



Chapter 3

Adults on in-centre haemodialysis (ICHHD) in the UK at the end of 2017

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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 2017 (figure 3.1). This population comprises patients who were on ICHD at the end of 2016 and remained on ICHD throughout 2017, as well as patients who commenced/re-commenced ICHD in 2017. This latter group includes both incident renal replacement therapy (RRT) patients who ended 2017 on ICHD and prevalent RRT patients who switched to ICHD from home haemodialysis (HHD), peritoneal dialysis (PD), or a transplant (Tx) in 2017. 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. Patients on HHD will be reported in a separate chapter in next year's annual report.

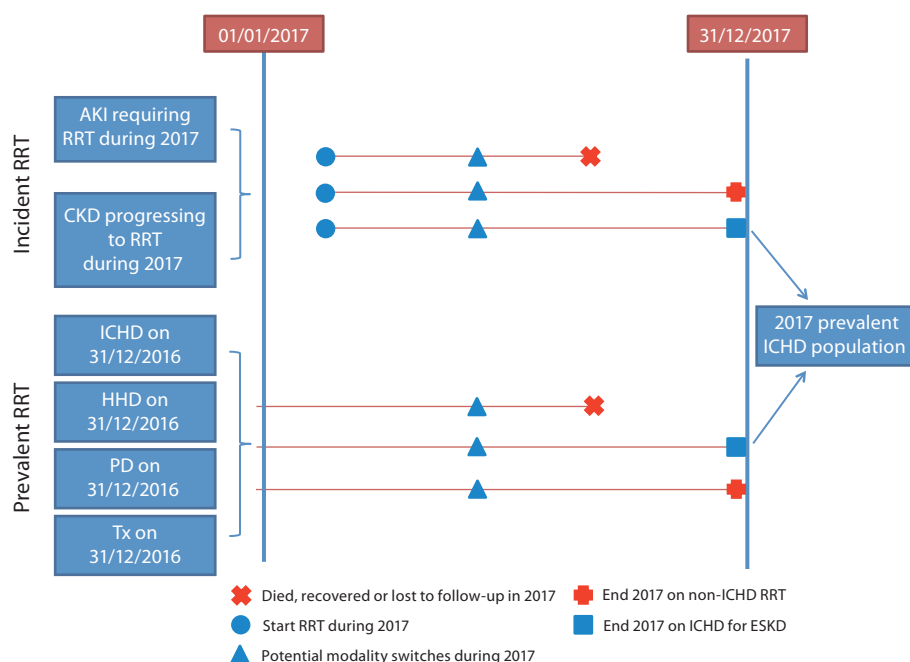


Figure 3.1 Pathways adult patients could follow to be included in the UK 2017 prevalent ICHD population

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 2017 or if they had been on RRT for ≥ 90 days and were on ICHD at the end of 2017
 CKD – chronic kidney disease

The infection analyses used a rolling two year cohort as per the audit measures (table 3.1). 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 care of patients on ICHD for which there are Renal Association guidelines (table 3.1):

- **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 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 2017 prevalent adult ICHD population, including the number on ICHD per million population (pmp), dialysis duration and frequency. Also reported is dialysis adequacy measured by URR, because this formed part of the specialised services quality dashboard during this period.

The Renal Association guidelines (<https://renal.org/guidelines/>) provide audit measures relevant to the care of patients on ICHD and, where data permit, their attainment by UK renal centres in 2017 is reported in this chapter (table 3.1). Audit measures in guidelines that have been archived (for example, ‘Haemodialysis’, ‘Blood borne viruses’ and ‘Nutrition’) are not included, with the exception of the potassium and bicarbonate measures, which will remain in the forthcoming 2019 haemodialysis (HD) guideline, albeit with an amended target range for bicarbonate of 18–26 mmol/L.

Some audit measures in current guidelines – for example, the target for glycated haemoglobin 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 on the UKRR website. Audit measures that cannot be reported because the required data items were not collected by the UKRR are omitted.

Where revised target ranges are published, the measures in place at the time of patient care are reported. However, where new guidelines remove audit measures, those targets are no longer reported – in this chapter this applies to phosphate and parathyroid hormone.

Table 3.1 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 3.6, figure 3.6
HD (forthcoming 2019 guideline and in archived 2009 guideline)	Proportion of patients with pre-dialysis bicarbonate 18–26 mmol/L	Table 3.7, figure 3.8
	Proportion of patients with pre-dialysis potassium 4.0–6.0 mmol/L	Table 3.7, figure 3.9
Anaemia (2017)	Proportion of patients with serum ferritin <100 µg/L at start of treatment with erythropoiesis stimulating agent (ESA)	Table 3.8, figure 3.13 (the UKRR does not hold treatment with ESA start dates)
	Proportion of patients with haemoglobin <100 g/L not on ESA	Table 3.9
	Proportion of patients on ESA with haemoglobin >120 g/L	Table 3.9, figure 3.15
Vascular access (2015)	Mean (median) ESA dose in patients maintained on ESA therapy	Table 3.9
	Proportion of prevalent dialysis patients with definitive access (AVF/AVG/PD catheter) – ≥80%	Figure 3.17
	Annual rate of MRSA <1 episode/100 patient years (measured over 2 years)	Table 3.10, figures 3.18, 3.20
Planning, initiating and withdrawing RRT (2014)	Annual rate of MSSA <2.5 episodes/100 patient years (measured over 2 years)	Table 3.10, figures 3.19, 3.21
	Number of patients withdrawing from ICHD as a proportion of all deaths on ICHD	Table 3.11, figure 3.22

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. The number preceding the centre name in each caterpillar plot indicates the percentage of missing data for that centre. Caterpillar plots exclude centres with <70% data completeness but include centres with small numbers of patients.

Cambridge renal centre (Addenbrooke's Hospital) was unable to submit patient level data for 2015–2017. 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. Using aggregate numbers of patients starting RRT by treatment modality, it is possible to report treatment rates for Cambridge, but no other quality assurance for the service provided.

Key findings

- 24,218 adult patients were receiving ICHD for ESKD in the UK on 31/12/2017, which represented 37.3% of the RRT population
- The median age of ICHD patients was 67.5 years and 61.9% were male
- 86.8% of ICHD patients achieved a dialysis adequacy of URR >65%
- 94.5% of ICHD patients had dialysis 3 times a week
- 74.5% of ICHD patients had dialysis for 4–5 hours per session
- The median adjusted calcium for ICHD patients was 2.3 mmol/L and 10.8% were above the target range 2.2–2.5 mmol/L
- The median haemoglobin and ferritin for ICHD patients was 111 g/L and 416 µg/L, respectively, and 92.6% were on an ESA at a median dose of 8,000 IU/week
- 0.8% of ICHD patients had a haemoglobin <100 g/L not on an ESA and 19.2% had a haemoglobin >120 g/L on an ESA
- Of the 40 centres that provided adequate long term dialysis access data in England, Northern Ireland and Wales, 15 centres achieved the 80% target for definitive access amongst prevalent dialysis patients (AVF/AVG/PD catheter)
- The 2 year rates (2016–2017) of MRSA and MSSA bacteraemia were 0.19/100 patient years and 2.55/100 patient years, respectively
- There was no cause of death data available for 37.9% of deaths. For those with data, the leading cause of death in younger patients (<65 years) was cardiac disease (31.4%) and in older patients (≥65 years) was treatment withdrawal (23.7%).

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 3.2 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)	2017 crude rate (pmp)
	2013	2014	2015	2016	2017	2013	2014	2015	2016	2017		
ENGLAND												
B Heart	412	397	406	376	375	63.0	62.5	62.2	57.7	57.3	0.77	485
B QEH	878	900	957	956	953	42.9	42.2	42.6	40.0	37.8	1.78	536
Basldn	160	172	159	153	168	59.3	61.9	58.0	55.6	55.8	0.43	387
Bradfd	198	216	229	243	269	38.1	39.4	39.2	38.2	39.9	0.68	394
Brightn	354	378	387	419	425	40.6	41.4	40.7	42.2	42.0	1.36	313
Bristol	485	506	503	489	492	34.1	34.7	34.1	33.3	33.4	1.51	326
Camb	359	332	583	429	346	30.1	26.9	37.9	27.7	24.4	1.21	285
Carlis	67	74	81	94	98	29.5	29.6	28.8	33.8	34.9	0.34	292
Carsh	736	756	798	819	842	49.8	48.7	50.4	49.9	50.1	2.00	420
Chelms	121	133	142	129	128	50.2	51.0	49.8	47.1	45.2	0.53	239
Colchr	115	119	120	124	127	100.0	100.0	100.0	100.0	100.0	0.31	405
Covnt	359	359	348	366	329	38.7	37.4	36.3	37.5	34.2	0.93	352
Derby	184	200	209	199	191	39.7	39.0	38.8	36.7	34.4	0.74	260
Donc	162	175	172	185	178	62.5	61.6	57.0	56.1	53.5	0.43	415
Dorset	264	272	285	273	294	42.1	41.0	41.9	39.7	40.1	0.90	326
Dudley	161	160	161	188	204	51.9	52.5	51.3	54.5	55.4	0.46	441
Exeter	399	411	435	443	454	44.9	43.5	44.9	43.7	43.1	1.14	398
Glouc	210	209	224	235	243	51.3	48.8	50.6	49.9	48.2	0.61	395
Hull	318	319	350	323	348	39.1	39.8	40.9	37.9	40.0	1.07	326
Ipswi	120	122	143	147	146	33.8	33.2	35.4	35.5	33.9	0.42	349
Kent	370	389	409	409	423	38.6	38.4	39.4	38.1	38.8	1.28	330
L Barts	933	943	980	1,004	1,030	44.7	42.7	43.0	42.4	41.2	1.92	537
L Guys	585	599	628	645	666	32.0	31.3	31.2	30.8	30.8	1.13	588
L Kings	493	530	554	566	571	51.2	51.8	51.1	51.0	49.9	1.23	465
L Rfree	696	694	694	709	685	36.2	34.6	33.2	32.6	31.2	1.59	431
L St.G	276	305	334	343	316	36.6	38.6	39.7	40.3	37.5	0.84	378
L West	1,384	1,397	1,424	1,455	1,448	44.4	43.3	43.0	42.7	41.4	2.51	576
Leeds	489	502	490	508	538	33.4	33.5	32.2	32.8	33.2	1.75	308
Leic	831	837	856	890	899	40.2	39.1	39.3	38.7	37.9	2.55	352
Liv Ain	146	151	159	173	166	76.8	69.6	71.9	76.2	76.9	0.51	328
Liv Roy	322	338	345	325	357	25.5	26.7	27.9	26.8	28.4	1.05	341
M RI	457	467	474	465	500	24.7	26.0	25.2	23.6	24.3	1.60	312
Middlbr	332	324	340	321	326	40.1	37.9	37.7	36.1	36.3	1.05	310
Newc	251	265	292	295	327	26.1	27.1	28.9	28.1	29.2	1.17	279
Norwch	301	294	311	315	302	43.7	42.9	42.0	40.9	38.9	0.82	367
Nottm	342	332	358	365	352	31.9	31.3	32.2	31.6	30.0	1.14	309
Oxford	407	444	412	429	451	26.0	26.8	24.4	24.3	24.0	1.77	255
Plymth	128	133	129	136	142	25.5	26.5	25.6	26.6	26.3	0.49	289
Ports	568	571	613	562	545	36.8	35.9	36.7	33.3	31.2	2.12	257
Prestn	513	524	533	523	517	47.1	44.7	43.9	43.4	40.8	1.56	331
Redng	275	284	295	295	302	37.6	37.4	38.1	37.4	37.9	0.95	317
Salford	363	395	387	376	387	41.2	40.7	39.7	36.9	34.7	1.56	248

Table 3.2 Continued

Centre	N on ICHD					% on ICHD					Estimated catchment population (millions)	2017 crude rate (pmp)
	2013	2014	2015	2016	2017	2013	2014	2015	2016	2017		
Sheff	547	540	547	561	549	41.2	39.7	39.6	39.4	38.1	1.44	382
Shrew	170	178	178	186	184	50.3	51.0	48.5	49.6	48.9	0.52	351
Stevng	431	459	481	502	466	57.1	59.0	58.9	56.1	51.7	1.26	370
Sthend	118	115	124	111	120	53.6	48.3	50.4	47.0	47.6	0.33	362
Stoke	286	303	300	311	304	39.5	39.1	38.1	37.7	37.4	0.93	326
Sund	195	208	219	245	243	46.3	46.2	47.7	48.3	44.9	0.65	375
Truro	142	139	150	160	160	38.3	36.7	36.3	37.6	37.8	0.43	370
Wirral	198	197	174	188	203	79.8	70.9	61.9	55.8	52.5	0.60	339
Wolve	287	294	295	286	302	50.6	51.2	50.7	50.1	52.0	0.70	431
York	128	132	149	184	183	31.3	28.6	30.4	34.5	33.0	0.52	355
N IRELAND												
Antrim	124	122	120	122	117	55.4	53.3	50.2	50.0	47.2	0.30	384
Belfast	197	192	174	185	180	27.1	25.7	22.6	22.6	21.4	0.66	274
Newry	90	90	85	86	78	45.2	43.5	37.8	36.3	32.4	0.27	289
Ulster	101	95	106	101	109	65.2	63.8	62.4	60.1	59.2	0.27	397
West NI	108	114	119	125	113	45.4	41.6	40.6	40.7	36.1	0.36	311
SCOTLAND												
Abrdn	216	197	213	227	223	41.8	39.3	40.1	40.9	39.6	0.61	363
Airdrie	191	181	195	185	192	49.1	45.8	45.9	42.0	41.0	0.57	340
D&Gall	45	46	51	47	51	37.8	35.4	39.2	35.9	37.8	0.15	336
Dundee	167	164	185	177	187	42.0	40.9	44.0	42.2	42.6	0.47	394
Edinb	267	262	279	283	313	36.2	35.1	36.3	36.4	37.4	0.99	317
Glasgw	572	538	579	571	574	36.1	33.5	33.9	32.6	32.4	1.66	345
Inverns	68	66	90	86	83	31.5	29.3	35.6	33.2	31.6	0.28	300
Klmarnk	130	124	126	133	144	43.9	41.5	40.6	42.0	42.6	0.37	389
Krkldy	147	143	149	144	140	51.9	51.6	50.5	49.0	46.8	0.32	432
WALES												
Bangor	72	70	69	64	73	72.7	68.6	37.9	35.8	37.6	0.23	316
Cardff	447	458	470	486	529	28.3	28.8	29.2	29.9	31.4	1.50	352
Clwyd	73	86	77	69	72	48.0	51.8	41.6	39.0	39.8	0.20	359
Swanse	309	294	338	340	348	44.7	41.7	44.1	43.9	44.0	0.94	371
Wrexm	99	112	107	115	118	39.4	39.7	36.5	37.1	37.0	0.25	464
TOTALS												
England	19,026	19,493	20,326	20,433	20,574	39.8	39.3	39.4	38.4	37.6	55.62	370
N Ireland	620	613	604	619	597	40.2	38.2	35.6	34.9	32.6	1.87	319
Scotland	1,803	1,721	1,867	1,853	1,907	39.7	37.6	38.6	37.5	37.3	5.42	352
Wales	1,000	1,020	1,061	1,074	1,140	36.0	35.8	34.9	35.0	36.0	3.13	365
UK	22,449	22,847	23,858	23,979	24,218	39.6	39.0	39.0	38.0	37.3	66.04	367

Country dialysis populations were calculated by summing the dialysis patients from centres in each country. Estimated country populations were derived from Office for National Statistics figures rather than from summing the estimated catchment populations of renal centres which may cross country borders

Breakdown of HD patients into ICHD and HHD is not available for Cambridge – the ICHD figure is the total HD percentage 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 centre patients with no ethnicity data is shown separately.

Table 3.3 Demographics of adult patients prevalent to ICHD on 31/12/2017 by centre

Centre	N on RRT	N on ICHD	% on ICHD	Median age (yrs)	% male	Ethnicity				
						% White	% South Asian	% Black	% Other	% missing
ENGLAND										
B Heart	654	375	57.3	67.4	59.7	53.1	34.7	10.9	1.3	0.0
B QEH	2,524	953	37.8	65.9	59.1	51.4	29.6	14.2	4.8	2.2
Basldn	301	168	55.8	66.8	67.9	85.2	3.1	5.6	6.2	3.6
Bradfd	674	269	39.9	64.7	60.6	47.2	47.9	2.6	2.2	0.7
Brightn	1,013	425	42.0	69.4	66.1	90.8	5.2	2.2	1.7	5.6
Bristol	1,473	492	33.4	69.7	64.0	83.3	4.7	9.6	2.4	0.0
Camb										
Carlis	281	98	34.9	67.0	63.3	100.0	0.0	0.0	0.0	2.0
Carsh	1,681	842	50.1	69.6	63.2	63.1	16.2	13.3	7.4	4.2
Chelms	283	128	45.2	69.7	68.0	89.8	3.9	2.4	3.9	0.8
Colchr	127	127	100.0	73.5	64.6	100.0	0.0	0.0	0.0	0.8
Covnt	962	329	34.2	69.8	62.3	75.3	16.5	7.0	1.2	0.3
Derby	556	191	34.4	65.0	60.7	80.4	11.1	4.8	3.7	1.0
Donc	333	178	53.5	70.3	59.0	93.3	2.2	1.7	2.8	0.0
Dorset	734	294	40.1	71.5	66.0	94.9	2.7	0.7	1.7	0.0
Dudley	368	204	55.4	68.5	64.2	82.4	11.8	4.9	1.0	0.0
Exeter	1,054	454	43.1	73.0	67.2	97.4	0.4	1.1	1.1	0.2
Glouc	504	243	48.2	72.3	64.6	92.1	2.5	3.3	2.1	0.4
Hull	871	348	40.0	67.8	67.0	97.4	2.1	0.3	0.3	2.3
Ipswi	431	146	33.9	72.0	65.1	83.8	0.7	4.2	11.3	2.7
Kent	1,091	423	38.8	69.0	61.9	93.6	3.1	1.4	1.9	0.2
L Barts	2,497	1,030	41.2	61.9	61.1	25.3	32.8	28.9	12.9	0.0
L Guys	2,159	666	30.8	62.6	60.5	45.7	5.2	42.4	6.7	4.1
L Kings	1,145	571	49.9	63.4	60.4	44.6	12.3	39.8	3.3	0.2
L Rfree	2,193	685	31.2	66.6	62.3	40.8	22.8	28.9	7.5	4.5
L St.G	843	316	37.5	66.5	57.0	29.1	29.4	34.3	7.3	8.5
L West	3,498	1,448	41.4	66.3	58.6	31.8	35.8	24.6	7.7	0.0
Leeds	1,621	538	33.2	61.7	61.5	72.8	18.7	6.7	1.9	0.4
Leic	2,374	899	37.9	68.8	64.1	67.7	23.0	6.4	3.0	5.8
Liv Ain	216	166	76.9	72.2	65.1	96.9	0.0	1.9	1.2	3.0
Liv Roy	1,255	357	28.4	63.0	63.3	87.4	1.4	5.2	6.0	2.5
M RI	2,059	500	24.3	64.9	57.8	55.9	14.5	26.0	3.6	0.6
Middlbr	898	326	36.3	68.6	61.7	91.7	7.4	0.9	0.0	0.0
Newc	1,118	327	29.2	66.0	67.3	90.5	4.0	2.1	3.4	0.0
Norwch	776	302	38.9	72.7	62.6	96.7	1.3	0.3	1.7	0.0
Nottm	1,174	352	30.0	71.1	61.1	74.4	11.9	10.2	3.4	0.0
Oxford	1,878	451	24.0	69.6	59.2	75.7	10.7	7.5	6.1	8.6
Plymth	540	142	26.3	72.5	65.5	97.9	0.0	0.7	1.4	0.0
Ports	1,746	545	31.2	68.7	63.1	91.8	2.8	1.8	3.6	7.7
Prestn	1,268	517	40.8	67.7	61.7	80.5	17.6	1.5	0.4	0.0
Redng	796	302	37.9	67.6	59.3	70.0	21.4	6.4	2.1	7.3
Salford	1,115	387	34.7	64.5	63.6	72.6	20.9	3.9	2.6	0.0
Sheff	1,441	549	38.1	68.1	62.5	85.4	7.1	3.7	3.7	2.6
Shrew	376	184	48.9	71.1	64.1	93.4	3.3	0.5	2.7	0.5
Stevng	901	466	51.7	68.0	59.7	70.0	16.1	9.4	4.4	6.9
Sthend	252	120	47.6	66.1	58.3	82.5	7.5	5.8	4.2	0.0
Stoke	813	304	37.4	71.3	61.8	90.0	4.7	2.3	3.0	1.3
Sund	541	243	44.9	66.4	65.0	95.1	3.7	0.4	0.8	0.0

Table 3.3 Continued

Centre	N on RRT	N on ICHD	% on ICHD	Median age (yrs)	% male	Ethnicity				
						% White	% South Asian	% Black	% Other	% missing
Truro	423	160	37.8	72.5	62.5	99.4	0.0	0.0	0.6	0.0
Wirral	387	203	52.5	67.5	53.2	96.1	2.5	0.0	1.5	0.0
Wolve	581	302	52.0	66.9	67.2	62.5	22.9	12.6	2.0	0.3
York	554	183	33.0	69.7	66.7	95.4	2.3	1.2	1.2	5.5
N IRELAND										
Antrim	248	117	47.2	75.6	65.0	99.1	0.0	0.9	0.0	0.0
Belfast	843	180	21.4	70.5	67.2	98.1	0.0	1.3	0.6	12.2
Newry	241	78	32.4	67.0	51.3	97.4	1.3	1.3	0.0	0.0
Ulster	184	109	59.2	76.4	59.6	93.6	0.9	2.8	2.8	0.0
West NI	313	113	36.1	72.0	56.6	98.2	1.8	0.0	0.0	0.0
SCOTLAND										
Abrdn	563	223	39.6	67.2	61.9					86.1
Airdrie	468	192	41.0	64.3	57.3	97.4	1.9	0.6	0.0	18.8
D&Gall	135	51	37.8	68.5	64.7					84.3
Dundee	439	187	42.6	66.9	61.5					82.4
Edinb	837	313	37.4	62.2	62.9					78.3
Glasgw	1,774	574	32.4	65.4	57.7					87.6
Inverns	263	83	31.6	69.0	59.0					67.5
Klmarnk	338	144	42.6	65.5	56.9					79.9
Krkldy	299	140	46.8	67.7	47.1					85.7
WALES										
Bangor	194	73	37.6	71.0	64.4	97.3	0.0	1.4	1.4	0.0
Cardff	1,684	529	31.4	66.3	63.1	89.5	7.2	1.6	1.7	2.6
Clwyd	181	72	39.8	68.1	70.8	100.0	0.0	0.0	0.0	0.0
Swanse	791	348	44.0	71.3	69.8	97.7	1.2	0.9	0.3	1.1
Wrexm	319	118	37.0	70.7	58.5	100.0	0.0	0.0	0.0	0.0
TOTALS										
England	53,353	20,228	37.9	67.5	62.0	68.7	15.3	11.9	4.2	2.1
N Ireland	1,829	597	32.6	72.2	61.3	97.4	0.7	1.2	0.7	3.7
Scotland	5,116	1,907	37.3	65.5	58.8					76.8
Wales	3,169	1,140	36.0	68.5	65.3	94.3	3.7	1.1	1.0	1.6
UK	63,467	23,872	37.6	67.5	61.9	71.0	14.2	11.0	3.9	8.1

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

Breakdown by ethnicity not shown for centres with <70% data completeness, but these centres are included in national averages
Cambridge is excluded from this table

Primary renal diseases (PRDs) were grouped into categories as shown in table 3.4, 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 3.4 Primary renal diseases (PRDs) of adult patients prevalent to ICHD on 31/12/2017

PRD	N on ICHD	% ICHD population	Age <65 yrs		Age ≥65 yrs		M:F ratio
			N	%	N	%	
Diabetes	6,194	27.1	2,839	28.1	3,355	26.4	1.6
Glomerulonephritis	3,171	13.9	1,734	17.2	1,437	11.3	2.1
Hypertension	1,751	7.7	705	7.0	1,046	8.2	2.2
Polycystic kidney	1,281	5.6	647	6.4	634	5.0	1.0
Pyelonephritis	1,836	8.0	867	8.6	969	7.6	1.6
Renal vascular disease	1,240	5.4	171	1.7	1,069	8.4	2.1
Other	3,586	15.7	1,751	17.3	1,835	14.4	1.3
Uncertain aetiology	3,764	16.5	1,388	13.7	2,376	18.7	1.6
Total (with data)	22,823	100.0	10,102	100.0	12,721	100.0	
Missing	1,049	4.4	513	4.8	536	4.0	1.5

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 2017 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 3.5 Median urea reduction ratio (URR) and distribution of session frequency and time of adult patients prevalent to ICHD on 31/12/2017 using end of third quarter data (30/09/2017)

Centre	Median URR (%)	% URR >65%	% session frequency/week			% session time			% data completeness		
			<3 sessions	3 sessions	>3 sessions	<4 hours	4–5 hours	>5 hours	URR	Session frequency	Session time
ENGLAND											
B Heart	74	83.6	11.0	88.0	1.0	10.9	88.7	0.4	99.0	84.8	83.1
B QEH	81	93.2	4.3	94.6	1.1	17.8	82.2	0.0	99.7	99.4	99.4
Basldn	71	83.8	1.3	93.5	5.2	30.6	69.4	0.0	99.3	96.9	96.6
Bradfd	72	81.8	8.1	91.9	0.0	27.9	72.1	0.0	93.0	98.4	99.6
Brightn	74	89.3	0.0	98.8	1.3	6.1	93.9	0.0	99.8	100.0	99.0
Bristol	73	82.4	5.5	93.9	0.6	25.1	74.9	0.0	100.0	100.0	100.0
Camb											
Carlisle	77	90.6	2.4	97.6	0.0	7.5	92.5	0.0	98.8	93.2	93.0
Carsh			1.4	98.3	0.3	7.0	92.9	0.1	4.9	99.7	99.6
Chelms	73	81.3	1.8	96.4	1.8	40.6	59.4	0.0	98.2	97.4	97.3
Colchr			2.8	97.2	0.0	5.7	94.3	0.0	0.0	97.3	97.3
Covnt	76	88.5	8.6	89.8	1.5	29.6	70.0	0.3	96.3	97.9	96.0
Derby	76	89.8	0.5	96.7	2.7				97.8	98.9	32.2
Donc	78	90.6	0.0	100.0	0.0	27.5	72.5	0.0	97.7	97.7	97.7
Dorset	77	93.2	0.7	99.3	0.0	4.5	95.5	0.0	87.0	99.3	99.6
Dudley	74	85.7	3.1	96.3	0.6	12.9	87.1	0.0	72.3	84.7	84.2

Table 3.5 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
Exeter	74	89.0	3.2	96.1	0.7	49.9	50.1	0.0	99.5	99.8	100.0
Glouc	76	88.5	3.9	95.2	0.9				99.5	99.6	0.0
Hull	77	92.9							99.4	0.3	1.6
Ipswi			10.3	89.7	0.0	12.5	87.5	0.0	0.0	99.3	97.6
Kent	72	80.0	2.4	95.2	2.4	66.4	33.6	0.0	97.5	99.0	99.7
L Barts									0.0	0.0	0.0
L Guys	75	90.8	5.1	94.4	0.5	24.0	76.0	0.0	99.3	99.8	99.8
L Kings	72	82.0	0.0	100.0	0.0	34.7	65.3	0.0	91.6	100.0	100.0
L Rfree			14.7	84.6	0.6				0.0	98.1	0.0
L St.G			0.7	99.3	0.0	4.6	95.4	0.0	0.3	96.6	88.1
L West	79	93.4	7.0	92.6	0.5	22.7	76.3	1.0	87.5	95.3	95.0
Leeds	73	84.1	7.3	92.7	0.0	22.6	77.4	0.0	100.0	99.0	100.0
Leic	75	84.3	0.6	99.4	0.0	8.3	87.3	4.3	98.7	97.9	74.4
Liv Ain			1.4	97.8	0.7	22.6	77.4	0.0	0.0	98.6	99.3
Liv Roy			0.6	87.2	12.2	6.6	93.4	0.0	0.0	95.1	99.7
M RI									1.1	22.7	22.0
Middlbr	74	82.6	2.4	96.2	1.4	33.7	64.5	1.8	99.7	99.7	100.0
Newc			1.3	98.0	0.7	16.9	81.8	1.4	14.2	100.0	100.0
Norwch	76	90.0	1.0	97.6	1.4	57.6	42.4	0.0	99.3	100.0	100.0
Nottm	75	88.2	0.3	94.6	5.1	6.9	92.8	0.3	90.6	100.0	100.0
Oxford	75	88.6	0.0	100.0	0.0	32.3	67.7	0.0	98.5	100.0	100.0
Plymth	74	83.6	3.3	95.9	0.8				99.2	96.1	0.0
Ports	76	92.8	7.1	89.6	3.3				99.1	98.5	0.0
Prestn	73	77.4							83.7	0.0	0.0
Redng			0.8	98.8	0.4	20.6	79.4	0.0	3.9	97.3	97.7
Salford			3.0	81.1	15.9	17.6	82.4	0.0	63.1	100.0	94.5
Sheff	74	89.0	3.1	96.9	0.0	84.4	15.4	0.2	97.4	99.4	90.1
Shrew			3.1	95.7	1.2	23.2	76.8	0.0	0.0	99.4	99.4
Stevng	73	78.1	7.8	89.5	2.7	71.2	28.8	0.0	98.5	98.0	97.8
Sthend	67	64.2	14.4	85.6	0.0	57.9	42.1	0.0	100.0	100.0	100.0
Stoke	74	84.3	4.3	92.0	3.6	12.4	87.6	0.0	91.1	98.6	100.0
Sund			0.9	91.4	7.7	28.0	72.0	0.0	0.5	100.0	78.1
Truro	70	67.0	6.9	91.5	1.5	55.8	43.4	0.8	89.4	90.9	97.7
Wirral	76	90.1	1.6	90.8	7.6	21.7	77.7	0.6	97.7	96.4	100.0
Wolve	75	90.5	1.1	98.1	0.8				95.8	98.5	69.3
York	76	94.4	2.6	90.8	6.6	12.2	87.8	0.0	100.0	86.9	86.3
N IRELAND											
Antrim	72	77.3	0.9	99.1	0.0	12.7	87.3	0.0	100.0	99.1	100.0
Belfast	74	89.2	0.6	97.1	2.4	16.1	83.3	0.6	99.4	98.3	100.0
Newry	75	94.3	14.9	85.1	0.0	53.1	46.9	0.0	82.8	98.7	100.0
Ulster	72	78.4	2.0	96.0	2.0	16.5	83.5	0.0	100.0	98.0	100.0
West NI	72	81.1	3.7	89.8	6.5	60.8	39.2	0.0	96.0	98.2	98.0
SCOTLAND											
Abrdn	71	79.0	0.9	92.1	7.0	3.6	93.9	2.5	100.0	98.6	98.5
Airdrie	70	77.8	3.3	95.4	1.3	14.6	82.1	3.3	100.0	94.4	98.7
D&Gall	71	71.1	0.0	93.6	6.4	22.2	75.6	2.2	97.8	95.9	97.8
Dundee	75	90.2	0.0	98.7	1.3	6.6	93.4	0.0	100.0	92.7	92.6
Edinb	72	84.2	1.1	97.7	1.1	37.0	63.0	0.0	98.6	94.3	94.9
Glasgw	72	82.6	0.4	99.4	0.2	7.2	89.3	3.5	99.5	93.5	98.4
Inverns	76	90.3	1.3	93.3	5.3	22.9	77.1	0.0	100.0	97.4	97.2
Klmarnk	76	91.6	0.0	100.0	0.0	1.7	90.4	7.8	100.0	96.6	96.6
Krkldy	72	83.5	3.3	95.9	0.8	20.5	78.6	0.9	100.0	97.6	96.7

Table 3.5 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
WALES											
Bangor	76	91.1	4.8	88.9	6.3				100.0	100.0	0.0
Cardff	76	89.2							99.8	0.0	0.0
Clwyd	71	81.4	0.0	100.0	0.0				100.0	96.6	0.0
Swanse	75	89.3	5.7	93.1	1.3	35.1	63.9	1.0	99.3	98.5	98.3
Wrexm	76	93.0	7.5	92.5	0.0				100.0	99.1	0.0
TOTALS											
England	75	87.1	4.0	94.3	1.7	25.9	73.7	0.4	71.2	87.0	76.2
N Ireland	73	83.7	3.4	94.3	2.3	28.0	71.8	0.2	97.0	98.4	99.6
Scotland	73	83.5	1.0	97.1	1.9	13.8	83.8	2.4	99.5	95.0	97.0
Wales	75	89.2	5.3	93.2	1.5	35.1	63.9	1.0	99.7	53.2	30.0
UK	75	86.8	3.8	94.5	1.7	24.9	74.5	0.6	75.5	86.3	76.3

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

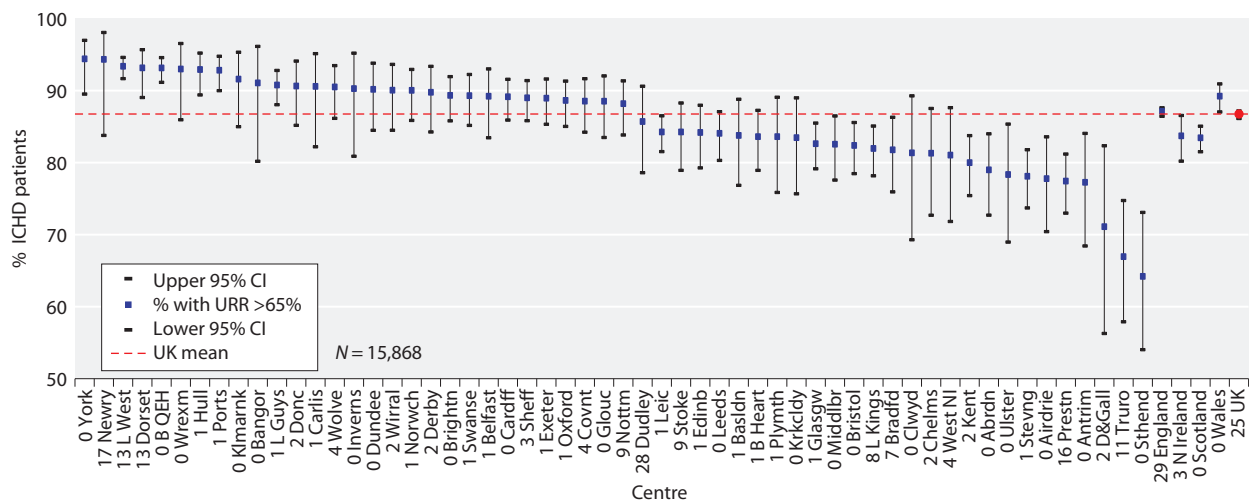


Figure 3.2 Percentage of adult patients prevalent to ICHD on 31/12/2017 with urea reduction ratio (URR) >65% by centre
CI – confidence interval

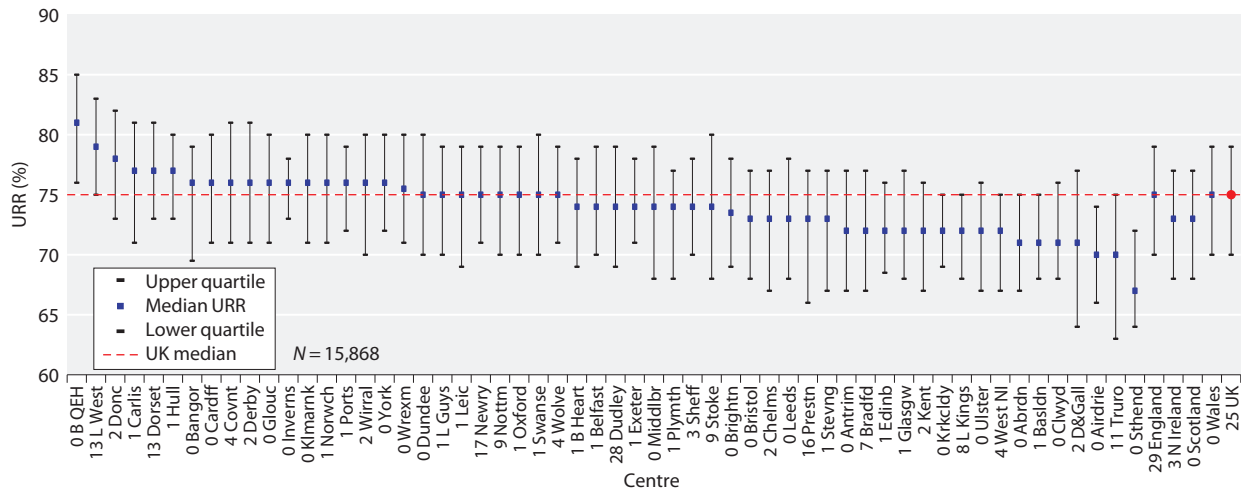


Figure 3.3 Median urea reduction ratio (URR) achieved in adult patients prevalent to ICHD on 31/12/2017 by centre

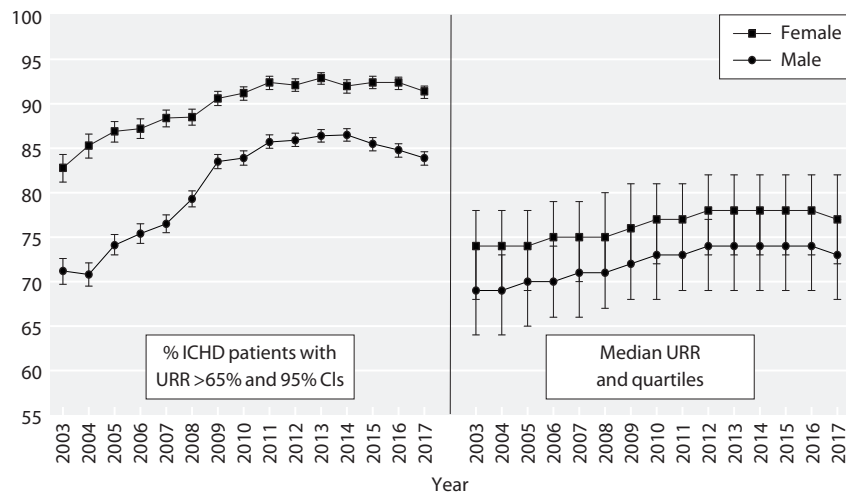


Figure 3.4 Change in the percentage of prevalent adult ICHD patients with urea reduction ratio (URR) >65% and the median URR by sex between 2003 and 2017
CI – confidence interval

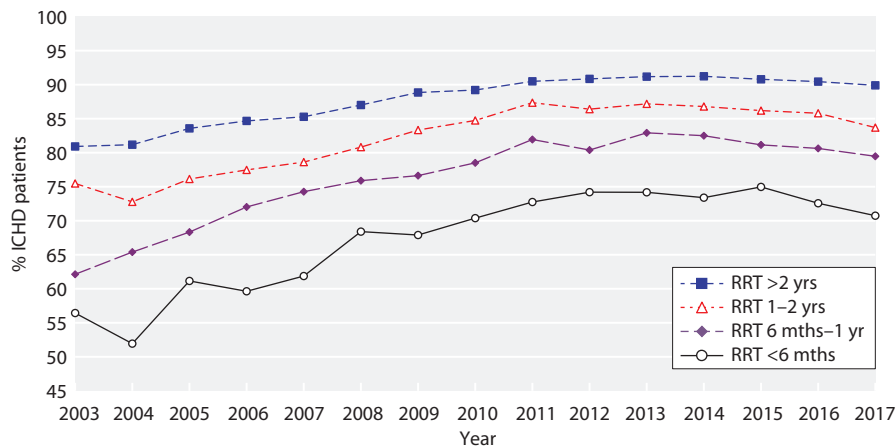


Figure 3.5 Percentage of prevalent adult ICHD patients achieving urea reduction ratio (URR) >65% by time on ICHD between 2003 and 2017

Biochemistry parameters in prevalent adult ICHD patients

The latest 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.

Table 3.6 Median adjusted calcium and percentage with adjusted calcium within and above the target range (2.2–2.5 mmol/L) in adult patients prevalent to ICHD on 31/12/2017 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	71.4	25.0	100.0
B QEH	2.3	78.9	5.9	99.8
Basldn	2.4	80.4	13.7	100.0
Bradfd	2.4	78.7	13.8	99.6
Brightn	2.3	74.9	9.2	100.0
Bristol	2.4	85.2	11.6	100.0
Camb				
Carlis	2.3	73.6	11.5	100.0
Carsh	2.3	80.4	7.1	99.9
Chelms	2.2	66.1	2.7	99.1
Colchr	2.3	82.6	9.6	99.1
Covnt	2.3	81.1	5.2	97.8
Derby	2.4	86.6	9.9	100.0
Donc	2.4	86.7	7.3	100.0
Dorset	2.3	82.5	4.8	99.3
Dudley	2.4	81.1	14.1	100.0
Exeter	2.3	88.8	7.1	100.0
Glouc	2.3	84.6	7.7	100.0
Hull	2.4	78.1	16.3	100.0
Ipswi	2.3	73.9	9.7	100.0
Kent	2.4	70.2	24.7	100.0
L Barts	2.3	76.2	7.6	100.0
L Guys	2.4	82.1	11.3	100.0
L Kings	2.3	80.6	4.5	100.0
L Rfree	2.3	82.1	7.4	99.8
L St.G	2.4	77.1	10.2	97.3
L West	2.3	73.0	13.2	84.5
Leeds	2.4	81.5	9.8	100.0
Leic	2.4	81.7	10.1	100.0
Liv Ain	2.4	79.9	13.2	100.0
Liv Roy	2.3	82.0	8.6	98.5
M RI	2.4	79.1	14.6	94.5
Middlbr	2.3	69.1	4.8	100.0
Newc	2.4	86.8	7.6	100.0
Norwch	2.4	76.6	16.0	100.0
Nottm	2.4	82.1	10.7	100.0
Oxford	2.4	84.3	9.6	100.0
Plymth	2.4	82.0	11.7	98.5
Ports	2.3	78.4	9.3	99.8
Prestn	2.3	80.3	1.8	92.9
Redng	2.4	85.2	10.4	100.0
Salford	2.4	75.6	12.5	100.0
Sheff	2.3	76.8	9.8	99.4
Shrew	2.4	78.1	18.9	100.0
Stevng	2.3	86.2	7.5	99.5
Sthend	2.4	76.4	17.3	100.0
Stoke	2.4	79.2	12.7	100.0
Sund	2.3	71.6	8.1	100.0
Truro	2.3	75.2	13.8	99.3
Wirral	2.3	80.7	7.3	100.0

Table 3.6 Continued

Centre	Median adj Ca (mmol/L)	% adj Ca 2.2–2.5 mmol/L	% adj Ca >2.5 mmol/L	% data completeness
Wolve	2.4	71.6	22.0	99.3
York	2.4	82.7	16.1	100.0
N IRELAND				
Antrim	2.4	83.3	10.8	100.0
Belfast	2.3	79.5	4.2	100.0
Newry	2.4	78.1	13.7	100.0
Ulster	2.5	71.3	28.7	99.0
West NI	2.3	84.1	4.7	100.0
SCOTLAND				
Abrdn	2.4	68.3	29.4	100.0
Airdrie	2.3	84.2	10.5	100.0
D&Gall	2.3	73.5	8.2	100.0
Dundee	2.4	79.8	13.5	100.0
Edinb	2.4	71.0	20.9	99.0
Glasgw	2.4	81.0	11.1	100.0
Inverns	2.4	84.7	13.9	96.0
Klmarnk	2.4	72.2	24.1	100.0
Krkldy	2.4	82.0	8.2	98.4
WALES				
Bangor	2.4	85.7	9.5	100.0
Cardff	2.4	75.0	16.0	100.0
Clwyd	2.4	83.6	13.1	100.0
Swanse	2.3	87.8	5.3	99.7
Wrexm	2.3	86.7	2.9	98.1
TOTALS				
England	2.3	79.2	10.3	98.3
N Ireland	2.4	79.4	11.3	99.8
Scotland	2.4	77.4	15.9	99.5
Wales	2.4	81.4	10.7	99.7
UK	2.3	79.2	10.8	98.5

Blank cells – no data returned by the centre
Ca – calcium

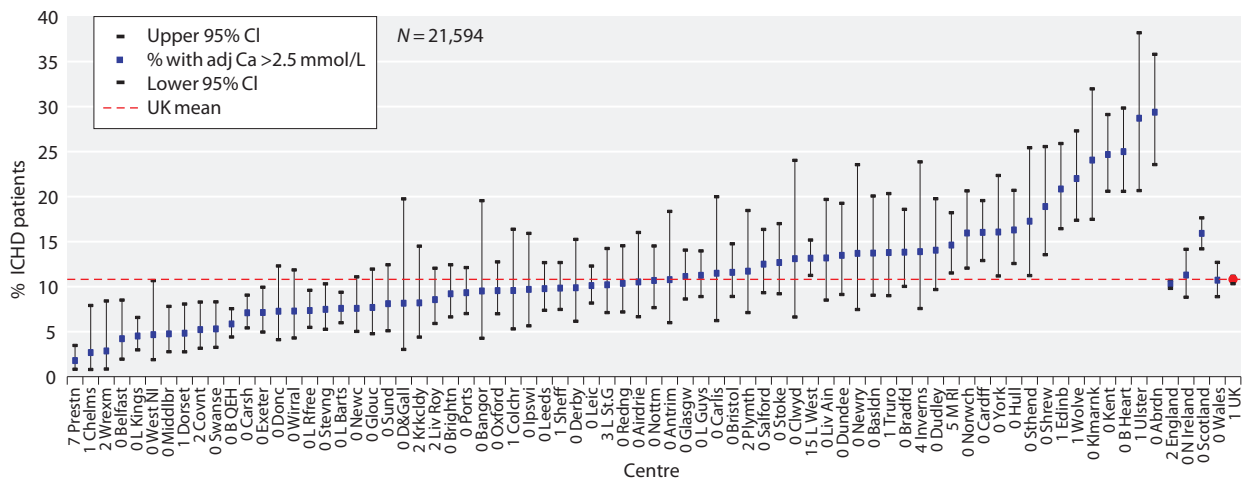


Figure 3.6 Percentage of adult patients prevalent to ICHD on 31/12/2017 with adjusted calcium above the target range (>2.5 mmol/L) by centre
Ca – calcium; CI – confidence interval

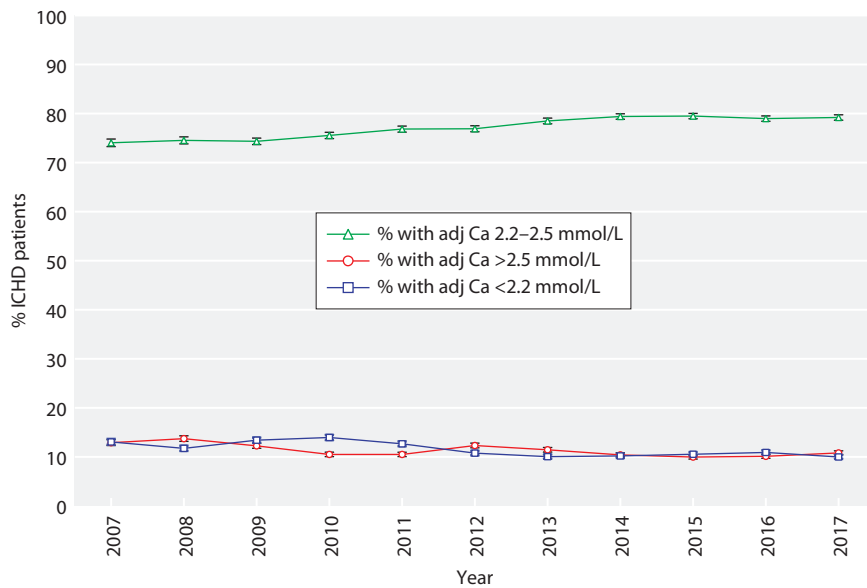


Figure 3.7 Change in percentage of prevalent adult ICHD patients within, above and below the target range for adjusted calcium (2.2–2.5 mmol/L) between 2007 and 2017
Ca – calcium

The forthcoming Renal Association guideline on HD contains audit measures for pre-dialysis potassium and bicarbonate, which were also present in the now archived 2009 guideline, although here we report the updated target range for bicarbonate (18–26 mmol/L). The Scottish Renal Registry does not send data for pre-dialysis potassium and bicarbonate.

Table 3.7 Median pre-dialysis potassium and bicarbonate and percentage attaining target ranges in adult patients prevalent to ICHD on 31/12/2017 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
ENGLAND										
B Heart	4.9	6.9	88.7	4.5	100.0	22	6.9	89.6	3.6	99.7
B QEH	4.9	10.0	82.0	8.0	99.8	24	0.4	87.4	12.3	99.8
Basldn	4.7	10.5	84.3	5.2	100.0	23	0.6	92.2	7.2	100.0
Bradfd	4.6	14.2	81.5	4.3	100.0	23	2.8	84.7	12.6	100.0
Brightn					0.0	24	2.3	82.9	14.8	100.0
Bristol	4.6	23.4	74.5	2.2	100.0	24	2.2	84.1	13.7	100.0
Camb										
Carlis					0.0	21	9.2	85.1	5.8	100.0
Carsh					0.0	24	0.5	81.2	18.3	74.0
Chelms	5.0	1.8	89.3	8.9	99.1	22	2.7	97.3	0.0	99.1
Colchr	5.1	4.4	92.2	3.5	99.1	23	0.9	97.4	1.7	99.1
Covnt					0.0	24	3.6	68.5	27.9	97.4
Derby					0.0	23	4.1	88.4	7.6	100.0
Donc	4.6	13.3	82.4	4.2	100.0	24	1.8	87.9	10.3	100.0
Dorset	4.8	8.6	86.6	4.8	99.3	22	4.1	87.4	8.6	99.3
Dudley	4.9	6.5	89.1	4.4	99.5					65.4
Exeter	4.6	20.0	77.4	2.6	100.0	23	1.2	88.8	10.0	100.0
Glouc					0.0	24	1.4	80.5	18.1	100.0
Hull	4.7	10.7	83.7	5.6	100.0	24	0.9	79.9	19.1	100.0

Table 3.7 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
Ipswi					0.0	23	1.5	88.8	9.7	100.0
Kent	4.7	18.6	74.8	6.6	100.0	21	8.4	88.6	3.1	100.0
L Barts					0.0	25	1.2	71.5	27.3	99.9
L Guys	4.8	17.6	75.2	7.3	100.0	23	3.4	81.0	15.6	92.6
L Kings					0.0	24	0.2	92.7	7.2	100.0
L Rfree	4.9	15.8	76.4	7.8	99.8	23	3.6	88.7	7.7	80.4
L St.G					0.0	26	0.4	59.2	40.4	87.3
L West					0.0					56.1
Leeds	5.2	3.5	87.4	9.2	100.0	24	1.8	87.0	11.2	100.0
Leic	4.9	10.5	81.9	7.6	100.0	25	1.7	71.5	26.8	99.6
Liv Ain					0.0	26	0.7	70.1	29.2	100.0
Liv Roy					0.0	28	0.3	41.4	58.3	92.5
M RI					0.0	23	4.2	90.5	5.4	94.3
Middlbr	4.9	7.5	86.4	6.1	100.0	26	0.7	64.0	35.4	100.0
Newc					0.0	24	1.3	76.9	21.8	100.0
Norwch	5.2	3.2	85.5	11.4	100.0	22	1.8	93.6	4.7	98.9
Nottm	4.9	7.6	88.4	4.1	100.0	24	0.6	86.5	12.9	100.0
Oxford	4.9	7.4	84.8	7.8	100.0	23	5.4	86.5	8.1	100.0
Plymth	4.9	10.2	78.1	11.7	98.5	26	0.0	53.9	46.1	98.5
Ports	4.8	8.5	85.5	6.0	99.8	24	2.8	80.4	16.9	99.8
Prestn					0.0	23	2.9	89.4	7.7	99.8
Redng					0.0	25	0.7	77.4	21.9	100.0
Salford					0.0					0.0
Sheff	5.0	8.3	79.5	12.2	99.4	25	2.4	73.4	24.2	99.4
Shrew					0.0	21	9.1	87.2	3.7	100.0
Stevng	5.0	5.6	87.4	7.0	99.5	24	1.9	89.7	8.4	99.5
Sthend	4.6	12.7	84.6	2.7	100.0	25	0.0	74.6	25.5	100.0
Stoke					20.4	26	0.0	54.8	45.2	99.7
Sund					0.0	29	0.0	21.6	78.4	100.0
Truro	4.9	14.5	80.0	5.5	99.3	22	2.1	84.8	13.1	99.3
Wirral					0.0	25	0.5	69.8	29.7	100.0
Wolve	4.9	6.0	89.2	4.9	99.3	20	13.1	86.6	0.4	99.3
York	5.3	3.0	82.1	14.9	100.0	23	3.6	83.3	13.1	100.0
N IRELAND										
Antrim	4.8	6.9	86.3	6.9	100.0	27	0.0	38.2	61.8	100.0
Belfast	5.1	5.4	84.3	10.2	100.0	23	1.2	92.7	6.1	99.4
Newry	4.9	6.9	86.3	6.9	100.0					24.7
Ulster	5.1	5.9	88.2	5.9	100.0	23	3.9	92.2	3.9	100.0
West NI	5.0	6.5	85.1	8.4	100.0	23	2.8	92.5	4.7	100.0
WALES										
Bangor					0.0	22	0.0	93.7	6.4	100.0
Cardff					0.0	22	10.0	81.8	8.1	100.0
Clwyd					0.0	23	1.6	91.8	6.6	100.0
Swanse					0.0	24	2.2	80.9	16.9	99.7
Wrexm					0.0	26	1.0	50.5	48.6	98.1
TOTALS										
England	4.9	10.8	82.4	6.8	55.0	24	2.6	80.4	17.0	92.0
N Ireland	4.9	6.2	85.8	8.0	100.0	23	2.0	81.0	17.0	89.8
Wales					0.0	23	5.5	79.7	14.9	99.7
E, NI & W	4.9	10.6	82.6	6.9	53.5	24	2.8	80.3	16.9	92.3

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

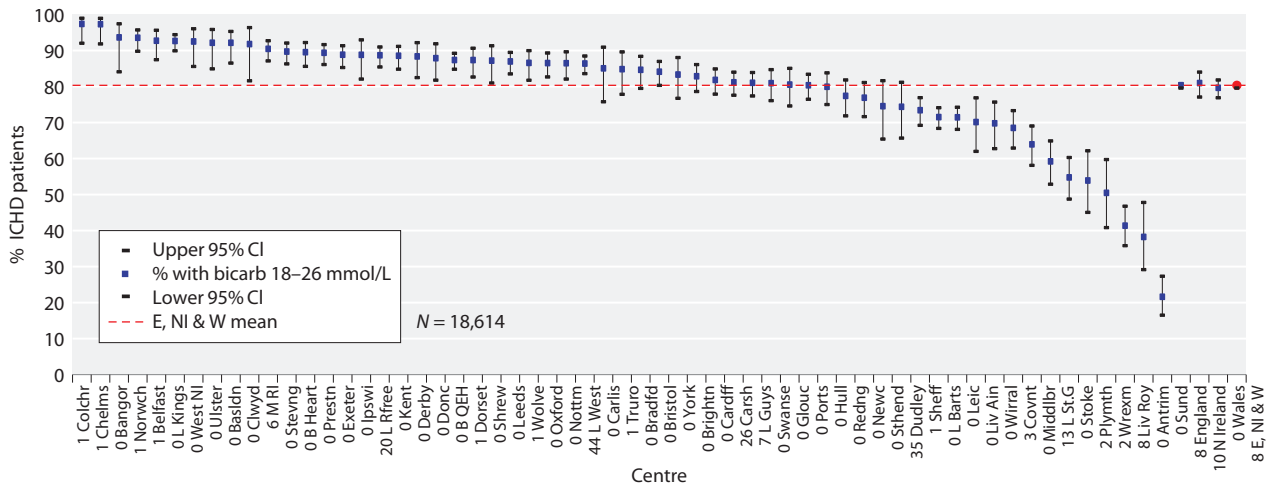


Figure 3.8 Percentage of adult patients prevalent to ICHD on 31/12/2017 with pre-dialysis bicarbonate within the target range (18–26 mmol/L) by centre
Bicarb – bicarbonate; CI – confidence interval

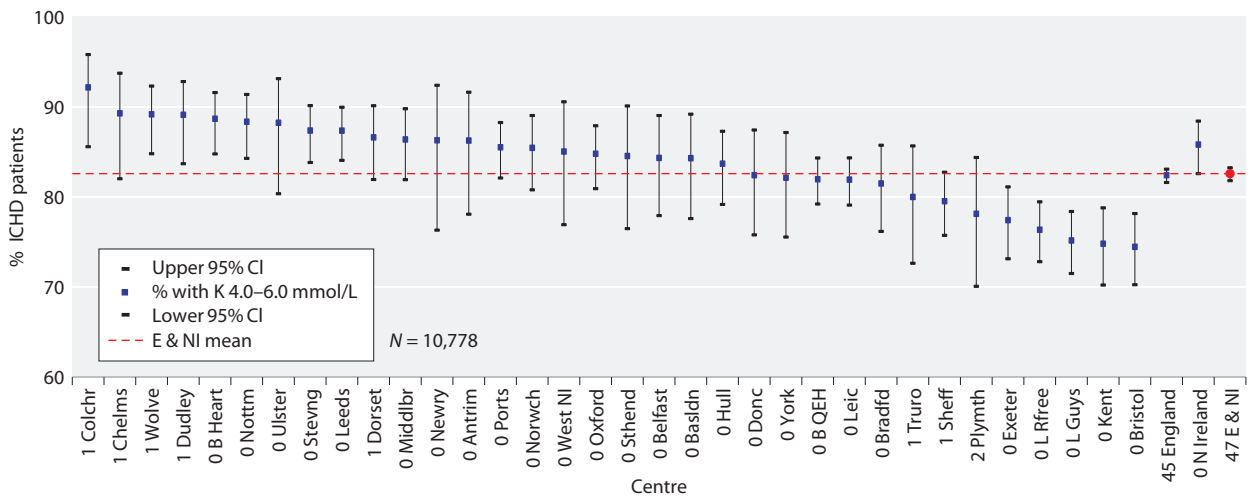


Figure 3.9 Percentage of adult patients prevalent to ICHD on 31/12/2017 with pre-dialysis potassium within the target range (4.0–6.0 mmol/L) by centre
CI – confidence interval; K – potassium

Pre-dialysis potassium has only been adequately collected by the UKRR since 2016 and therefore longitudinal analyses are not shown.

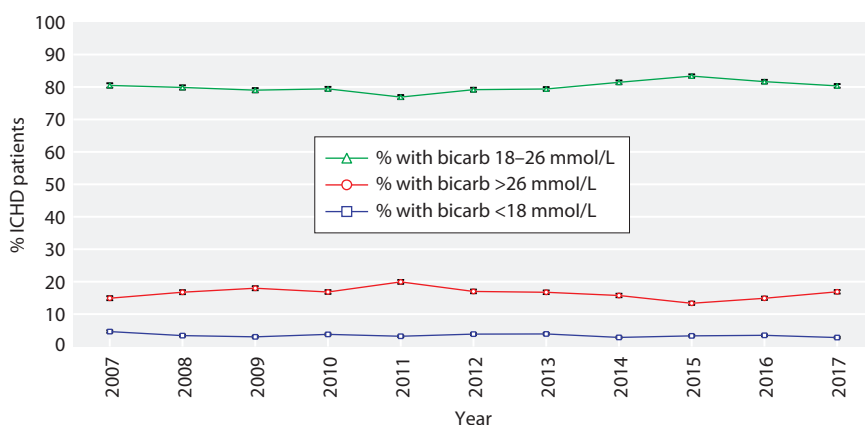


Figure 3.10 Change in percentage of prevalent adult ICHD patients within, above and below the target range for pre-dialysis bicarbonate (18–26 mmol/L) between 2007 and 2017

Bicarb – bicarbonate

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.

Table 3.8 Median haemoglobin and ferritin and percentage attaining target ranges in adult patients prevalent to ICHD on 31/12/2017 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	19.9	20.8	100.0	242	20.1	96.1
B QEH	108	24.5	12.5	99.8	380	4.4	99.7
Basldn	111	17.6	20.9	100.0	309	16.3	100.0
Bradfd	117	16.5	42.1	100.0	478	6.7	100.0
Brightn	112	19.7	23.5	100.0	521	2.0	100.0
Bristol	110	7.9	22.1	100.0	635	1.1	100.0
Camb							
Carlisle	110	13.8	23.0	100.0	573	4.6	100.0
Carsh	110	22.4	15.7	100.0	323	8.2	99.1
Chelms	113	9.8	26.8	99.1	562	2.7	99.1
Colchr	112	20.0	20.9	99.1			5.2
Covnt	107	28.4	9.5	97.8	363	4.2	98.1
Derby	113	15.7	30.8	100.0	500	1.2	100.0
Donc	108	26.1	14.5	100.0	413	0.6	100.0
Dorset	111	20.5	20.1	98.9	534	1.5	97.8
Dudley	115	8.8	25.3	98.4	278	10.4	98.9
Exeter	112	7.6	23.5	100.0	314	6.7	100.0
Glouc	112	16.3	21.3	100.0	357	7.0	96.4
Hull	110	26.3	16.3	100.0	408	4.4	99.7
Ipswi	111	19.4	17.9	100.0	548	6.0	100.0
Kent	112	22.4	25.4	100.0	547	6.9	99.8

Table 3.8 Continued

Centre	Haemoglobin				Ferritin		
	Median (g/L)	% <100 g/L	% >120 g/L	% data completeness	Median (µg/L)	% <100 µg/L	% data completeness
L Barts	110	19.3	18.9	100.0	640	5.0	99.9
L Guys	108	25.8	15.4	100.0	477	4.6	99.8
L Kings	111	18.5	14.3	100.0	476	4.6	98.9
L Rfree	110	21.7	19.6	99.8	440	7.5	99.5
L St.G	105	32.5	12.7	96.9	403	3.3	92.8
L West	113	13.7	21.9	90.7	297	5.8	90.2
Leeds	105	28.3	11.2	100.0	468	3.9	99.6
Leic	113	18.0	28.5	99.9	326	6.8	99.8
Liv Ain	109	22.9	20.1	100.0	545	7.2	96.5
Liv Roy	112	17.4	23.9	98.5	410	7.4	98.2
M RI	113	22.3	25.3	94.5	415	1.8	83.6
Middlbr	110	21.8	16.0	100.0	814	6.1	99.7
Newc	110	20.1	24.1	100.0	330	8.3	100.0
Norwch	111	24.8	22.7	100.0	425	6.4	100.0
Nottm	108	19.9	12.3	99.4	469	2.5	100.0
Oxford	112	25.0	25.0	100.0	301	7.4	99.8
Plymth	115	18.8	32.0	98.5	465	8.6	98.5
Ports	110	21.6	20.4	99.8	415	4.6	99.2
Prestn	110	20.6	18.1	99.8	648	3.5	95.2
Redng	112	17.0	27.8	100.0	443	3.0	100.0
Salford	109	32.6	24.7	100.0			0.0
Sheff	111	25.0	22.8	99.4	459	3.7	99.4
Shrew	114	14.0	32.3	100.0	418	2.4	100.0
Stevng	110	21.7	18.7	99.5	565	3.5	98.4
Sthend	110	20.0	10.9	100.0	292	1.8	100.0
Stoke	112	14.8	27.8	100.0	354	2.8	99.3
Sund	113	19.8	23.9	100.0	243	8.1	99.6
Truro	106	26.9	10.3	99.3	430	3.4	99.3
Wirral	111	17.2	21.4	100.0	478	6.8	99.5
Wolve	109	23.1	26.1	99.3	415	8.2	99.3
York	109	20.8	17.3	100.0	412	4.8	100.0
N IRELAND							
Antrim	108	25.0	19.0	98.0	409	4.9	100.0
Belfast	116	12.0	33.7	100.0	488	4.8	100.0
Newry	109	20.5	24.7	100.0	465	4.1	100.0
Ulster	116	6.9	36.3	100.0	668	2.0	100.0
West NI	114	12.1	26.2	100.0	609	2.8	100.0
SCOTLAND							
Abrdn	106	34.1	11.8	100.0	501	4.0	95.3
Airdrie	111	22.8	14.0	100.0	617	3.6	98.8
D&Gall	107	22.4	14.3	100.0	609	2.0	100.0
Dundee	112	13.5	17.4	100.0	292	13.5	100.0
Edinb	115	14.2	34.5	98.3	456	9.1	99.7
Glasgw	111	20.7	26.9	100.0	495	5.2	100.0
Inverns	111	22.2	19.4	96.0	301	9.7	82.7
Klmarnk	109	25.6	16.5	100.0	275	16.5	100.0
Krkldy	113	13.1	27.9	98.4	389	10.6	99.2
WALES							
Bangor	112	14.3	22.2	100.0	446	6.3	100.0
Cardff	110	22.6	23.3	100.0	311	7.7	100.0
Clwyd	114	14.8	24.6	100.0	295	1.6	100.0
Swanse	111	20.3	14.4	99.7	386	10.0	99.7
Wrexm	112	17.1	33.3	98.1	481	0.0	100.0

Table 3.8 Continued

Centre	Haemoglobin			Ferritin			
	Median (g/L)	% <100 g/L	% >120 g/L	% data completeness	Median (µg/L)	% <100 µg/L	% data completeness
TOTALS							
England	110	20.4	20.6	98.9	415	5.5	95.7
N Ireland	114	14.6	28.8	99.6	529	3.8	100.0
Scotland	111	20.7	22.7	99.4	440	7.7	98.5
Wales	111	20.4	21.5	99.7	350	7.2	99.9
UK	111	20.3	21.0	99.0	416	5.7	96.2

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

Table 3.9 Distribution of haemoglobin and erythropoiesis stimulating agent (ESA) dose values in adult patients prevalent to ICHD on 31/12/2017 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	87.2	6,000	0.6	11.9
B QEH	0.2			
Basldn	95.4	8,000	0.7	20.3
Bradfd	97.2	6,000	0.4	39.4
Brightn	93.1	5,000	0.0	21.7
Bristol	91.6	8,000	0.2	18.9
Camb				
Carlis	82.8	4,000	1.1	11.5
Carsh	2.3			
Chelms	96.5	10,000	0.0	23.2
Colchr	0.0			
Covnt	84.0	8,000	2.0	6.2
Derby	0.0			
Donc	94.5	6,000	0.6	14.5
Dorset	91.1	6,000	0.4	15.7
Dudley	1.6			
Exeter	93.6	6,000	0.0	20.7
Glouc	91.4		0.5	19.0
Hull	50.2			
Ipswi	56.7			
Kent	94.9	9,000	1.0	22.1
L Barts	0.1			
L Guys	0.2			
L Kings	94.5	7,000	0.0	11.9
L Rfree	0.0			
L St.G	0.0			
L West	0.0			
Leeds	94.9	5,000	0.0	9.0
Leic	98.4	6,000	0.2	27.7
Liv Ain	0.0			
Liv Roy	0.3			
M RI	0.0			
Middlbr	71.1	4,000	5.4	8.8
Newc	92.4	6,200	1.0	22.8
Norwch	95.7	9,000	0.7	20.9
Nottm	91.5	6,000	0.3	8.2
Oxford	94.4	12,000	0.0	23.3

Table 3.9 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
Plymth	0.0			
Ports	5.5			
Prestn	94.4		0.0	15.0
Redng	93.7	13,077	3.3	26.7
Salford	12.5			
Sheff	87.7	6,000	3.0	19.1
Shrew	0.6			
Stevng	95.3	10,000	0.0	15.7
Sthend	91.8	8,000	0.0	7.3
Stoke	0.0			
Sund	90.1	7,846	0.0	19.8
Truro	0.0			
Wirral	89.6	9,000	0.0	15.1
Wolve	83.7	8,000	1.9	17.9
York	88.7	5,000	1.8	12.5
N IRELAND				
Antrim	92.2	6,000	1.0	15.0
Belfast	95.8	8,000	0.0	31.9
Newry	93.2	6,000	0.0	21.9
Ulster	93.1	4,000	0.0	32.4
West NI	98.1	6,000	0.0	27.1
SCOTLAND				
Abrdn	95.9	6,000	1.4	20.3
Airdrie	100.0	8,000	0.0	24.4
D&Gall	98.0	8,000	0.0	25.0
Dundee	91.5	6,000	1.2	24.2
Edinb	77.0	4,000	4.3	25.2
Glasgw	99.3	8,000	0.2	24.9
Inverns	97.4	6,000	1.3	26.0
Klmarnk	99.2	8,000	0.8	22.7
Krkldy	96.0	8,000	0.0	27.0
WALES				
Bangor	90.5		0.0	22.2
Cardff	39.1			
Clwyd	47.5			
Swanse	95.0	8,000	0.6	12.8
Wrexm	61.7			
TOTAL*				
	92.6	8,000	0.8	19.2

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

*This is the total of only those centres with at least 70% of ICHD patients on an ESA

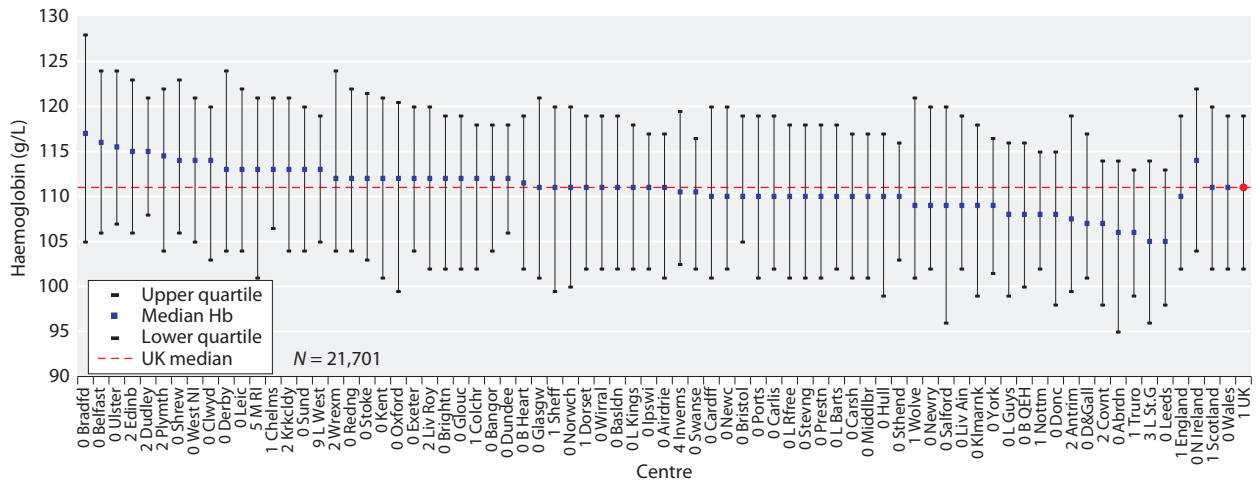


Figure 3.11 Median haemoglobin in adult patients prevalent to ICHD on 31/12/2017 by centre
Hb – haemoglobin

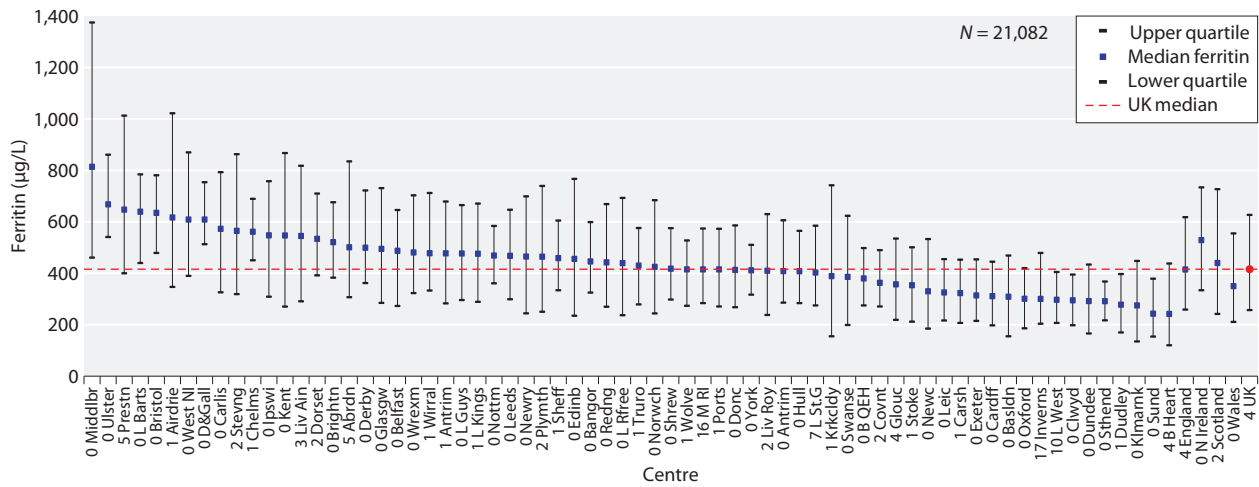


Figure 3.12 Median ferritin in adult patients prevalent to ICHD on 31/12/2017 by centre

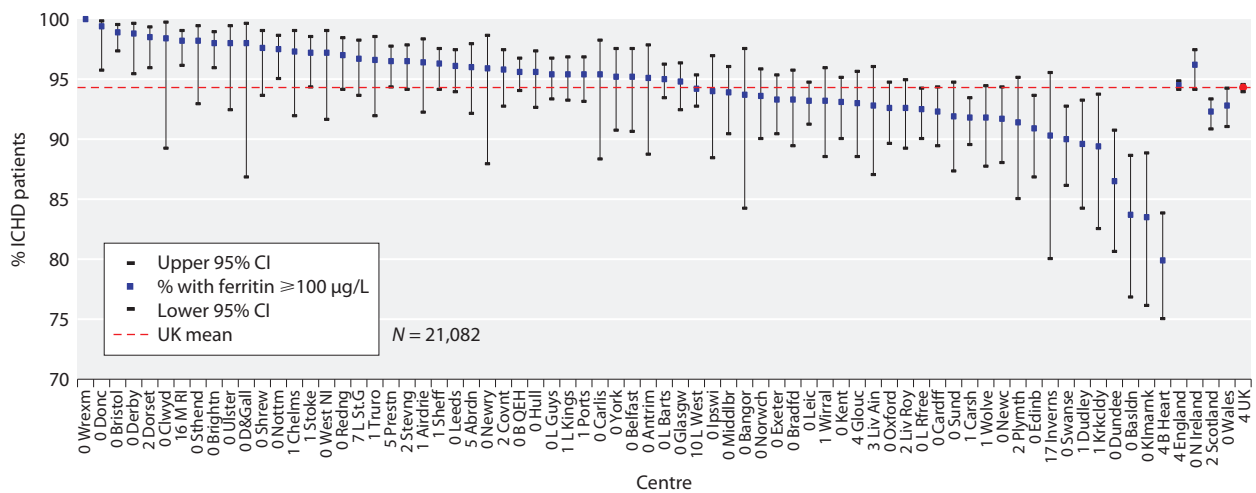


Figure 3.13 Percentage of adult patients prevalent to ICHD on 31/12/2017 with ferritin ≥ 100 µg/L by centre
CI – confidence interval

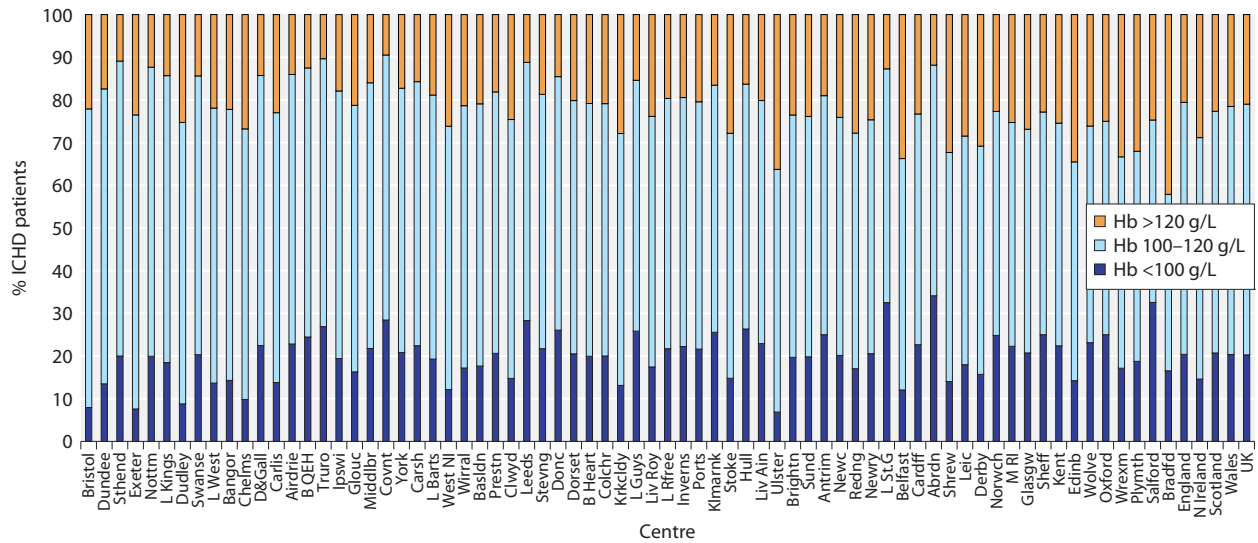


Figure 3.14 Distribution of haemoglobin in adult patients prevalent to ICHD on 31/12/2017 by centre
Hb – haemoglobin

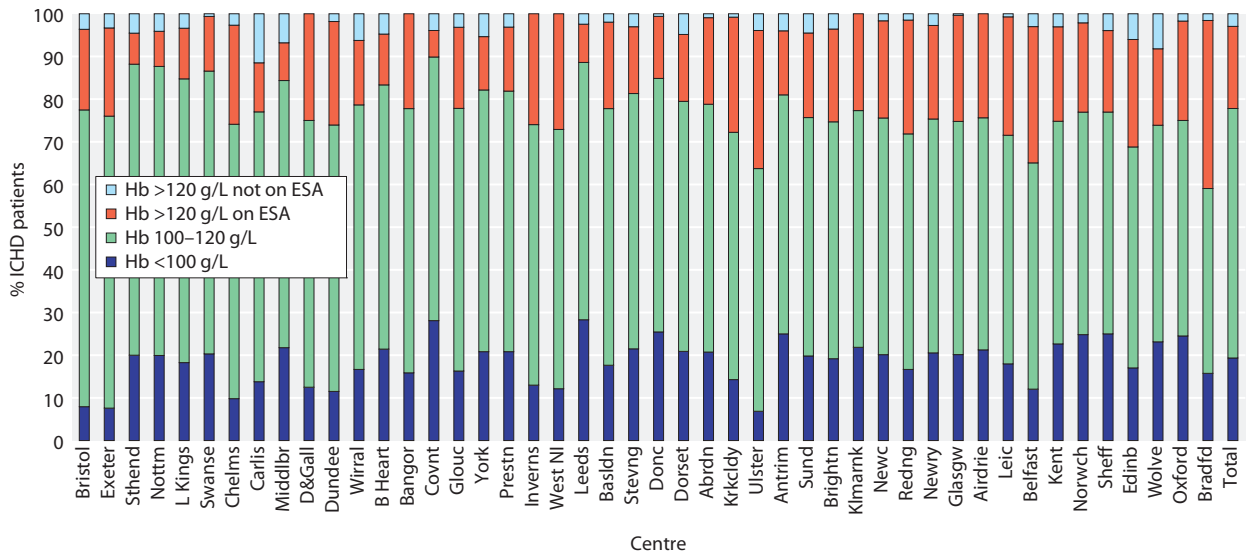


Figure 3.15 Distribution of haemoglobin in adult patients prevalent to ICHD on 31/12/2017 and the proportion with haemoglobin >120 g/L receiving erythropoiesis stimulating agent (ESA) by centre
Figure (including total) does not include centres with <70% data completeness (or <70% ESA use)
Hb – haemoglobin

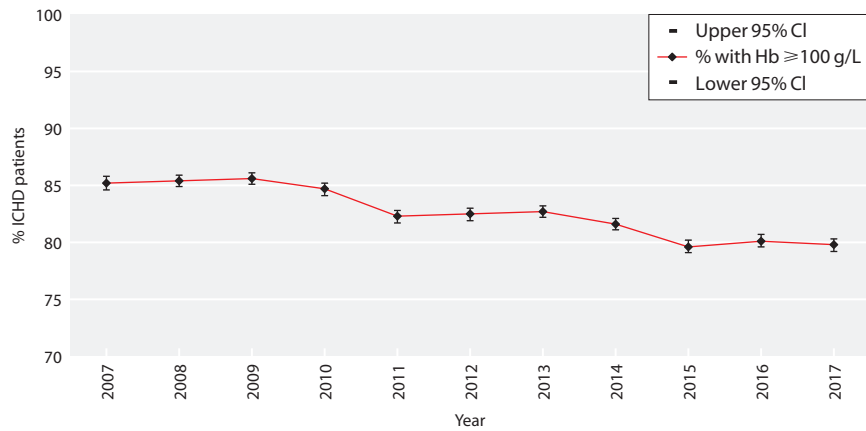


Figure 3.16 Percentage of prevalent adult ICHD patients with haemoglobin \geq 100 g/L between 2007 and 2017
 CI – confidence interval; Hb – haemoglobin

Dialysis access in prevalent adult dialysis patients

Prevalent dialysis access data were collected separately to the main UKRR quarterly data returns via the 2017 Multisite Dialysis Access Audit (see appendix A). Scotland is not included in this audit.

The type of prevalent dialysis access is presented in [figure 3.17](#) for the 40 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.

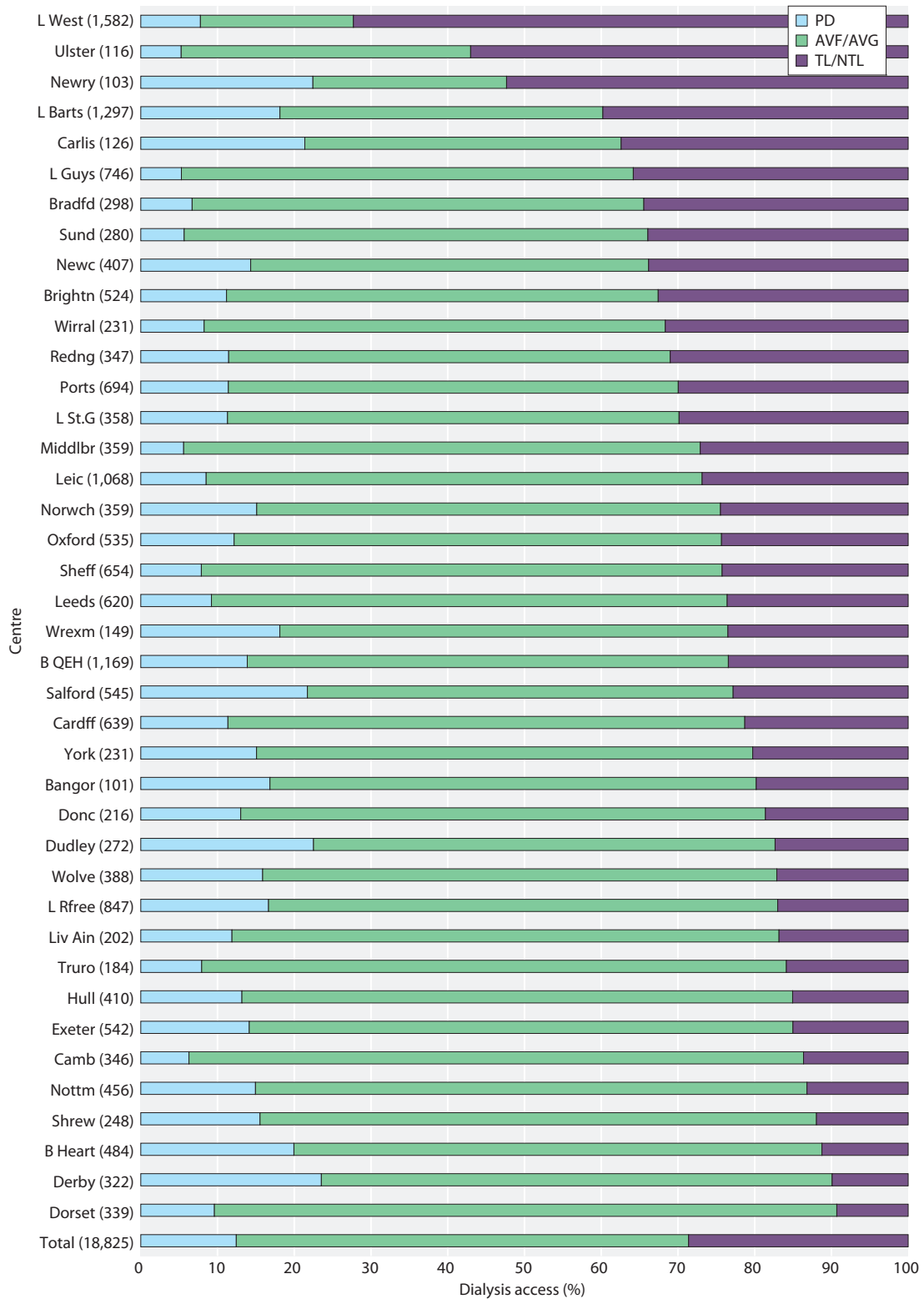


Figure 3.17 Dialysis access in adult patients prevalent to dialysis on 31/12/2017 by centre (2017 Multisite Dialysis Access Audit)

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

Centres are sorted by decreasing proportion of patients on RRT with a line

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. For the first time, Wales provided data, which were extracted locally from the renal and hospital IT systems.

In previous reports, infection data were validated by securely emailing individual renal centres to confirm that infections were related to dialysis patients. Historically, this has resulted in only a small number of alterations in cases and so was not undertaken for these analyses. 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 include all patients on HD, whether on HHD or ICHD.

Table 3.10 Rate of infection episodes per 100 HD patient years in prevalent adult HD patients in England and Wales from January 2016 to December 2017 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	808	0.12	1.73	0.99	1.49
B QEH	2,130	0.23	2.35	0.99	1.69
Basldn	348	0.29	3.17	2.88	0.86
Bradfd	514	0.58	3.69	0.97	1.94
Brightn	919	0.11	2.29	2.07	2.39
Bristol	1,043	0.58	1.73	1.05	2.21
Camb					
Carlis	190	0.00	5.27	1.05	2.11
Carsh	1,712	0.23	1.93	0.82	1.87
Chelms	270	0.37	2.60	2.97	0.74
Colchr	251	0.00	3.19	0.80	3.59
Covnt	753	0.00	1.59	0.53	1.46
Derby	500	0.00	1.00	0.80	1.20
Donc	391	0.00	3.58	0.26	1.53
Dorset	589	0.00	1.36	1.36	2.04
Dudley	397	0.00	3.52	1.01	2.01
Exeter	910	0.11	2.31	1.21	1.43
Glouc	496	0.00	3.43	1.41	0.61
Hull	681	0.00	2.79	1.18	2.50
Ipswi	298	0.34	3.69	1.68	2.35
Kent	889	0.11	4.16	0.45	2.59
L Barts	2,065	0.34	3.63	0.53	2.23
L Guys	1,380	0.36	2.25	0.43	1.16
L Kings	1,168	0.43	1.80	0.60	1.11
L Rfree	1,429	0.21	1.33	1.75	2.31
L St.G	664	0.00	3.01	1.05	2.41
L West	2,983	0.13	1.88	1.24	1.54
Leeds	1,060	0.28	2.93	1.13	2.17
Leic	1,912	0.10	2.20	0.73	2.04
Liv Ain	360	0.00	5.56	1.67	0.83
Liv Roy	780	0.00	2.44	1.92	1.92
M RI	1,106	0.36	3.43	1.63	1.36
Middlbr	671	0.00	2.53	1.49	2.38
Newc	656	0.15	4.72	1.22	1.52
Norwch	663	0.15	0.91	0.60	1.51

Table 3.10 Continued

Centre	HD patient years	Rate per 100 HD patient years			
		MRSA	MSSA	<i>C. difficile</i>	<i>E.coli</i>
Nottm	804	0.00	2.99	0.75	2.24
Oxford	930	0.21	1.61	0.86	2.26
Plymth	283	0.00	3.18	1.41	2.12
Ports	1,285	0.16	2.88	1.09	1.95
Prestn	1,138	0.18	2.72	0.44	1.93
Redng	606	0.00	2.47	0.49	4.45
Salford	794	0.50	3.02	0.88	1.64
Sheff	1,216	0.08	2.63	1.32	1.40
Shrew	407	0.00	0.74	0.98	2.95
Stevng	1,068	0.28	1.22	0.94	1.59
Sthend	247	0.00	4.45	0.40	1.62
Stoke	684	0.00	2.05	1.02	3.36
Sund	498	0.80	3.42	1.41	1.61
Truro	329	0.00	2.74	1.82	0.61
Wirral	397	0.25	2.27	1.01	1.26
Wolve	633	0.00	1.11	0.79	1.58
York	378	0.00	4.77	1.32	2.65
WALES					
Bangor	156	0.00	4.49	3.21	1.92
Cardff	1,037	0.39	3.18	1.45	2.22
Clwyd	149	0.67	2.68	2.68	2.01
Swanse	754	0.13	4.64	2.39	3.18
Wrexm	239	0.42	2.92	3.34	2.09
TOTALS					
England	42,681	0.19	2.49	1.05	1.87
Wales	2,336	0.30	3.68	2.14	2.48
E & W	45,017	0.19	2.55	1.11	1.91

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.

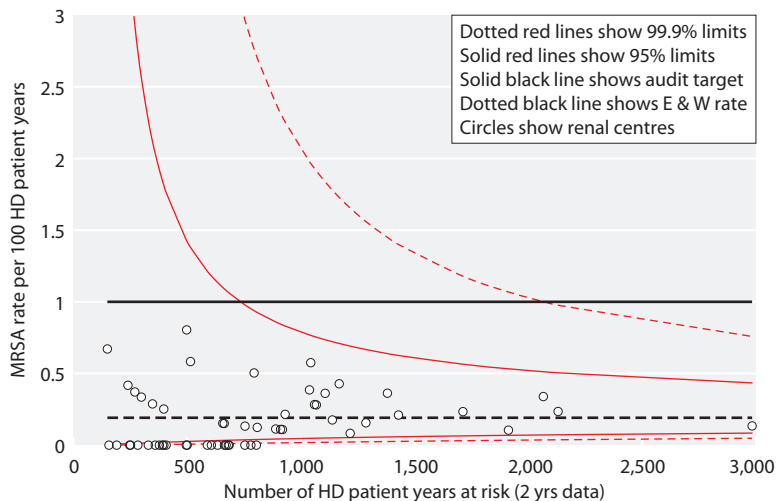


Figure 3.18 Methicillin-resistant *Staphylococcus aureus* (MRSA) rates by centre per 100 HD adult patient years (2016–2017 data) compared to audit target

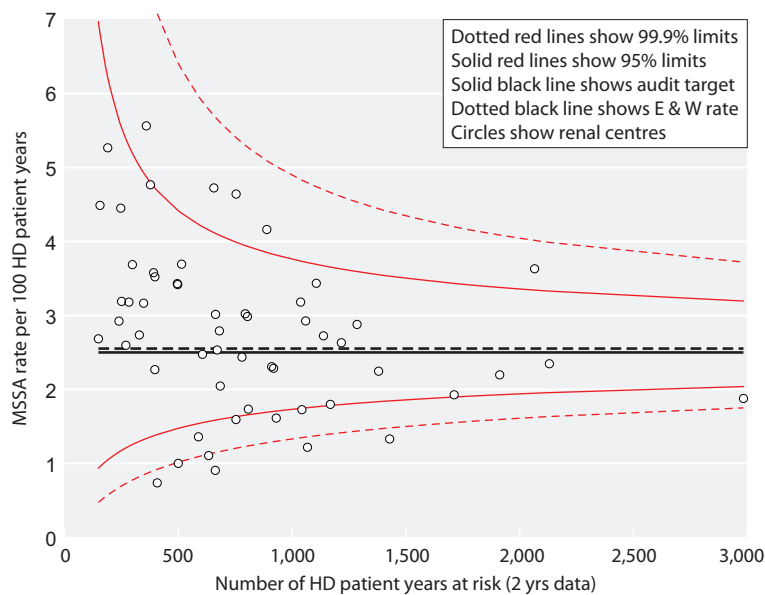


Figure 3.19 Methicillin-sensitive *Staphylococcus aureus* (MSSA) rates by centre per 100 HD adult patient years (2016–2017 data) compared to audit target

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).

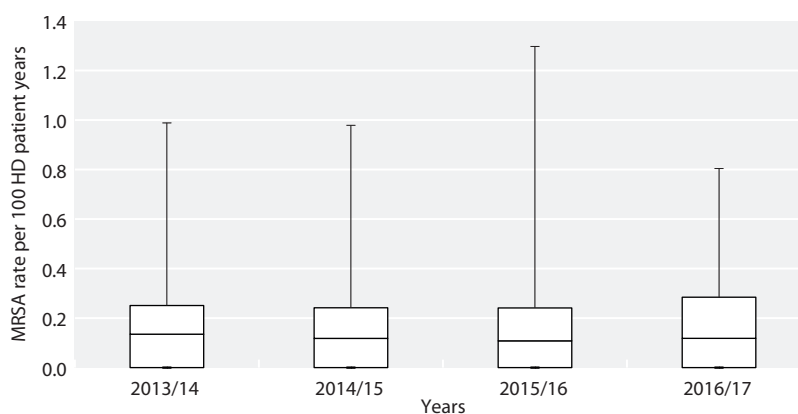


Figure 3.20 Distribution of methicillin-resistant *Staphylococcus aureus* (MRSA) centre rates per 100 HD adult patient years by rolling 2 calendar year cohort (Wales included in the 2016–2017 cohort only)

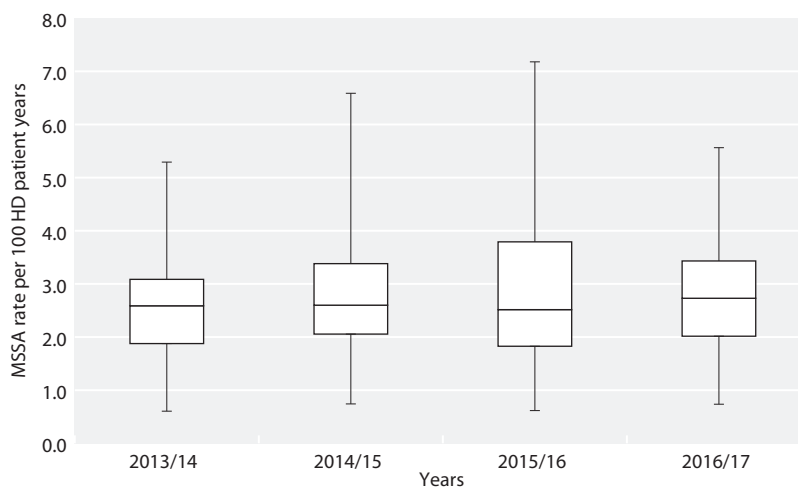


Figure 3.21 Distribution of methicillin-sensitive *Staphylococcus aureus* (MSSA) centre rates per 100 HD adult patient years by rolling 2 calendar year cohort (Wales included in the 2016–17 cohort only)

Cause of death in adult ICHD patients

Cause of death was analysed in prevalent patients receiving ICHD on 31/12/2016 and followed-up for one year in 2017. 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.

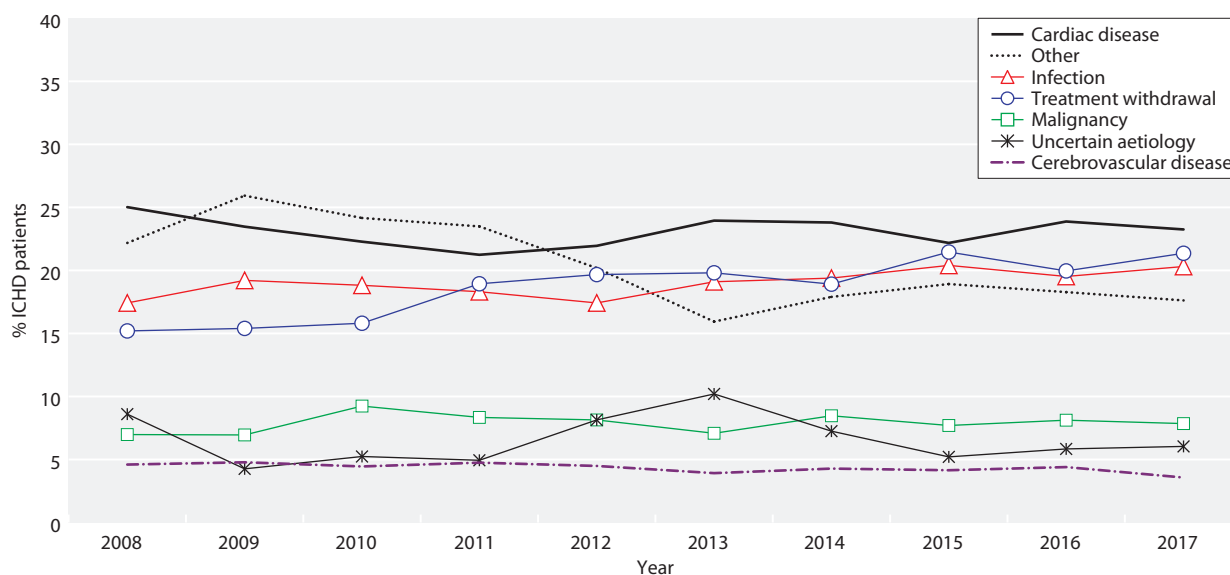


Figure 3.22 Cause of death for prevalent adult ICHD patients between 2008 and 2017

Table 3.11 Cause of death in adult patients prevalent to ICHD on 31/12/2016 followed-up in 2017 by age group

Cause of death	ICHD all ages		ICHD <65 yrs		ICHD ≥65 yrs	
	N	%	N	%	N	%
Cardiac disease	554	23.3	180	31.4	374	20.7
Cerebrovascular disease	85	3.6	28	4.9	57	3.2
Infection	484	20.3	115	20.1	369	20.4
Malignancy	187	7.9	33	5.8	154	8.5
Treatment withdrawal	509	21.4	81	14.1	428	23.7
Other	420	17.6	106	18.5	314	17.4
Uncertain aetiology	144	6.0	30	5.2	114	6.3
Total (with data)	2,383	100.0	573	100.0	1,810	100.0
Missing	1,451	37.9	387	40.3	1,064	37.0