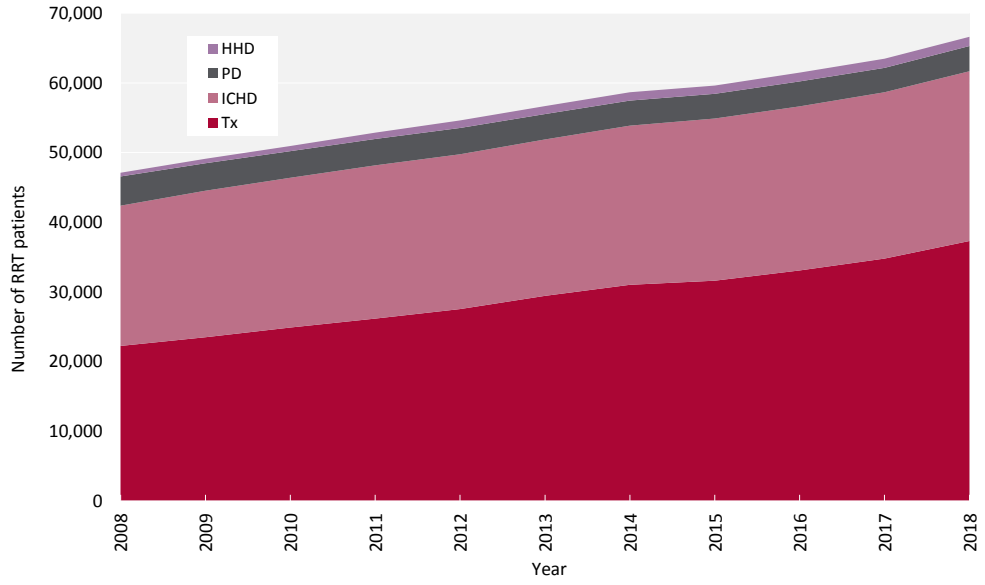

Figure 2.6 Growth in numbers of prevalent adult RRT patients by treatment modality between 2008 and 2018

Table 2.4 Change in adult RRT prevalence rates by modality between 2014 and 2018

	Prevalence rate (pmp)					% growth in prevalence rate				
Year	HD	PD	Dialysis	Tx	RRT	HD	PD	Dialysis	Tx	RRT
2014	472	71	543	609	1,152					
2015	483	70	553	633	1,186	2.3	-1.5	1.8	3.9	2.9
2016	486	70	556	657	1,212	0.6	-0.1	0.5	3.8	2.2
2017	491	68	558	686	1,245	0.9	-2.9	0.4	4.5	2.7
2018	490	69	560	712	1,272	-0.0	2.3	0.2	3.7	2.2
Average annual growth 2014-2018						**0.9**	**-0.5**	**0.7**	**4.0**	**2.5**

Rates appear higher than in previous reports, because from this year those <18 years were excluded from the estimated populations.
pmp – per million population

In table 2.5, for each PRD category, the proportion of patients on each treatment modality is shown for patients with PRD data and these total 100% of patients with data. The proportion of patients with no PRD data is shown on a separate line. Table 2.6 shows changes in PRDs between 2009 and 2018, in particular the increase in diabetes.

Table 2.5 Treatment modality of adult patients prevalent to RRT on 31/12/2018 by primary renal disease (PRD)

PRD	N on RRT	% RRT population	Modality (%)		
			HD	PD	Tx
Diabetes	11,393	18.0	56.8	7.0	36.2
Glomerulonephritis	12,396	19.5	28.8	4.4	66.8
Hypertension	3,955	6.2	44.7	6.8	48.5
Polycystic kidney disease	6,569	10.4	21.1	3.8	75.0
Pyelonephritis	6,309	9.9	29.8	3.2	67.0
Renal vascular disease	1,857	2.9	67.0	10.6	22.4
Other	11,444	18.0	37.7	4.8	57.5
Uncertain aetiology	9,502	15.0	39.5	6.1	54.4
Total (with data)	**63,425**	**100.0**	**38.4**	**5.4**	**56.2**
Missing	1,687	2.6	53.9	10.1	36.0

Table 2.6 Change in primary renal disease (PRD) of adult patients prevalent to RRT between 2009 and 2018

PRD	Year									
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Diabetes	15.3	15.4	15.8	16.2	16.5	16.7	17.1	17.3	17.7	18.0
Glomerulonephritis	19.3	19.4	19.3	19.4	19.5	19.4	19.4	19.4	19.5	19.5
Hypertension	6.0	6.1	6.1	6.3	6.3	6.3	6.3	6.2	6.3	6.2
Polycystic kidney disease	9.8	9.9	10.0	10.0	10.2	10.1	10.2	10.2	10.3	10.4
Pyelonephritis	12.2	11.8	11.6	11.4	11.2	10.9	10.6	10.4	10.3	9.9
Renal vascular disease	3.5	3.6	3.5	3.3	3.1	3.1	3.0	3.0	3.0	2.9
Other	16.1	16.3	16.4	16.6	16.8	17.2	17.4	17.7	17.8	18.0
Uncertain aetiology	17.7	17.6	17.4	16.9	16.4	16.3	16.0	15.8	15.2	15.0
Missing	0.5	0.4	0.7	0.6	1.0	0.9	1.1	1.2	1.9	2.6

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

The treatment modality distribution for prevalent adult RRT patients was further divided by treatment location for HD patients – hospital unit, satellite unit or home – and for PD patients by type of PD – automated PD (APD) and continuous ambulatory PD (CAPD).

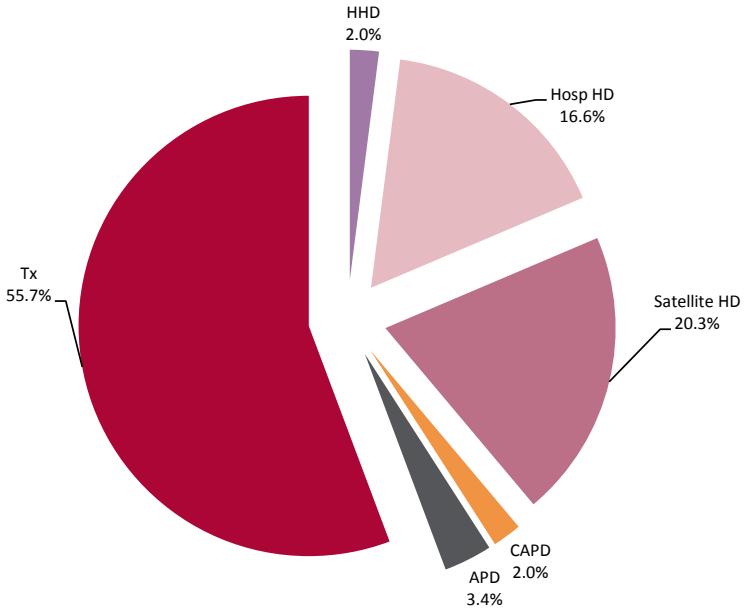

Figure 2.7 Detailed treatment modality of adult patients prevalent to RRT on 31/12/2018

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

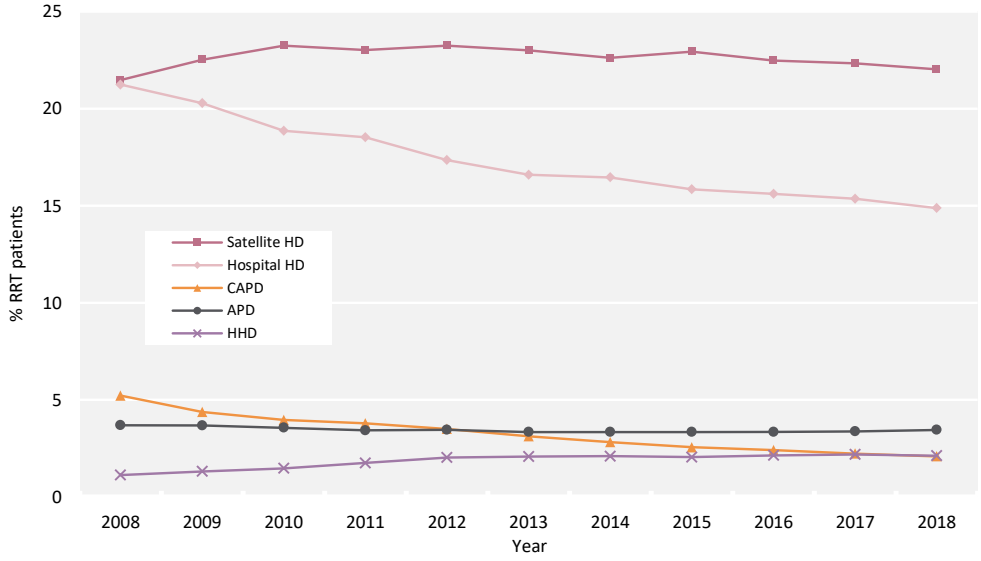

Figure 2.8 Detailed dialysis modality changes in prevalent adult RRT patients between 2008 and 2018

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

Table 2.7 Adult patients prevalent to dialysis on 31/12/2018 by detailed dialysis modality and centre

Centre	N on dialysis	% Tx wait-listed <65 yrs	% Tx wait-listed ≥65 yrs	% on HD				% on PD		
				All HD	HHD	Hospital	Satellite	All PD	CAPD	APD
ENGLAND										
B Heart	497	20.1	2.3	80.9	4.2	72.6	4.0	19.1	2.6	16.5
B QEH	1,170	28.2	4.5	86.1	4.0	13.1	69.0	13.9	3.3	10.6
Basldn	209	45.2	6.0	86.6	4.8	63.2	18.7	13.4	2.9	10.5
Bradfd	295	30.7	6.2	91.2	3.1	74.6	13.6	8.8	2.0	6.8
Brightn	544	29.2	3.7	89.0	7.2	38.4	43.4	11.0	7.0	4.0
Bristol	546	34.1	4.0	89.7	2.8	18.7	68.3	10.3	6.2	4.0
Camb	361									
Carlis	132	27.3	9.1	76.5	0.0	50.0	26.5	23.5	6.8	16.7
Carsh	973	32.9	4.9	89.9	3.0	18.3	68.7	10.1	2.4	7.5
Chelms	147	25.5	3.3	77.6	1.4	76.2	0.0	22.5	6.1	16.3
Colchr	121	27.8	3.5	100.0	0.0	100.0	0.0	0.0	0.0	0.0
Covnt	378	30.4	2.8	86.2	5.8	80.4	0.0	13.8	13.8	0.0
Derby	331	31.1	6.6	75.5	16.0	59.5	0.0	24.5	13.9	10.6
Donc	212	43.9	6.9	88.7	4.3	44.3	40.1	11.3	2.4	9.0
Dorset	342	33.3	7.4	88.9	3.8	18.7	66.4	11.1	2.6	8.5
Dudley	253	26.1	3.6	85.4	4.4	37.2	43.9	14.6	8.7	5.9
Exeter	548	35.1	2.1	85.8	3.8	8.8	73.2	14.2	5.7	8.6
Glouc	274	35.1	5.0	86.9	1.1	62.8	23.0	13.1	1.1	12.0
Hull	403	26.9	8.6	88.3	1.2	44.4	42.7	11.7	7.2	4.5
Ipswi	196	29.9	2.5	79.6	2.6	67.9	9.2	20.4	8.2	11.2
Kent	480	28.5	3.6	90.8	3.8	27.7	59.4	9.2	6.7	2.5
L Barts	1,341	36.1	7.7	82.3	2.7	34.6	45.0	17.7	2.7	15.0
L Guys	772	37.0	10.5	94.4	4.9	14.4	75.1	5.6	0.9	4.7
L Kings	704	29.7	6.1	87.2	2.4	19.6	65.2	12.8	5.3	7.5
L Rfree	861	43.3	10.0	80.7	1.4	2.9	76.4	19.3	6.7	12.5
L St.G	340	41.6	12.8	88.2	1.8	19.4	67.1	11.8	4.7	5.6
L West	1,583	48.6	13.7	91.5	1.2	17.7	72.6	8.5	4.8	3.7
Leeds	633	39.0	11.2	89.7	3.6	19.4	66.7	10.3	3.5	6.8
Leic	1,091	34.3	7.1	89.9	5.9	18.1	66.0	10.1	1.9	8.2
Liv Ain	199	29.3	4.7	86.9	9.1	5.0	72.9	13.1	0.0	13.1
Liv Roy	456	27.2	13.1	87.5	8.6	32.9	46.1	12.5	6.8	5.7
M RI	649	36.5	14.6	89.5	11.3	23.4	54.9	10.5	3.7	6.8
Middlbr	385	38.0	10.3	92.7	3.4	24.2	65.2	7.3	7.3	0.0
Newc	422	37.4	11.1	85.8	5.2	64.0	16.6	14.2	1.0	13.3
Norwch	345	27.2	2.7	89.6	3.8	52.2	33.6	10.4	8.7	1.7
Nottm	456	28.2	2.8	84.2	7.5	31.4	45.4	15.8	3.7	12.1
Oxford	538	43.5	5.2	87.2	3.4	31.0	52.8	12.8	2.8	9.9
Plymth	178	29.3	12.5	77.5	5.6	62.4	9.6	22.5	5.6	16.9
Ports	691	33.5	11.1	86.4	10.1	16.9	59.3	13.6	12.9	0.7
Prestn	602	30.2	10.0	93.7	7.1	22.1	64.5	6.3	2.3	4.0
Redng	342	36.8	4.3	88.0	2.3	35.7	50.0	12.0	7.3	4.7
Salford	549	37.5	17.1	79.1	6.4	21.0	51.7	21.0	6.0	14.9
Sheff	661	34.4	8.2	90.8	7.6	45.2	38.0	9.2	3.0	6.2
Shrew	285	22.2	4.0	79.3	7.0	41.1	31.2	20.7	3.9	16.8
Stevng	563	42.3	5.3	95.0	7.6	41.6	45.8	5.0	5.0	0.0
Sthend	159	31.9	4.6	81.1	0.6	80.5	0.0	18.9	18.9	0.0
Stoke	388	26.2	1.3	79.1	5.7	47.7	25.8	20.9	2.3	13.9
Sund	282	35.2	7.1	94.0	7.8	47.5	38.7	6.0	2.8	3.2
Truro	188	34.9	8.8	91.0	1.6	56.4	33.0	9.0	4.3	4.8
Wirral	230	28.4	6.1	91.7	3.5	41.3	47.0	8.3	0.9	7.4
Wolve	403	19.3	2.0	86.4	8.2	63.8	14.4	13.7	2.5	8.4

Table 2.7 Continued

Centre	N on dialysis	% Tx wait-listed <65 yrs	% Tx wait-listed ≥65 yrs	% on HD				% on PD		
				All HD	HHD	Hospital	Satellite	All PD	CAPD	APD
York	230	37.1	2.8	87.4	7.4	29.6	50.4	12.6	10.0	2.6
N IRELAND[1]										
Antrim	143	41.0	4.8	86.0	2.8	83.2	0.0	14.0	0.7	13.3
Belfast	206	41.8	9.3	88.8	4.9	84.0	0.0	11.2	0.5	10.7
Newry	99	29.4	7.7	83.8	2.0	81.8	0.0	16.2	0.0	16.2
Ulster	116	29.6	3.4	91.4	0.0	91.4	0.0	8.6	0.9	4.3
West NI	123	25.0	8.9	92.7	1.6	91.1	0.0	7.3	1.6	5.7
SCOTLAND[2]										
Abrdn	244	33.9	10.6	89.3	1.6	87.7	0.0	10.7	9.0	1.6
Airdrie	213	48.0	18.2	90.1	0.0	90.1	0.0	9.9	4.2	5.6
D&Gall	62	54.2	13.2	90.3	1.6	88.7	0.0	9.7	4.8	4.8
Dundee	189	35.3	3.8	88.4	4.2	84.1	0.0	11.6	0.5	11.1
Edinb	339	33.3	12.4	89.4	0.9	88.5	0.0	10.6	2.7	8.0
Glasgw	658	52.5	12.8	92.0	2.7	89.2	0.0	8.1	2.6	5.5
Inverns	110	38.1	4.4	88.2	6.4	81.8	0.0	11.8	11.8	0.0
Klmarnk	176	31.5	11.9	87.5	7.4	80.1	0.0	12.5	0.6	11.9
Krkcldy	146	32.3	6.0	92.5	0.0	92.5	0.0	7.5	0.0	7.5
WALES										
Bangor	103	37.2	8.3	80.6	12.6	46.6	21.4	19.4	5.8	13.6
Cardff	649	30.8	6.1	90.8	5.2	2.5	83.1	9.2	5.1	4.2
Clwyd	92	25.8	8.2	83.7	2.2	81.5	0.0	16.3	8.7	7.6
Swanse	478	23.3	3.6	85.4	7.3	46.2	31.8	14.6	7.1	7.5
Wrexm	143	29.4	5.3	83.2	3.5	68.5	11.2	16.8	0.0	16.8
TOTALS										
England	**24,577**	**34.3**	**7.2**	**87.4**	**4.7**	**32.0**	**50.7**	**12.6**	**4.7**	**7.7**
N Ireland	**687**	**35.5**	**6.7**	**88.7**	**2.6**	**86.0**	**0.0**	**11.4**	**0.7**	**10.0**
Scotland	**2,137**	**41.8**	**10.9**	**90.2**	**2.5**	**87.7**	**0.0**	**9.8**	**3.5**	**6.3**
Wales	**1,465**	**28.6**	**5.5**	**87.1**	**6.1**	**31.3**	**49.8**	**12.9**	**5.5**	**7.4**
UK	**28,866**	**34.6**	**7.4**	**87.6**	**4.6**	**37.4**	**45.7**	**12.4**	**4.6**	**7.6**

Blank cells – no data returned by the centre.
[1]There were no satellite units in Northern Ireland.
[2]All HD patients in Scotland were shown as receiving treatment at home or in hospital because no data were available regarding satellite dialysis.
APD – automated PD; CAPD – continuous ambulatory PD

The proportion of patients on HHD versus satellite HD is shown in figure 2.9, with the remaining patients on hospital HD.

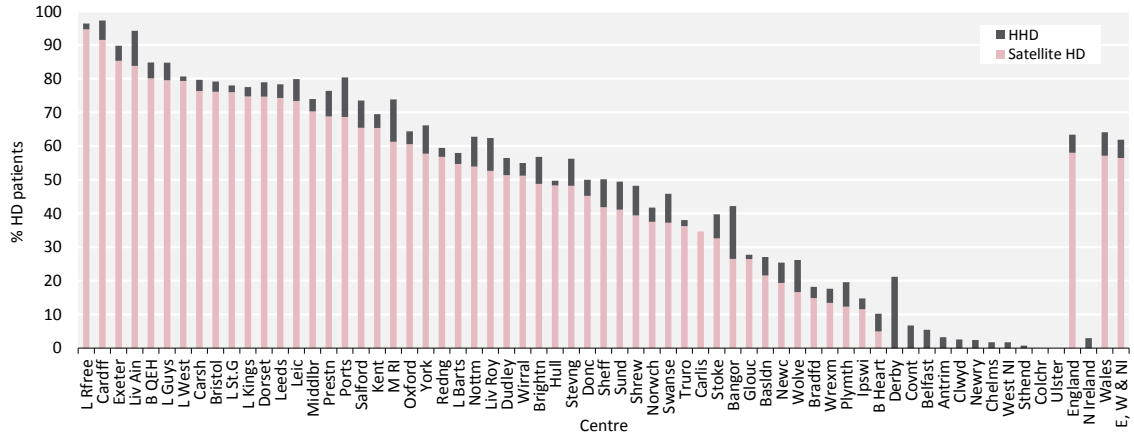

Figure 2.9 Adult patients prevalent to HD on 31/12/2018 treated with satellite HD or HHD by centre

There were no satellite units in Northern Ireland and Scottish centres were excluded because data on satellite HD were not available.

Dialysis access in prevalent adult dialysis patients

The type of dialysis access used by the prevalent dialysis population is described in chapter 4.

Survival in adult dialysis patients

Survival was analysed in prevalent patients receiving dialysis on 31/12/2017 and followed-up for one year in 2018. Survival in patients with a Tx is presented in chapter 3.

Survival analyses, where stated, were adjusted to age 60 years to allow comparisons between centres with different age distributions. Centre-specific survival rates were further adjusted for not only age (figure 2.10), but also sex and comorbidities for centres with at least 85% completeness (figure 2.11). For the first time, UKRR comorbidity data were augmented using diagnostic and procedure codes from Hospital Episode Statistics (HES) in England and Patient Episode Database for Wales (PEDW) in Wales (see appendix A for details). Centres are identifiable from the x-axis by using the number of prevalent dialysis patients by centre in table 2.8.

Table 2.8 1 year adjusted survival (age and case-mix) of adult patients prevalent to dialysis on 31/12/2017 by centre

	Age adjusted survival				Case-mix adjusted survival[1]			
Centre	N on dialysis	1 yr (%)	Lower 95% limit	Upper 95% limit	N on dialysis	1 yr (%)	Lower 95% limit	Upper 95% limit
D&Gall	58	86.5	76.8	94.2				
Clwyd	82	85.9	79.0	93.4	82	86.9	80.6	94.4
Newry	93	88.0	79.6	93.2	90	85.3	81.1	94.3
Inverns	94	91.4	79.7	93.1				
Bangor	95	88.4	79.7	93.1	95	89.9	81.4	94.2
Carlis	118	88.6	80.8	92.7	115	89.4	82.3	93.8
Colchr	122	86.3	80.9	92.6	122	87.8	82.5	93.7
Ulster	124	92.5	81.0	92.6	122	91.0	82.5	93.7
Antrim	129	89.3	81.1	92.5	121	87.2	82.5	93.7
West NI	137	90.4	81.4	92.4	126	86.7	82.7	93.7
Wrexm	141	85.0	81.5	92.4	140	85.0	83.1	93.5
Krkcldy	143	83.3	81.5	92.4				
Sthend	148	86.7	81.7	92.3	148	86.2	83.3	93.4
Chelms	167	91.6	82.1	92.1	166	92.3	83.7	93.2
Truro	170	90.9	82.2	92.1	170	92.3	83.8	93.2
Klmarnk	170	86.3	82.2	92.1				
Liv Ain	183	89.5	82.4	91.9	183	91.6	84.0	93.1
Plymth	186	85.6	82.4	91.9	183	87.2	84.0	93.1
Ipswi	187	90.2	82.5	91.9	182	91.6	84.0	93.1
Airdrie	196	84.6	82.6	91.8				
Dundee	197	89.0	82.6	91.8				
Basldn	201	87.8	82.7	91.8	199	89.4	84.3	92.9
Donc	210	89.5	82.8	91.7	207	89.6	84.4	92.9
York	217	88.3	82.9	91.7	217	89.5	84.5	92.8
Belfast	220	90.6	83.0	91.6				
Wirral	227	86.1	83.0	91.6	224	88.9	84.6	92.8
Shrew	230	90.4	83.1	91.6	230	91.3	84.7	92.7
Abrdn	237	85.1	83.2	91.5				
Dudley	261	88.2	83.4	91.4	261	89.2	85.0	92.6
Sund	263	85.0	83.4	91.4	263	86.8	85.0	92.6
Glouc	274	91.1	83.5	91.3	270	91.6	85.1	92.5
Bradfd	287	84.8	83.7	91.2	285	87.2	85.2	92.4
Derby	305	87.4	83.8	91.2	304	88.2	85.4	92.4
Edinb	320	89.2	83.9	91.1				
Redng	321	86.1	83.9	91.1	321	88.1	85.5	92.3
Dorset	324	90.4	83.9	91.1	323	91.0	85.5	92.3
Middlbr	329	85.6	84.0	91.1	329	88.4	85.5	92.3
L St.G	338	90.4	84.0	91.0	325	91.5	85.5	92.3
Wolve	367	88.6	84.2	90.9	367	90.3	85.8	92.1
Norwch	367	89.5	84.2	90.9	367	89.8	85.8	92.1
Hull	381	86.8	84.3	90.9	380	88.0	85.8	92.1
Newc	381	86.6	84.3	90.9	381	89.4	85.8	92.1
Covnt	383	90.2	84.3	90.9	374	90.9	85.8	92.1
Stoke	394	86.1	84.4	90.8	393	87.6	85.9	92.0
Swanse	430	86.8	84.5	90.7	430	88.9	86.1	91.9
Nottm	440	88.3	84.6	90.7	439	89.5	86.1	91.9
Liv Roy	448	88.3	84.6	90.7	439	90.3	86.1	91.9
B Heart	465	88.4	84.7	90.6	463	89.4	86.2	91.9
Kent	470	85.9	84.7	90.6	470	87.1	86.2	91.8
Brightn	491	88.3	84.8	90.6	482	89.5	86.3	91.8
Salford	504	85.3	84.8	90.5	504	88.5	86.4	91.8
Oxford	511	86.1	84.8	90.5	502	87.4	86.3	91.8

Table 2.8 Continued

Centre	Age adjusted survival				Case-mix adjusted survival[1]			
	N on dialysis	1 yr (%)	Lower 95% limit	Upper 95% limit	N on dialysis	1 yr (%)	Lower 95% limit	Upper 95% limit
Stevng	513	88.4	84.8	90.5	511	89.3	86.4	91.8
Exeter	523	89.7	84.9	90.5	520	90.9	86.4	91.7
Bristol	537	85.3	84.9	90.5	535	87.8	86.5	91.7
Prestn	567	87.8	85.0	90.4	547	89.5	86.5	91.7
Glasgw	578	86.8	85.0	90.4				
Leeds	581	87.3	85.1	90.4	579	89.4	86.6	91.6
Cardff	586	85.1	85.1	90.4	585	87.2	86.6	91.6
M RI	615	86.9	85.1	90.3	608	88.7	86.7	91.6
Sheff	621	89.0	85.2	90.3	619	90.5	86.7	91.6
L Kings	656	89.3	85.2	90.2	650	90.7	86.7	91.5
Ports	657	85.4	85.2	90.2	648	87.3	86.7	91.5
L Guys	692	88.7	85.3	90.2	691	89.8	86.8	91.5
L Rfree	802	87.5	85.5	90.0	790	88.9	87.0	91.3
Carsh	930	89.7	85.7	89.9	909	90.5	87.2	91.2
Leic	1,007	87.4	85.8	89.8	1,001	88.3	87.3	91.1
B QEH	1,123	89.6	85.9	89.7	1,119	90.6	87.4	91.0
L Barts	1,220	89.1	86.0	89.7	1,208	90.5	87.5	91.0
L West	1,501	90.0	86.2	89.5	1,444	90.9	87.7	90.9

Centres are ordered by increasing number of patients.
[1]Centres excluded if <85% comorbidity data were available – this included Belfast and all Scottish renal centres.

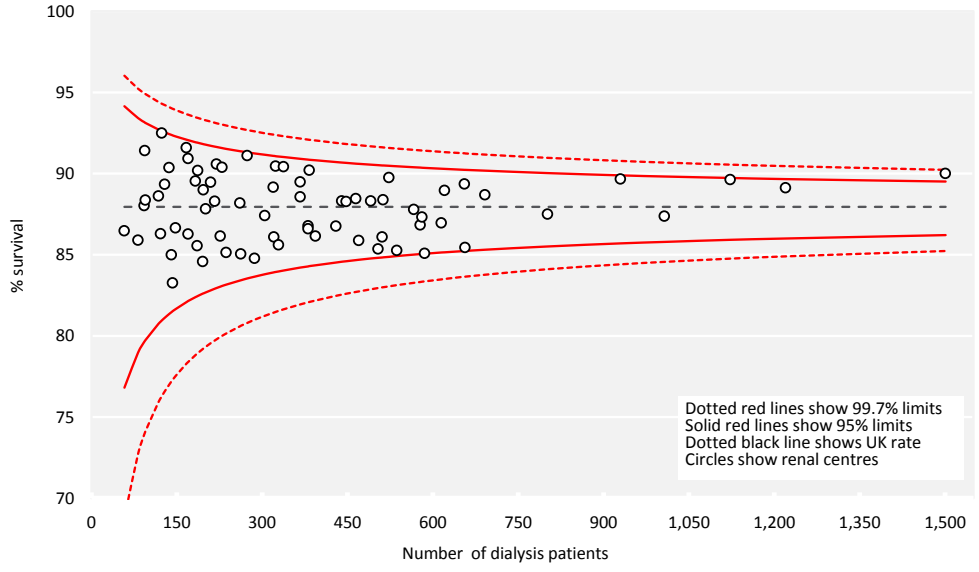

Figure 2.10 1 year survival (adjusted to age 60 years) of adult patients prevalent to dialysis on 31/12/2017 by centre

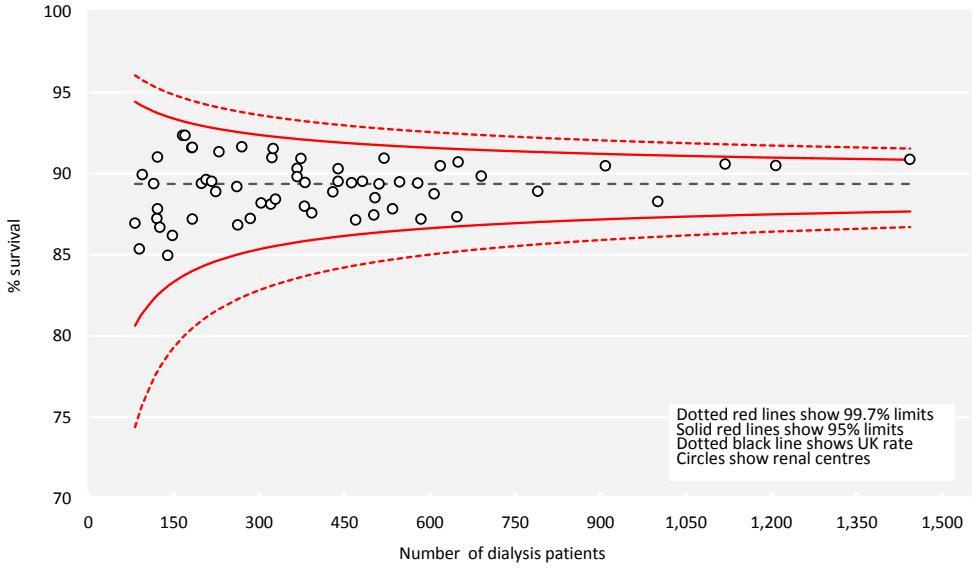

Figure 2.11 1 year survival (adjusted to 60 years, male and median comorbidity score) of adult patients prevalent to dialysis on 31/12/2017 by centre

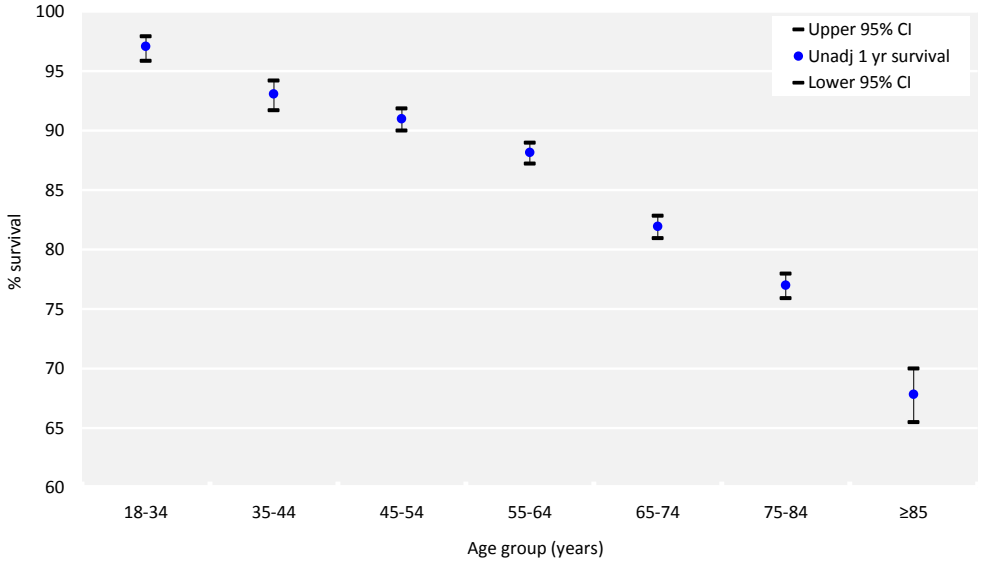

Figure 2.12 1 year survival (unadjusted) of adult patients prevalent to dialysis on 31/12/2017 by age group

CI – confidence interval

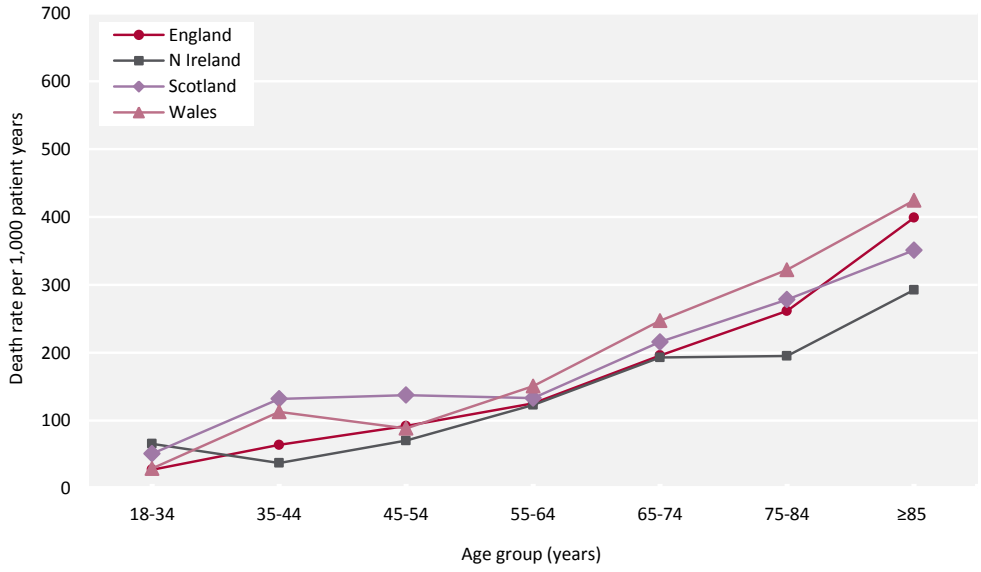

Figure 2.13 1 year death rate per 1,000 patient years for adult patients prevalent to dialysis on 31/12/2017 by country and age group

The serial one year death rate in prevalent adult dialysis patients by country is shown in figure 2.14, adjusted to age 60 years.

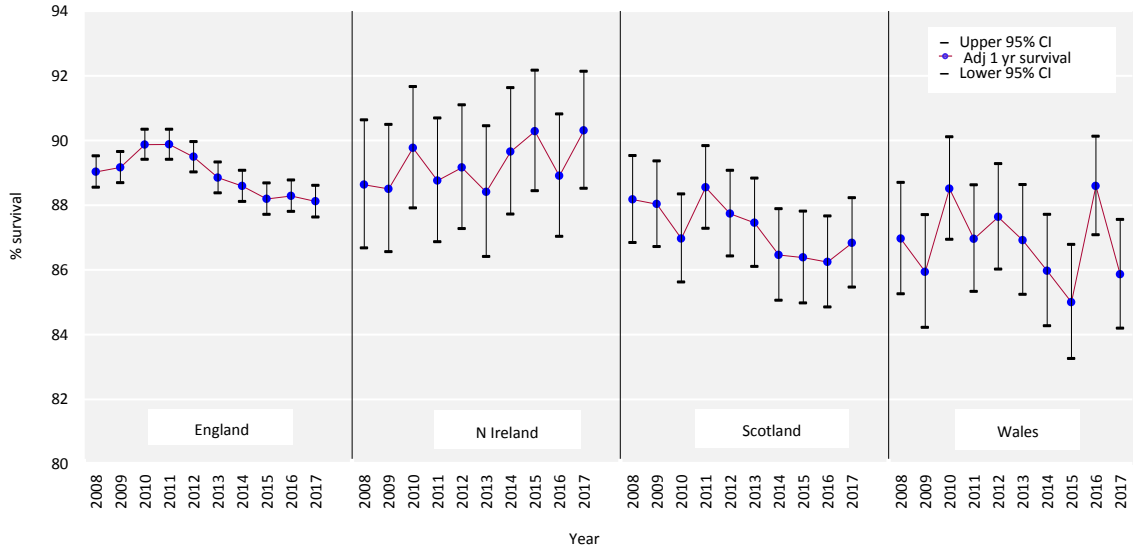

Figure 2.14 1 year survival (adjusted to age 60 years) for prevalent adult dialysis patients by country between 2008 and 2017

CI – confidence interval

The relative risk of death by age group for prevalent RRT patients compared to the general population's risk of death, calculated using Office for National Statistics UK population and deaths data, is shown in table 2.9.

Table 2.9 Death rate by age group for adult patients prevalent to RRT on 31/12/2017 followed-up for 1 year compared with the general population and with previous analyses in the 1998–2001 cohort

Age group (yrs)	UK population mid-2018 (thousands)	UK deaths in 2018	Death rate per 1,000 population	Expected number of deaths in UKRR population	UKRR deaths in 2018	UKRR death rate per 1,000 prevalent RRT patients	Relative risk of death in 2018	Relative risk of death 1998-2001 cohort
20-24	4,185	1,589	0.4	0	7	8	19.9	41.1
25-29	4,527	2,185	0.5	1	17	11	22.2	41.8
30-34	4,463	2,989	0.7	2	30	13	19.1	31.2
35-39	4,372	4,282	1.0	3	57	18	18.3	26.0
40-44	3,993	5,928	1.5	6	100	26	17.6	22.6
45-49	4,507	10,152	2.3	13	172	30	13.4	19.0
50-54	4,674	15,116	3.2	22	310	45	13.8	12.8
55-59	4,294	21,169	4.9	37	391	52	10.5	10.1
60-64	3,673	28,297	7.7	53	532	77	10.0	10.4
65-69	3,396	41,405	12.2	78	746	116	9.5	7.9
70-74	3,252	62,099	19.1	115	877	146	7.6	7.2
75-79	2,236	75,062	33.6	150	891	199	5.9	5.3
80-84	1,673	98,915	59.1	172	816	280	4.7	4.0
≥85	1,608	241,938	150.4	212	558	397	2.6	3.0
Total	**50,853**	**611,126**	**12.0**	**864**	**5,504**	**91**	**6.4**	**7.7**

Cause of death in adult RRT patients

Cause of death was analysed in prevalent patients receiving RRT on 31/12/2017 and followed-up for one year in 2018. The proportion of RRT patients with each cause of death is shown for patients with cause of death data and these total 100% of patients with data. The proportion of patients with no cause of death data is shown on a separate line.

Table 2.10 Cause of death in adult patients prevalent to RRT on 31/12/2017 followed-up in 2018 by age group

	RRT all ages		RRT <65 yrs		RRT ≥65 yrs	
Cause of death	N	%	N	%	N	%
Cardiac disease	786	20.7	284	25.3	502	18.8
Cerebrovascular disease	147	3.9	63	5.6	84	3.2
Infection	715	18.9	213	19.0	502	18.8
Malignancy	335	8.8	117	10.4	218	8.2
Treatment withdrawal	666	17.6	117	10.4	549	20.6
Other	769	20.3	228	20.3	541	20.3
Uncertain aetiology	371	9.8	99	8.8	272	10.2
Total (with data)	**3,789**	**100.0**	**1,121**	**100.0**	**2,668**	**100.0**
Missing	1,717	31.2	497	30.7	1,220	31.4

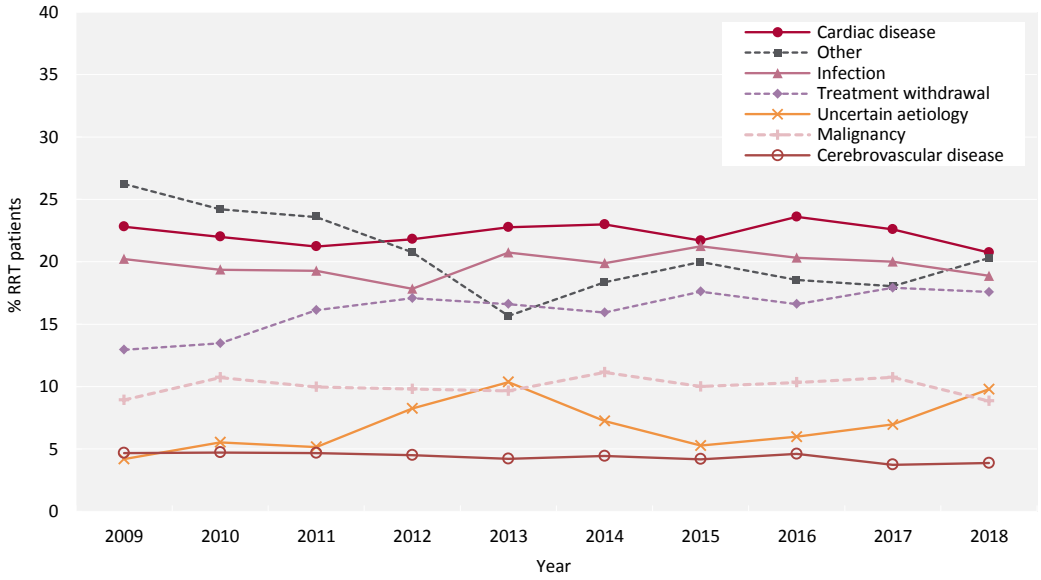

Figure 2.15 Cause of death between 2009 and 2018 for adult patients prevalent to RRT at the beginning of the year