

## *Chapter 4*

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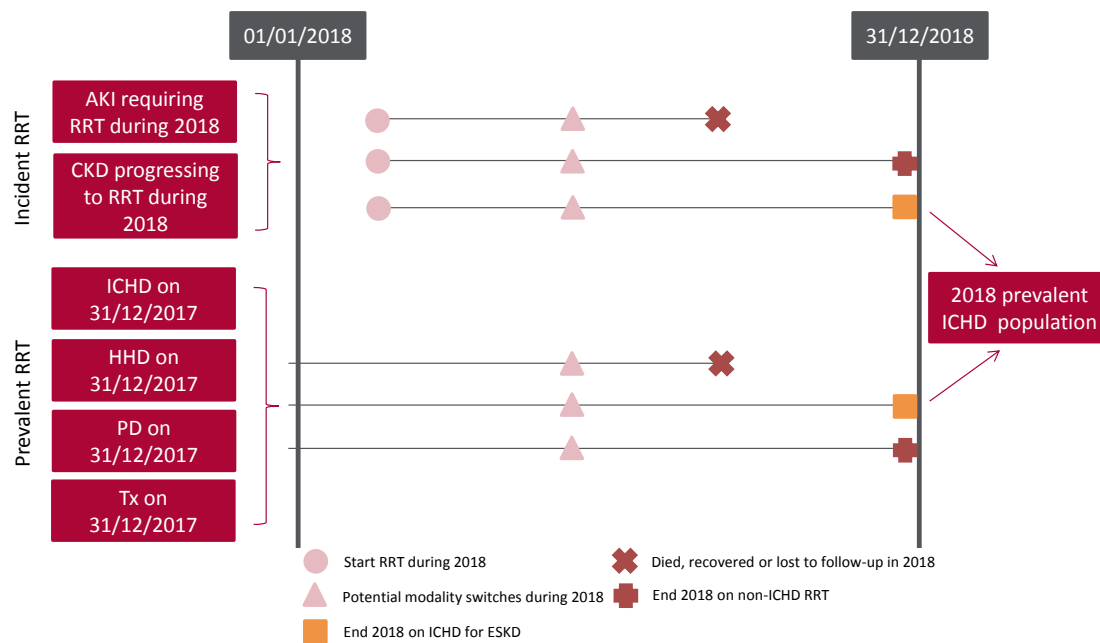
# **Adults on in-centre haemodialysis (ICHHD) in the UK at the end of 2018**

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# Introduction

This chapter describes the population of adult patients with end-stage kidney disease (ESKD) who were receiving regular in-centre haemodialysis (ICHD) in the UK at the end of 2018 (figure 4.1). This population comprises patients who were on ICHD at the end of 2017 and remained on ICHD throughout 2018, as well as patients who commenced/re-commenced ICHD in 2018. This latter group includes both incident renal replacement therapy (RRT) patients who ended 2018 on ICHD and prevalent RRT patients who switched to ICHD from home haemodialysis (HHD), peritoneal dialysis (PD), or a transplant (Tx) in 2018. Consequently, the cohort of patients receiving ICHD in a centre not only reflects differences in underlying population case-mix, but also differences in the rates of acceptance onto RRT, survival on ICHD, transplantation and home therapies (HHD and PD), and the care of patients on those other modalities, as described in other chapters of this report.



**Figure 4.1** Pathways adult patients could follow to be included in the UK 2018 prevalent ICHD population

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

CKD – chronic kidney disease

The infection analyses used a rolling two year cohort as per the audit measures (table 4.1). The cause of death analyses were undertaken on historic prevalent cohorts to allow sufficient follow-up time.

This chapter addresses the following key aspects of the care of patients on ICHD for which there are Renal Association guidelines (table 4.1):

- **Complications associated with ESKD and ICHD:** these include anaemia and mineral bone disorders
- **Adequacy of ICHD:** measures of dialysis care include urea clearance and frequency and length of dialysis sessions. Currently, the urea reduction ratio (URR) is the only urea clearance measure routinely reported to the UK Renal Registry (UKRR)
- **Type of ICHD access:** definitive access – either a surgically created arteriovenous fistula (AVF) or arteriovenous graft (AVG). Alternatively, more temporary access can be provided through a central venous catheter (CVC) – either a tunnelled line (TL) or a non-tunnelled line (NTL)
- **Infections associated with haemodialysis (ICHD and HHD):** analysis of infections is presented for ICHD and HHD combined because renal centres are not required to submit changes in dialysis modality that last <30 days. It is therefore not possible to attribute accurately an infection to HHD or ICHD. Rates of the four infections subject to mandatory reporting to Public Health England (PHE) are reported in this chapter – methicillin-resistant *Staphylococcus aureus* (MRSA), methicillin-sensitive *Staphylococcus aureus* (MSSA), *Escherichia coli* bacteraemia and *Clostridium difficile*.

# Rationale for analyses

The analyses begin with a description of the 2018 prevalent adult ICHD population, including the number on ICHD per million population (pmp), dialysis duration and frequency.

The Renal Association guidelines ([renal.org/health-professionals/guidelines/guidelines-commentaries](http://renal.org/health-professionals/guidelines/guidelines-commentaries)) provide audit measures relevant to the care of patients on ICHD and, where data permit, their attainment by UK renal centres in 2018 is reported in this chapter (table 4.1). Audit measures in guidelines that have been archived are not included. Some audit measures – for example, the target for glycosylated haemoglobin (HbA1c) in those on hypoglycaemia-inducing treatment – cannot be reported because the completeness of the required data items is too low. Further detail about the completeness of data returned to the UKRR is available through the UKRR data completeness portal ([renal.org/audit-research/data-portal/completeness](http://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.

**Table 4.1** The Renal Association audit measures relevant to ICHD that are reported in this chapter

The Renal Association guideline	Audit criteria	Related analysis/analyses
CKD mineral bone disorder (2018)	Percentage of patients with serum calcium above the normal reference range of 2.2–2.5 mmol/L	Table 4.6, figure 4.6
HD (2019)	Proportion of patients with pre-dialysis bicarbonate 18–26 mmol/L	Table 4.7, figure 4.8
	Proportion of patients with pre-dialysis potassium 4.0–6.0 mmol/L	Table 4.7, figure 4.9
Anaemia (2017)	Proportion of patients with serum ferritin <100 µg/L at start of treatment with erythropoiesis stimulating agent (ESA)	Table 4.8, figure 4.13 (the UKRR does not hold treatment with ESA start dates)
	Proportion of patients with haemoglobin <100 g/L not on ESA	Table 4.9
	Proportion of patients on ESA with haemoglobin >120 g/L	Table 4.9, figure 4.15
Vascular access (2015)	Mean (median) ESA dose in patients maintained on ESA therapy	Table 4.9
	Proportion of prevalent dialysis patients with definitive access (AVF/AVG/PD catheter) – ≥80%	Figure 4.17
	Annual rate of MRSA <1 episode/100 patient years (measured over 2 years)	Table 4.10, figures 4.18, 4.20
	Annual rate of MSSA <2.5 episodes/100 patient years (measured over 2 years)	Table 4.10, figures 4.19, 4.21
Planning, initiating and withdrawing RRT (2014)	Number of patients withdrawing from ICHD as a proportion of all deaths on ICHD	Table 4.11, figure 4.22

AVF – arteriovenous fistula; AVG – arteriovenous graft; ESA – erythropoiesis stimulating agent; MRSA – methicillin-resistant *Staphylococcus aureus*; MSSA – methicillin-sensitive *Staphylococcus aureus*

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

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

- 24,366 adult patients were receiving ICHD for ESKD in the UK on 31/12/2018, which represented 36.8% of the RRT population
- The median age of ICHD patients was 67.4 years and 61.6% were male
- 86.6% of ICHD patients achieved a dialysis adequacy of URR >65%
- 93.6% of ICHD patients had dialysis 3 times a week
- 73.4% of ICHD patients had dialysis for 4–5 hours per session
- The median adjusted calcium for ICHD patients was 2.3 mmol/L and 10.3% were above the target range 2.2–2.5 mmol/L
- The median haemoglobin and ferritin for ICHD patients was 111 g/L and 419 µg/L, respectively, and 90.9% were on an ESA at a median dose of 8,000 IU/week
- 1.1% of ICHD patients had a haemoglobin <100 g/L not on an ESA and 17.3% had a haemoglobin >120 g/L on an ESA
- Of the 43 centres that provided adequate long term dialysis access data in England, Northern Ireland and Wales, 11 centres achieved the 80% target for definitive access amongst prevalent dialysis patients (AVF/AVG/PD catheter)
- The 2 year rates (2017–2018) of MRSA and MSSA bacteraemia were 0.19/100 patient years and 2.88/100 patient years, respectively
- 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 (28.3%) and in older patients (≥65 years) was treatment withdrawal (24.1%).

# Analyses

## Changes to the prevalent adult ICHD population

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

**Table 4.2** Number of prevalent adult ICHD patients and proportion of adult RRT patients on ICHD by year and by centre; number of ICHD patients as a proportion of the catchment population

Centre	N on ICHD					% on ICHD					Estimated catchment population (millions)	2018 crude rate (pmp)
	2014	2015	2016	2017	2018	2014	2015	2016	2017	2018		
ENGLAND												
B Heart	397	406	376	377	381	62.5	62.3	57.7	57.6	56.1	0.61	623
B QEH	900	957	956	957	960	42.2	42.6	40.0	38.1	37.4	1.41	682
Basldn	172	159	151	165	171	61.9	58.0	55.1	54.8	54.5	0.34	497
Bradfd	217	229	244	269	260	39.6	39.3	38.4	40.0	37.9	0.54	481
Brightn	379	387	419	425	445	41.4	40.7	42.2	42.0	42.2	1.07	414
Bristol	506	503	489	491	475	34.7	34.1	33.3	33.4	32.3	1.19	398
Camb	331	332	327	346	317	26.8	25.4	24.6	24.4	22.4	0.96	330
Carlis	74	81	95	98	101	29.6	28.8	33.8	34.8	34.5	0.27	380
Carsh	755	796	819	841	846	48.7	50.3	49.9	49.9	48.7	1.59	534
Chelms	133	142	129	126	112	50.8	50.4	47.6	45.5	41.5	0.42	265
Colchr	119	120	123	129	121	100	100	100	100	100	0.25	488
Covnt	359	347	366	332	380	37.4	36.2	37.6	34.4	36.5	0.74	514
Derby	200	209	200	191	197	38.9	38.8	36.9	34.4	33.4	0.58	338
Donc	175	172	185	178	179	61.6	57.0	55.9	53.5	53.9	0.34	527
Dorset	272	285	273	295	291	40.9	41.9	39.8	40.2	38.0	0.71	407
Dudley	160	161	188	206	205	52.5	51.1	54.3	55.8	56.8	0.37	560
Exeter	411	435	443	457	449	43.5	44.9	43.7	43.2	41.3	0.90	497
Glouc	209	224	235	244	235	48.8	50.5	49.8	48.1	46.1	0.49	483
Hull	320	350	324	351	351	39.9	40.9	37.9	40.2	39.8	0.85	415
Ipswi	122	143	147	147	151	33.2	35.7	35.6	33.9	35.3	0.33	457
Kent	389	410	409	424	418	38.4	39.4	38.1	38.9	37.5	1.01	412
L Barts	944	982	1,006	1,030	1,068	42.8	43.1	42.5	41.3	40.9	1.52	704
L Guys	600	628	645	667	691	31.3	31.2	30.7	30.9	31.1	0.90	770
L Kings	530	554	566	573	597	51.8	51.1	51.0	49.9	50.3	0.97	615
L Rfree	695	694	709	686	683	34.6	33.2	32.6	31.3	30.6	1.26	543
L St.G	305	335	342	315	294	38.6	39.7	40.3	37.6	35.1	0.66	445
L West	1,395	1,422	1,453	1,446	1,429	43.4	43.2	42.8	41.6	40.1	1.99	719
Leeds	503	491	509	539	545	33.5	32.2	32.8	33.3	32.3	1.38	394
Leic	837	856	889	899	917	39.1	39.3	38.7	37.9	37.2	2.02	454
Liv Ain	151	159	173	160	155	69.6	71.6	76.2	76.6	71.1	0.40	386
Liv Roy	338	345	325	352	360	26.9	27.9	26.8	28.1	28.2	0.83	434
M RI	467	473	466	498	508	26.1	25.2	23.6	24.4	24.5	1.27	400
Middlbr	324	340	321	334	344	37.9	37.7	36.1	36.9	37.2	0.83	413
Newc	265	292	295	326	340	27.1	28.9	28.1	29.3	29.4	0.93	366
Norwch	294	311	315	302	296	42.9	43.1	40.9	38.9	37.7	0.65	454
Nottm	332	358	365	354	350	31.3	32.2	31.7	30.1	29.3	0.90	388
Oxford	443	412	429	450	451	26.8	24.4	24.3	24.0	23.2	1.40	322
Plymth	133	129	136	142	128	26.5	25.6	26.5	26.3	23.7	0.39	329
Ports	573	614	562	548	527	36.0	36.8	33.3	31.4	29.9	1.68	314



**Table 4.2** Continued

Centre	N on ICHD					% on ICHD					Estimated catchment population (millions)	2018 crude rate (pmp)
	2014	2015	2016	2017	2018	2014	2015	2016	2017	2018		
Prestn	524	533	522	517	521	44.7	43.9	43.4	40.7	39.4	1.24	421
Redng	285	295	295	303	293	37.5	38.1	37.4	38.1	36.2	0.75	388
Salford	395	387	375	387	399	40.7	39.7	36.8	34.7	34.0	1.24	323
Sheff	540	546	560	549	550	39.7	39.5	39.4	38.2	37.1	1.14	484
Shrew	178	178	186	183	206	51.0	48.2	49.3	47.7	48.6	0.41	496
Stevng	459	480	501	464	492	58.6	59.0	56.5	52.1	51.4	1.00	493
Sthend	115	124	111	121	128	48.3	50.4	47.0	47.6	49.2	0.26	488
Stoke	303	300	311	302	285	39.1	38.1	37.7	37.3	35.3	0.74	386
Sund	208	219	245	243	243	46.2	47.7	48.3	44.8	43.6	0.51	474
Truro	139	150	160	158	168	36.6	36.3	37.6	37.3	38.4	0.34	491
Wirral	197	174	188	202	203	70.9	61.9	55.8	52.5	51.4	0.47	428
Wolve	294	295	286	303	315	51.1	50.7	50.1	52.0	52.3	0.55	568
York	132	149	184	183	184	28.6	30.4	34.4	33.0	32.4	0.41	451
<b>N IRELAND</b>												
Antrim	122	120	123	117	119	52.8	49.8	48.8	45.9	43.4	0.23	507
Belfast	192	174	185	179	173	25.8	22.6	22.8	21.4	19.7	0.51	341
Newry	90	85	86	77	81	43.5	37.8	36.4	32.0	32.5	0.21	389
Ulster	95	106	101	109	106	63.8	62.7	60.8	59.9	55.8	0.21	500
West NI	114	119	125	113	112	41.6	40.6	40.7	36.1	34.6	0.28	399
<b>SCOTLAND</b>												
Abrdn	197	213	227	226	214	39.3	40.1	40.9	40.1	37.3	0.50	429
Airdrie	181	195	185	192	192	45.8	45.9	42.1	41.1	39.4	0.46	418
D&Gall	46	51	47	51	55	35.4	39.2	35.9	37.8	37.9	0.12	445
Dundee	164	184	176	183	159	40.9	43.9	42.1	42.1	35.7	0.39	413
Edinb	262	279	282	305	300	35.1	36.3	36.3	37.0	34.8	0.80	374
Glasgw	538	579	571	574	587	33.5	33.9	32.6	32.4	32.4	1.35	434
Inverns	66	90	86	83	90	29.3	35.6	33.2	31.6	32.3	0.22	401
Klmarnk	124	126	133	144	141	41.5	40.6	42.0	42.7	41.2	0.30	469
Krkldy	143	149	144	144	135	51.6	50.5	49.0	47.5	45.0	0.26	512
<b>WALES</b>												
Bangor	70	69	64	73	70	65.4	37.9	35.8	37.4	34.7	0.19	378
Cardff	458	470	486	529	555	28.8	29.1	29.9	31.4	32.2	1.21	460
Clwyd	87	77	69	72	75	51.2	41.6	39.0	40.0	39.5	0.16	466
Swanse	294	338	340	353	373	41.7	44.2	43.9	44.3	45.3	0.75	496
Wrexm	112	107	115	120	114	39.6	36.5	37.1	37.3	36.2	0.20	559
<b>TOTALS</b>												
<b>England</b>	<b>19,498</b>	<b>20,073</b>	<b>20,328</b>	<b>20,585</b>	<b>20,715</b>	<b>39.3</b>	<b>39.1</b>	<b>38.4</b>	<b>38.0</b>	<b>37.2</b>	<b>44.02</b>	<b>471</b>
<b>N Ireland</b>	<b>613</b>	<b>604</b>	<b>620</b>	<b>595</b>	<b>591</b>	<b>38.2</b>	<b>35.6</b>	<b>35.0</b>	<b>32.5</b>	<b>30.9</b>	<b>1.44</b>	<b>409</b>
<b>Scotland</b>	<b>1,721</b>	<b>1,866</b>	<b>1,851</b>	<b>1,902</b>	<b>1,873</b>	<b>37.6</b>	<b>38.5</b>	<b>37.4</b>	<b>37.3</b>	<b>35.7</b>	<b>4.41</b>	<b>425</b>
<b>Wales</b>	<b>1,021</b>	<b>1,061</b>	<b>1,074</b>	<b>1,147</b>	<b>1,187</b>	<b>35.7</b>	<b>34.9</b>	<b>35.0</b>	<b>36.1</b>	<b>36.5</b>	<b>2.51</b>	<b>473</b>
<b>UK</b>	<b>22,853</b>	<b>23,604</b>	<b>23,873</b>	<b>24,229</b>	<b>24,366</b>	<b>39.0</b>	<b>38.8</b>	<b>38.0</b>	<b>37.7</b>	<b>36.8</b>	<b>52.38</b>	<b>465</b>

Country ICHD populations were calculated by summing the ICHD patients from centres in each country. Estimated country populations were derived from Office for National Statistics figures. See appendix A for details on estimated catchment population by 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. Breakdown of haemodialysis (HD) patients into ICHD and HHD was not available for Cambridge – the ICHD figure is the total HD percentage. Coventry submitted data for 76 prevalent ICHD patients after the closing date. Results shown here and in table 4.3 were corrected using the additional data.

pmp – per million population

## Demographics of prevalent adult ICHD patients

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

**Table 4.3** Demographics of adult patients prevalent to ICHD on 31/12/2018 by centre

Centre	N on RRT	N on ICHD	% on ICHD	Median age (yrs)	% male	Ethnicity				% missing
						% White	% South Asian	% Black	% Other	
<b>ENGLAND</b>										
B Heart	679	381	56.1	67.5	59.8	50.7	36.5	11.5	1.3	0.0
B QEH	2,569	960	37.4	65.6	58.1	51.1	29.8	14.4	4.7	2.5
Basldn	314	171	54.5	67.7	69.0	83.5	4.7	7.1	4.7	0.6
Bradfd	686	260	37.9	63.8	62.3	43.9	49.0	3.6	3.6	2.7
Brightn	1,055	445	42.2	70.7	64.0	89.1	5.7	2.4	2.8	5.2
Bristol	1,469	475	32.3	69.1	62.1	84.4	4.2	9.1	2.3	0.4
Camb										
Carlis	293	101	34.5	68.0	59.4	100.0	0.0	0.0	0.0	2.0
Carsh	1,736	846	48.7	68.7	61.9	63.2	16.5	13.9	6.5	4.7
Chelms	270	112	41.5	71.1	69.6	92.8	2.7	1.8	2.7	0.9
Colchr	121	121	100.0	73.0	61.2	96.7	0.8	1.7	0.8	0.0
Covnt	1,042	380	36.5	70.7	58.9	71.5	18.9	8.6	1.0	0.7
Derby	589	197	33.4	66.2	60.9	80.6	10.7	4.6	4.1	0.5
Donc	332	179	53.9	69.6	59.2	91.6	3.9	1.7	2.8	0.0
Dorset	765	291	38.0	72.5	63.6	94.1	2.4	1.0	2.4	1.0
Dudley	361	205	56.8	68.9	60.5	81.0	11.7	6.3	1.0	0.0
Exeter	1,088	449	41.3	73.5	69.5	97.1	0.7	1.1	1.1	0.2
Glouc	510	235	46.1	73.5	63.4	92.3	3.0	3.0	1.7	0.9
Hull	883	351	39.8	66.7	63.0	97.1	2.0	0.3	0.6	1.7
Ipswi	428	151	35.3	71.9	62.9	81.9	1.4	4.2	12.5	4.6
Kent	1,114	418	37.5	69.0	61.2	94.4	3.4	1.2	1.0	2.2
L Barts	2,610	1,068	40.9	62.1	60.8	24.5	31.5	29.4	14.6	0.2
L Guys	2,225	691	31.1	63.3	59.9	44.9	6.2	42.3	6.6	3.9
L Kings	1,186	597	50.3	63.4	59.0	40.2	11.7	42.2	5.9	0.0
L Rfree	2,234	683	30.6	66.0	60.8	38.6	23.2	29.4	8.9	5.9
L St.G	837	294	35.1	66.6	58.5	31.2	26.2	35.5	7.1	4.1
L West	3,566	1,429	40.1	66.7	59.1	31.6	37.9	23.9	6.6	0.0
Leeds	1,687	545	32.3	62.5	62.2	71.2	18.6	7.9	2.2	0.6
Leic	2,468	917	37.2	67.1	62.3	70.8	20.9	5.7	2.7	5.9
Liv Ain	218	155	71.1	70.9	64.5	97.4	0.0	2.0	0.7	1.3
Liv Roy	1,277	360	28.2	64.0	60.8	86.0	2.3	5.7	6.0	2.5
M RI	2,073	508	24.5	64.2	59.4	47.7	13.5	35.8	3.0	1.0
Middlbr	925	344	37.2	67.5	65.4	91.6	7.6	0.9	0.0	0.0
Newc	1,155	340	29.4	66.3	65.3	88.8	5.3	2.7	3.2	0.3
Norwch	786	296	37.7	73.5	63.5	96.9	0.7	0.0	2.4	0.3
Nottm	1,196	350	29.3	70.0	62.0	74.9	10.6	11.4	3.1	0.0
Oxford	1,940	451	23.2	69.5	61.9	76.8	10.7	6.5	6.0	15.1
Plymth	539	128	23.7	73.2	66.4	96.9	0.0	0.8	2.3	0.0
Ports	1,764	527	29.9	68.0	63.4	91.1	3.7	2.1	3.1	8.3
Prestn	1,322	521	39.4	67.8	63.0	81.0	17.3	1.3	0.4	0.0
Redng	810	293	36.2	69.2	59.0	66.2	24.8	6.8	2.3	9.2
Salford	1,173	399	34.0	63.2	61.2	72.7	19.5	4.8	3.0	0.0
Sheff	1,481	550	37.1	68.4	64.5	85.4	6.3	4.1	4.3	1.8
Shrew	424	206	48.6	71.6	65.0	93.2	3.9	0.5	2.4	0.0
Stevng	957	492	51.4	68.4	61.8	68.7	14.4	9.8	7.1	11.0

**Table 4.3** Continued

Centre	N on RRT	N on ICHD	% on ICHD	Median age (yrs)	% male	Ethnicity				
						% White	% South Asian	% Black	% Other	% missing
Sthend	260	128	49.2	67.1	57.8	82.8	6.3	7.0	3.9	0.0
Stoke	808	285	35.3	72.0	65.3	91.2	4.4	1.8	2.6	4.2
Sund	557	243	43.6	69.7	64.2	95.5	2.9	0.8	0.8	0.0
Truro	437	168	38.4	71.7	58.9	100.0	0.0	0.0	0.0	0.0
Wirral	395	203	51.4	65.2	54.2	96.1	1.5	0.5	2.0	0.0
Wolve	602	315	52.3	66.7	64.8	60.2	24.5	13.1	2.2	0.3
York	568	184	32.4	70.7	68.5	97.1	1.1	1.1	0.6	5.4
<b>N IRELAND</b>										
Antrim	274	119	43.4	74.9	62.2	99.2	0.0	0.8	0.0	0.0
Belfast	877	173	19.7	67.0	63.0	98.0	0.0	0.7	1.3	12.1
Newry	249	81	32.5	69.3	56.8	98.8	1.2	0.0	0.0	0.0
Ulster	190	106	55.8	76.8	55.7	94.3	1.9	0.9	2.8	0.0
West NI	324	112	34.6	74.0	56.3	99.1	0.9	0.0	0.0	0.0
<b>SCOTLAND</b>										
Abrdn	573	214	37.3	67.3	61.2					87.9
Airdrie	487	192	39.4	62.0	57.8	98.1	1.3	0.6		19.8
D&Gall	145	55	37.9	69.5	67.3					81.8
Dundee	445	159	35.7	67.3	59.7					84.3
Edinb	862	300	34.8	63.0	63.0					79.7
Glasgw	1,812	587	32.4	65.1	57.9					88.6
Inverns	279	90	32.3	70.3	58.9					73.3
Klmarnk	342	141	41.2	66.3	59.6					80.9
Krkldy	300	135	45.0	68.8	54.8					90.4
<b>WALES</b>										
Bangor	202	70	34.7	71.2	68.6	98.6	0.0	0.0	1.4	0.0
Cardff	1,721	555	32.2	65.9	60.5	89.3	7.0	1.3	2.4	2.5
Clwyd	190	75	39.5	69.5	70.7	100.0	0.0	0.0	0.0	1.3
Swanse	824	373	45.3	70.1	65.7	97.6	1.1	0.5	0.8	1.1
Wrexm	315	114	36.2	68.2	58.8	99.1	0.0	0.9	0.0	0.0
<b>TOTALS</b>										
<b>England</b>	<b>54,784</b>	<b>20,398</b>	<b>37.2</b>	<b>67.4</b>	<b>61.8</b>	<b>67.8</b>	<b>15.3</b>	<b>12.5</b>	<b>4.3</b>	<b>2.5</b>
<b>N Ireland</b>	<b>1,914</b>	<b>591</b>	<b>30.9</b>	<b>72.2</b>	<b>59.4</b>	<b>97.9</b>	<b>0.7</b>	<b>0.5</b>	<b>0.9</b>	<b>3.6</b>
<b>Scotland</b>	<b>5,245</b>	<b>1,873</b>	<b>35.7</b>	<b>65.8</b>	<b>59.5</b>					<b>78.3</b>
<b>Wales</b>	<b>3,252</b>	<b>1,187</b>	<b>36.5</b>	<b>68.5</b>	<b>63.1</b>	<b>94.1</b>	<b>3.6</b>	<b>0.9</b>	<b>1.5</b>	<b>1.6</b>
<b>UK</b>	<b>65,195</b>	<b>24,049</b>	<b>36.9</b>	<b>67.4</b>	<b>61.6</b>	<b>70.4</b>	<b>14.2</b>	<b>11.4</b>	<b>4.0</b>	<b>8.4</b>

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.

Coventry submitted data for 76 prevalent ICHD patients after the closing date; these patients were not included in the age, sex or ethnicity breakdown.

Primary renal diseases (PRDs) were grouped into categories as shown in table 4.4, with the mapping of disease codes into groups explained in more detail in appendix A. The proportion of ICHD patients with each PRD is shown for patients with PRD data and these total 100% of patients with data. The proportion of patients with no PRD data is shown on a separate line.

**Table 4.4** Primary renal diseases (PRDs) of adult patients prevalent to ICHD on 31/12/2018

PRD	N on ICHD	% ICHD population	Age <65 yrs		Age ≥65 yrs		M/F ratio
			N	%	N	%	
Diabetes	6,283	27.2	2,891	28.1	3,392	26.5	1.6
Glomerulonephritis	3,243	14.0	1,836	17.8	1,407	11.0	2.1
Hypertension	1,703	7.4	695	6.8	1,008	7.9	2.2
Polycystic kidney disease	1,278	5.5	653	6.3	625	4.9	1.0
Pyelonephritis	1,743	7.5	819	8.0	924	7.2	1.6
Renal vascular disease	1,215	5.3	157	1.5	1,058	8.3	2.0
Other	4,061	17.6	1,923	18.7	2,138	16.7	1.3
Uncertain aetiology	3,578	15.5	1,319	12.8	2,259	17.6	1.6
<b>Total (with data)</b>	<b>23,104</b>	<b>100.0</b>	<b>10,293</b>	<b>100.0</b>	<b>12,811</b>	<b>100.0</b>	
Missing	869	3.6	413	3.9	456	3.4	1.6

### Adequacy of dialysis in prevalent adult ICHD patients

URR and session duration were calculated only for patients who were undertaking ICHD three times per week. Patients who had missing data for the number of dialysis sessions per week were assumed to be dialysing three times per week for the purposes of calculating the median URR. These analyses were undertaken on the 2018 prevalent ICHD population, using data collected at the end of the third quarter, because of better data completeness compared to the fourth quarter of the year.

**Table 4.5** Median urea reduction ratio (URR) and distribution of session frequency and time for adult patients prevalent to ICHD on 31/12/2018 using end of third quarter data (30/09/2018)

Centre	Median URR (%)	% URR >65%	% session frequency/week			% session time			% data completeness		
			<3 sessions	3 sessions	>3 sessions	<4 hours	4-5 hours	>5 hours	URR	Session frequency	Session time
<b>ENGLAND</b>											
B Heart	74	80.1	8.0	90.7	1.3	9.3	90.0	0.7	97.6	85.7	83.8
B QEH	80	92.1	5.0	94.2	0.8	18.1	81.8	0.1	99.6	99.4	99.4
Basldn	72	82.5	1.3	93.5	5.2	34.3	65.7	0.0	97.3	97.5	97.3
Bradfd	71	71.4	5.4	93.8	0.8	28.3	71.7	0.0	77.4	100.0	100.0
Brightn	74	88.4	1.3	98.5	0.3	5.9	94.1	0.0	99.2	99.8	94.9
Bristol	73	80.2	4.6	94.9	0.4	24.5	75.5	0.0	99.8	99.8	99.8
Camb											
Carlis	74	81.1	4.8	95.2	0.0	16.3	83.8	0.0	100.0	89.4	88.9
Carsh			1.5	98.1	0.4	6.1	93.6	0.4	1.3	99.9	99.5
Chelms	74	82.8	3.2	92.6	4.2	35.2	64.8	0.0	92.6	94.1	93.6
Colchr	79	97.3	3.4	96.6	0.0	2.7	97.3	0.0	99.1	99.2	99.1
Covnt	76	89.6	8.5	90.4	1.1	25.3	74.7	0.0	94.7	96.9	94.7
Derby	76	84.5	1.2	95.9	2.9				98.8	100.0	29.5
Donc	76	86.5	1.2	98.8	0.0	26.9	73.1	0.0	98.8	97.0	97.0
Dorset	77	91.0	1.1	98.5	0.4	7.4	92.6	0.0	89.7	98.9	99.3
Dudley	76	90.8	3.9	96.1	0.0	11.6	87.8	0.6	93.1	92.3	92.0
Exeter	74	91.1	3.8	95.3	0.9	52.1	47.9	0.0	99.5	99.8	99.8
Glouc	76	93.3	4.1	93.2	2.7				100.0	99.1	0.0
Hull	78	92.3							98.2	0.6	1.2
Ipswi			12.3	87.7	0.0	13.6	86.4	0.0	0.0	99.3	96.7
Kent	72	84.9	2.1	96.3	1.6	68.9	31.1	0.0	95.9	99.5	100.0
L Barts									0.0	0.0	0.0

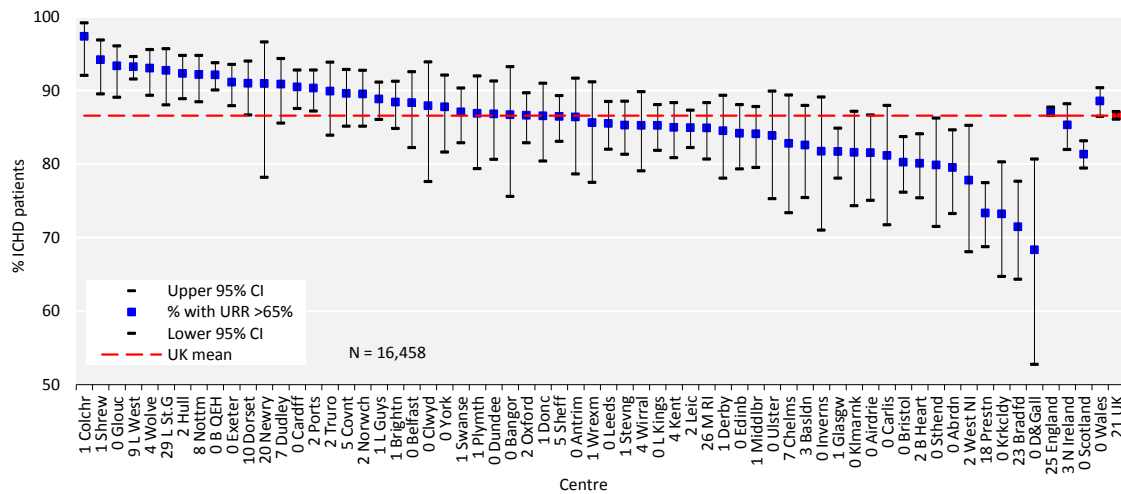
**Table 4.5** Continued

Centre	Median URR (%)	% URR >65%	% session frequency/week			% session time			% data completeness		
			<3 sessions	3 sessions	>3 sessions	<4 hours	4-5 hours	>5 hours	URR	Session frequency	Session time
L Guys	74	88.8	7.1	92.2	0.6	22.7	77.0	0.3	99.5	99.2	99.2
L Kings	73	85.2	5.6	94.0	0.4	62.1	37.9	0.0	99.6	99.8	99.8
L Rfree			17.5	81.5	1.0	57.8	41.8	0.4	0.0	96.0	95.2
L St.G	79	92.7	0.4	99.6	0.0	8.3	91.7	0.0	71.0	97.0	94.4
L West	79	93.2	12.2	86.9	0.9	23.4	76.0	0.6	91.3	92.0	91.1
Leeds	74	85.5	8.4	91.4	0.2	20.6	79.4	0.0	99.8	98.2	100.0
Leic	76	84.9	3.6	96.0	0.4	11.2	84.4	4.5	98.1	98.8	99.5
Liv Ain			4.0	94.0	2.0	14.3	85.7	0.0	0.0	99.3	99.3
Liv Roy			0.6	88.6	10.8	8.2	91.8	0.0	0.0	97.1	99.7
M RI	76	84.9	2.8	96.7	0.5	7.0	93.0	0.0	73.9	85.1	84.7
Middlbr	73	84.1	2.9	96.8	0.3	34.4	62.3	3.3	99.3	99.7	99.7
Newc			2.9	96.4	0.6	20.5	78.1	1.3	15.8	100.0	100.0
Norwch	76	89.5	1.9	96.3	1.9	56.0	44.0	0.0	98.1	98.2	98.1
Nottm	74	92.1	0.3	94.9	4.8	9.1	90.9	0.0	91.5	100.0	100.0
Oxford	75	86.6	0.0	100.0	0.0	34.3	65.7	0.0	98.5	100.0	100.0
Plymth	75	86.8	2.6	96.6	0.9				99.1	97.5	0.0
Ports	75	90.3	8.7	90.1	1.2				98.4	97.4	0.0
Prestn	72	73.3							82.2	0.0	0.2
Redng			0.8	99.2	0.0	19.1	80.9	0.0	1.5	96.4	98.2
Salford			3.0	80.1	17.0	18.9	81.1	0.0	62.5	97.7	93.5
Sheff	74	86.4	2.4	97.6	0.0	84.5	15.5	0.0	95.2	99.8	89.7
Shrew	75	94.2	2.2	95.0	2.8	20.9	79.1	0.0	98.8	99.5	99.4
Stevng	74	85.3	9.7	87.2	3.1	68.6	31.2	0.3	98.9	98.1	97.9
Sthend	70	79.8	5.8	94.2	0.0	47.4	52.6	0.0	100.0	100.0	100.0
Stoke			5.4	91.7	2.9	14.9	85.1	0.0	64.7	100.0	100.0
Sund			1.8	89.6	8.6	30.1	69.9	0.0	1.0	96.9	79.5
Truro	74	89.9							98.0	0.0	0.0
Wirral	75	85.2	1.1	90.8	8.2	24.4	75.6	0.0	96.0	95.3	100.0
Wolve	76	93.0	2.5	97.5	0.0				96.1	97.9	63.3
York	76	87.7	4.7	89.3	6.0	12.3	87.7	0.0	100.0	87.7	89.0
N IRELAND											
Antrim	74	86.4	1.8	97.3	0.9	13.9	86.1	0.0	100.0	97.4	98.2
Belfast	74	88.3	0.6	96.8	2.5	14.9	84.4	0.6	100.0	98.7	100.0
Newry	75	90.9	21.7	76.8	1.4	59.3	40.7	0.0	80.0	97.2	98.2
Ulster	72	83.8	2.0	96.1	2.0	15.2	84.8	0.0	100.0	99.0	100.0
West NI	72	77.8	5.9	88.1	5.9	69.7	30.3	0.0	97.8	97.1	96.7
SCOTLAND											
Abrdn	72	79.5	1.0	93.2	5.8	3.6	94.3	2.1	100.0	98.6	98.5
Airdrie	71	81.5	0.0	97.7	2.3	16.0	81.1	3.0	100.0	97.2	97.7
D&Gall	71	68.3	4.5	90.9	4.5	12.5	85.0	2.5	100.0	97.8	97.6
Dundee	73	86.8	0.0	98.7	1.3	7.6	92.4	0.0	100.0	98.8	98.7
Edinb	72	84.1	0.4	98.5	1.1	32.6	67.4	0.0	100.0	100.0	98.5
Glasgw	72	81.7	0.8	98.6	0.6	7.2	88.8	4.0	99.4	94.7	99.4
Inverns	72	81.7	0.0	97.2	2.8	23.2	76.8	0.0	100.0	97.3	97.2
Klmarkn	73	81.6	0.7	99.3	0.0	4.8	90.4	4.8	100.0	94.4	88.7
Krkldy	71	73.2	3.3	95.9	0.8	22.0	78.0	0.0	100.0	96.1	95.9
WALES											
Bangor	74	86.7	1.6	96.8	1.6				100.0	100.0	0.0
Cardff	75	90.4							99.8	0.0	0.0
Clwyd	72	87.9	1.5	98.5	0.0				100.0	100.0	0.0
Swanse	76	87.0	5.1	93.2	1.8	39.9	59.7	0.3	99.4	98.5	98.4
Wrexm	74	85.6	3.7	96.3	0.0				99.1	99.1	0.0

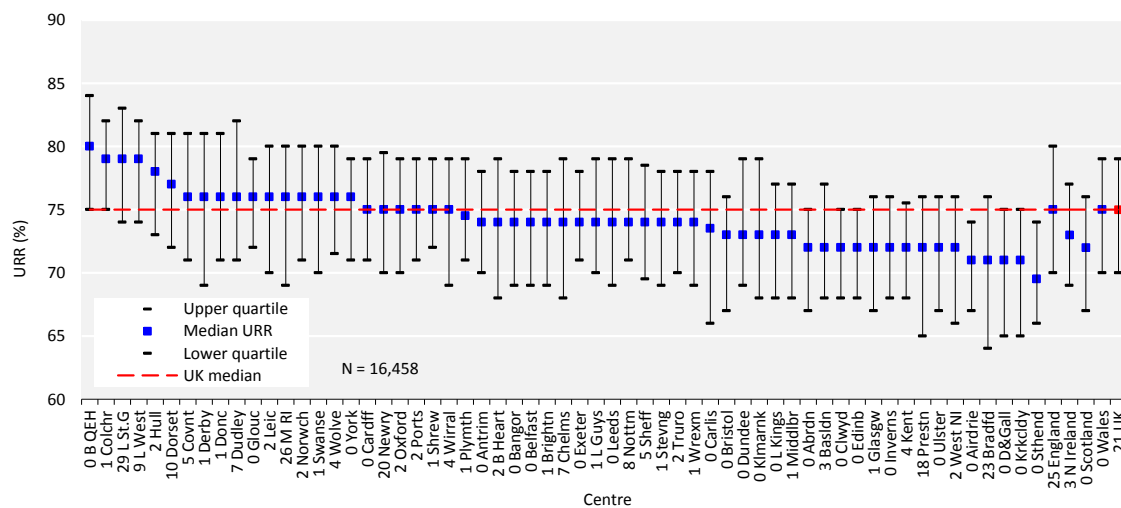
**Table 4.5** Continued

Centre	Median URR (%)	% URR >65%	% session frequency/week			% session time			% data completeness		
			<3 sessions	3 sessions	>3 sessions	<4 hours	4-5 hours	>5 hours	URR	Session frequency	Session time
<b>TOTALS</b>											
England	75	87.1	5.0	93.3	1.7	27.0	72.5	0.5	74.9	87.2	80.4
N Ireland	73	85.3	4.8	92.6	2.6	29.2	70.6	0.2	97.5	98.0	98.8
Scotland	72	81.3	0.8	97.4	1.7	13.5	84.3	2.2	99.8	96.9	97.6
Wales	75	88.5	4.0	94.8	1.2	39.9	59.7	0.3	99.6	53.5	30.1
UK	75	86.6	4.6	93.6	1.7	26.0	73.4	0.6	78.7	86.6	79.7

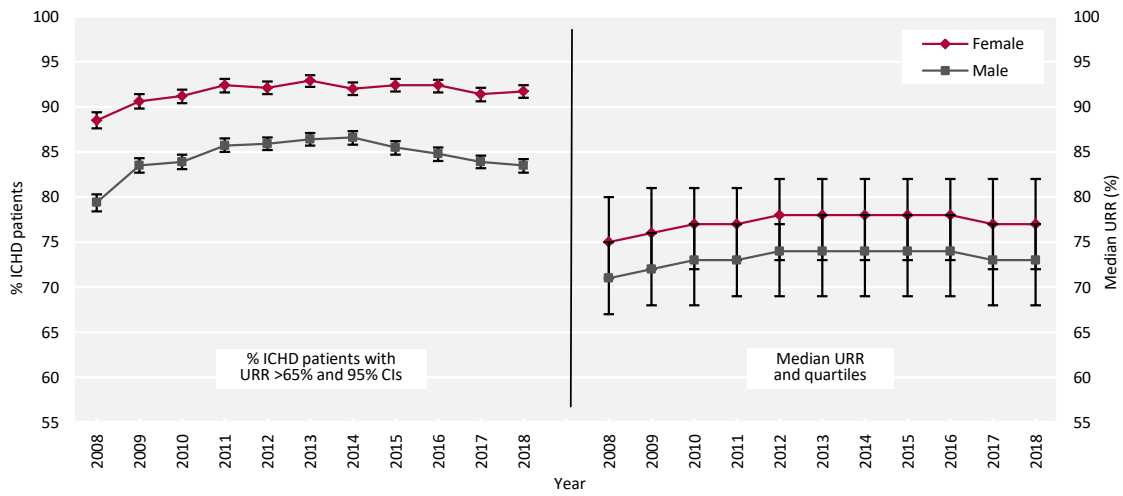
Blank cells – no data returned by the centre or data completeness <70%.



**Figure 4.2** Percentage of adult patients prevalent to ICHD on 31/12/2018 with urea reduction ratio (URR) >65% by centre  
CI – confidence interval

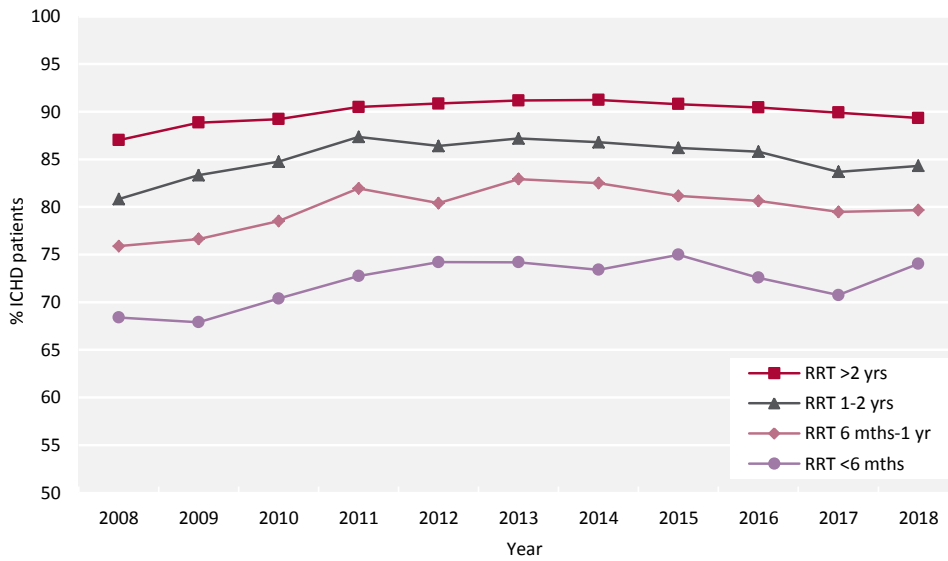


**Figure 4.3** Median urea reduction ratio (URR) achieved in adult patients prevalent to ICHD on 31/12/2018 by centre



**Figure 4.4** Change in the percentage of prevalent adult ICHD patients with urea reduction ratio (URR) >65% and the median URR by sex between 2008 and 2018

CI – confidence interval



**Figure 4.5** Percentage of prevalent adult ICHD patients achieving urea reduction ratio (URR) >65% by time on RRT between 2008 and 2018

## Biochemistry parameters in prevalent adult ICHD patients

The Renal Association guideline on CKD mineral bone disease contains only one audit measure, which is the percentage of patients with adjusted calcium above the target range. For the first time the Scottish Renal Registry sent pre-dialysis potassium and bicarbonate data to the UKRR.

**Table 4.6** Median adjusted calcium (Ca) and percentage with adjusted Ca within and above the target range (2.2–2.5 mmol/L) in adult patients prevalent to ICHD on 31/12/2018 by centre

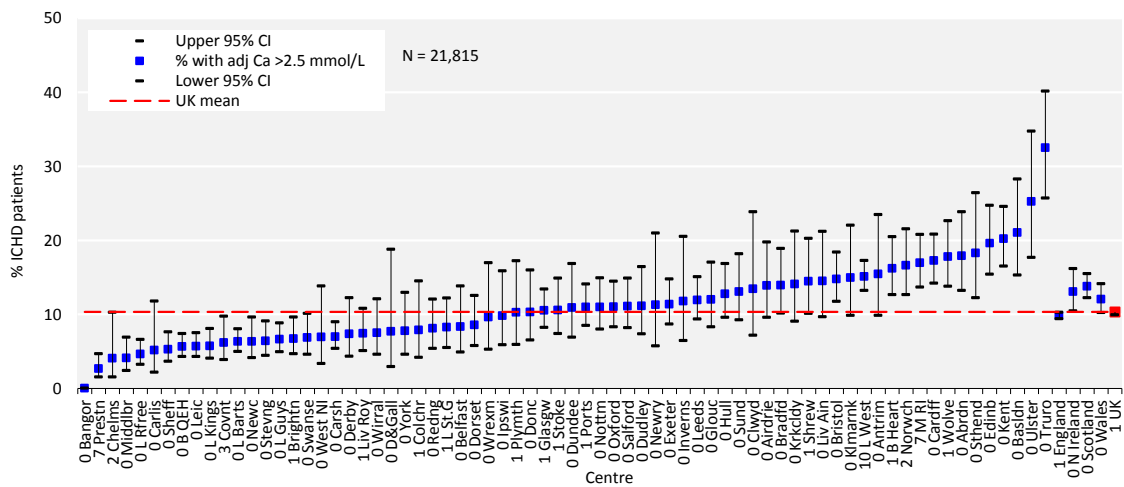
Centre	Median adj Ca (mmol/L)	% adj Ca 2.2-2.5 mmol/L	% adj Ca >2.5 mmol/L	% data completeness
ENGLAND				
B Heart	2.4	78.5	16.2	99.1
B QEH	2.3	81.0	5.6	99.8
Basldn	2.4	74.3	21.1	100.0
Bradfd	2.4	82.0	13.9	99.6
Brightn	2.3	83.8	6.7	99.3
Bristol	2.4	82.3	14.8	99.8
Camb				
Carlis	2.3	78.4	5.2	100.0
Carsh	2.3	78.2	7.0	99.6
Chelms	2.3	83.8	4.0	98.0
Colchr	2.3	84.2	7.9	99.1
Covnt	2.3	77.5	6.2	97.2
Derby	2.4	88.7	7.3	100.0
Donc	2.4	82.4	10.3	100.0
Dorset	2.3	81.4	8.6	100.0
Dudley	2.4	79.9	11.1	100.0
Exeter	2.4	87.0	11.4	99.8
Glouc	2.4	80.7	12.0	100.0
Hull	2.4	79.3	12.8	100.0
Ipswi	2.3	77.6	9.8	100.0
Kent	2.4	75.6	20.2	99.7
L Barts	2.3	78.6	6.3	99.7
L Guys	2.3	79.7	6.6	100.0
L Kings	2.3	77.2	5.7	99.6
L Rfree	2.3	78.0	4.6	99.8
L St.G	2.4	80.2	8.2	98.5
L West	2.4	70.0	15.1	89.7
Leeds	2.4	81.9	11.9	99.8
Leic	2.3	83.7	5.7	100.0
Liv Ain	2.4	80.7	14.5	100.0
Liv Roy	2.4	84.5	7.4	98.5
M RI	2.4	74.7	16.9	93.3
Middlbr	2.3	73.6	4.1	99.7
Newc	2.3	84.2	6.3	100.0
Norwch	2.4	79.7	16.6	98.2
Nottm	2.4	83.1	11.0	100.0
Oxford	2.4	80.8	11.0	100.0
Plymth	2.3	82.9	10.3	99.2
Ports	2.4	78.5	11.0	99.2
Prestn	2.3	78.0	2.7	93.4
Redng	2.4	87.5	8.1	100.0
Salford	2.4	78.4	11.1	100.0
Sheff	2.3	76.7	5.3	99.8
Shrew	2.4	82.4	14.4	99.5
Stevng	2.3	81.3	6.4	99.8
Sthend	2.4	73.0	18.3	100.0
Stoke	2.4	84.9	10.6	98.9
Sund	2.3	76.1	13.1	99.6
Truro	2.5	66.9	32.5	100.0
Wirral	2.3	80.5	7.5	99.5
Wolve	2.4	77.4	17.8	99.0
York	2.4	87.4	7.8	100.0



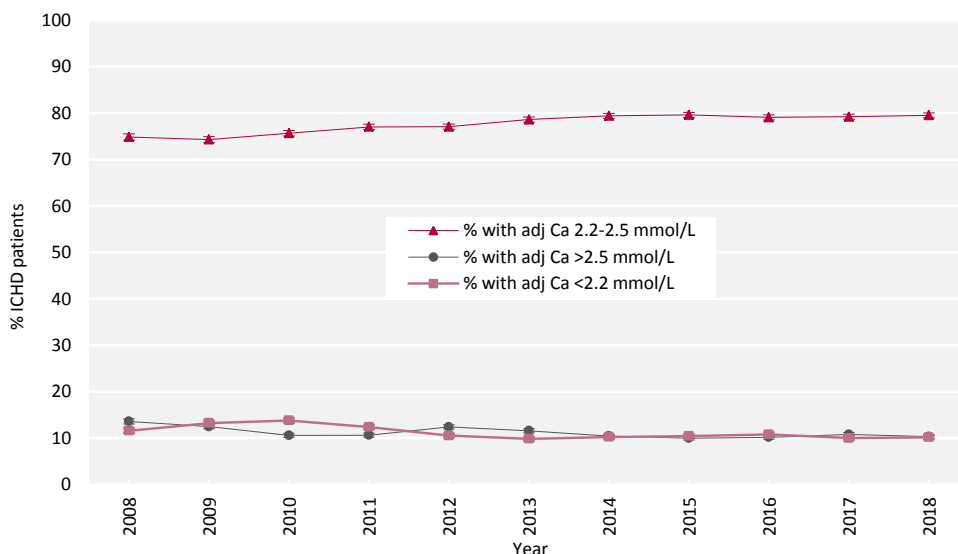
**Table 4.6** Continued

Centre	Median adj Ca (mmol/L)	% adj Ca 2.2-2.5 mmol/L	% adj Ca >2.5 mmol/L	% data completeness
<b>N IRELAND</b>				
Antrim	2.4	82.7	15.5	100.0
Belfast	2.3	82.1	8.3	100.0
Newry	2.4	87.3	11.3	100.0
Ulster	2.5	73.7	25.3	100.0
West NI	2.3	83.2	6.9	100.0
<b>SCOTLAND</b>				
Abrdn	2.4	78.1	17.9	100.0
Airdrie	2.4	82.2	13.9	100.0
D&Gall	2.3	76.9	7.7	100.0
Dundee	2.3	82.1	10.9	100.0
Edinb	2.4	73.9	19.6	100.0
Glasgw	2.4	84.3	10.5	99.5
Inverns	2.3	65.9	11.8	100.0
Klmarnk	2.4	82.8	14.9	100.0
Krkldy	2.4	81.3	14.1	100.0
<b>WALES</b>				
Bangor	2.3	96.7	0.0	100.0
Cardff	2.4	73.8	17.3	100.0
Clwyd	2.4	80.6	13.4	100.0
Swanse	2.3	83.6	6.9	100.0
Wrexm	2.3	80.8	9.6	100.0
<b>TOTALS</b>				
<b>England</b>	<b>2.3</b>	<b>79.4</b>	<b>9.8</b>	<b>98.6</b>
<b>N Ireland</b>	<b>2.4</b>	<b>81.6</b>	<b>13.0</b>	<b>100.0</b>
<b>Scotland</b>	<b>2.4</b>	<b>80.1</b>	<b>13.8</b>	<b>99.8</b>
<b>Wales</b>	<b>2.4</b>	<b>79.3</b>	<b>12.0</b>	<b>100.0</b>
<b>UK</b>	<b>2.3</b>	<b>79.5</b>	<b>10.3</b>	<b>98.8</b>

Blank cells – no data returned by the centre.



**Figure 4.6** Percentage of adult patients prevalent to ICHD on 31/12/2018 with adjusted calcium (Ca) above the target range (>2.5 mmol/L) by centre  
CI – confidence interval



**Figure 4.7** Change in percentage of prevalent adult ICHD patients within, above and below the target range for adjusted calcium (Ca 2.2–2.5 mmol/L) between 2008 and 2018

**Table 4.7** Median pre-dialysis potassium and bicarbonate and percentage attaining target ranges in adult patients prevalent to ICHD on 31/12/2018 by centre

Centre	Pre-dialysis potassium					Pre-dialysis bicarbonate				
	Median (mmol/L)	% <4.0 mmol/L	% 4.0–6.0 mmol/L	% >6.0 mmol/L	% data completeness	Median (mmol/L)	% <18 mmol/L	% 18–26 mmol/L	% >26 mmol/L	% data completeness
<b>ENGLAND</b>										
B Heart	4.8	9.1	82.1	6.5	99.1	22	3.2	91.8	5.0	99.1
B QEH	4.9	10.3	81.6	8.5	99.8	23	1.3	93.0	5.8	99.8
Basldn	4.7	8.6	87.5	5.0	100.0	23	0.0	94.1	5.9	100.0
Bradfd	4.7	17.6	74.2	13.3	99.6	23	2.1	91.4	6.6	99.6
Brightn					0.0	25	1.0	73.6	25.4	99.3
Bristol	4.7	16.6	79.3	13.4	99.8	24	1.6	82.5	15.9	99.8
Camb										
Carlis					0.0	20	9.3	89.7	1.0	100.0
Carsh					0.0	25	0.2	77.6	22.2	72.1
Chelms	5.0	2.0	90.9	0.5	98.0	22	2.0	96.0	2.0	98.0
Colchr	4.7	21.1	75.4	14.5	99.1	22	0.9	96.5	2.6	99.1
Covnt					0.0	25	1.8	63.6	34.6	97.2
Derby					0.0	22	3.4	93.2	3.4	100.0
Donc	4.6	11.5	86.1	7.5	100.0	24	0.6	84.9	14.6	100.0
Dorset	4.8	8.2	86.6	5.5	100.0	22	2.2	88.9	8.9	100.0
Dudley	4.8	4.8	89.4	2.5	100.0					63.0
Exeter	4.5	20.9	77.7	17.2	99.8	23	2.8	87.9	9.2	99.8
Glouc					0.0	25	1.4	80.2	18.4	100.0
Hull	4.7	10.6	84.2	7.7	100.0	24	0.9	86.3	12.8	100.0
Ipswi					0.0	26	1.4	62.9	35.7	100.0
Kent	4.7	22.5	73.6	18.6	100.0	22	6.8	84.0	9.2	99.7
L Barts					0.0	23	7.4	83.5	9.1	99.4
L Guys	4.6	26.5	68.6	23.2	100.0	23	2.4	86.1	11.5	99.8
L Kings	5.2	6.3	80.7	4.5	99.6	22	4.3	93.5	2.2	99.6
L Rfree	5.0	13.2	78.2	10.8	99.8	22	5.4	87.6	7.0	95.2

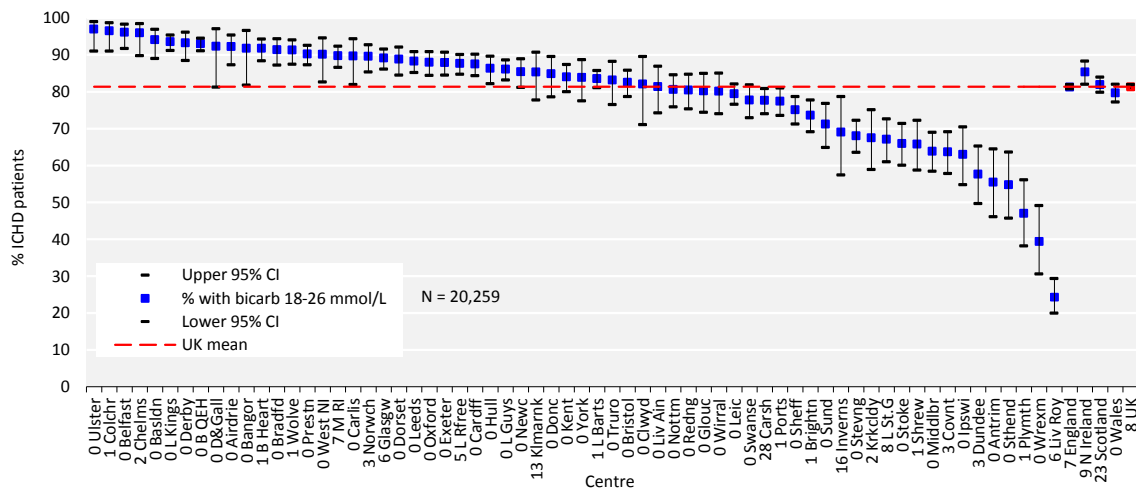
**Table 4.7** Continued

Centre	Pre-dialysis potassium					Pre-dialysis bicarbonate				
	Median (mmol/L)	% <4.0 mmol/L	% 4.0–6.0 mmol/L	% >6.0 mmol/L	% data completeness	Median (mmol/L)	% <18 mmol/L	% 18–26 mmol/L	% >26 mmol/L	% data completeness
L St.G					0.4	26	1.2	67.1	31.7	91.9
L West					0.0					57.0
Leeds	5.1	3.6	87.9	2.3	100.0	24	1.6	88.3	10.1	99.8
Leic	4.9	10.4	81.6	8.5	100.0	24	0.9	79.4	19.7	100.0
Liv Ain					0.0	24	1.4	81.4	17.2	100.0
Liv Roy					0.0	29	0.3	24.3	75.4	94.1
M RI					0.0	22	1.9	89.8	8.4	93.1
Middlbr	4.9	8.5	87.7	5.9	99.7	26	0.9	63.8	35.2	99.7
Newc					0.0	23	2.5	85.4	12.0	100.0
Norwch	5.0	3.3	87.5	1.7	98.2	23	4.5	89.6	6.0	97.5
Nottm	4.9	6.3	89.3	4.1	100.0	24	0.9	80.6	18.5	100.0
Oxford	5.0	7.5	86.3	5.3	100.0	23	3.0	88.0	9.0	100.0
Plymth	4.8	14.5	79.5	9.2	99.2	27	0.0	47.0	53.0	99.2
Ports	4.8	9.5	82.2	7.2	99.2	24	3.1	77.4	19.5	99.2
Prestn					0.0	23	4.0	90.2	5.8	100.0
Redng					0.0	25	1.1	80.4	18.5	100.0
Salford	4.7	14.3	81.9	11.0	100.0					0.3
Sheff	4.9	6.7	84.3	4.8	99.8	25	0.8	75.1	24.1	99.6
Shrew					0.0	25	2.1	65.8	32.1	99.5
Stevng	5.1	4.8	85.6	3.2	99.8	25	0.9	68.0	31.1	99.8
Sthend	4.7	14.8	77.4	9.4	100.0	26	0.9	54.8	44.4	100.0
Stoke					0.0	25	0.8	65.9	33.3	99.6
Sund					0.0	26	0.5	71.2	28.4	99.6
Truro	4.8	4.4	91.3	2.1	100.0	25	0.0	83.1	16.9	100.0
Wirral					0.0	24	1.0	80.1	18.9	100.0
Wolve	4.9	9.1	80.8	6.2	99.0	21	8.0	91.3	0.7	99.0
York	5.3	1.2	84.4	0.3	100.0	24	1.8	83.8	14.4	100.0
N IRELAND										
Antrim	4.9	8.2	84.6	4.3	100.0	26	0.0	55.5	44.6	100.0
Belfast	5.1	5.1	80.8	2.6	100.0	22	1.9	96.2	1.9	100.0
Newry	5.0	11.3	83.1	5.7	100.0					29.6
Ulster	4.8	9.1	87.9	4.8	100.0	23	0.0	97.0	3.0	100.0
West NI	5.1	11.9	80.2	6.9	100.0	23	0.0	90.1	9.9	100.0
SCOTLAND										
Abrdn	4.9	8.5	84.1	5.3	100.0					8.5
Airdrie	4.4	28.3	68.9	22.2	100.0	21	6.1	92.2	1.7	100.0
D&Gall	5.0	7.7	90.4	2.9	100.0	23	0.0	92.3	7.7	100.0
Dundee	4.9	7.1	84.0	4.0	100.0	26	0.7	57.6	41.7	96.8
Edinb	4.9	14.8	78.8	11.1	99.3					46.1
Glasgw	4.9	8.1	84.0	6.1	99.8	22	5.5	89.1	5.5	94.3
Inverns	5.0	7.8	87.0	3.5	90.6	25	2.8	69.0	28.2	83.5
Klmarnk	5.0	7.5	86.5	4.1	99.3	23	3.5	85.3	11.2	86.6
Krkldy	4.9	10.2	85.2	6.0	100.0	26	0.8	67.5	31.8	98.4
WALES										
Bangor					0.0	23	1.6	91.8	6.6	100.0
Cardff					0.0	22	6.8	87.5	5.8	100.0
Clwyd					0.0	24	0.0	82.1	17.9	100.0
Swanse					0.0	24	1.5	77.7	20.8	100.0
Wrexm					0.0	27	0.0	39.4	60.6	100.0

**Table 4.7** Continued

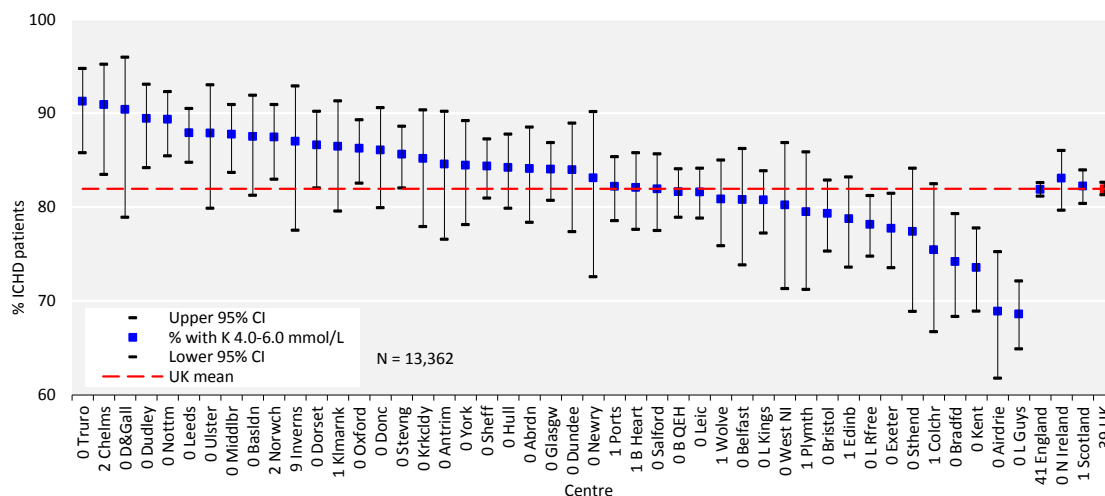
Centre	Pre-dialysis potassium					Pre-dialysis bicarbonate				
	Median (mmol/L)	% <4.0 mmol/L	% 4.0–6.0 mmol/L	% >6.0 mmol/L	% data completeness	Median (mmol/L)	% <18 mmol/L	% 18–26 mmol/L	% >26 mmol/L	% data completeness
<b>TOTALS</b>										
<b>England</b>	4.9	11.1	81.9	10.5	59.2	24	2.9	81.3	15.8	92.7
<b>N Ireland</b>	5.0	8.6	83.1	6.5	100.0	23	0.6	85.4	14.0	90.7
<b>Scotland</b>	4.8	11.3	82.2	9.9	99.3	23	3.8	81.9	14.2	77.0
<b>Wales</b>					0.0	23	3.7	79.7	16.6	100.0
<b>UK</b>	4.9	11.0	82.0	10.5	60.5	23	2.9	81.4	15.7	91.7

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



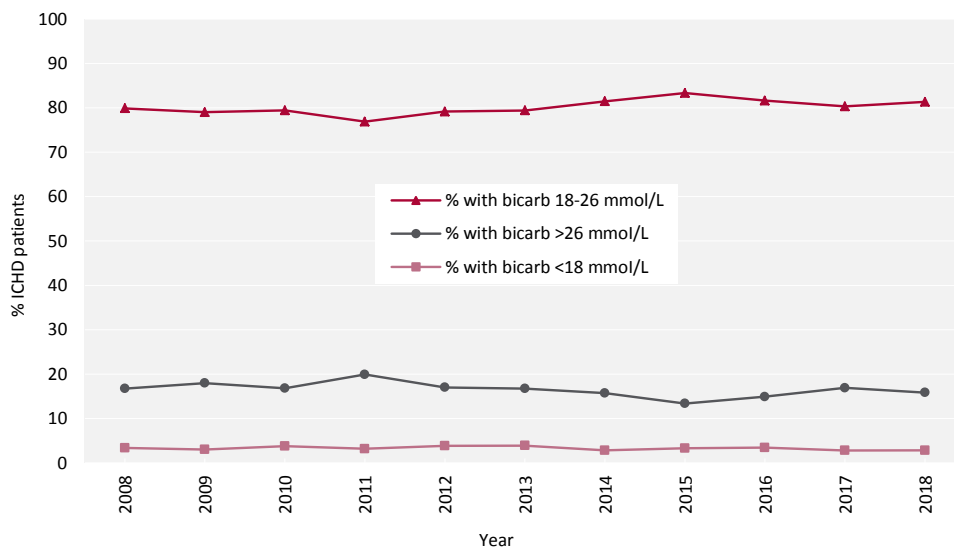
**Figure 4.8** Percentage of adult patients prevalent to ICHD on 31/12/2018 with pre-dialysis bicarbonate (bicarb) within the target range (18–26 mmol/L) by centre

CI – confidence interval



**Figure 4.9** Percentage of adult patients prevalent to ICHD on 31/12/2018 with pre-dialysis potassium (K) within the target range (4.0–6.0 mmol/L) by centre  
 CI – confidence interval

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



**Figure 4.10** Change in percentage of prevalent adult ICHD patients within, above and below the target range for pre-dialysis bicarbonate (bicarb 18–26 mmol/L) between 2008 and 2018

## Anaemia in prevalent adult ICHD patients

Inadequate data completeness in relation to ESAs makes auditing against national guidelines difficult to interpret. An important assumption is that patients for whom no ESA data have been submitted to the UKRR are not on ESA treatment, provided the centre has submitted ESA data for other patients on ICHD. The weekly ESA dose is reported, but there are some uncertainties surrounding the accuracy of this measure (see appendix A).

**Table 4.8** Median haemoglobin and ferritin and percentage attaining target ranges in adult patients prevalent to ICHD on 31/12/2018 by centre

Centre	Haemoglobin			Ferritin			
	Median (g/L)	% <100 g/L	% >120 g/L	% data completeness	Median (µg/L)	% <100 µg/L	% data completeness
ENGLAND							
B Heart	112	19.4	20.9	99.1	236	23.1	97.4
B QEH	111	20.1	18.6	99.8	373	5.2	99.7
Basldn	112	19.1	23.0	100.0	397	7.2	100.0
Bradfd	112	22.0	30.2	100.0	523	2.4	100.0
Brightn	110	21.4	23.1	99.3	531	2.0	99.0
Bristol	111	8.6	23.4	99.8	654	1.8	100.0
Camb							
Carlis	111	20.6	22.7	100.0	529	7.2	100.0
Carsh	108	23.5	14.6	100.0	353	6.5	98.4
Chelms	115	13.1	29.3	98.0	400	11.1	98.0
Colchr	112	19.3	14.9	99.1	548	0.9	99.1
Covnt	106	32.0	9.1	97.2	422	5.1	96.8
Derby	121	6.8	52.0	100.0	528	3.4	99.4
Donc	107	30.3	14.5	100.0	424	1.8	100.0
Dorset	112	15.3	22.0	99.6	460	1.1	99.6
Dudley	115	13.8	25.4	100.0	241	10.1	73.0
Exeter	111	10.9	19.9	99.8	310	7.6	99.8
Glouc	113	16.6	26.3	100.0	392	8.5	98.2
Hull	111	21.6	20.1	100.0	402	4.3	100.0
Ipswi	110	18.3	9.9	99.3	541	8.4	100.0
Kent	110	18.6	18.8	100.0	507	4.0	99.2
L Barts	108	25.9	15.3	99.8	639	3.6	99.7
L Guys	109	25.9	14.8	100.0	508	3.5	99.1
L Kings	111	20.4	19.8	99.6	518	2.8	99.6
L Rfree	110	20.9	17.4	99.8	427	7.7	99.5
L St.G	104	38.6	13.5	98.5	358	7.2	97.1
L West	113	14.4	22.6	95.8	327	6.2	95.5
Leeds	107	28.0	11.9	100.0	354	7.0	99.8
Leic	112	20.6	26.2	99.9	354	8.0	100.0
Liv Ain	114	20.0	27.6	100.0	515	4.2	97.9
Liv Roy	111	20.3	22.7	98.2	377	7.2	98.0
M RI	110	24.3	23.4	93.5	394	3.2	81.2
Middlbr	113	18.2	24.5	99.7	824	5.1	99.1
Newc	110	23.1	20.9	100.0	412	4.7	100.0
Norwch	114	18.6	31.2	97.5	399	6.3	98.2
Nottm	108	18.8	11.9	100.0	405	2.8	100.0
Oxford	111	21.3	22.0	100.0	314	7.6	98.8
Plymth	111	16.2	31.6	99.2	452	6.8	99.2
Ports	112	22.2	26.7	99.2	394	5.4	98.4
Prestn	112	17.5	22.5	100.0	637	4.8	96.3

**Table 4.8** Continued

Centre	Haemoglobin				Ferritin		
	Median (g/L)	% <100 g/L	% >120 g/L	% data completeness	Median (µg/L)	% <100 µg/L	% data completeness
Redng	110	18.5	17.3	100.0	589	3.7	100.0
Salford	110	28.0	21.9	100.0	347	11.0	87.2
Sheff	109	25.6	20.9	99.8	476	2.3	100.0
Shrew	116	11.8	35.3	99.5	393	3.2	99.5
Stevng	107	27.3	10.3	100.0	449	4.8	99.8
Sthend	108	27.0	13.0	100.0	343	4.3	100.0
Stoke	113	18.0	25.1	99.6	392	4.1	99.6
Sund	116	13.5	36.9	99.6	263	8.7	98.2
Truro	105	28.1	10.0	100.0	358	1.9	100.0
Wirral	111	20.9	18.9	100.0	504	5.5	99.5
Wolve	111	25.1	25.4	99.0	440	3.8	99.3
York	110	20.4	16.2	100.0	395	6.6	100.0
N IRELAND							
Antrim	109	22.9	11.0	99.1	436	1.8	100.0
Belfast	114	17.3	26.9	100.0	459	1.9	100.0
Newry	112	19.7	21.1	100.0	454	7.0	100.0
Ulster	113	18.2	23.2	100.0	675	1.0	100.0
West NI	111	17.8	24.8	100.0	719	2.0	100.0
SCOTLAND							
Abrdn	110	20.4	14.4	100.0	518	3.2	92.0
Airdrie	110	23.3	10.6	100.0	537	4.5	98.3
D&Gall	114	5.8	26.9	100.0	648	1.9	100.0
Dundee	115	16.0	34.0	100.0	365	11.0	99.4
Edinb	117	12.5	38.2	100.0	453	4.3	99.6
Glasgw	110	22.4	21.3	99.8	498	5.2	99.1
Inverns	114	9.4	17.6	100.0	364	6.8	85.9
Klmarnk	106	26.1	13.4	100.0	212	22.4	100.0
Krkldy	114	12.5	31.3	100.0	495	7.1	99.2
WALES							
Bangor	112	23.0	24.6	100.0	378	4.9	100.0
Cardff	110	23.6	22.6	100.0	348	3.8	100.0
Clwyd	108	26.9	16.4	100.0	294	6.0	100.0
Swanse	111	14.9	19.9	100.0	412	9.3	99.1
Wrexm	114	15.4	28.8	100.0	637	1.9	100.0
TOTALS							
<b>England</b>	<b>111</b>	<b>20.9</b>	<b>20.6</b>	<b>99.2</b>	<b>417</b>	<b>5.5</b>	<b>98.0</b>
<b>N Ireland</b>	<b>112</b>	<b>19.0</b>	<b>21.8</b>	<b>99.8</b>	<b>549</b>	<b>2.4</b>	<b>100.0</b>
<b>Scotland</b>	<b>112</b>	<b>18.6</b>	<b>23.4</b>	<b>99.9</b>	<b>452</b>	<b>6.7</b>	<b>97.8</b>
<b>Wales</b>	<b>111</b>	<b>20.2</b>	<b>22.1</b>	<b>100.0</b>	<b>381</b>	<b>5.5</b>	<b>99.7</b>
<b>UK</b>	<b>111</b>	<b>20.6</b>	<b>20.9</b>	<b>99.3</b>	<b>419</b>	<b>5.5</b>	<b>98.1</b>

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

**Table 4.9** Distribution of haemoglobin and erythropoiesis stimulating agent (ESA) dose values in adult patients prevalent to ICHD on 31/12/2018 by centre

Centre	ESA		Haemoglobin and ESA	
	% on ESA	Median dose (IU/week)	% <100 g/L and not on ESA	% >120 g/L and on ESA
ENGLAND				
B Heart	87.8	8,000	0.9	11.8
B QEH	0.1			
Basldn	94.1	6,000	0.7	20.4
Bradfd	91.0	6,000	2.0	26.1
Brightn	93.3	6,400	0.2	19.2
Bristol	93.9	8,000	0.0	21.4
Camb				
Carlis	84.5	6,000	0.0	18.6
Carsh	0.8			
Chelms	94.1	12,000	0.0	25.3
Colchr	0.0			
Covnt	83.0	8,000	2.5	6.5
Derby	0.0			
Donc	95.2	8,000	0.0	12.1
Dorset	92.2	6,000	0.4	18.7
Dudley	87.8	10,000	1.6	19.0
Exeter	92.7	6,000	0.2	17.1
Glouc	86.6		0.0	20.7
Hull	43.8			
Ipswi	44.1			
Kent	94.0	9,000	0.3	16.5
L Barts	0.2			
L Guys	0.0			
L Kings	92.1	8,000	0.2	15.4
L Rfree	0.2			
L St.G	0.0			
L West	0.0			
Leeds	97.2	8,000	0.0	10.1
Leic	88.4	6,000	2.3	20.7
Liv Ain	0.0			
Liv Roy	0.0			
M RI	0.0			
Middlbr	63.9			
Newc	93.4	7,400	0.6	19.6
Norwch	91.7	9,000	0.4	27.5
Nottm	94.4	6,000	0.3	8.2
Oxford	91.8	12,000	1.0	18.3
Plymth	0.0			
Ports	5.3			
Prestn	91.9		0.8	18.9
Redng	91.1	14,100	3.3	14.8
Salford	3.5			
Sheff	87.3	6,000	4.1	18.0
Shrew	1.6			
Stevng	95.2	10,000	0.5	8.4
Sthend	92.2	10,000	0.0	7.8
Stoke	0.0			
Sund	92.4	7,100	0.0	32.0
Truro	0.0			
Wirral	87.6	9,000	1.0	13.9



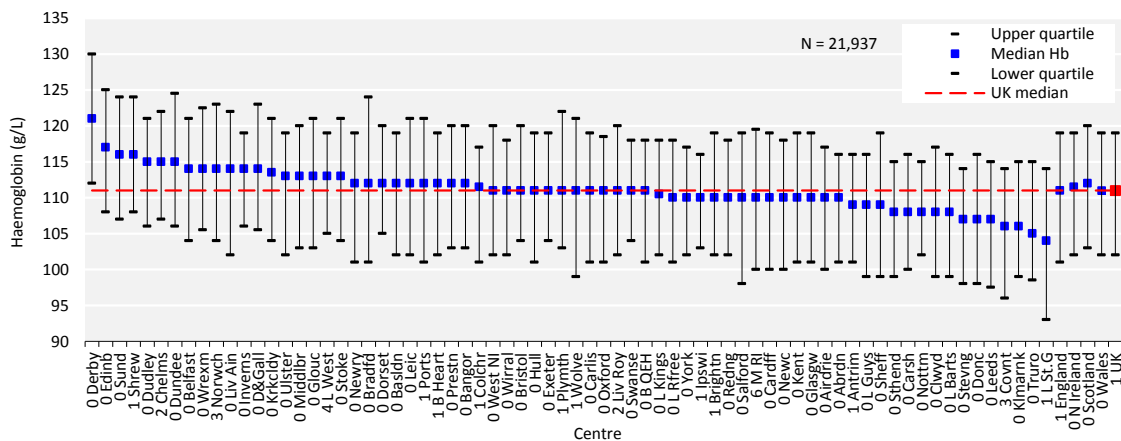
**Table 4.9** Continued

Centre	ESA		Haemoglobin and ESA	
	% on ESA	Median dose (IU/week)	% <100 g/L and not on ESA	% >120 g/L and on ESA
Wolve	87.6	8,000	2.1	22.6
York	91.0	6,000	0.6	10.2
N IRELAND				
Antrim	94.5	6,000	0.9	5.5
Belfast	96.2	8,000	0.0	24.4
Newry	94.4	6,000	0.0	18.3
Ulster	94.9	4,000	1.0	23.2
West NI	100.0	6,000	0.0	24.8
SCOTLAND				
Abrdn	88.5		2.9	12.9
Airdrie	96.0	8,000	1.1	11.9
D&Gall	82.2	10,000	6.7	24.4
Dundee	79.5		2.5	18.0
Edinb	80.7		2.5	21.8
Glasgw	88.3	8,000	1.8	17.0
Inverns	78.1		1.4	13.7
Klmarnk	91.5	8,000	1.4	18.3
Krkldy	83.6		3.1	20.3
WALES				
Bangor	82.0		3.3	21.3
Cardff	51.0			
Clwyd	40.3			
Swanse	94.6	9,000	0.0	15.8
Wrexm	45.2			
TOTAL <sup>1</sup>				
<b>UK</b>	<b>90.9</b>	<b>8,000</b>	<b>1.1</b>	<b>17.3</b>

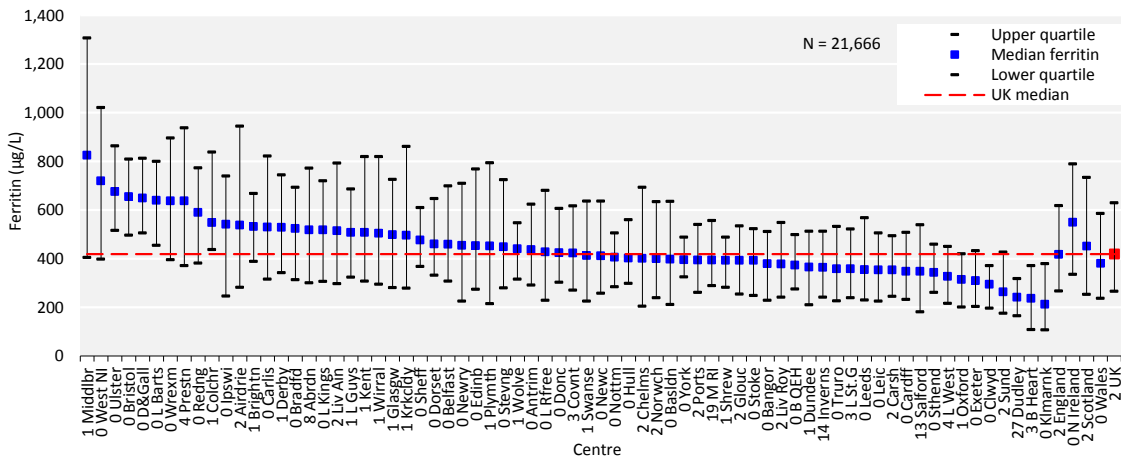
Blank cells – no data returned by the centre or data completeness <70% (or <70% patients were on an ESA).

Data for Scotland refer to patients prevalent to ICHD on 31/05/2018 due to ESA data availability.

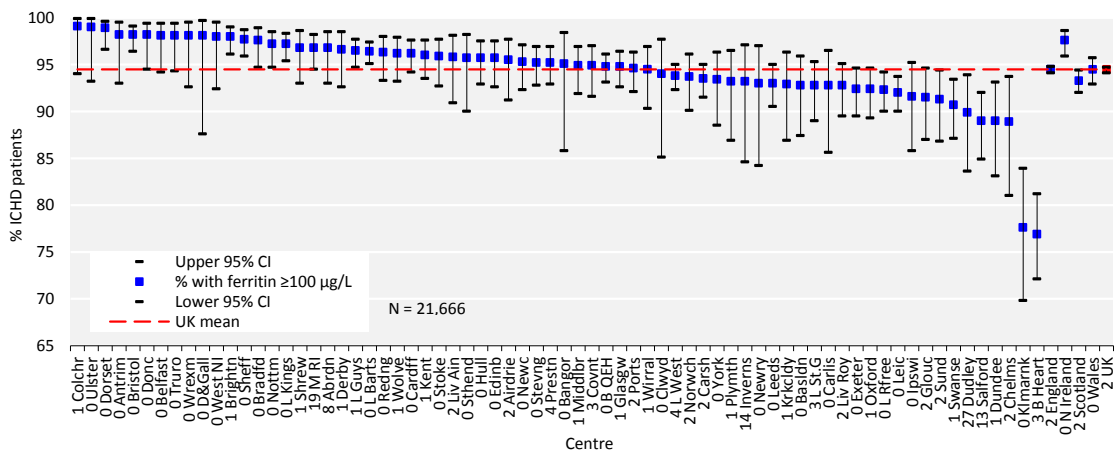
<sup>1</sup>This is the total of only those centres with at least 70% of ICHD patients on an ESA.



**Figure 4.11** Median haemoglobin (Hb) in adult patients prevalent to ICHD on 31/12/2018 by centre

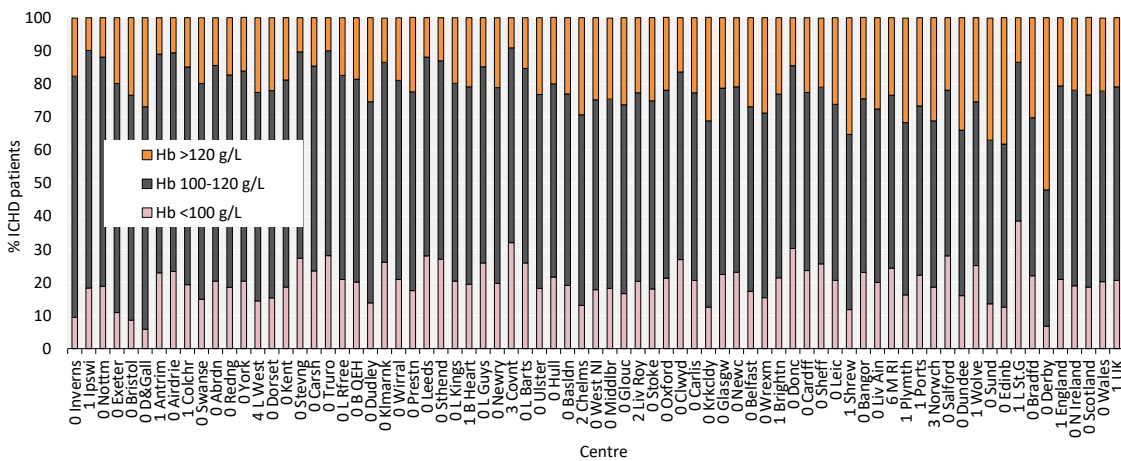


**Figure 4.12** Median ferritin in adult patients prevalent to ICHD on 31/12/2018 by centre



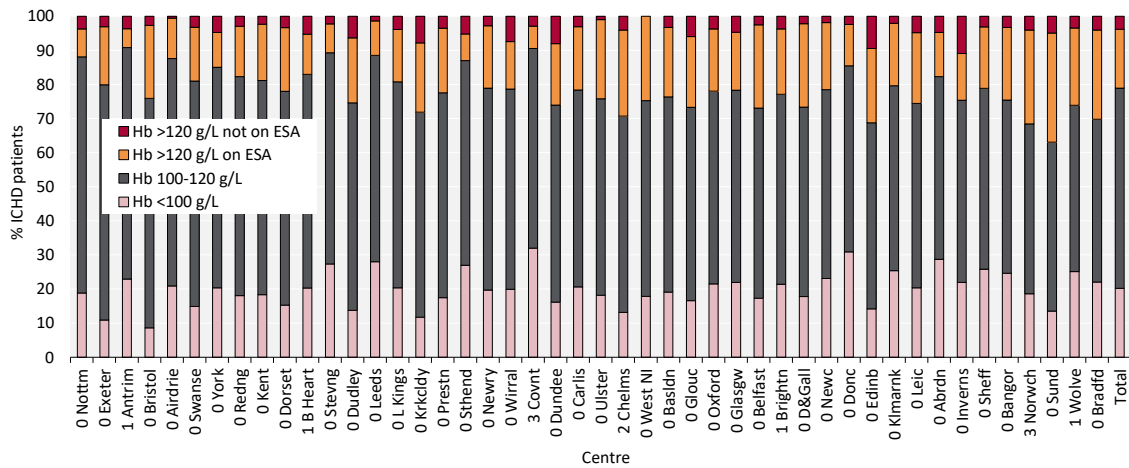
**Figure 4.13** Percentage of adult patients prevalent to ICHD on 31/12/2018 with ferritin  $\geq 100$   $\mu\text{g/L}$  by centre

CI – confidence interval



**Figure 4.14** Distribution of haemoglobin (Hb) in adult patients prevalent to ICHD on 31/12/2018 by centre

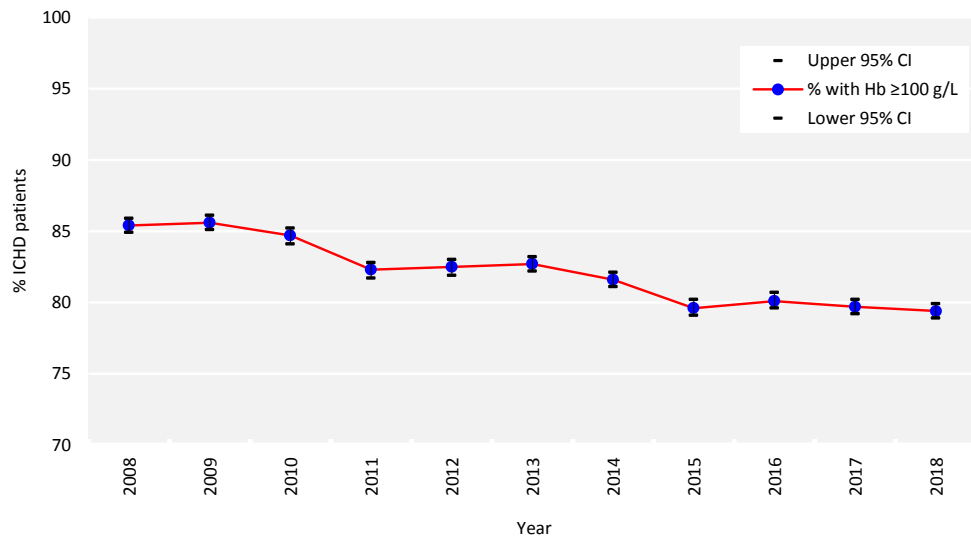
ICHHD



**Figure 4.15** Distribution of haemoglobin (Hb) in adult patients prevalent to ICHD on 31/12/2018 and the proportion with haemoglobin >120 g/L receiving erythropoiesis stimulating agent (ESA) by centre

Figure (including total) does not include centres with <70% data completeness (or <70% ESA use).

Data for Scotland refer to patients prevalent to ICHD on 31/5/2018 due to ESA data availability.

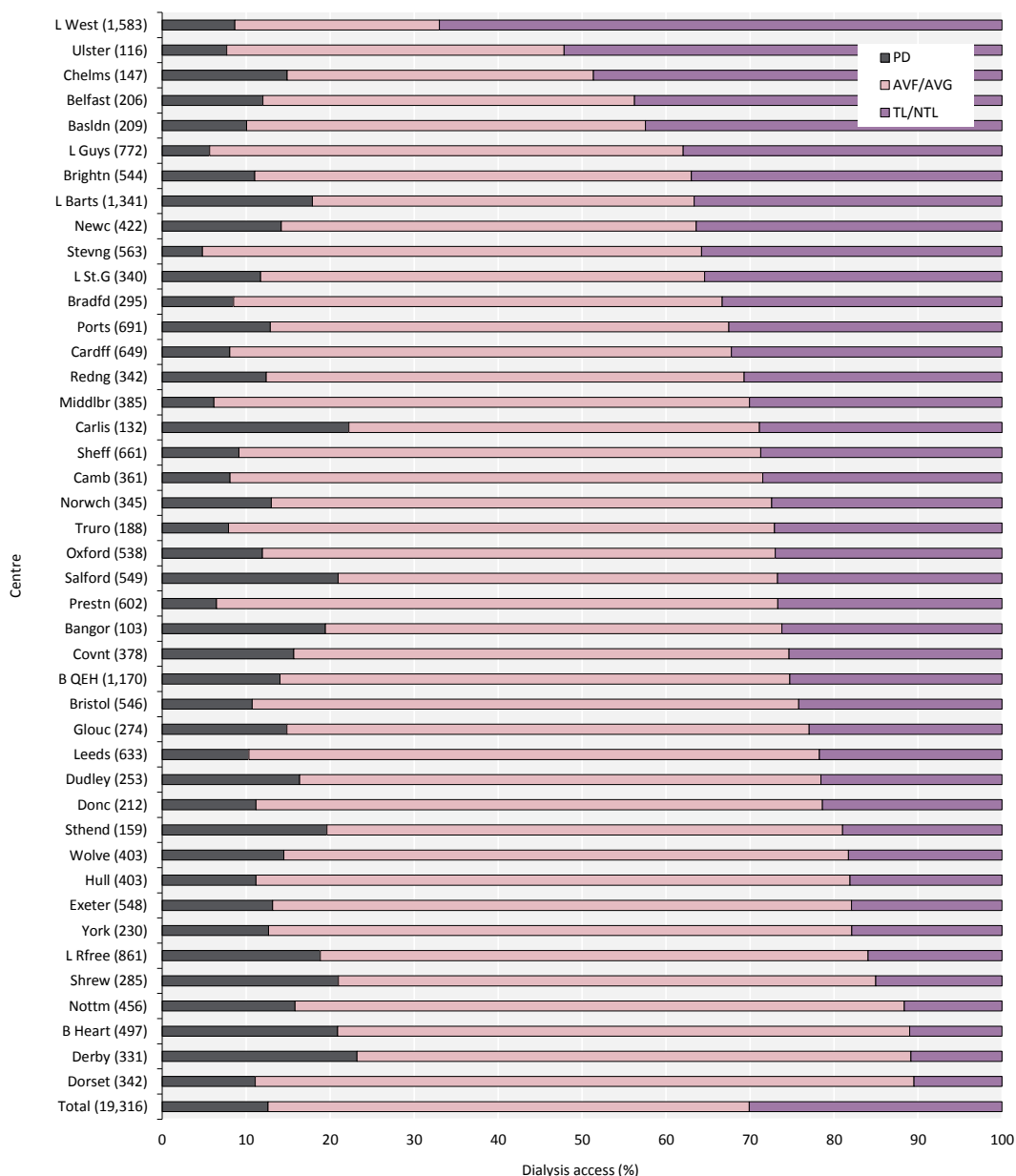


**Figure 4.16** Percentage of prevalent adult ICHD patients with haemoglobin (Hb)  $\geq 100$  g/L between 2008 and 2018  
CI – confidence interval

## Dialysis access in prevalent adult dialysis patients

Prevalent dialysis access data were collected separately to the main UKRR quarterly data returns via the 2018 Multisite Dialysis Access Audit (see appendix A). Although Scotland do not contribute data via the audit they submit access data for incident patients separately (see chapter 1).

The type of prevalent dialysis access is presented in figure 4.17 for the 43 of 62 centres in England, Northern Ireland and Wales that returned vascular access data on  $\geq 70\%$  of their prevalent dialysis patients. Rates of PD may impact the types of vascular access used for ICHD and this is reflected in the combined audit measures for dialysis access.



**Figure 4.17** Dialysis access in adult patients prevalent to dialysis on 31/12/2018 by centre (2018 Multisite Dialysis Access Audit)

Number of patients on dialysis in a centre in brackets (centres with  $<70\%$  access data for the prevalent dialysis population were excluded). AVF – arteriovenous fistula; AVG – arteriovenous graft; NTL – non-tunnelled line; TL – tunnelled line

## Infections in adult haemodialysis patients

PHE has carried out mandatory enhanced surveillance of MRSA bacteraemia since October 2005 and of MSSA bacteraemia since January 2011 for NHS acute trusts, with the subsequent addition of *E. coli* bacteraemia and *C. difficile* reporting. Patient-level infection data are reported in real time to PHE. Wales provides infection data extracted locally from the renal and hospital IT systems.

The definition of each type of infectious episode is detailed in appendix A.

A rolling two year cohort is reported in line with Renal Association guidelines. These analyses included all patients on HD, whether on HHD or ICHD.

**Table 4.10** Rate of infection episodes per 100 HD patient years in prevalent adult HD patients in England and Wales from January 2017 to December 2018 by centre

Centre	HD patient years	Rate per 100 HD patient years			
		MRSA	MSSA	<i>C.difficile</i>	<i>E.coli</i>
ENGLAND					
B Heart	804	0.12	1.87	1.37	1.62
B QEH	2,103	0.14	2.57	1.09	1.71
Basldn	356	0.56	4.77	3.65	0.28
Bradfd	540	0.74	3.89	0.19	2.04
Brightn	944	0.32	3.60	2.65	2.65
Bristol	1,029	0.87	1.85	0.78	2.53
Camb					
Carlis	197	0.00	5.60	1.53	2.54
Carsh	1,754	0.17	2.17	1.03	2.05
Chelms	251	0.00	0.80	2.79	1.20
Colchr	255	0.39	2.35	0.39	0.78
Covnt	709	0.00	1.55	0.99	2.26
Derby	498	0.00	1.41	1.21	1.21
Donc	386	0.00	4.15	0.78	2.33
Dorset	603	0.17	1.49	1.49	1.99
Dudley	426	0.00	3.99	1.17	1.41
Exeter	929	0.11	2.15	1.18	1.29
Glouc	493	0.00	3.04	1.01	1.01
Hull	702	0.00	3.42	1.28	1.71
Ipswi	312	0.32	3.20	0.96	1.92
Kent	899	0.22	3.56	0.33	1.89
L Barts	2,130	0.38	2.96	0.66	2.07
L Guys	1,420	0.21	2.32	0.21	1.48
L Kings	1,185	0.25	2.19	1.10	1.01
L Rfree	1,410	0.07	1.70	1.84	2.77
L St.G	630	0.00	1.91	0.64	2.22
L West	2,969	0.24	2.16	1.11	1.85
Leeds	1,097	0.18	2.55	1.09	1.46
Leic	1,937	0.05	3.25	0.77	2.17
Liv Ain	360	0.00	3.89	1.39	2.78
Liv Roy	799	0.00	2.50	1.63	1.63
M RI	1,140	0.09	4.04	1.75	1.93
Middlbr	687	0.00	1.31	0.73	1.60
Newc	699	0.14	6.15	2.15	2.00
Norwch	639	0.16	1.25	0.94	1.72
Nottm	790	0.00	2.66	1.14	2.91

**Table 4.10** Continued

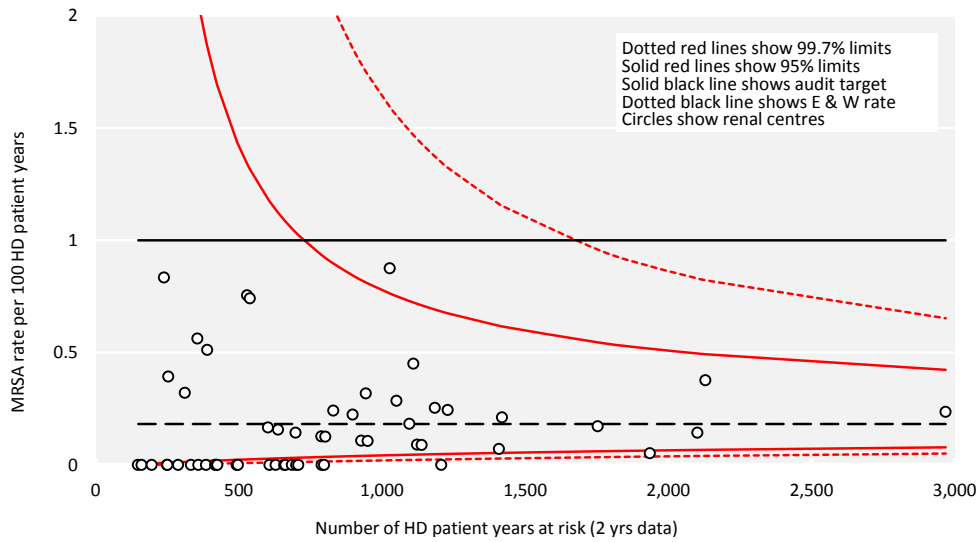
Centre	HD patient years	Rate per 100 HD patient years			
		MRSA	MSSA	<i>C.difficile</i>	<i>E.coli</i>
Oxford	951	0.11	1.47	0.53	2.21
Plymth	289	0.00	3.46	1.39	2.08
Ports	1,231	0.24	3.66	0.98	1.71
Prestn	1,124	0.09	2.76	1.16	1.33
Redng	609	0.00	3.45	0.49	3.12
Salford	831	0.24	3.61	1.56	1.56
Sheff	1,208	0.00	2.73	1.08	1.32
Shrew	418	0.00	1.20	0.48	2.39
Stevng	1,051	0.29	2.00	0.95	2.09
Sthend	251	0.00	2.79	0.80	1.59
Stoke	659	0.00	1.67	0.45	3.79
Sund	530	0.76	2.64	1.13	2.45
Truro	334	0.00	3.29	1.80	0.90
Wirral	422	0.00	1.42	2.61	1.42
Wolve	664	0.00	1.51	0.30	2.41
York	391	0.51	5.88	1.53	2.56
WALES					
Bangor	161	0.00	4.96	3.72	3.10
Cardff	1,111	0.45	3.60	1.98	1.62
Clwyd	149	0.00	4.03	2.01	2.01
Swanse	790	0.13	4.05	1.52	3.93
Wrexm	240	0.83	4.17	1.67	2.08
TOTALS					
<b>England</b>	<b>40,698</b>	<b>0.18</b>	<b>2.81</b>	<b>1.17</b>	<b>2.03</b>
<b>Wales</b>	<b>2,341</b>	<b>0.34</b>	<b>4.10</b>	<b>2.01</b>	<b>2.65</b>
<b>E &amp; W</b>	<b>43,038</b>	<b>0.19</b>	<b>2.88</b>	<b>1.21</b>	<b>2.06</b>

Blank cells – no data returned by the centre.

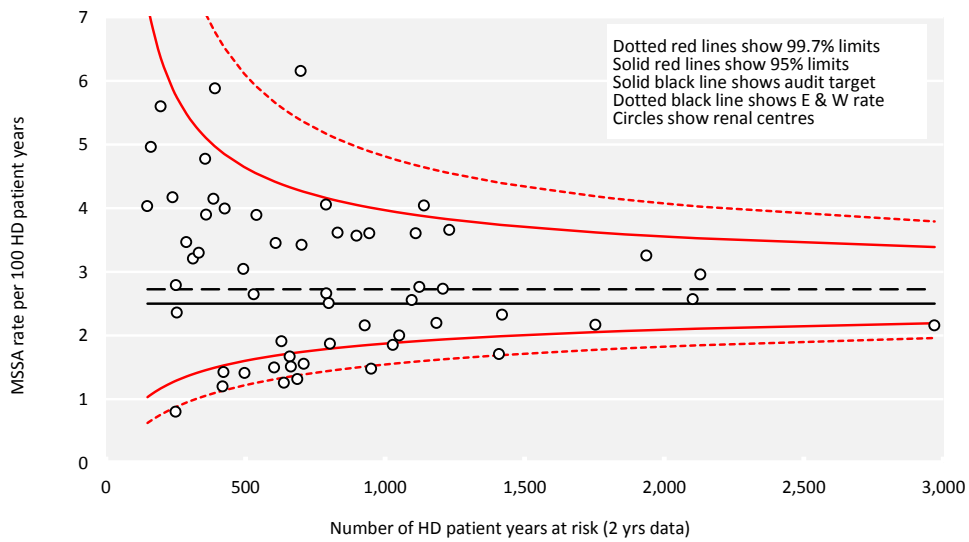
*C. difficile* – *Clostridium difficile*; *E. coli* – *Escherichia coli*; MRSA – methicillin-resistant *Staphylococcus aureus*;

MSSA – methicillin-sensitive *Staphylococcus aureus*

Funnel plots show each centre's estimated infection rate per 100 HD patient years for MRSA and MSSA against the number of patient years at risk to take into account the greater variation expected as centre size decreases.

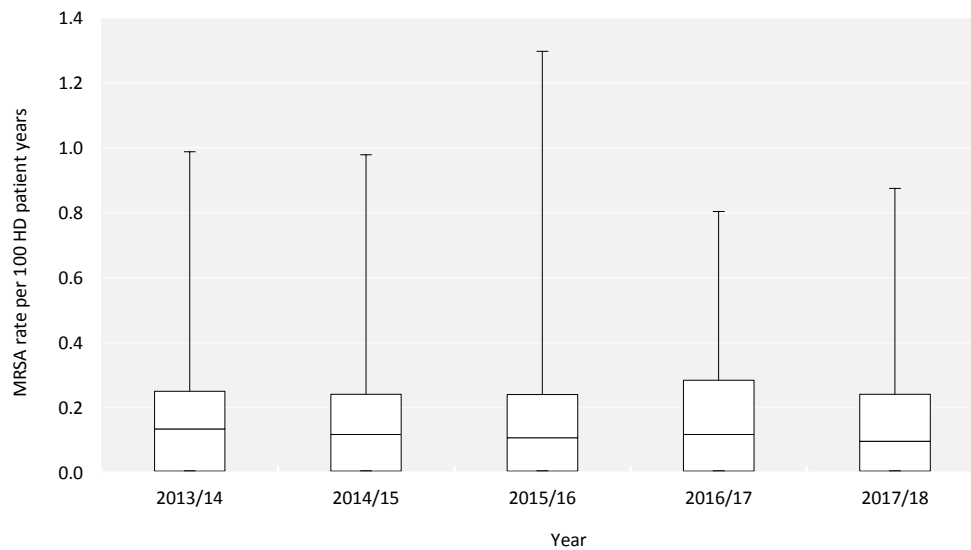


**Figure 4.18** Methicillin-resistant *Staphylococcus aureus* (MRSA) rates by centre per 100 HD adult patient years (2017–2018 data) compared to audit target

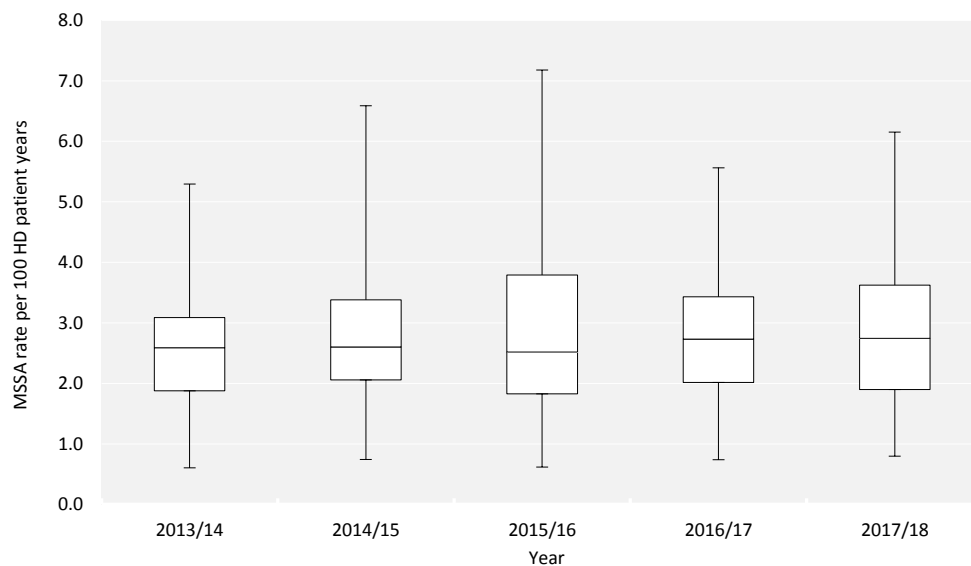


**Figure 4.19** Methicillin-sensitive *Staphylococcus aureus* (MSSA) rates by centre per 100 HD adult patient years (2017–2018 data) compared to audit target

Trends in MRSA and MSSA rates are displayed using box and whisker plots, displaying the median, interquartile range and range of centre rates (more detail is available in appendix A).



**Figure 4.20** Distribution of methicillin-resistant *Staphylococcus aureus* (MRSA) centre rates per 100 HD adult patient years by rolling 2 calendar year cohort (Wales included from 2016 onwards)



**Figure 4.21** Distribution of methicillin-sensitive *Staphylococcus aureus* (MSSA) centre rates per 100 HD adult patient years by rolling 2 calendar year cohort (Wales included from 2016 onwards)

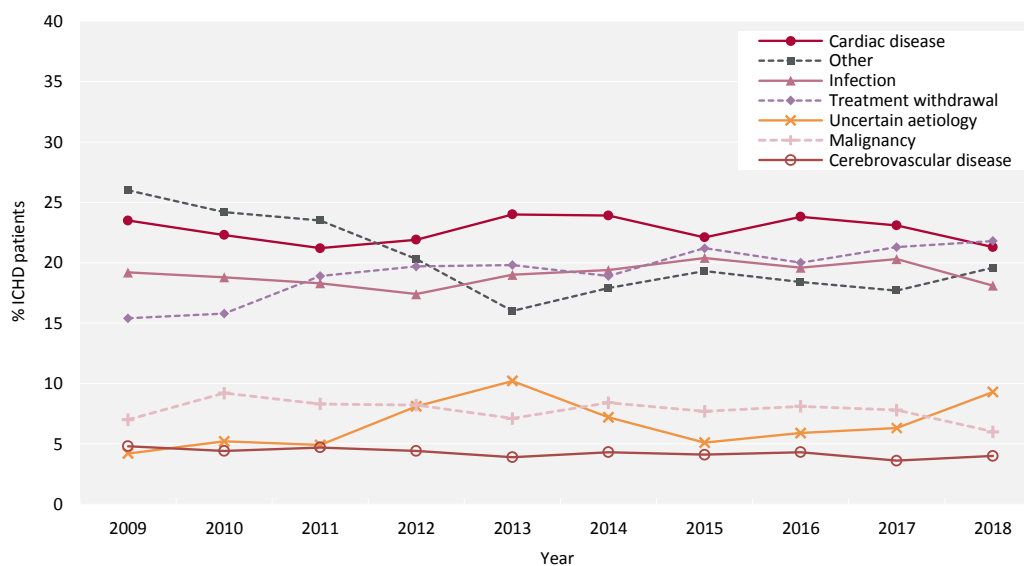


## Cause of death in adult ICHD patients

Cause of death was analysed in prevalent patients receiving ICHD on 31/12/2017 and followed-up for one year in 2018. The proportion of ICHD patients with each cause of death is shown for patients with cause of death data and these total 100% of patients with data. The proportion of patients with no cause of death data is shown on a separate line. Further detail on the survival of prevalent RRT patients is in chapter 2.

**Table 4.11** Cause of death in adult patients prevalent to ICHD on 31/12/2017 followed-up in 2018 by age group

Cause of death	ICHD all ages		ICHD <65 years		ICHD ≥65 years	
	N	%	N	%	N	%
Cardiac disease	567	21.3	193	28.3	374	18.8
Cerebrovascular disease	107	4.0	47	6.9	60	3.0
Infection	482	18.1	122	17.9	360	18.1
Malignancy	161	6.0	30	4.4	131	6.6
Treatment withdrawal	580	21.8	102	15.0	478	24.1
Other	522	19.6	131	19.2	391	19.7
Uncertain aetiology	247	9.3	56	8.2	191	9.6
<b>Total (with data)</b>	<b>2,666</b>	<b>100.0</b>	<b>681</b>	<b>100.0</b>	<b>1,985</b>	<b>100.0</b>
Missing	1,206	31.2	290	29.9	916	31.6



**Figure 4.22** Cause of death between 2009 and 2018 for adult patients prevalent to ICHD at the beginning of the year