

Chapter 6

Adults on peritoneal dialysis (PD) in the UK at the end of 2019

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Introduction

This chapter describes the population of adult patients with end-stage kidney disease (ESKD) who were receiving regular peritoneal dialysis (PD) in the UK at the end of 2019 (figure 6.1). This population comprises patients who were on PD at the end of 2018 and remained on PD throughout 2019, as well as patients who commenced/re-commenced PD in 2019. This latter group includes both incident renal replacement therapy (RRT) patients who ended 2019 on PD and prevalent RRT patients who switched to PD from in-centre haemodialysis (ICHD), home haemodialysis (HHD) or a transplant (Tx) in 2019. Consequently, the cohort of patients receiving PD in a centre not only reflects differences in underlying population case-mix, but also differences in the rates of acceptance onto RRT, survival on PD, transplantation and haemodialysis (ICHD and HHD), and the care of patients on those other modalities, as described in other chapters of this report.

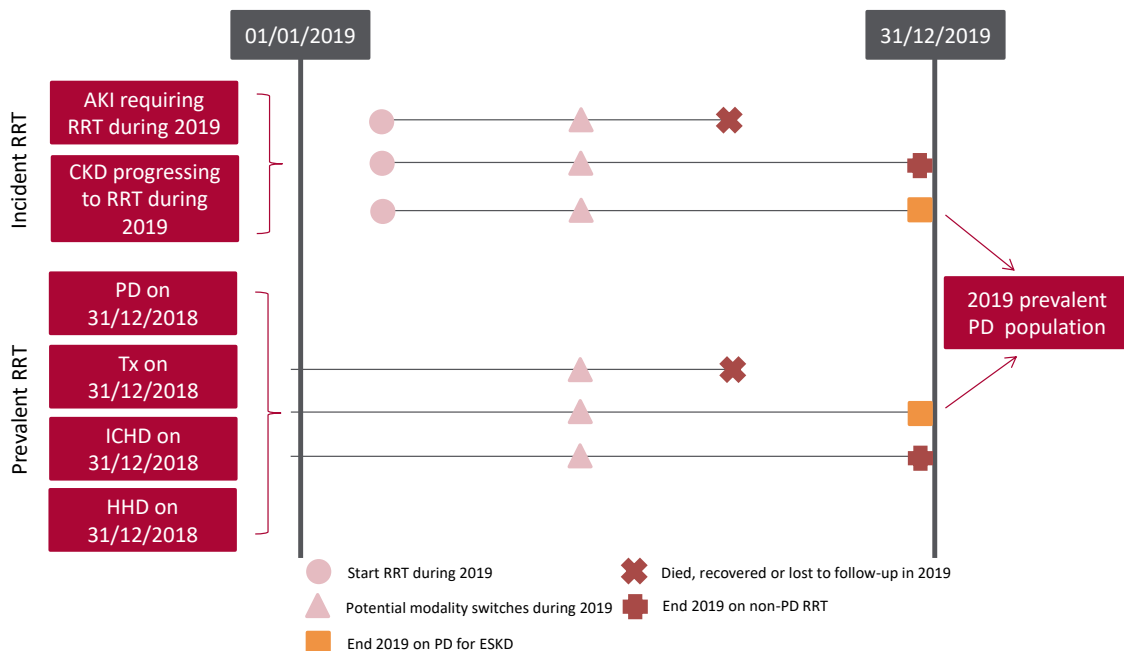


Figure 6.1 Pathways adult patients could follow to be included in the UK 2019 prevalent PD population

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 PD at the end of 2019 or if they had been on RRT for ≥ 90 days and were on PD at the end of 2019. CKD – chronic kidney disease

The infection analyses, except for peritonitis, used a rolling two year cohort to be consistent with the reporting of infections in chapter 5. 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 PD for which there are Renal Association guidelines (table 6.1):

- **Complications associated with ESKD and PD:** these include anaemia, mineral bone disorders and metabolic acidosis
- **Infections associated with PD:** rates of PD peritonitis are reported and 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 2019 prevalent adult PD population, including the number on PD per million population (pmp).

The Renal Association guidelines (renal.org/health-professionals/guidelines/guidelines-commentaries) provide audit measures relevant to the care of patients on PD and, where data permit, their attainment by UK renal centres in 2019 is reported in this chapter (table 6.1). Audit measures in guidelines that have been archived are not included.

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

The chapter includes analyses carried out by Getting It Right First Time (GIRFT), a national programme designed to reduce unwarranted variation in medical care provided by the NHS by sharing best practice. The GIRFT metrics for renal services, analysed in collaboration with the UKRR, were based on data derived from multiple sources and included equity of access to services, outcomes and pathways in nephrology, dialysis and transplantation.

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.

As Colchester renal centre did not have any PD patients they were excluded from some of the analyses, although their dialysis patients were included in the relevant dialysis population denominators.

Table 6.1 The Renal Association audit measures relevant to PD 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 6.5, figure 6.3
PD (2017)	Plasma bicarbonate should be maintained in the normal reference range 22–30 mmol/L – 100%	Table 6.5, figure 6.5
Anaemia (2017)	Proportion of patients with serum ferritin <100 µg/L at start of treatment with erythropoiesis stimulating agent (ESA)	Table 6.6, figure 6.9 (the UKRR does not hold treatment with ESA start dates)
	Proportion of patients with haemoglobin <100 g/L not on ESA	Table 6.7
	Proportion of patients on ESA with haemoglobin >120 g/L	Table 6.7, figure 6.11
	Mean (median) ESA dose in patients maintained on ESA therapy	Table 6.7
Peritoneal access (2009)	>80% of PD catheters should be patent at 1 year (censoring for death and elective modality change)	See chapter 2
	Peritonitis within 2 weeks of PD catheter insertion <5%	For peritonitis in prevalent patients see table 6.9 and figure 6.13
Planning, initiating and withdrawing RRT (2014)	Number of patients withdrawing from PD as a proportion of all deaths on PD	Table 6.10, figure 6.14

ESA – erythropoiesis stimulating agent

Key findings

- 3,644 adult patients were receiving PD for ESKD in the UK on 31/12/2019, which represented 5.4% of the RRT population
- The median age of PD patients was 64.4 years and 59.5% were male
- The median adjusted calcium for PD patients was 2.4 mmol/L and 13.2% were above the target range of 2.2–2.5 mmol/L
- The median bicarbonate for PD patients was 24 mmol/L and 79.1% were within the target range of 22–30 mmol/L
- The median haemoglobin and ferritin for PD patients was 111 g/L and 335 µg/L, respectively, and 77.3% were on an ESA at a median dose of 4,800 IU/week
- The PD peritonitis rate in 2019 (England only) was 0.38/1 PD patient-year
- There was no cause of death data available for 32.3% of deaths. For those with data, the leading cause of death in younger patients (<65 years) was cardiac disease (24.7%) and in older patients (≥65 years) was treatment withdrawal (23.1%).

Analyses

Changes to the prevalent adult PD population

For the 70 adult renal centres, the number of prevalent patients on PD 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 6.2 Number of prevalent adult PD patients and proportion of adult RRT patients on PD by year and by centre; number of PD patients as a proportion of the catchment population

Centre	N on PD					% on PD					Estimated catchment population (millions)	2019 crude rate (pmp)
	2015	2016	2017	2018	2019	2015	2016	2017	2018	2019		
ENGLAND												
Basldn	35	34	28	27	20	12.7	12.5	9.3	8.5	6.2	0.34	59
Bham	193	231	249	256	257	6.7	7.6	7.9	7.9	7.8	2.03	126
Bradfd	18	25	20	26	34	3.1	3.9	3.0	3.8	4.6	0.49	70
Brightn	67	64	59	60	55	7.1	6.5	5.8	5.7	5.2	1.07	52
Bristol	57	53	58	56	64	3.9	3.6	3.9	3.8	4.3	1.21	53
Camb	31	22	26	32	28	2.4	1.7	2.0	2.3	1.9	0.93	30
Carlis	38	36	28	31	36	13.5	12.9	10.0	10.6	11.9	0.25	142
Carsh ¹	113	113	96	99	69	7.1	6.8	5.7	5.6	3.9	1.61	43
Chelms	26	32	31	30	31	9.2	11.8	11.2	11.5	11.9	0.37	83
Colchr	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.29	0
Covnt	78	67	52	52	82	8.1	6.9	5.4	5.4	7.6	0.79	104
Derby	78	77	79	79	62	14.5	14.2	14.2	13.5	9.5	0.56	112
Donc	23	27	29	24	25	7.6	8.2	8.7	7.2	7.3	0.37	67
Dorset	42	36	35	38	33	6.2	5.2	4.8	5.0	4.3	0.72	46
Dudley	57	50	55	37	36	18.1	14.5	14.9	10.1	9.8	0.34	106
Exeter	82	84	75	77	84	8.5	8.3	7.1	7.1	7.7	0.94	89
Glouc	37	42	45	37	29	8.3	8.9	8.9	7.1	5.5	0.51	57
Hull	75	72	56	45	49	8.8	8.4	6.4	5.1	5.4	0.79	62
Ipswi	36	34	45	40	42	9.0	8.2	10.3	9.3	9.9	0.31	136
Kent	60	58	52	44	51	5.8	5.4	4.8	4.0	4.5	1.06	48
L Barts	207	202	236	237	229	9.1	8.5	9.5	9.1	8.6	1.57	145
L Guys	33	39	39	43	53	1.6	1.9	1.8	1.9	2.3	1.00	53
L Kings	90	91	97	90	95	8.3	8.2	8.4	7.6	7.6	0.92	103
L Rfree	154	159	145	166	168	7.4	7.3	6.6	7.4	7.2	1.32	128
L St.G	48	44	37	40	44	5.7	5.3	4.5	4.8	5.2	0.66	67
L West	70	100	120	135	156	2.1	2.9	3.5	3.8	4.3	1.95	80
Leeds	57	47	59	64	67	3.7	3.0	3.6	3.8	3.9	1.36	49
Leic	107	88	96	108	127	4.9	3.8	4.1	4.4	4.9	2.07	61
Liv Ain	38	27	21	25	18	17.1	11.9	10.0	11.6	8.6	0.43	42
Liv Roy	67	71	70	57	32	5.4	5.9	5.6	4.5	2.6	0.80	40
M RI	65	63	72	70	77	3.5	3.2	3.5	3.4	3.7	1.32	58
Middlbr	22	26	23	29	32	2.4	2.9	2.5	3.1	3.4	0.80	40
Newc	46	53	58	60	60	4.6	5.0	5.2	5.2	5.1	0.94	64
Norwch	38	48	43	36	47	5.3	6.2	5.5	4.6	5.8	0.68	69
Nottm	82	81	69	70	76	7.4	7.0	5.9	5.9	6.2	0.92	83
Oxford	95	95	67	69	57	5.6	5.4	3.6	3.6	2.9	1.43	40
Plymth	34	41	49	40	42	6.8	8.0	9.1	7.4	7.9	0.40	106
Ports	71	75	84	94	88	4.3	4.4	4.8	5.3	4.7	1.73	51
Prestn	53	40	34	38	42	4.4	3.3	2.7	2.9	3.1	1.22	34

Table 6.2 Continued

Centre	N on PD					% on PD					Estimated catchment population (millions)	2019 crude rate (pmp)
	2015	2016	2017	2018	2019	2015	2016	2017	2018	2019		
Redng	66	56	39	40	56	8.5	7.1	4.9	4.9	6.5	0.69	81
Salford	94	106	117	115	120	9.7	10.4	10.5	9.8	9.7	1.14	105
Sheff	64	55	55	61	60	4.6	3.9	3.8	4.1	4.0	1.12	53
Shrew	32	39	42	58	55	8.7	10.3	10.9	13.6	12.9	0.41	135
Stevng	15	21	23	28	37	1.8	2.4	2.6	3.0	3.8	1.10	34
Sthend	17	30	34	30	34	6.9	12.7	13.4	11.4	12.9	0.27	125
Stoke	75	79	72	81	71	9.5	9.6	8.9	10.1	8.8	0.72	98
Sund	18	17	16	17	26	3.9	3.4	3.0	3.1	4.6	0.54	48
Truro	23	18	15	17	20	5.6	4.2	3.5	3.9	4.5	0.35	56
Wirral	21	22	19	20	17	7.5	6.5	4.9	5.1	4.1	0.47	37
Wolve	79	69	54	54	49	13.6	12.1	9.3	8.9	8.2	0.54	90
York	29	33	35	29	33	5.9	6.2	6.3	5.1	5.7	0.48	69
N IRELAND												
Antrim	20	16	14	20	19	8.3	6.3	5.5	7.3	6.8	0.24	78
Belfast	24	24	17	23	19	3.1	3.0	2.0	2.6	2.1	0.53	36
Newry	22	21	23	16	11	9.8	8.9	9.5	6.4	4.4	0.23	47
Ulster	6	6	6	10	8	3.6	3.6	3.3	5.2	4.4	0.20	40
West NI	12	10	9	9	14	4.1	3.3	2.9	2.8	4.3	0.25	56
SCOTLAND												
Abrdn	26	21	22	26	22	4.9	3.8	3.9	4.5	3.9	0.50	44
Airdrie	16	24	16	21	21	3.8	5.5	3.4	4.3	4.0	0.46	46
D&Gall	11	10	6	6	8	8.5	7.6	4.4	4.1	5.4	0.12	66
Dundee	17	21	18	22	21	4.1	5.0	4.1	4.9	4.7	0.37	57
Edinb	26	36	33	36	41	3.4	4.6	4.0	4.2	4.6	0.84	49
Glasgw	55	54	48	52	45	3.2	3.1	2.7	2.9	2.4	1.37	33
Inverns	13	11	10	13	12	5.2	4.3	3.8	4.7	4.3	0.22	54
Klmarnk	37	33	24	19	24	11.9	10.4	7.1	5.6	6.7	0.29	83
Krkldy	21	18	11	10	12	7.1	6.1	3.6	3.4	4.1	0.27	44
WALES												
Bangor	15	16	17	20	14	8.2	8.9	8.7	9.9	7.0	0.16	86
Cardff	79	75	72	60	64	4.9	4.6	4.3	3.5	3.7	1.15	56
Clwyd	20	15	12	15	13	10.8	8.5	6.7	7.9	6.3	0.18	72
Swanse	62	67	74	70	78	8.1	8.7	9.3	8.5	9.0	0.75	104
Wrexm	37	32	27	24	23	12.6	10.3	8.4	7.7	7.4	0.21	112
TOTALS												
England	3,056	3,092	3,058	3,111	3,175	6.0	5.8	5.6	5.6	5.5	44.33	72
N Ireland	84	77	69	78	71	4.9	4.3	3.8	4.1	3.7	1.45	49
Scotland	222	228	188	205	206	4.6	4.6	3.7	3.9	3.8	4.43	47
Wales	213	205	202	189	192	7.0	6.7	6.4	5.8	5.8	2.45	78
UK	3,575	3,602	3,517	3,583	3,644	5.9	5.7	5.4	5.4	5.4	52.67	69

Country PD populations were calculated by summing the PD 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.

¹Carshalton discovered a problem related to the submission of PD patients after the closing date. As a consequence, 26 PD patients are not included in this report. No adjustment has been made this year, but the problem has been resolved and numbers will be correct next year.

pmp – per million population

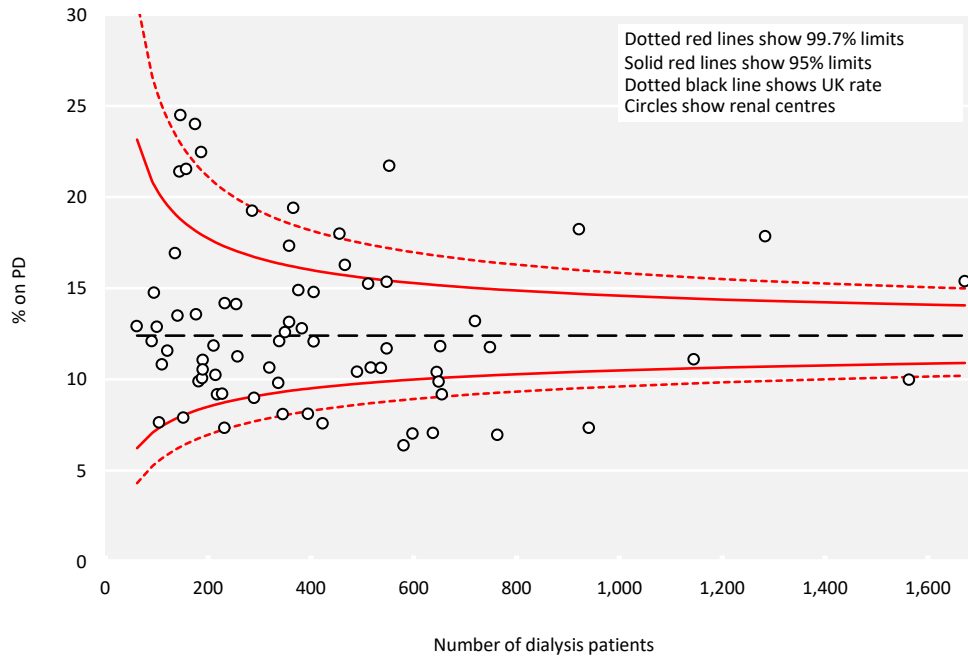


Figure 6.2 Percentage of adult patients prevalent to dialysis on 31/12/2019 who were on PD by centre

Demographics of prevalent adult PD patients

The proportion of PD 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 6.3 Demographics of adult patients prevalent to PD on 31/12/2019 by centre

Centre	N on			Median age (yrs)	% male	Ethnicity				
	RRT	N on PD	% on PD			% White	% Asian	% Black	% Other	% missing
ENGLAND										
Basldn	322	20	6.2	71.8	75.0	90.0	5.0	0.0	5.0	0.0
Bham	3,308	257	7.8	61.0	60.3	56.6	27.0	13.1	3.3	5.1
Bradfd	733	34	4.6	58.7	47.1	54.5	36.4	3.0	6.1	2.9
Brightn	1,059	55	5.2	67.2	60.0	84.6	11.5	1.9	1.9	5.5
Bristol	1,486	64	4.3	60.3	64.1	90.5	0.0	7.9	1.6	1.6
Camb	1,469	28	1.9	72.7	67.9	92.6	3.7	3.7	0.0	3.6
Carlis	303	36	11.9	68.5	55.6	100.0	0.0	0.0	0.0	0.0
Carsh ¹	1,771	69	3.9	65.3	56.5	67.6	17.6	14.7	0.0	1.4
Chelms	261	31	11.9	67.1	61.3	100.0	0.0	0.0	0.0	6.5
Colchr	145	0	0.0							
Covnt	1,076	82	7.6	62.8	63.4	84.1	8.5	7.3	0.0	0.0
Derby	652	62	9.5	70.3	56.5	87.1	11.3	1.6	0.0	0.0
Donc	342	25	7.3	66.5	52.0	100.0	0.0	0.0	0.0	0.0
Dorset	772	33	4.3	67.5	60.6	93.5	0.0	0.0	6.5	6.1
Dudley	366	36	9.8	64.2	61.1	86.1	8.3	5.6	0.0	0.0
Exeter	1,091	84	7.7	70.6	61.9	90.4	1.2	0.0	8.4	1.2
Glouc	525	29	5.5	69.0	51.7	93.1	0.0	3.4	3.4	0.0
Hull	904	49	5.4	65.4	65.3	100.0	0.0	0.0	0.0	0.0
Ipswi	424	42	9.9	72.8	69.0	77.8	0.0	8.3	13.9	14.3
Kent	1,140	51	4.5	60.4	52.9	91.8	8.2	0.0	0.0	3.9
L Barts	2,660	229	8.6	61.5	57.6	28.8	40.5	18.0	12.6	3.1
L Guys	2,310	53	2.3	54.4	50.9	48.0	14.0	32.0	6.0	5.7
L Kings	1,244	95	7.6	55.6	58.9	47.8	13.0	31.5	7.6	3.2
L Rfree	2,344	168	7.2	63.0	56.0	35.1	27.2	26.5	11.3	10.1
L St.G	852	44	5.2	67.8	54.5	31.6	21.1	21.1	26.3	13.6
L West	3,613	156	4.3	66.8	53.2	46.8	31.4	19.9	1.9	0.0
Leeds	1,723	67	3.9	58.0	62.7	82.1	10.4	6.0	1.5	0.0
Leic	2,587	127	4.9	62.8	55.9	78.5	13.2	6.6	1.7	4.7
Liv Ain	210	18	8.6	68.4	66.7	100.0	0.0	0.0	0.0	0.0
Liv Roy	1,227	32	2.6	63.8	56.3	93.5	0.0	0.0	6.5	3.1
M RI	2,060	77	3.7	63.2	58.4	65.8	21.9	9.6	2.7	5.2
Middlbr	949	32	3.4	62.6	56.3	96.9	3.1	0.0	0.0	0.0
Newc	1,175	60	5.1	63.6	63.3	93.3	5.0	0.0	1.7	0.0
Norwch	809	47	5.8	70.6	63.8	95.7	2.1	0.0	2.1	0.0
Nottm	1,218	76	6.2	61.7	57.9	77.6	15.8	5.3	1.3	0.0
Oxford	1,969	57	2.9	60.4	59.6	81.4	7.0	7.0	4.7	24.6
Plymth	531	42	7.9	68.2	76.2	95.2	0.0	0.0	4.8	0.0
Ports	1,883	88	4.7	68.0	69.3	92.6	2.5	1.2	3.7	8.0
Prestn	1,341	42	3.1	62.3	52.4	85.7	14.3	0.0	0.0	0.0
Redng	860	56	6.5	68.4	66.1	75.6	13.3	6.7	4.4	19.6
Salford	1,237	120	9.7	64.5	61.7	90.0	8.3	1.7	0.0	0.0
Sheff	1,491	60	4.0	68.7	68.3	89.7	10.3	0.0	0.0	3.3
Shrew	428	55	12.9	72.1	63.6	88.9	3.7	3.7	3.7	1.8
Stevng	966	37	3.8	68.1	67.6	85.2	11.1	0.0	3.7	27.0
Sthend	264	34	12.9	75.5	70.6	97.1	0.0	0.0	2.9	0.0

Table 6.3 Continued

Centre	N on			Median age (yrs)	% male	Ethnicity				
	RRT	N on PD	% on PD			% White	% Asian	% Black	% Other	% missing
Stoke	803	71	8.8	65.5	53.5	89.6	9.0	1.5	0.0	5.6
Sund	568	26	4.6	50.1	38.5	92.3	7.7	0.0	0.0	0.0
Truro	449	20	4.5	66.5	65.0	100.0	0.0	0.0	0.0	0.0
Wirral	411	17	4.1	62.0	58.8	94.1	0.0	5.9	0.0	0.0
Wolve	598	49	8.2	61.3	57.1	61.2	28.6	8.2	2.0	0.0
York	581	33	5.7	72.0	81.8	100.0	0.0	0.0	0.0	6.1
N IRELAND										
Antrim	280	19	6.8	70.9	68.4	100.0	0.0	0.0	0.0	0.0
Belfast	890	19	2.1	68.4	52.6					63.2
Newry	251	11	4.4	79.5	54.5	100.0	0.0	0.0	0.0	0.0
Ulster	182	8	4.4	69.4	87.5	87.5	0.0	0.0	12.5	0.0
West NI	328	14	4.3	59.3	64.3	100.0	0.0	0.0	0.0	0.0
SCOTLAND										
Abrdn	558	22	3.9	60.8	59.1					90.9
Airdrie	524	21	4.0	63.5	52.4	100.0	0.0	0.0	0.0	9.5
D&Gall	149	8	5.4	47.0	37.5					75.0
Dundee	449	21	4.7	66.0	66.7					100.0
Edinb	885	41	4.6	67.2	53.7					95.1
Glasgw	1,854	45	2.4	58.0	51.1					60.0
Inverns	282	12	4.3	61.0	41.7					91.7
Klmarnk	359	24	6.7	62.3	45.8					66.7
Krkldy	295	12	4.1	61.2	66.7					100.0
WALES										
Bangor	201	14	7.0	65.3	64.3	100.0	0.0	0.0	0.0	14.3
Cardff	1,730	64	3.7	62.6	51.6	88.3	6.7	3.3	1.7	6.3
Clwyd	205	13	6.3	68.7	69.2	90.0	10.0	0.0	0.0	23.1
Swanse	868	78	9.0	65.5	66.7	97.4	2.6	0.0	0.0	2.6
Wrexm	311	23	7.4	59.9	56.5	90.9	0.0	9.1	0.0	4.3
TOTALS										
England	57,510	3,175	5.5	64.3	59.8	72.7	14.6	8.8	3.9	4.1
N Ireland	1,931	71	3.7	71.4	63.4	98.3	0.0	0.0	1.7	16.9
Scotland	5,355	206	3.8	63.0	53.4					74.8
Wales	3,315	192	5.8	64.6	60.4	93.3	3.9	2.2	0.6	6.3
UK	68,111	3,644	5.4	64.4	59.5	74.5	13.6	8.2	3.7	8.5

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.

¹Carshalton discovered a problem related to the submission of PD patients after the closing date. As a consequence, 26 PD patients are not included in this report. No adjustment has been made this year, but the problem has been resolved and numbers will be correct next year.

Primary renal diseases (PRDs) were grouped into categories as shown in table 6.4, with the mapping of disease codes into groups explained in more detail in appendix A. The proportion of PD 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 6.4 Primary renal diseases (PRDs) of adult patients prevalent to PD on 31/12/2019

PRD	N on PD	% PD population	Age <65 yrs		Age ≥65 yrs		M/F ratio
			N	%	N	%	
Diabetes	862	24.7	479	26.7	383	22.7	1.7
Glomerulonephritis	560	16.1	348	19.4	212	12.6	1.7
Hypertension	272	7.8	119	6.6	153	9.1	2.1
Polycystic kidney disease	244	7.0	154	8.6	90	5.3	0.9
Pyelonephritis	216	6.2	105	5.8	111	6.6	1.5
Renal vascular disease	199	5.7	41	2.3	158	9.4	2.3
Other	546	15.7	301	16.8	245	14.5	1.0
Uncertain aetiology	586	16.8	249	13.9	337	20.0	1.4
Total (with data)	3,485	100.0	1,796	100.0	1,689	100.0	
Missing	159	4.4	78	4.2	81	4.6	1.6

Biochemistry parameters in prevalent adult PD 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. The Renal Association guideline on PD contains one biochemical audit measure, which is the proportion of patients with bicarbonate in the target range.

Table 6.5 Median adjusted calcium (Ca) and percentage with adjusted Ca within and above the target range (2.2–2.5 mmol/L); and median bicarbonate and percentage with bicarbonate below, within and above the target range (22–30 mmol/L) in adult patients prevalent to PD on 31/12/2019 by centre

Centre	Adjusted calcium				Bicarbonate				
	Median (mmol/L)	% 2.2-2.5 mmol/L	% >2.5 mmol/L	% data completeness	Median (mmol/L)	% <22 mmol/L	% 22-30 mmol/L	% >30 mmol/L	% data completeness
ENGLAND									
Basldn	2.4	94.4	5.6	100.0	27	5.6	77.8	16.7	100.0
Bham	2.4	85.0	9.7	100.0	22	37.5	62.0	0.5	95.2
Bradfd	2.5	73.1	26.9	100.0	25	19.2	73.1	7.7	100.0
Brightn	2.4	70.0	14.0	100.0	25	12.0	88.0	0.0	100.0
Bristol	2.4	87.5	10.7	100.0	24	26.8	73.2	0.0	100.0
Camb	2.4	78.3	13.0	100.0	26	4.4	87.0	8.7	100.0
Carlis	2.3	88.9	3.7	90.0	24	22.2	74.1	3.7	90.0
Carsh	2.3	69.8	13.2	82.8					0.0
Chelms	2.3	78.6	7.1	100.0	24	21.4	78.6	0.0	100.0
Colchr									
Covnt	2.3	80.0	5.0	96.8	25	10.5	89.5	0.0	91.9
Derby	2.4	74.1	20.7	100.0	24	12.1	84.5	3.5	100.0
Donc	2.3	85.7	9.5	100.0	24	14.3	85.7	0.0	100.0
Dorset	2.4	93.6	3.2	93.9	22	46.9	53.1	0.0	97.0
Dudley	2.5	72.7	24.2	97.1	24	14.7	85.3	0.0	100.0
Exeter	2.4	84.9	13.7	100.0	23	28.8	71.2	0.0	100.0
Glouc	2.4	68.4	10.5	90.5	25	5.3	94.7	0.0	90.5
Hull	2.4	76.3	21.1	100.0	26	10.5	79.0	10.5	100.0
Ipswi	2.3	68.6	11.4	97.2	26	11.8	88.2	0.0	94.4
Kent	2.4	74.3	20.0	89.7	24	21.1	76.3	2.6	97.4
L Barts	2.3	76.3	7.7	93.7	24	23.8	71.5	4.7	93.2
L Guys	2.4	85.4	12.2	100.0	25	19.5	80.5	0.0	100.0
L Kings	2.3	81.6	9.2	98.7	25	25.0	73.7	1.3	98.7

Table 6.5 Continued

Centre	Adjusted calcium				Bicarbonate				
	Median (mmol/L)	% 2.2-2.5 mmol/L	% >2.5 mmol/L	% data completeness	Median (mmol/L)	% <22 mmol/L	% 22-30 mmol/L	% >30 mmol/L	% data completeness
L Rfree	2.4	78.3	16.8	100.0	24	13.6	85.7	0.7	97.9
L St.G	2.5	69.7	27.3	91.7	23	21.2	78.8	0.0	91.7
L West				54.5					53.7
Leeds	2.4	78.2	20.0	98.2	26	5.4	80.4	14.3	100.0
Leic	2.4	91.2	5.9	99.0	26	11.8	85.3	2.9	99.0
Liv Ain	2.4	93.3	0.0	100.0	26	0.0	86.7	13.3	100.0
Liv Roy	2.4	86.7	10.0	100.0	25	3.3	93.3	3.3	100.0
M RI	2.4	74.6	20.3	98.3	24	8.6	91.4	0.0	96.7
Middlbr	2.3	59.3	11.1	96.4	25	7.4	92.6	0.0	96.4
Newc	2.4	62.8	19.6	98.1	23	27.5	66.7	5.9	98.1
Norwch	2.4	75.6	12.2	100.0	24	29.3	70.7	0.0	100.0
Nottm	2.3	83.6	9.8	100.0					47.5
Oxford	2.4	77.5	12.5	83.3					62.5
Plymth	2.4	89.5	2.6	100.0	25	7.9	84.2	7.9	100.0
Ports	2.4	86.3	11.3	100.0	26	10.0	87.5	2.5	100.0
Prestn	2.3	81.3	3.1	97.0	25	3.2	87.1	9.7	93.9
Redng	2.4	76.1	17.4	100.0	25	8.7	87.0	4.4	100.0
Salford	2.4	76.9	18.3	99.1					0.0
Sheff	2.3	81.1	3.8	100.0	23	35.9	64.2	0.0	100.0
Shrew	2.4	70.0	24.0	98.0	25	14.0	82.0	4.0	98.0
Stevng	2.4	75.9	17.2	100.0	25	10.3	89.7	0.0	100.0
Sthend	2.4	86.7	13.3	100.0	25	6.9	86.2	6.9	96.7
Stoke	2.4	80.4	16.1	96.6	27	1.8	87.5	10.7	96.6
Sund	2.4	66.7	27.8	100.0					11.1
Truro	2.5	70.6	29.4	100.0	24	5.9	76.5	17.7	100.0
Wirral	2.3	92.3	7.7	92.9	23	23.1	76.9	0.0	92.9
Wolve	2.4	88.6	6.8	95.7	25	9.1	90.9	0.0	95.7
York	2.4	89.7	10.3	96.7	27	3.3	90.0	6.7	100.0
N IRELAND									
Antrim	2.4	81.3	12.5	100.0	23	12.5	87.5	0.0	100.0
Belfast	2.4	75.0	18.8	94.1	23	12.5	87.5	0.0	94.1
Newry	2.4	72.7	27.3	100.0	26	9.1	90.9	0.0	100.0
Ulster				100.0					100.0
West NI	2.4	85.7	0.0	100.0	25	14.3	78.6	7.1	100.0
SCOTLAND									
Abrdn	2.4	77.3	18.2	100.0					0.0
Airdrie	2.4	84.2	15.8	100.0	24	10.5	89.5	0.0	100.0
D&Gall				100.0					100.0
Dundee	2.5	81.3	18.8	100.0	28	0.0	100.0	0.0	93.8
Edinb	2.4	84.2	10.5	100.0					60.5
Glasgw	2.4	70.3	24.3	100.0	25	8.1	89.2	2.7	100.0
Inverns				90.0					90.0
Klmarnk	2.4	76.2	19.1	100.0	23	15.8	84.2	0.0	90.5
Krkldy	2.4	90.9	9.1	100.0	24	27.3	72.7	0.0	100.0
WALES									
Bangor	2.3	76.9	7.7	100.0	27	0.0	92.3	7.7	100.0
Cardff	2.4	77.4	15.1	98.2	25	12.8	82.1	5.1	72.2
Clwyd				100.0					100.0
Swanse	2.4	90.3	6.9	98.6	26	8.3	87.5	4.2	98.6
Wrexm	2.3	89.5	5.3	100.0	28	0.0	73.7	26.3	100.0

PD

Table 6.5 Continued

Centre	Adjusted calcium				Bicarbonate				
	Median (mmol/L)	% 2.2-2.5 mmol/L	% >2.5 mmol/L	% data completeness	Median (mmol/L)	% <22 mmol/L	% 22-30 mmol/L	% >30 mmol/L	% data completeness
TOTALS									
England	2.4	79.5	13.1	95.4	24	18.9	78.1	2.9	86.9
N Ireland	2.4	76.6	15.6	98.5	24	10.9	87.5	1.6	98.5
Scotland	2.4	79.9	15.6	99.4	25	13.7	85.6	0.7	77.2
Wales	2.4	82.5	12.1	98.8	26	7.9	84.9	7.2	90.5
UK	2.4	79.6	13.2	95.9	24	17.9	79.1	3.0	86.7

Blank cells – no data returned by the centre or <10 patients in the centre or data completeness <70%.

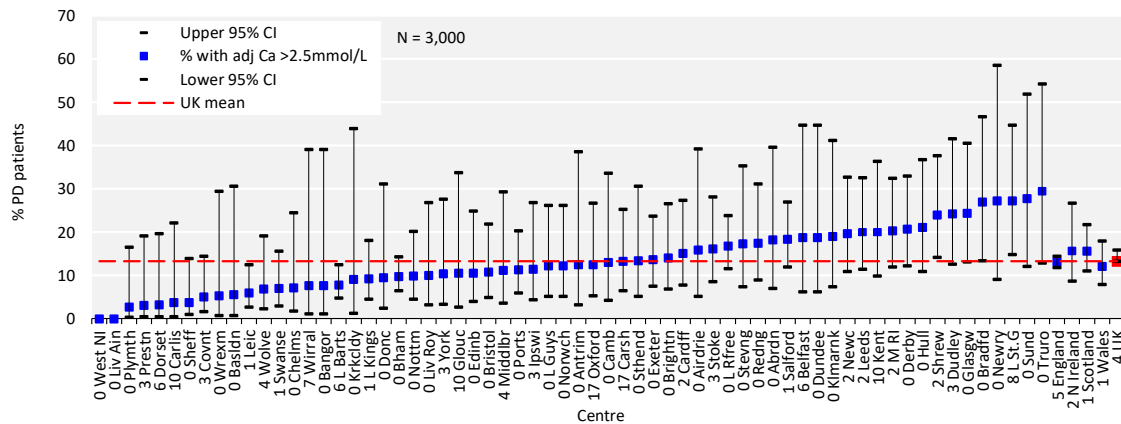


Figure 6.3 Percentage of adult patients prevalent to PD on 31/12/2019 with adjusted calcium (Ca) above the target range (>2.5 mmol/L) by centre

CI – confidence interval

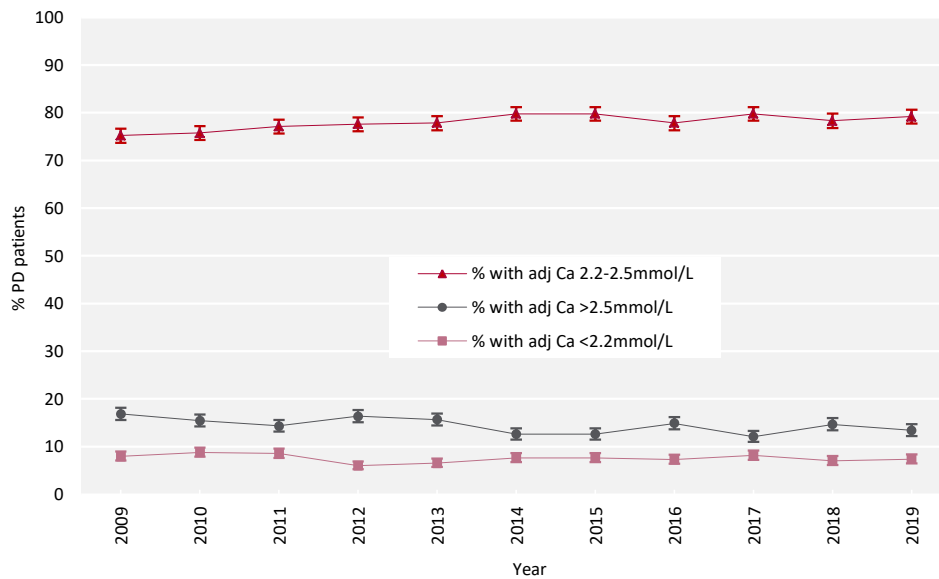


Figure 6.4 Change in percentage of prevalent adult PD patients within, above and below the target range for adjusted calcium (Ca 2.2–2.5 mmol/L) between 2009 and 2019

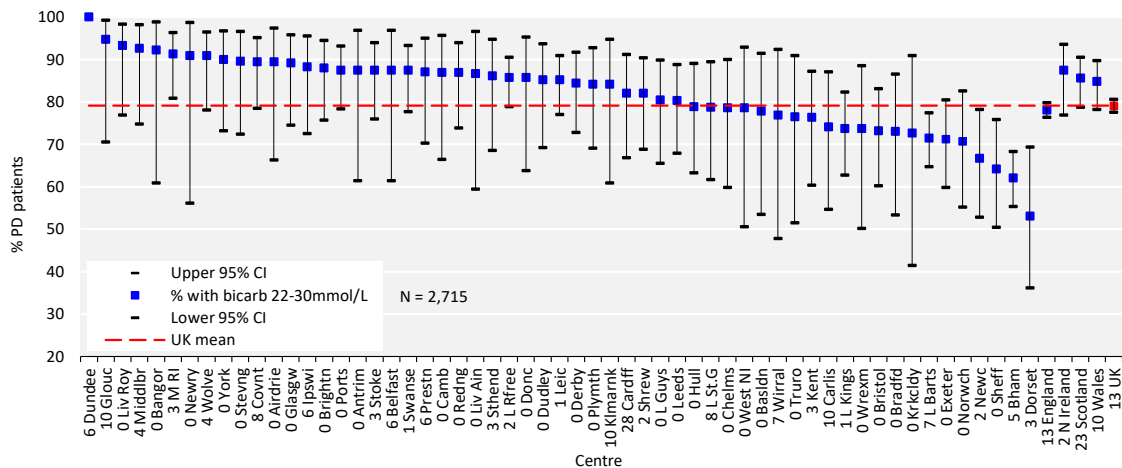


Figure 6.5 Percentage of adult patients prevalent to PD on 31/12/2019 with bicarbonate (bicarb) within the target range (22–30 mmol/L) by centre
CI – confidence interval

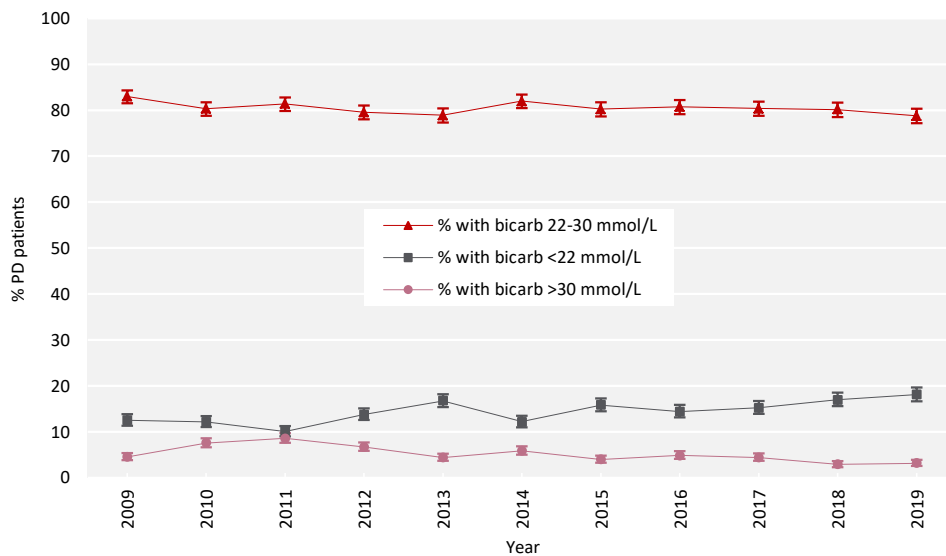


Figure 6.6 Percentage of prevalent adult PD patients within, above and below the target range for bicarbonate (bicarb) 22–30 mmol/L) between 2009 and 2019

Anaemia in prevalent adult PD 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 PD. The weekly ESA dose is reported, but there are some uncertainties surrounding the accuracy of this measure (see appendix A). The Scottish Renal Registry does not submit ESA data for PD patients.

Table 6.6 Median haemoglobin and ferritin and percentage attaining target ranges in adult patients prevalent to PD on 31/12/2019 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							
Basldn	116	5.6	44.4	100.0	168	27.8	100.0
Bham	110	22.6	18.6	99.6	280	8.0	99.1
Bradfd	116	3.8	34.6	100.0	371	4.0	96.2
Brightn	115	10.0	28.0	100.0	440	10.0	100.0
Bristol	117	5.4	37.5	100.0	335	1.8	98.2
Camb	115	13.0	43.5	100.0	399	0.0	100.0
Carlis	111	14.8	18.5	90.0	331	18.5	90.0
Carsh	114	22.2	20.4	84.4	205	21.8	85.9
Chelms	116	32.1	17.9	100.0	163	22.2	96.4
Colchr							
Covnt	111	26.2	19.7	98.4	289	16.4	98.4
Derby	108	27.6	15.5	100.0	556	1.7	100.0
Donc	118	4.8	38.1	100.0	211	19.0	100.0
Dorset	111	21.9	6.3	97.0	326	12.9	93.9
Dudley	116	11.8	29.4	100.0			2.9
Exeter	112	4.1	19.2	100.0	272	12.5	98.6
Glouc	107	28.6	28.6	100.0	279	5.3	90.5
Hull	114	7.9	36.8	100.0	474	5.3	100.0
Ipswi	110	17.1	11.4	97.2	367	14.7	94.4
Kent	111	25.0	38.9	92.3	236	16.2	94.9
L Barts	108	29.7	24.6	94.2	333	12.9	89.9
L Guys	104	41.5	7.3	100.0	211	26.8	100.0
L Kings	113	19.7	23.7	98.7	321	9.6	94.8
L Rfree	105	32.2	17.5	100.0	534	5.7	98.6
L St.G	108	30.3	9.1	91.7	312	3.0	91.7
L West				56.0			44.8
Leeds	108	23.6	14.5	98.2	430	7.3	98.2
Leic	111	17.6	18.6	99.0	276	21.8	98.1
Liv Ain	115	6.7	40.0	100.0	491	0.0	100.0
Liv Roy	113	23.3	10.0	100.0	345	0.0	100.0
M RI	107	25.4	15.3	98.3	252	6.8	98.3
Middlbr	110	18.5	25.9	96.4	448	11.5	92.9
Newc	115	11.5	26.9	100.0	382	6.3	92.3
Norwch	113	12.2	36.6	100.0	250	19.5	100.0
Nottm	111	16.4	24.6	100.0	522	0.0	100.0
Oxford	106	23.9	17.4	95.8	296	2.1	100.0
Plymth	110	15.8	21.1	100.0	301	23.7	100.0
Ports	114	13.8	27.5	100.0	394	6.7	93.8
Prestn	113	21.9	28.1	97.0	760	3.1	97.0
Redng	111	23.9	28.3	100.0	418	8.7	100.0
Salford	113	13.3	29.5	100.0	635	3.8	99.1
Sheff	108	24.5	22.6	100.0	475	1.9	100.0
Shrew	107	26.0	10.0	98.0	422	4.1	96.1
Stevng	106	31.0	17.2	100.0	135	39.3	96.6
Sthend	114	16.7	33.3	100.0	333	6.7	100.0
Stoke	112	12.5	19.6	96.6	425	1.9	93.1
Sund	118	11.1	38.9	100.0	363	31.3	88.9
Truro	114	11.8	29.4	100.0	167	21.4	82.4
Wirral	106	15.4	15.4	92.9	448	7.7	92.9
Wolve	109	29.5	18.2	95.7	153	38.6	95.7

Table 6.6 Continued

Centre	Haemoglobin				Ferritin		
	Median (g/L)	% <100 g/L	% >120 g/L	% data completeness	Median (µg/L)	% <100 µg/L	% data completeness
York	107	30.0	26.7	100.0	311	6.7	100.0
N IRELAND							
Antrim	109	18.8	25.0	100.0	437	6.3	100.0
Belfast	120	0.0	47.1	100.0	396	0.0	100.0
Newry	110	27.3	9.1	100.0	240	18.2	100.0
Ulster				100.0			100.0
West NI	117	14.3	35.7	100.0	316	14.3	100.0
SCOTLAND							
Abrdn	116	9.1	27.3	100.0	365	0.0	100.0
Airdrie	107	21.1	10.5	100.0	279	26.3	100.0
D&Gall				100.0			100.0
Dundee	117	25.0	37.5	100.0	262	25.0	100.0
Edinb	113	18.4	34.2	100.0	271	20.0	92.1
Glasgw	107	27.0	21.6	100.0	245	25.7	94.6
Inverns	110	40.0	30.0	100.0			80.0
Klmarnk	109	28.6	14.3	100.0	363	9.5	100.0
Krkldy	122	0.0	54.5	100.0	153	40.0	90.9
WALES							
Bangor	112	15.4	30.8	100.0	248	0.0	100.0
Cardff	113	18.9	26.4	98.2	156	36.5	96.3
Clwyd				100.0			100.0
Swanse	111	23.3	23.3	100.0	264	14.1	97.3
Wrexm	117	5.3	36.8	100.0	278	0.0	100.0
TOTALS							
England	111	20.9	22.4	96.0	343	10.4	92.8
N Ireland	116	12.3	32.3	100.0	360	7.7	100.0
Scotland	112	21.1	27.2	100.0	287	18.6	95.6
Wales	112	18.0	26.3	99.4	237	18.3	97.6
UK	111	20.6	23.1	96.5	335	11.3	93.4

Blank cells – no data returned by the centre or <10 patients in the centre or data completeness <70%

Table 6.7 Distribution of haemoglobin and erythropoiesis stimulating agent (ESA) dose values in adult patients prevalent to PD on 31/12/2019 by centre

Centre	ESA		Haemoglobin and ESA	
	% on ESA	Median dose (IU/week)	% <100g/L and not on ESA	% >120g/L and on ESA
ENGLAND				
Basldn	61.1			
Bham	16.7			
Bradfd	80.8	5,000	0.0	19.2
Brightn	8.0			
Bristol	71.4	4,000	0.0	23.2
Camb	60.9			
Carlis	60.0			
Carsh	1.6			
Chelms	78.6	5,000	0.0	10.7
Colchr				
Covnt	66.1			
Derby	0.0			
Donc	71.4	4,000	0.0	14.3
Dorset	81.8	4,000	0.0	3.1

Table 6.7 Continued

Centre	ESA		Haemoglobin and ESA	
	% on ESA	Median dose (IU/week)	% <100g/L and not on ESA	% >120g/L and on ESA
Dudley	76.5	6,000	0.0	17.6
Exeter	71.2	4,000	0.0	8.2
Glouc	66.7			
Hull	63.2			
Ipswi	0.0			
Kent	48.7			
L Barts	70.0	6,000	5.1	12.8
L Guys	0.0			
L Kings	85.7	6,000	1.3	21.1
L Rfree	0.0			
L St.G	0.0			
L West	0.0			
Leeds	75.0	3,000	1.8	9.1
Leic	73.8	3,000	3.9	11.8
Liv Ain	0.0			
Liv Roy	0.0			
M RI	0.0			
Middlbr	82.1	3,000	0.0	18.5
Newc	3.8			
Norwch	53.7			
Nottm	85.2	4,000	1.6	19.7
Oxford	79.2	6,000	6.5	15.2
Plymth	0.0			
Ports	60.0			
Prestn	81.8		0.0	21.9
Redng	10.9			
Salford	83.8	8,000	0.0	19.0
Sheff	75.5	5,000	5.7	20.8
Shrew	2.0			
Stevng	62.1			
Sthend	53.3			
Stoke	0.0			
Sund	55.6			
Truro	0.0			
Wirral	100.0	6,000	0.0	15.4
Wolve	65.2			
York	53.3			
N IRELAND				
Antrim	56.3			
Belfast	82.4	3,000	0.0	35.3
Newry	81.8		0.0	9.1
Ulster	100.0			
West NI	71.4	3,000	0.0	14.3
WALES				
Bangor	46.2			
Cardff	31.5			
Clwyd	44.4			
Swanse	23.3			
Wrexm	21.1			
TOTAL ¹				
UK	77.3	4,800	2.1	15.8

Blank cells – no data returned by the centre or <10 patients in the centre or data completeness <70% (or <70% patients were on an ESA).

¹This is the total of only those centres with at least 70% of PD patients on an ESA.

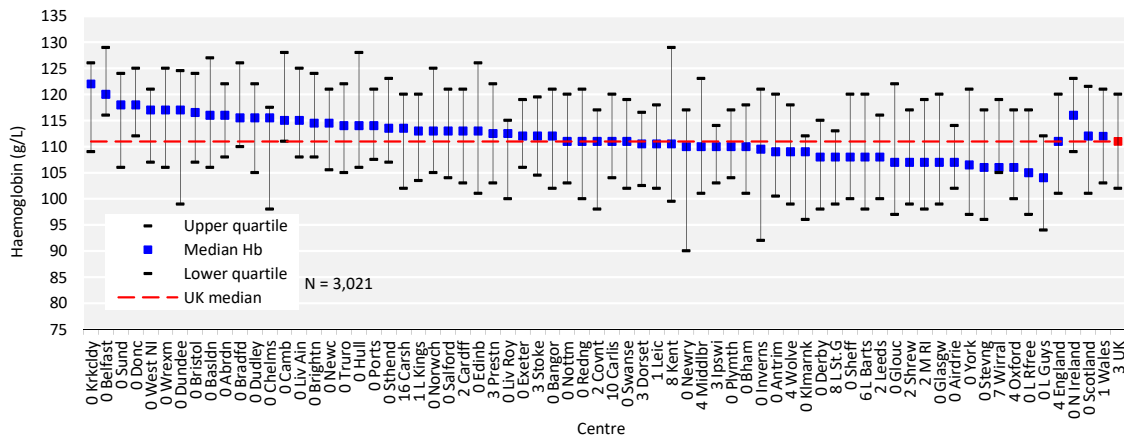


Figure 6.7 Median haemoglobin (Hb) in adult patients prevalent to PD on 31/12/2019 by centre

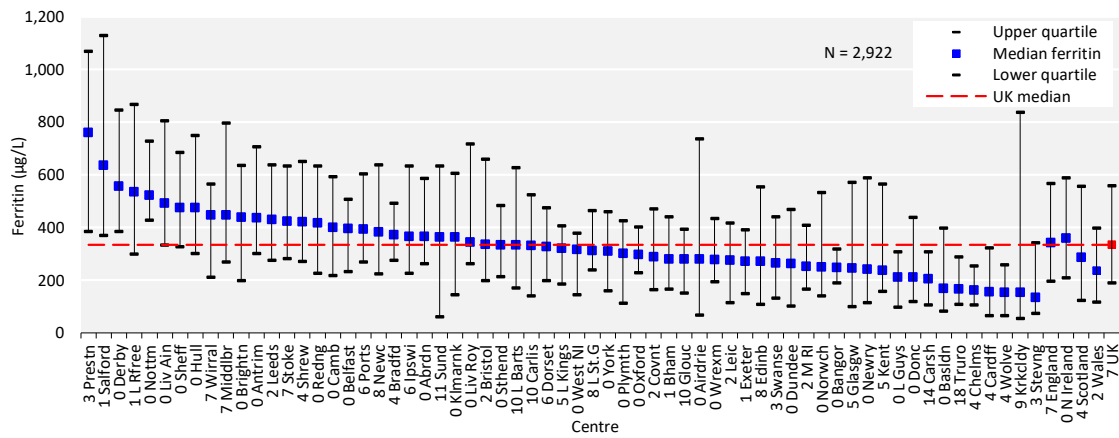


Figure 6.8 Median ferritin in adult patients prevalent to PD on 31/12/2019 by centre

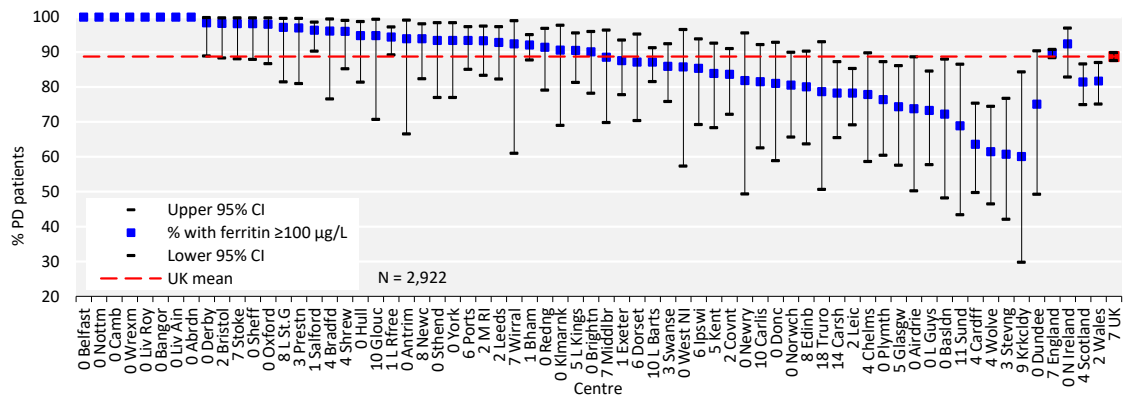


Figure 6.9 Percentage of adult patients prevalent to PD on 31/12/2019 with ferritin ≥ 100 $\mu\text{g/L}$ by centre
CI – confidence interval

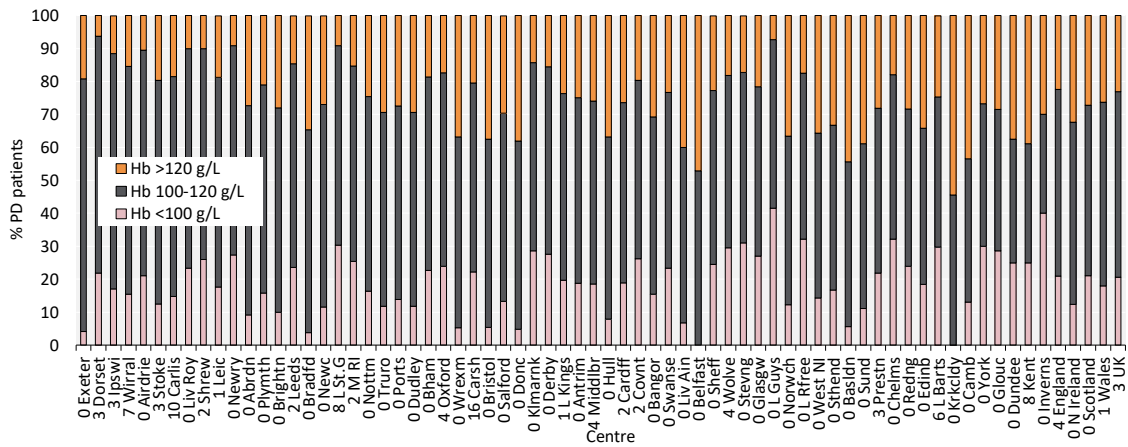


Figure 6.10 Distribution of haemoglobin (Hb) in adult patients prevalent to PD on 31/12/2019 by centre

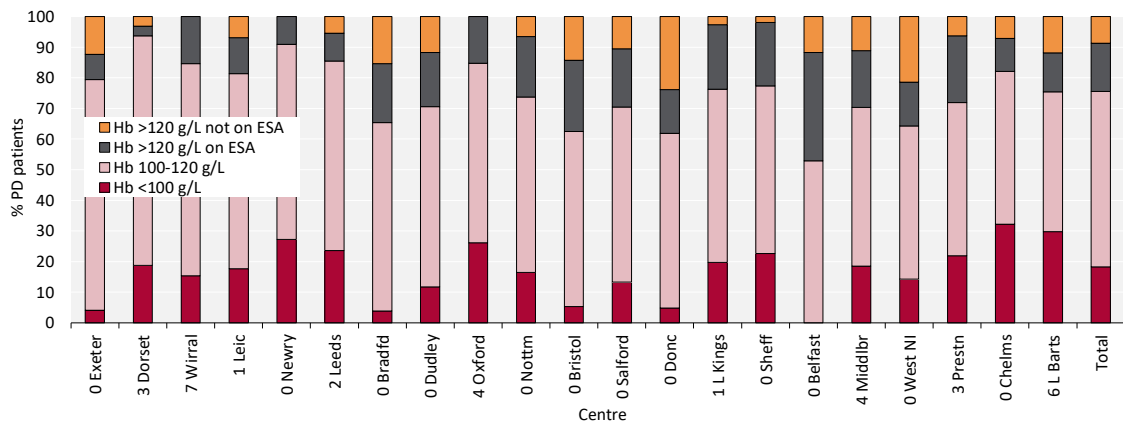


Figure 6.11 Distribution of haemoglobin (Hb) in adult patients prevalent to PD on 31/12/2019 and the proportion with haemoglobin >120 g/L receiving erythropoiesis stimulating agent (ESA) by centre
Figure (including total) does not include centres with <70% data completeness (or <70% ESA use).

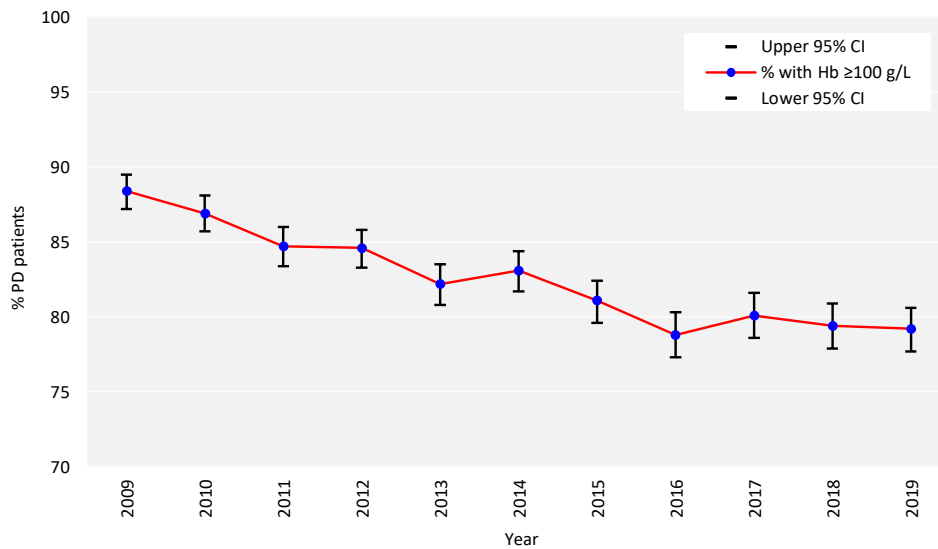


Figure 6.12 Percentage of prevalent adult PD patients with haemoglobin (Hb) ≥ 100 g/L between 2009 and 2019
CI – confidence interval

Infections in adult PD 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.

Given the small numbers of infections in PD patients, data are only shown at the national level and are compared to infection rates in haemodialysis (HD) patients. The definition of each type of infectious episode is detailed in appendix A.

A rolling two year cohort is reported to be consistent with the reporting of infections in chapter 5. These analyses included all patients on HD, whether on HHD or ICHD.

Table 6.8 Number and rate of infection episodes per 100 patient-years in prevalent adult PD patients in England and Wales compared to prevalent adult HD patients in England and Wales from January 2018 to December 2019

	Infection			
	MRSA	MSSA	<i>C. difficile</i>	<i>E.coli</i>
Number of episodes				
HD	80	1,271	498	924
PD	1	29	56	67
Rate per 100 patient-years (with range between centres)				
HD	0.17 (0.0 - 1.27)	2.72 (0.82 - 7.60)	1.06 (0.0 - 3.31)	1.96 (0.54 - 4.37)
PD	0.01 (0.0 - 0.67)	0.43 (0.0 - 5.36)	0.83 (0.0 - 6.26)	0.99 (0.0 - 7.34)

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

PD peritonitis infection rates are collected for English renal centres by the UKRR in collaboration with NHS England for the Renal Dialysis Quality Dashboard (renal.org/audit-research/data-permissions/data/ukrr-nhs-england-quality-dashboard-dataset) and are listed in the table below. The funnel plot (figure 6.13) shows each centre's 2019 peritonitis rate per one PD patient-year against the number of patient-years at risk to take into account the greater variation expected as centre size decreases.

Table 6.9 Number of patient-years and peritonitis rate in adult patients receiving PD in 2019 by centre in England

Centre	PD patient-years	Peritonitis rate per 1 PD patient-year
Basldn	27	0.22
Birm	249	0.45
Bradfd	29	0.24
Brightn	53	0.36
Bristol	71	0.42
Camb	30	0.39
Carlis	24	0.17
Carsh	102	0.46
Chelms	32	0.06
Covnt	78	0.45
Derby	66	0.46
Donc	24	0.34
Dorset	38	0.49
Dudley	41	0.36
Exeter	80	0.28
Glouc	39	0.47
Hull	43	0.33
Ipswi	45	0.31
Kent	59	0.34
L Barts	244	0.32
L Guys	47	0.38
L Kings	95	0.41
L Rfree	166	0.35
L St.G	49	0.37
L West	153	0.37
Leeds	63	0.27
Leic	115	0.24
Liv Ain	31	0.49
Liv Roy*	50	0.36
M RI	75	0.41
Middlbr	27	0.37
Newc	56	0.92
Norwch	42	0.31
Nottm	76	0.47
Oxford	61	0.30
Plymth	38	0.21
Ports	88	0.45
Prestn	44	0.41
Redng	50	0.55
Salford	124	0.51
Sheff	59	0.02
Shrew	68	0.50
Stevng	32	0.37
Sthend	25	0.04
Stoke	76	0.53
Sund	21	0.24
Truro	20	0.41
Wirral	20	0.30
Wolve	58	0.45
York	30	0.23
	TOTAL	
England	3,232	0.38

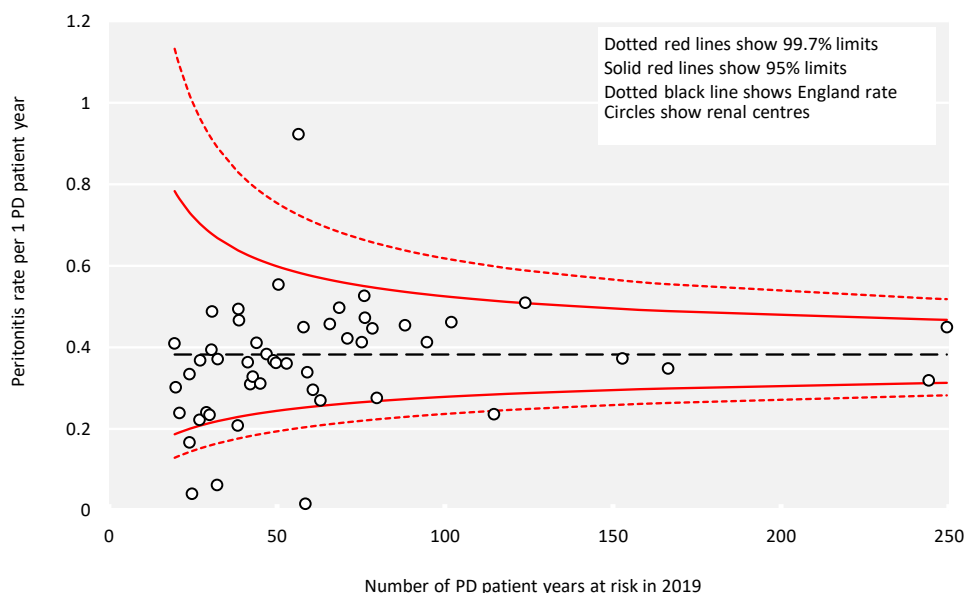


Figure 6.13 PD peritonitis rates in adult patients receiving PD in 2019 per 1 PD patient-year by centre in England
Please visit the UKRR data portal (renal.org/audit-research/data-portal) to identify individual renal centres.

Cause of death in adult PD patients

Cause of death was analysed in prevalent patients receiving PD on 31/12/2018 and followed-up for one year in 2019. The proportion of PD 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 3.

Table 6.10 Cause of death in adult patients prevalent to PD on 31/12/2018 followed-up in 2019 by age group

Cause of death	PD all ages		PD <65 years		PD ≥65 years	
	N	%	N	%	N	%
Cardiac disease	75	21.8	24	24.7	51	20.7
Cerebrovascular disease	11	3.2	7	7.2	4	1.6
Infection	64	18.6	21	21.7	43	17.4
Malignancy	10	2.9	1	1.0	9	3.6
Treatment withdrawal	69	20.1	12	12.4	57	23.1
Other	86	25.0	24	24.7	62	25.1
Uncertain aetiology	29	8.4	8	8.3	21	8.5
Total (with data)	344	100.0	97	100.0	247	100.0
Missing	164	32.3	38	28.2	126	33.8

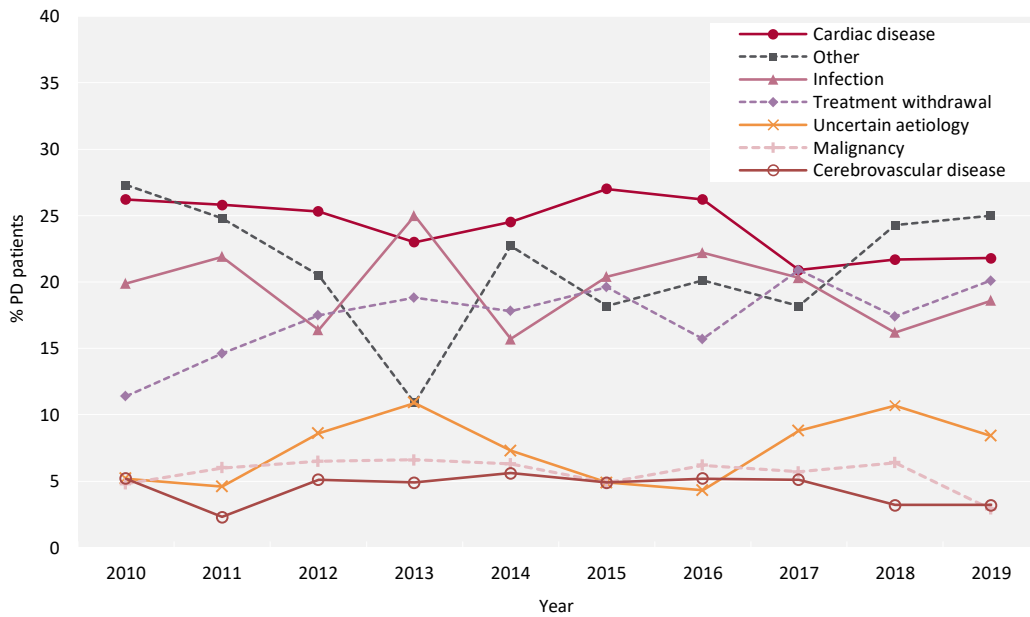


Figure 6.14 Cause of death between 2010 and 2019 for adult patients prevalent to PD at the beginning of the year

Hospitalisation of PD patients

Hospital Episodes Statistics (HES) and Patient Episode Database for Wales (PEDW) data for prevalent RRT patients on 31/12/2018 were used to compare emergency admission hospitalisation amongst PD patients (figure 6.15). The y-axis displays the total number of hospitalised days following an emergency admission for PD patients divided by the total number of PD patient-years at that centre for 2019. The average rate in England and Wales was 13.2 days per patient-year, compared to 4.2 days for Tx patients and 14.3 days for ICHD patients.

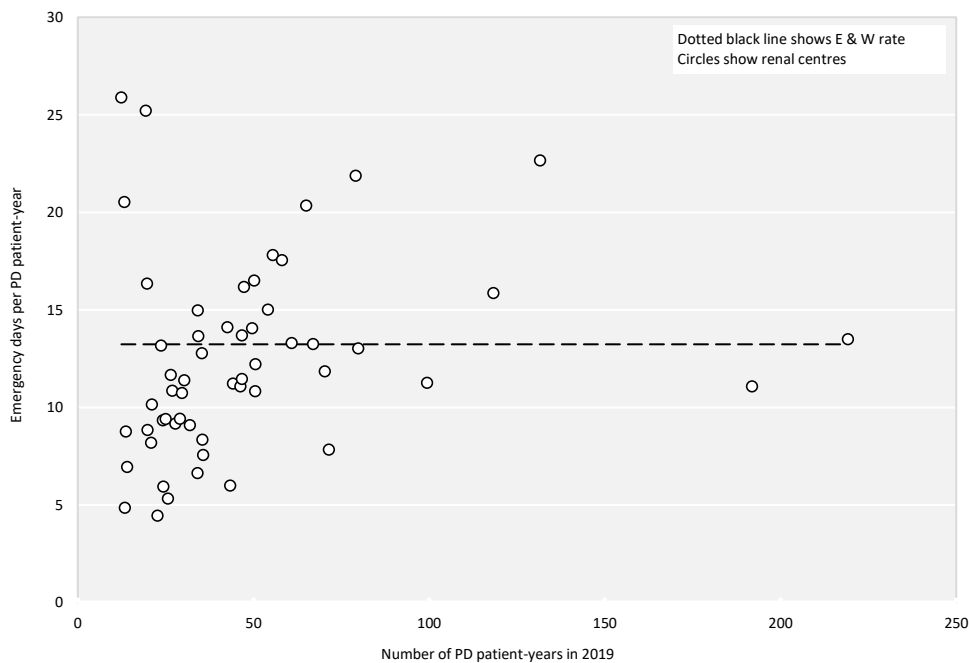


Figure 6.15 Emergency inpatient days per PD patient-year in 2019 for patients prevalent to RRT in England and Wales on 31/12/2018 by centre