



Chapter 4

Adults on peritoneal dialysis (PD) in the UK at the end of 2017

Contents

Introduction	3
Rationale for analyses	5
Key findings.....	7
Analyses.....	8
Changes to the prevalent adult PD population	8
Demographics of prevalent adult PD patients	10
Biochemistry parameters in prevalent adult PD patients.....	12
Anaemia in prevalent adult PD patients.....	16
PD catheter insertion techniques and catheter patency in prevalent adult PD patients.....	22
Infections in adult PD patients	22
Cause of death in adult PD patients.....	24

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 2017 (figure 4.1). This population comprises patients who were on PD at the end of 2016 and remained on PD throughout 2017, as well as patients who commenced/re-commenced PD in 2017. This latter group includes both incident renal replacement therapy (RRT) patients who ended 2017 on PD and prevalent RRT patients who switched to PD from in-centre haemodialysis (ICHD), home haemodialysis (HHD) or a transplant (Tx) in 2017. 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. Patients on HHD will be reported in a separate chapter in next year's annual report.

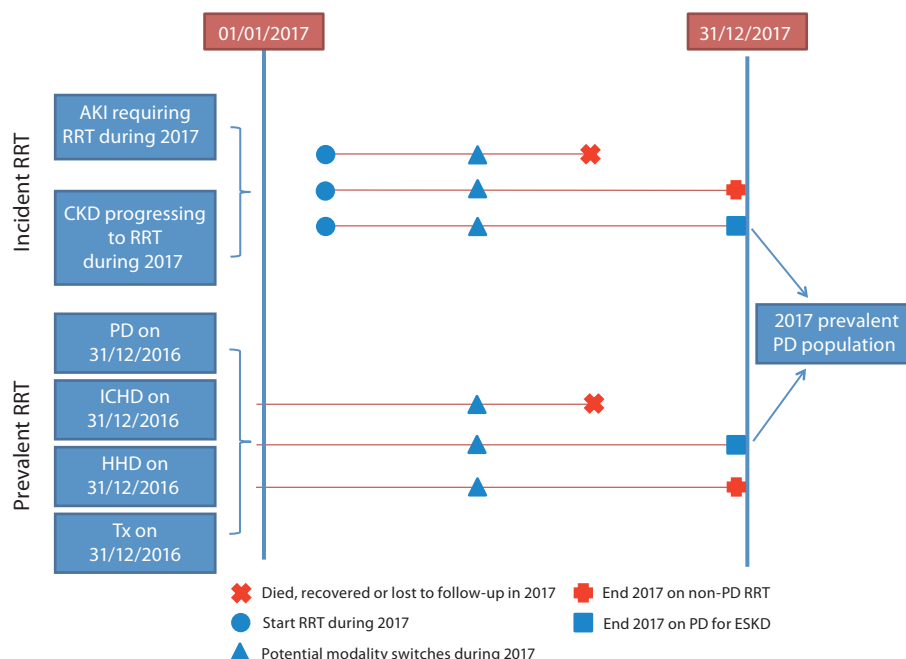


Figure 4.1 Pathways adult patients could follow to be included in the UK 2017 prevalent PD population

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

The infection analyses used a rolling two year cohort to be consistent with the reporting of infections in chapter 3. 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 PD for which there are Renal Association guidelines (table 4.1):

- **Complications associated with ESKD and PD** – these include anaemia, mineral bone disorders and metabolic acidosis
- **Infections associated with PD** – rates of PD peritonitis 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 2017 prevalent adult PD population, including the number on PD per million population (pmp).

The Renal Association guidelines (<https://renal.org/guidelines/>) provide audit measures relevant to the care of patients on PD and, where data permit, their attainment by UK renal centres in 2017 is reported in this chapter (table 4.1). Audit measures in guidelines that have been archived (for example, ‘Blood borne viruses’ and ‘Nutrition’) are not included.

Some audit measures in current guidelines – for example, the target for glycosylated 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 UK Renal Registry (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 4.1 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 4.5, figure 4.2
PD (2017)	Plasma bicarbonate should be maintained in the normal reference range 22–30 mmol/L	Table 4.5, figure 4.4
Anaemia (2017)	Proportion of patients with serum ferritin <100 µg/L at start of treatment with erythropoiesis stimulating agent (ESA)	Table 4.6, figure 4.8 (the UKRR does not hold treatment with ESA start dates)
	Proportion of patients with haemoglobin <100 g/L not on ESA	Table 4.7
	Proportion of patients on ESA with haemoglobin >120 g/L	Table 4.7, figure 4.10
Peritoneal access (2009)	Mean (median) ESA dose in patients maintained on ESA therapy	Table 4.7
	>80% of PD catheters should be patent at 1 year (censoring for death and elective modality change)	See chapter 1
	Complications following PD catheter insertion Peritonitis within 2 weeks of PD catheter insertion <5%	See chapter 1 Figure 4.12
Planning, initiating and withdrawing RRT (2014)	Number of patients withdrawing from PD as a proportion of all deaths on PD	Table 4.9, figure 4.13

ESA – erythropoiesis stimulating agent

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.

As Colchester 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.

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

- 3,531 adult patients were receiving PD for ESKD in the UK on 31/12/2017, which represented 5.4% of the RRT population
- The median age of PD patients was 64.4 years and 60.5% were male
- The median adjusted calcium for PD patients was 2.4 mmol/L and 14.5% were above the target range 2.2–2.5 mmol/L
- The median bicarbonate for PD patients was 25 mmol/L and 80.4% were within the target range 22–30 mmol/L
- The median haemoglobin and ferritin for PD patients was 111 g/L and 308 µg/L, respectively, and 78.6% were on an ESA at a median dose of 4,000 IU/week
- The 2 year PD peritonitis rate (2016–2017 – England only) was 45/100 PD patient years (1 : 26.7 months)
- There was no cause of death data available for 40.0% of deaths. For those with data, the leading cause of death in younger patients (<65 years) was cardiac disease (30.1%) and in older patients (≥65 years) was treatment withdrawal (25.1%).

Analyses

Changes to the prevalent adult PD population

For the 71 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 4.2 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)	2017 crude rate (pmp)
	2013	2014	2015	2016	2017	2013	2014	2015	2016	2017		
ENGLAND												
B Heart	40	34	51	88	88	6.1	5.4	7.8	13.5	13.5	0.77	114
B QEH	137	143	142	143	162	6.7	6.7	6.3	6.0	6.4	1.78	91
Basldn	30	28	35	34	28	11.1	10.1	12.8	12.4	9.3	0.43	64
Bradfd	30	21	18	25	20	5.8	3.8	3.1	3.9	3.0	0.68	29
Brightn	79	64	67	64	59	9.1	7.0	7.1	6.5	5.8	1.36	43
Bristol	67	67	57	53	58	4.7	4.6	3.9	3.6	3.9	1.51	38
Camb	24	31	44	23	31	2.0	2.5	2.9	1.5	2.2	1.21	26
Carlis	27	26	38	35	28	11.9	10.4	13.5	12.6	10.0	0.34	83
Carsh	120	136	113	113	96	8.1	8.8	7.1	6.9	5.7	2.00	48
Chelms	21	27	27	33	35	8.7	10.3	9.5	12.0	12.4	0.53	65
Colchr	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0	0.31	0
Covnt	81	90	78	67	52	8.7	9.4	8.1	6.9	5.4	0.93	56
Derby	82	85	78	77	79	17.7	16.6	14.5	14.2	14.2	0.74	107
Donc	35	27	23	27	29	13.5	9.5	7.6	8.2	8.7	0.43	68
Dorset	48	51	42	36	35	7.7	7.7	6.2	5.2	4.8	0.90	39
Dudley	56	54	57	50	55	18.1	17.7	18.2	14.5	14.9	0.46	119
Exeter	74	94	82	84	75	8.3	9.9	8.5	8.3	7.1	1.14	66
Glouc	33	43	37	42	45	8.1	10.0	8.4	8.9	8.9	0.61	73
Hull	80	77	75	72	56	9.8	9.6	8.8	8.5	6.4	1.07	52
Ipswi	30	31	37	34	45	8.5	8.4	9.2	8.2	10.4	0.42	108
Kent	64	66	60	58	52	6.7	6.5	5.8	5.4	4.8	1.28	41
L Barts	193	223	207	202	236	9.2	10.1	9.1	8.5	9.5	1.92	123
L Guys	29	29	33	39	39	1.6	1.5	1.6	1.9	1.8	1.13	34
L Kings	104	91	90	91	97	10.8	8.9	8.3	8.2	8.5	1.23	79
L Rfree	132	143	154	159	145	6.9	7.1	7.4	7.3	6.6	1.59	91
L St.G	48	48	48	44	37	6.4	6.1	5.7	5.2	4.4	0.84	44
L West	61	64	71	101	122	2.0	2.0	2.1	3.0	3.5	2.51	49
Leeds	70	63	57	47	59	4.8	4.2	3.7	3.0	3.6	1.75	34
Leic	151	122	108	89	97	7.3	5.7	5.0	3.9	4.1	2.55	38
Liv Ain	30	39	38	27	22	15.8	18.0	17.2	11.9	10.2	0.51	43
Liv Roy	58	60	67	71	70	4.6	4.7	5.4	5.9	5.6	1.05	67
M RI	81	73	65	62	70	4.4	4.1	3.5	3.1	3.4	1.60	44
Middlbr	12	11	22	26	21	1.5	1.3	2.4	2.9	2.3	1.05	20
Newc	42	52	46	53	59	4.4	5.3	4.6	5.0	5.3	1.17	50
Norwch	39	35	38	48	43	5.7	5.1	5.1	6.2	5.5	0.82	52
Nottm	83	84	82	82	70	7.7	7.9	7.4	7.1	6.0	1.14	61
Oxford	99	82	95	95	68	6.3	5.0	5.6	5.4	3.6	1.77	38
Plymth	36	34	34	40	49	7.2	6.8	6.8	7.8	9.1	0.49	100
Ports	85	79	71	75	84	5.5	5.0	4.3	4.4	4.8	2.12	40
Prestn	56	58	53	40	34	5.1	5.0	4.4	3.3	2.7	1.56	22
Redng	76	72	66	56	39	10.4	9.5	8.5	7.1	4.9	0.95	41
Salford	84	94	94	106	117	9.5	9.7	9.7	10.4	10.5	1.56	75

Table 4.2 Continued

Centre	N on PD					% on PD					Estimated catchment population (millions)	2017 crude rate (pmp)
	2013	2014	2015	2016	2017	2013	2014	2015	2016	2017		
Sheff	70	62	64	55	55	5.3	4.6	4.6	3.9	3.8	1.44	38
Shrew	32	32	32	39	42	9.5	9.2	8.7	10.4	11.2	0.52	80
Stevng	45	27	15	21	23	6.0	3.5	1.8	2.3	2.6	1.26	18
Sthend	18	20	17	30	34	8.2	8.4	6.9	12.7	13.5	0.33	103
Stoke	87	83	75	79	73	12.0	10.7	9.5	9.6	9.0	0.93	78
Sund	12	18	18	17	16	2.9	4.0	3.9	3.4	3.0	0.65	25
Truro	24	21	22	18	15	6.5	5.5	5.3	4.2	3.5	0.43	35
Wirral	35	22	21	22	19	14.1	7.9	7.5	6.5	4.9	0.60	32
Wolve	84	79	79	69	54	14.8	13.8	13.6	12.1	9.3	0.70	77
York	27	29	29	33	35	6.6	6.3	5.9	6.2	6.3	0.52	68
N IRELAND												
Antrim	15	13	20	16	14	6.7	5.7	8.4	6.6	5.6	0.30	46
Belfast	27	15	24	24	17	3.7	2.0	3.1	2.9	2.0	0.66	26
Newry	18	16	22	21	23	9.0	7.7	9.8	8.9	9.5	0.27	85
Ulster	6	4	6	6	6	3.9	2.7	3.5	3.6	3.3	0.27	22
West NI	15	14	12	10	9	6.3	5.1	4.1	3.3	2.9	0.36	25
SCOTLAND												
Abrdn	25	27	26	21	22	4.8	5.4	4.9	3.8	3.9	0.61	36
Airdrie	14	9	16	24	16	3.6	2.3	3.8	5.5	3.4	0.57	28
D&Gall	15	15	11	10	6	12.6	11.5	8.5	7.6	4.4	0.15	39
Dundee	20	23	17	21	18	5.0	5.7	4.0	5.0	4.1	0.47	38
Edinb	30	21	26	36	34	4.1	2.8	3.4	4.6	4.1	0.99	34
Glasgw	44	39	55	54	48	2.8	2.4	3.2	3.1	2.7	1.66	29
Inverns	13	15	13	11	10	6.0	6.7	5.1	4.2	3.8	0.28	36
Klmarnk	43	36	37	33	24	14.5	12.0	11.9	10.4	7.1	0.37	65
Krkldy	19	15	21	18	10	6.7	5.4	7.1	6.1	3.3	0.32	31
WALES												
Bangor	13	16	15	16	17	13.1	15.7	8.2	8.9	8.8	0.23	74
Cardff	73	79	79	75	72	4.6	5.0	4.9	4.6	4.3	1.50	48
Clwyd	13	11	20	15	12	8.6	6.6	10.8	8.5	6.6	0.20	60
Swanse	58	53	62	67	74	8.4	7.5	8.1	8.7	9.4	0.94	79
Wrexm	22	30	37	32	27	8.8	10.6	12.6	10.3	8.5	0.25	106
TOTALS												
England	3,161	3,144	3,072	3,094	3,072	6.6	6.3	6.0	5.8	5.6	55.62	55
N Ireland	81	62	84	77	69	5.3	3.9	4.9	4.3	3.8	1.87	37
Scotland	223	200	222	228	188	4.9	4.4	4.6	4.6	3.7	5.42	35
Wales	179	189	213	205	202	6.4	6.6	7.0	6.7	6.4	3.13	65
UK	3,644	3,595	3,591	3,604	3,531	6.4	6.1	5.9	5.7	5.4	66.04	53

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
pmp – per million population

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 centre patients with no ethnicity data is shown separately.

Table 4.3 Demographics of adult patients prevalent to PD on 31/12/2017 by centre

Centre	N on RRT	N on PD	% on PD	Median age (yrs)	% male	Ethnicity				
						% White	% South Asian	% Black	% Other	% missing
ENGLAND										
B Heart	654	88	13.5	65.0	65.9	62.5	21.6	13.6	2.3	0.0
B QEH	2,524	162	6.4	59.4	61.7	58.8	19.6	14.2	7.4	8.6
Basldn	301	28	9.3	68.7	67.9	92.9	3.6	3.6	0.0	0.0
Bradfd	674	20	3.0	52.0	40.0	60.0	35.0	0.0	5.0	0.0
Brightn	1,013	59	5.8	70.1	69.5	91.1	7.1	0.0	1.8	5.1
Bristol	1,473	58	3.9	64.9	70.7	94.8	1.7	3.4	0.0	0.0
Camb										
Carlis	281	28	10.0	73.1	64.3	100.0	0.0	0.0	0.0	3.6
Carsh	1,681	96	5.7	67.7	56.3	77.4	15.1	6.5	1.1	3.1
Chelms	283	35	12.4	66.4	62.9	91.2	2.9	0.0	5.9	2.9
Colchr	127	0	0.0							
Covnt	962	52	5.4	66.0	63.5	80.8	13.5	5.8	0.0	0.0
Derby	556	79	14.2	63.4	63.3	91.1	7.6	0.0	1.3	0.0
Donc	333	29	8.7	64.5	51.7	96.6	0.0	3.4	0.0	0.0
Dorset	734	35	4.8	71.2	57.1	97.1	0.0	2.9	0.0	2.9
Dudley	368	55	14.9	66.7	50.9	87.3	10.9	0.0	1.8	0.0
Exeter	1,054	75	7.1	68.9	56.0	81.3	1.3	0.0	17.3	0.0
Glouc	504	45	8.9	64.5	55.6	86.7	6.7	2.2	4.4	0.0
Hull	871	56	6.4	60.0	60.7	98.2	1.8	0.0	0.0	0.0
Ipswi	431	45	10.4	70.3	60.0	68.6	0.0	5.7	25.7	22.2
Kent	1,091	52	4.8	70.5	65.4	94.2	1.9	1.9	1.9	0.0
L Barts	2,497	236	9.5	60.2	60.6	28.8	39.0	17.8	14.4	0.0
L Guys	2,159	39	1.8	57.2	51.3	59.5	8.1	27.0	5.4	5.1
L Kings	1,145	97	8.5	59.0	53.6	49.5	12.4	34.0	4.1	0.0
L Rfree	2,193	145	6.6	63.9	54.5	44.2	26.8	21.7	7.2	4.8
L St.G	843	37	4.4	68.6	54.1	56.3	12.5	21.9	9.4	13.5
L West	3,498	122	3.5	66.1	60.7	50.0	26.2	17.2	6.6	0.0
Leeds	1,621	59	3.6	52.7	52.5	83.1	13.6	1.7	1.7	0.0
Leic	2,374	97	4.1	61.9	56.7	80.9	10.6	4.3	4.3	3.1
Liv Ain	216	22	10.2	58.0	50.0	100.0	0.0	0.0	0.0	0.0
Liv Roy	1,255	70	5.6	60.2	60.0	87.0	4.3	5.8	2.9	1.4
M RI	2,059	70	3.4	61.9	60.0	72.1	19.1	7.4	1.5	2.9
Middlbr	898	21	2.3	62.9	61.9	100.0	0.0	0.0	0.0	0.0
Newc	1,118	59	5.3	62.1	66.1	98.3	0.0	1.7	0.0	0.0
Norwch	776	43	5.5	66.0	76.7	95.3	2.3	2.3	0.0	0.0
Nottm	1,174	70	6.0	63.6	54.3	81.4	10.0	5.7	2.9	0.0
Oxford	1,878	68	3.6	68.8	67.6	84.5	3.4	6.9	5.2	14.7
Plymth	540	49	9.1	70.1	67.3	95.8	0.0	0.0	4.2	2.0
Ports	1,746	84	4.8	64.3	73.8	94.9	1.3	1.3	2.6	7.1
Prestn	1,268	34	2.7	65.5	67.6	88.2	11.8	0.0	0.0	0.0
Redng	796	39	4.9	68.8	61.5	77.1	17.1	5.7	0.0	10.3
Salford	1,115	117	10.5	61.9	64.1	81.2	17.1	0.9	0.9	0.0
Sheff	1,441	55	3.8	68.9	65.5	90.6	5.7	1.9	1.9	3.6
Shrew	376	42	11.2	65.8	73.8	95.2	2.4	2.4	0.0	0.0
Stevng	901	23	2.6	71.0	60.9	86.4	9.1	4.5	0.0	4.3
Sthend	252	34	13.5	72.2	64.7	88.2	8.8	2.9	0.0	0.0
Stoke	813	73	9.0	67.0	57.5	97.2	1.4	0.0	1.4	1.4
Sund	541	16	3.0	66.3	43.8	93.8	0.0	0.0	6.3	0.0

Table 4.3 Continued

Centre	N on RRT	N on PD	% on PD	Median age (yrs)	% male	Ethnicity				
						% White	% South Asian	% Black	% Other	% missing
Truro	423	15	3.5	73.2	60.0	100.0	0.0	0.0	0.0	0.0
Wirral	387	19	4.9	69.2	73.7	94.7	0.0	5.3	0.0	0.0
Wolve	581	54	9.3	64.8	63.0	57.4	29.6	11.1	1.9	0.0
York	554	35	6.3	68.2	77.1	96.9	3.1	0.0	0.0	8.6
N IRELAND										
Antrim	248	14	5.6	65.0	71.4	100.0	0.0	0.0	0.0	0.0
Belfast	843	17	2.0	66.9	41.2	100.0	0.0	0.0	0.0	29.4
Newry	241	23	9.5	76.1	60.9	100.0	0.0	0.0	0.0	0.0
Ulster	184	6	3.3	74.7	50.0	100.0	0.0	0.0	0.0	0.0
West NI	313	9	2.9	73.7	66.7	100.0	0.0	0.0	0.0	0.0
SCOTLAND										
Abrdn	563	22	3.9	55.8	50.0					81.8
Airdrie	468	16	3.4	66.5	43.8	92.3	0.0	0.0	7.7	18.8
D&Gall	135	6	4.4	71.2	66.7					100.0
Dundee	439	18	4.1	65.1	55.6					94.4
Edinb	837	34	4.1	67.4	38.2					91.2
Glasgw	1,774	48	2.7	59.5	47.9					93.8
Inverns	263	10	3.8	69.0	50.0					90.0
Klmarnk	338	24	7.1	55.5	66.7					79.2
Krkldy	299	10	3.3	61.3	50.0					90.0
WALES										
Bangor	194	17	8.8	68.3	58.8	100.0	0.0	0.0	0.0	0.0
Cardff	1,684	72	4.3	68.0	62.5	91.7	5.6	1.4	1.4	0.0
Clwyd	181	12	6.6	70.8	58.3	91.7	8.3	0.0	0.0	0.0
Swanse	791	74	9.4	67.4	56.8	97.1	1.4	0.0	1.4	5.4
Wrexm	319	27	8.5	67.7	70.4	96.3	0.0	3.7	0.0	0.0
TOTALS										
England	53,353	3,041	5.7	64.2	61.2	74.9	12.9	7.9	4.3	2.7
N Ireland	1,829	69	3.8	73.3	58.0	100.0	0.0	0.0	0.0	7.2
Scotland	5,116	188	3.7	62.0	50.0					83.5
Wales	3,169	202	6.4	67.8	60.9	94.9	3.0	1.0	1.0	2.0
UK	63,467	3,500	5.5	64.4	60.5	76.6	12.1	7.3	4.1	7.1

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 4.4, 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 4.4 Primary renal diseases (PRDs) of adult patients prevalent to PD on 31/12/2017

PRD	N on PD	% PD population	Age <65 yrs		Age ≥65 yrs		M:F ratio
			N	%	N	%	
Diabetes	757	22.8	414	24.2	343	21.3	1.8
Glomerulonephritis	598	18.0	383	22.4	215	13.4	1.8
Hypertension	260	7.8	104	6.1	156	9.7	2.3
Polycystic kidney	236	7.1	154	9.0	82	5.1	1.0
Pyelonephritis	218	6.6	110	6.4	108	6.7	1.1
Renal vascular disease	180	5.4	37	2.2	143	8.9	2.3
Other	498	15.0	282	16.5	216	13.4	1.2
Uncertain aetiology	573	17.3	229	13.4	344	21.4	1.3
Total (with data)	3,320	100.0	1,713	100.0	1,607	100.0	
Missing	180	5.1	91	5.0	89	5.2	1.5

Biochemistry parameters in prevalent adult PD 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. The Renal Association guideline on PD contains one biochemical audit measure, which is the proportion of patients with bicarbonate in the target range. The Scottish Renal Registry does not submit bicarbonate data.

Table 4.5 Median adjusted calcium and percentage with adjusted calcium 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 31/12/2017 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									
B Heart	2.4	73.7	14.5	100.0	21	51.3	48.7	0.0	100.0
B QEHE	2.3	78.3	7.7	99.3	24	25.4	73.9	0.8	90.3
Basldn	2.5	80.8	19.2	100.0	27	0.0	96.2	3.9	100.0
Bradfd	2.4	80.0	20.0	100.0	25	20.0	75.0	5.0	100.0
Brightn	2.4	75.0	13.5	100.0	27	5.8	82.7	11.5	100.0
Bristol	2.4	83.0	17.0	100.0	24	19.6	80.4	0.0	97.9
Camb									
Carlsh	2.3	84.6	3.9	100.0	26	7.7	92.3	0.0	100.0
Carsh	2.4	75.6	12.2	96.5					0.0
Chelms	2.4	62.5	16.7	80.0	25	13.0	87.0	0.0	76.7
Colchr									
Covnt	2.4	88.6	6.8	95.7	25	11.6	86.1	2.3	93.5
Derby	2.4	83.6	13.4	100.0	26	13.6	83.3	3.0	98.5
Donc	2.4	90.9	4.6	100.0	24	27.3	72.7	0.0	100.0
Dorset	2.3	82.1	7.1	96.6	23	33.3	59.3	7.4	93.1
Dudley	2.6	44.7	51.1	100.0	27	4.3	87.2	8.5	100.0
Exeter	2.3	89.9	5.8	100.0	24	10.1	89.9	0.0	100.0

Table 4.5 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
Glouc	2.4	75.7	18.9	97.4	25	7.9	89.5	2.6	100.0
Hull	2.4	76.7	18.6	100.0	26	9.3	88.4	2.3	100.0
Ipswi	2.3	88.9	2.8	97.3	27	2.8	91.7	5.6	97.3
Kent	2.5	62.5	37.5	100.0	24	22.5	77.5	0.0	100.0
L Barts	2.3	78.5	7.0	99.5	25	16.0	79.5	4.5	99.5
L Guys	2.4	84.4	12.5	100.0	25	12.5	87.5	0.0	100.0
L Kings	2.3	78.6	7.1	100.0	26	7.1	87.1	5.7	100.0
L Rfree	2.4	73.8	15.9	100.0	24	19.6	77.6	2.8	84.9
L St.G	2.5	69.7	30.3	97.1	25	15.2	84.9	0.0	97.1
L West				69.0					68.0
Leeds	2.4	69.4	26.5	100.0	27	18.4	73.5	8.2	100.0
Leic	2.4	85.2	13.6	100.0	25	9.0	82.1	9.0	96.3
Liv Ain	2.4	87.5	6.3	88.9	27	6.3	87.5	6.3	88.9
Liv Roy	2.3	89.8	8.5	98.3	26	6.8	88.1	5.1	98.3
M RI	2.4	75.9	19.0	98.3	24	25.9	74.1	0.0	98.3
Middlbr	2.3	81.3	6.3	100.0	28	0.0	81.3	18.8	100.0
Newc	2.4	60.0	32.0	100.0	25	10.0	88.0	2.0	100.0
Norwch	2.4	84.2	10.5	100.0	22	39.5	60.5	0.0	100.0
Nottm	2.3	78.6	7.1	98.3					38.6
Oxford	2.4	80.0	16.7	100.0	25	18.5	81.5	0.0	90.0
Plymth	2.4	83.3	11.9	100.0	25	12.2	82.9	4.9	97.6
Ports	2.4	87.1	10.0	100.0	27	2.9	91.3	5.8	98.6
Prestn	2.3	77.4	12.9	100.0	25	16.1	80.7	3.2	100.0
Redng	2.4	82.4	11.8	100.0	27	0.0	91.2	8.8	100.0
Salford	2.4	78.4	16.7	100.0					0.0
Sheff	2.3	81.6	6.1	100.0	24	20.8	79.2	0.0	98.0
Shrew	2.4	72.2	22.2	100.0	26	19.4	72.2	8.3	100.0
Stevng	2.4	80.0	20.0	93.8	24	23.1	69.2	7.7	81.3
Sthend	2.3	79.3	3.5	96.7	26	3.3	90.0	6.7	100.0
Stoke	2.4	79.7	18.8	95.5	27	1.5	86.4	12.1	98.5
Sund	2.4	69.2	30.8	100.0					0.0
Truro	2.5	71.4	28.6	100.0	26	7.7	92.3	0.0	92.9
Wirral	2.3	75.0	0.0	100.0	26	25.0	68.8	6.3	100.0
Wolve	2.4	80.9	12.8	95.9	23	29.8	70.2	0.0	95.9
York	2.4	83.3	13.3	100.0	26	10.0	86.7	3.3	100.0
N IRELAND									
Antrim	2.4	72.7	9.1	100.0	24	9.1	90.9	0.0	100.0
Belfast	2.3	73.3	13.3	100.0	25	6.7	93.3	0.0	100.0
Newry	2.4	79.0	21.1	100.0	27	0.0	94.7	5.3	100.0
Ulster				100.0					100.0
West NI				100.0					100.0
SCOTLAND									
Abrdn	2.5	61.1	33.3	100.0					
Airdrie	2.4	84.6	0.0	100.0					
D&Gall				83.3					
Dundee	2.5	73.3	26.7	100.0					
Edinb				64.3					
Glasgw	2.4	73.7	26.3	100.0					
Inverns				80.0					
Klmarnk	2.4	77.3	18.2	100.0					
Krkldy				77.8					

Table 4.5 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
WALES									
Bangor	2.4	93.3	6.7	100.0	27	0.0	93.3	6.7	100.0
Cardff	2.4	81.7	15.0	98.4					63.9
Clwyd	2.5	83.3	16.7	100.0	24	16.7	83.3	0.0	100.0
Swanse	2.4	83.6	13.1	98.4	26	6.8	76.3	17.0	95.2
Wrexm	2.4	89.5	10.5	100.0	28	0.0	89.5	10.5	100.0
TOTALS									
England	2.4	78.3	14.1	97.7	25	16.2	80.0	3.8	86.9
N Ireland	2.4	76.7	16.7	100.0	26	6.7	88.3	5.0	100.0
Scotland	2.4	74.3	21.5	90.6					0.0
Wales	2.4	84.4	13.2	98.8	26	7.6	81.9	10.4	85.2
UK	2.4	78.5	14.5	97.4	25	15.4	80.4	4.2	87.1

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

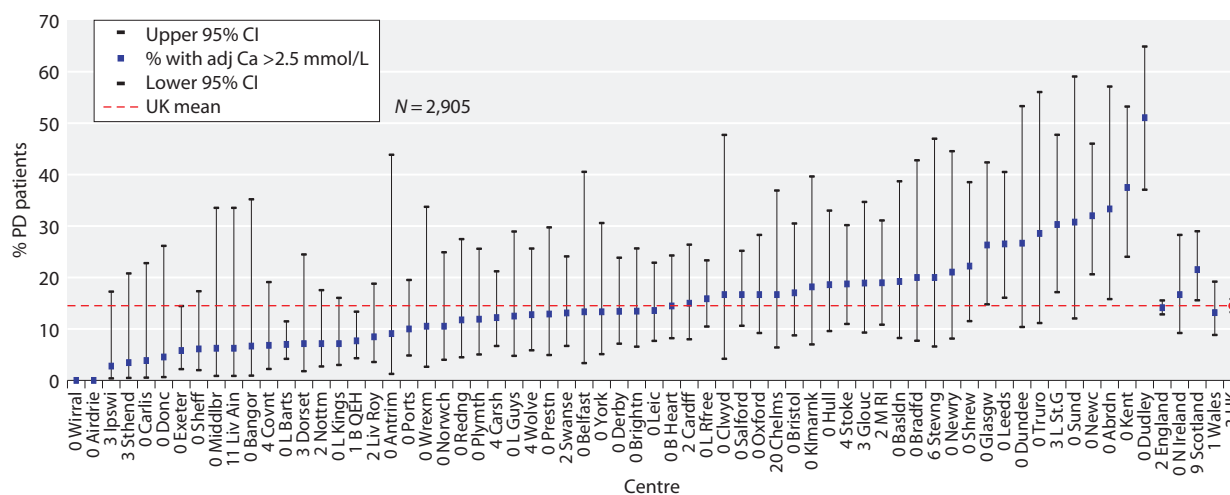


Figure 4.2 Percentage of adult patients prevalent to PD on 31/12/2017 with adjusted calcium above the target range (>2.5 mmol/L) by centre
Ca – calcium; CI – confidence interval

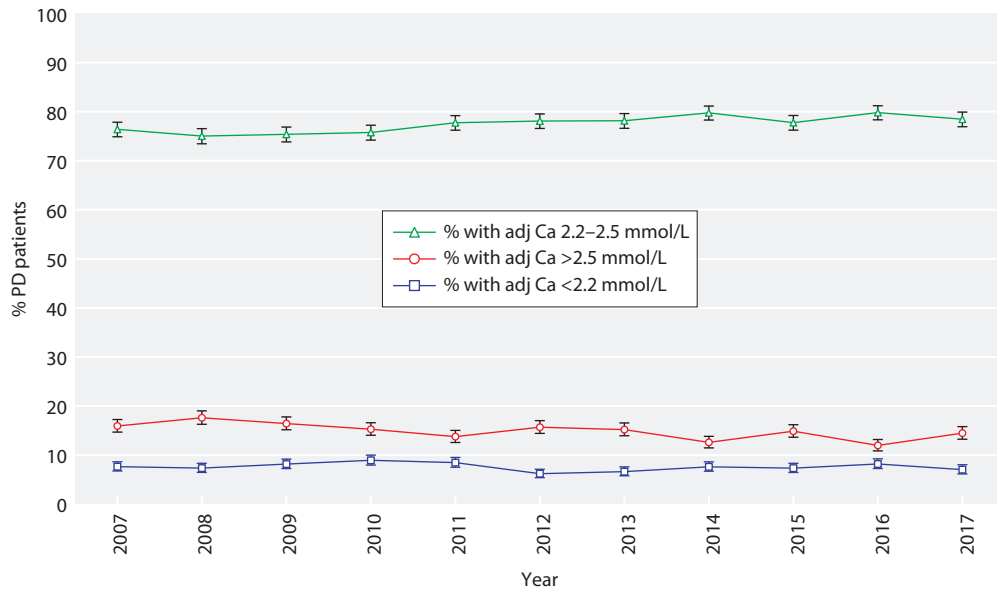


Figure 4.3 Change in percentage of prevalent adult PD patients within, above and below the target range for adjusted calcium (2.2–2.5 mmol/L) between 2007 and 2017

Ca – calcium

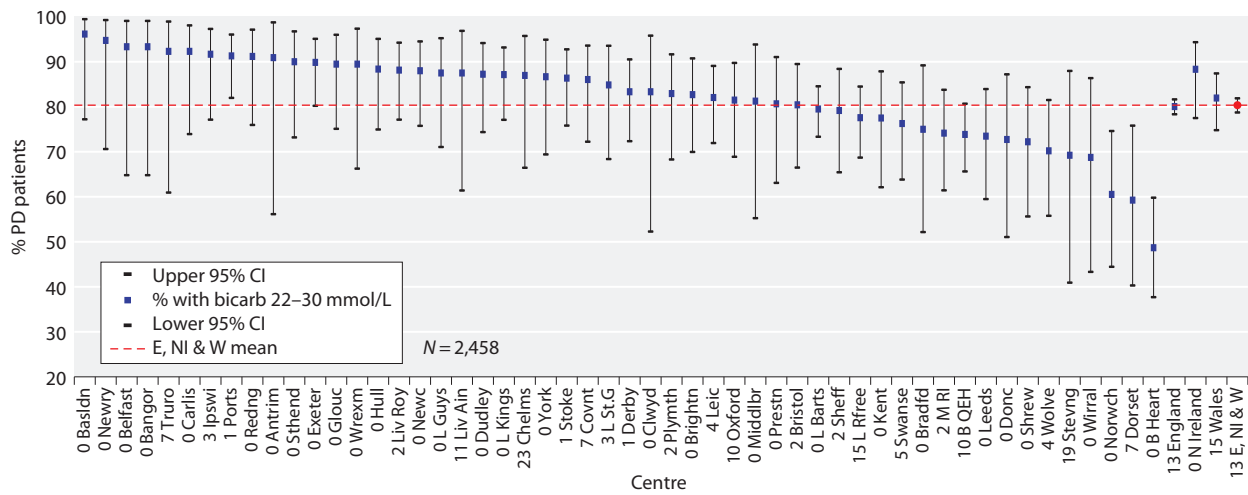


Figure 4.4 Percentage of adult patients prevalent to PD on 31/12/2017 with bicarbonate within the target range (22–30 mmol/L) by centre

Bicarb – bicarbonate; CI – confidence interval

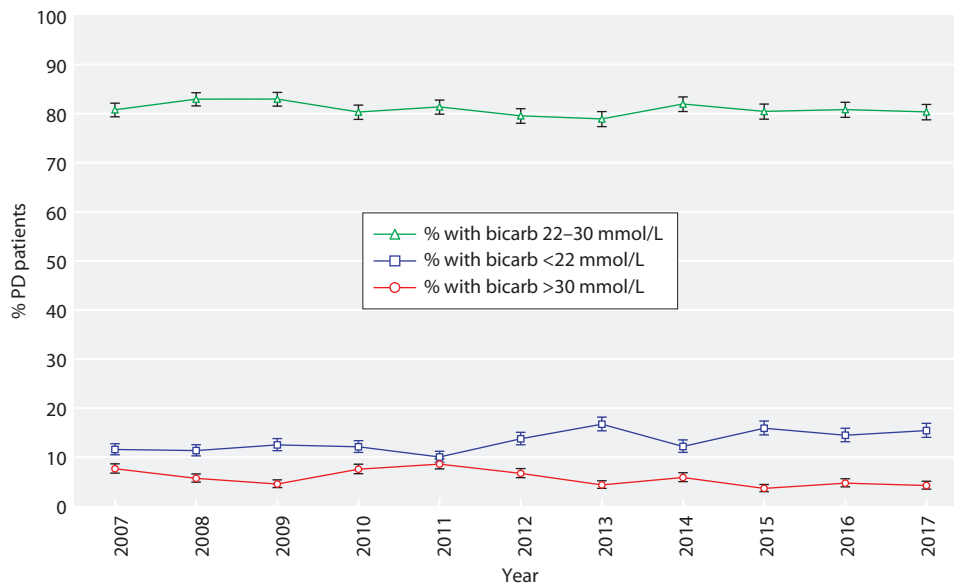


Figure 4.5 Percentage of prevalent adult PD patients within, above and below the target range for bicarbonate (22–30 mmol/L) between 2007 and 2017
Bicarb – bicarbonate

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 Scottish Renal Registry does not submit ESA data for PD patients.

Table 4.6 Median haemoglobin and ferritin and percentage attaining target ranges in adult patients prevalent to PD 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	111	28.9	32.9	100.0	148	36.8	100.0
B QEH	107	30.1	16.1	99.3	319	8.4	99.3
Basldn	110	23.1	11.5	100.0	101	50.0	92.3
Bradfd	107	30.0	20.0	100.0	315	10.0	100.0
Brightn	115	13.5	32.7	100.0	372	3.9	98.1
Bristol	110	12.8	25.5	100.0	366	2.2	97.9
Camb							
Carlis	114	7.7	23.1	100.0	362	15.4	100.0
Carsh	108	25.0	19.0	98.8	155	30.1	97.7
Chelms	111	30.4	17.4	76.7	147	26.9	86.7
Colchr							
Covnt	103	34.1	11.4	95.7	195	22.7	95.7
Derby	111	17.9	29.9	100.0	517	0.0	100.0
Donc	115	18.2	36.4	100.0	392	0.0	100.0
Dorset	114	27.6	31.0	100.0	369	6.9	100.0
Dudley	115	25.5	34.0	100.0	160	41.9	91.5
Exeter	115	4.3	30.4	100.0	258	8.7	100.0

Table 4.6 Continued

Centre	Haemoglobin				Ferritin		
	Median (g/L)	% <100 g/L	% >120 g/L	% data completeness	Median (µg/L)	% <100 µg/L	% data completeness
Glouc	113	13.2	31.6	100.0	126	32.4	89.5
Hull	112	16.3	18.6	100.0	424	4.7	100.0
Ipswi	109	25.0	19.4	97.3	452	8.3	97.3
Kent	116	12.5	40.0	100.0	379	5.0	100.0
L Barts	109	26.6	25.6	99.0	271	15.3	94.0
L Guys	110	25.0	12.5	100.0	140	38.7	96.9
L Kings	112	18.6	17.1	100.0	171	22.0	71.4
L Rfree	110	24.6	22.2	100.0	583	8.7	100.0
L St.G	105	27.3	15.2	97.1	300	15.2	97.1
L West	110	14.3	14.3	70.0	358	4.1	73.0
Leeds	108	20.4	14.3	100.0	404	6.1	100.0
Leic	110	14.8	25.9	100.0	355	17.5	98.8
Liv Ain	112	23.5	23.5	94.4	475	6.3	88.9
Liv Roy	113	15.3	28.8	98.3	346	6.8	98.3
M RI	111	27.6	20.7	98.3	254	6.9	98.3
Middlbr	114	6.3	25.0	100.0	202	18.8	100.0
Newc	107	34.0	16.0	100.0	458	6.1	98.0
Norwch	108	18.4	18.4	100.0	407	2.6	100.0
Nottm	106	28.1	14.0	100.0	525	3.6	98.3
Oxford	109	23.3	20.0	100.0	298	3.3	100.0
Plymth	115	19.0	45.2	100.0	329	9.8	97.6
Ports	118	15.7	32.9	100.0	393	1.4	98.6
Prestn	113	22.6	35.5	100.0	498	10.3	93.6
Redng	113	14.7	26.5	100.0	416	8.8	100.0
Salford	112	16.7	24.5	100.0			0.0
Sheff	112	22.4	26.5	100.0	528	4.3	95.9
Shrew	113	13.9	22.2	100.0	273	8.3	100.0
Stevng	105	25.0	18.8	100.0	349	6.7	93.8
Sthend	114	16.7	33.3	100.0	236	6.9	96.7
Stoke	112	15.2	25.8	98.5	259	4.8	94.0
Sund	111	15.4	30.8	100.0	470	25.0	92.3
Truro	110	28.6	21.4	100.0	185	21.4	100.0
Wirral	112	25.0	6.3	100.0	540	0.0	100.0
Wolve	111	23.4	19.1	95.9	94	50.0	98.0
York	109	16.7	16.7	100.0	350	6.7	100.0
N IRELAND							
Antrim	107	9.1	27.3	100.0	323	0.0	100.0
Belfast	119	13.3	33.3	100.0	323	6.7	100.0
Newry	110	5.3	5.3	100.0	309	10.5	100.0
Ulster				100.0			100.0
West NI				100.0			100.0
SCOTLAND							
Abrdn	111	11.1	22.2	100.0	478	6.7	83.3
Airdrie	106	30.8	23.1	100.0	316	16.7	92.3
D&Gall				100.0			83.3
Dundee	109	0.0	26.7	100.0	213	13.3	100.0
Edinb	117	18.2	27.3	78.6			53.6
Glasgw	117	10.5	39.5	100.0	209	26.3	100.0
Inverns				80.0			80.0
Klmarnk	113	22.7	18.2	100.0	414	22.7	100.0
Krkldy				88.9			88.9

Table 4.6 Continued

Centre	Haemoglobin				Ferritin		
	Median (g/L)	% <100 g/L	% >120 g/L	% data completeness	Median (µg/L)	% <100 µg/L	% data completeness
WALES							
Bangor	117	26.7	20.0	100.0	148	26.7	100.0
Cardff	114	19.7	29.5	100.0	187	25.9	95.1
Clwyd	109	8.3	16.7	100.0	319	0.0	100.0
Swanse	114	8.1	25.8	100.0	257	8.5	95.2
Wrexm	114	0.0	31.6	100.0	190	5.3	100.0
TOTALS							
England	111	21.2	23.7	98.0	314	12.9	92.1
N Ireland	114	6.7	20.0	100.0	362	6.7	100.0
Scotland	113	14.0	25.3	94.3	307	17.4	86.8
Wales	114	13.0	26.6	100.0	215	15.3	96.5
UK	111	20.1	23.9	98.0	308	13.2	92.2

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

Table 4.7 Distribution of haemoglobin and erythropoiesis stimulating agent (ESA) dose values in adult patients prevalent to PD on 31/12/2017 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				
B Heart	61.8			
B QEH	0.0			
Basldn	80.8	4,000	0.0	3.8
Bradfd	90.0	6,000	0.0	10.0
Brightn	3.8			
Bristol	74.5	4,000	0.0	12.8
Camb				
Carlis	61.5			
Carsh	0.0			
Chelms	70.0	3,000	8.7	13.0
Colchr				
Covnt	70.0	8,000	4.5	2.3
Derby	0.0			
Donc	54.5			
Dorset	75.9	3,700	0.0	20.7
Dudley	2.1			
Exeter	75.4	4,308	0.0	15.9
Glouc	65.8			
Hull	53.5			
Ipswi	0.0			
Kent	50.0			
L Barts	0.0			
L Guys	0.0			
L Kings	78.6	4,000	1.4	14.3
L Rfree	0.0			
L St.G	0.0			
L West	1.0			
Leeds	81.6	4,000	0.0	4.1
Leic	81.5	4,100	0.0	16.0
Liv Ain	0.0			

Table 4.7 Continued

Centre	ESA		Haemoglobin and ESA	
	% on ESA	Median dose (IU/week)	% <100g/L and not on ESA	% >120g/L and on ESA
Liv Roy	0.0			
M RI	0.0			
Middlbr	75.0	2,500	0.0	12.5
Newc	2.0			
Norwch	76.3	3,000	0.0	10.5
Nottm	84.2	3,600	0.0	8.8
Oxford	83.3	6,000	0.0	8.3
Plymth	0.0			
Ports	4.3			
Prestn	80.6		0.0	25.8
Redng	8.8			
Salford	75.5	6,000	2.9	15.7
Sheff	61.2			
Shrew	0.0			
Stevng	62.5			
Sthend	66.7			
Stoke	0.0			
Sund	84.6	1,154	0.0	23.1
Truro	0.0			
Wirral	100.0	4,000	0.0	6.3
Wolve	69.4			
York	70.0	2,660	0.0	6.7
N IRELAND				
Antrim	81.8		0.0	9.1
Belfast	80.0	2,000	0.0	26.7
Newry	78.9	6,000	0.0	5.3
Ulster	66.7			
West NI	88.9			
WALES				
Bangor	26.7			
Cardff	37.7			
Clwyd	58.3			
Swanse	79.0	5,000	0.0	16.1
Wrexm	36.8			
TOTAL*				
	78.6	4,000	0.9	12.7

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)

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

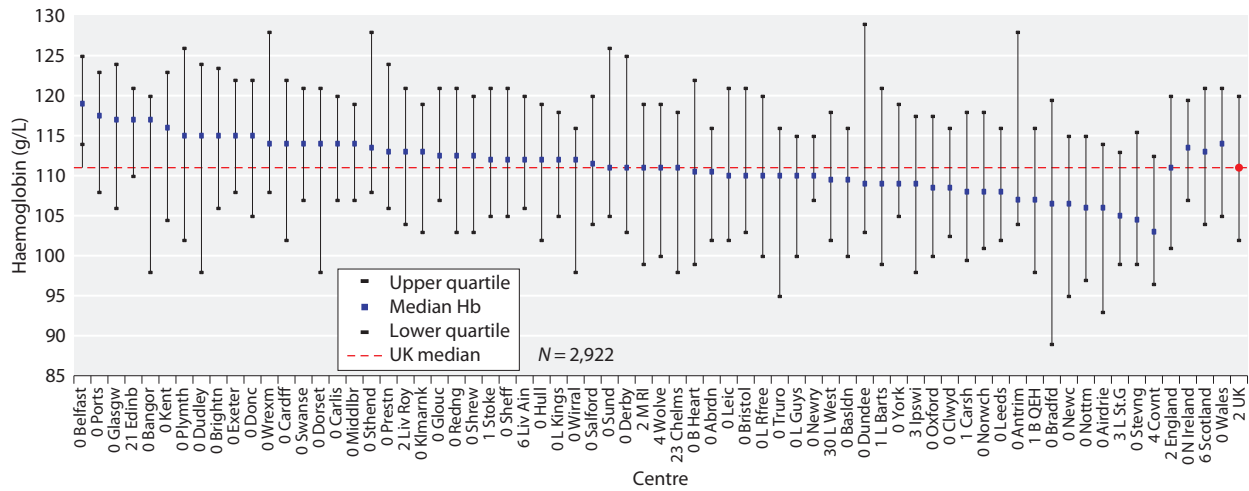


Figure 4.6 Median haemoglobin in adult patients prevalent to PD on 31/12/2017 by centre
Hb – haemoglobin

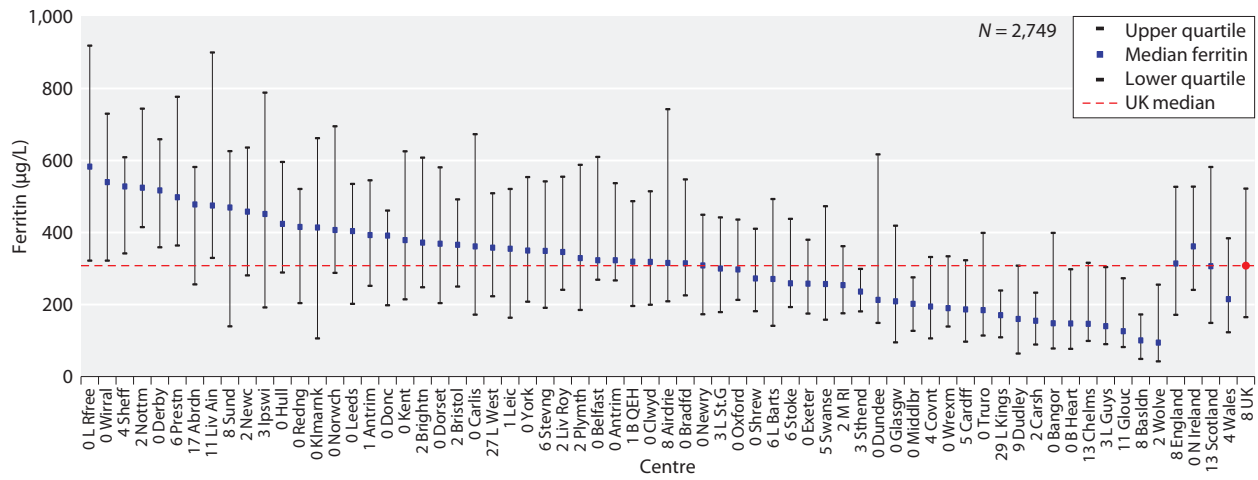


Figure 4.7 Median ferritin in adult patients prevalent to PD on 31/12/2017 by centre

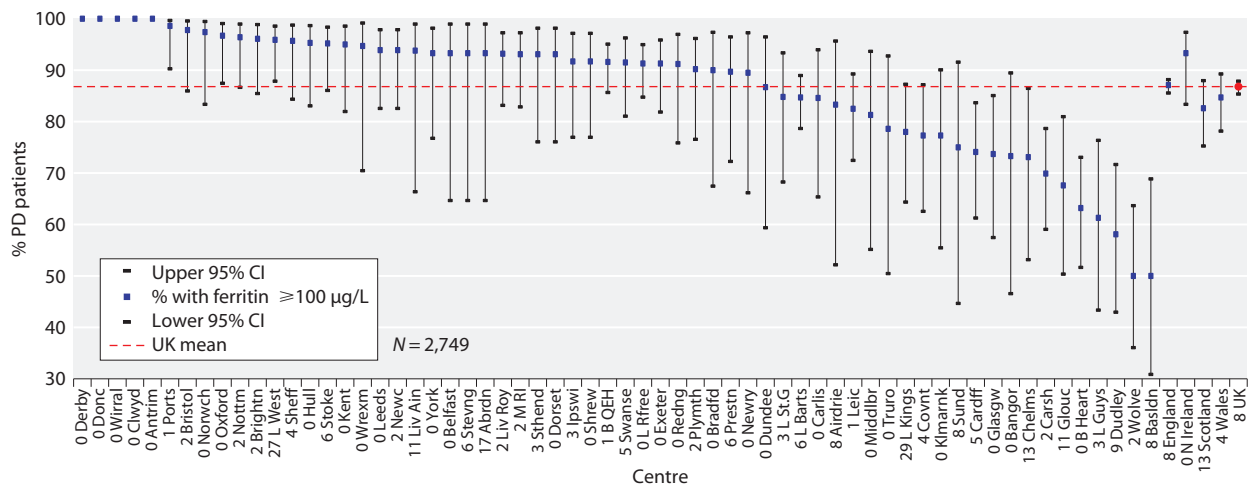


Figure 4.8 Percentage of adult patients prevalent to PD on 31/12/2017 with ferritin ≥ 100 $\mu\text{g/L}$ by centre
CI – confidence interval

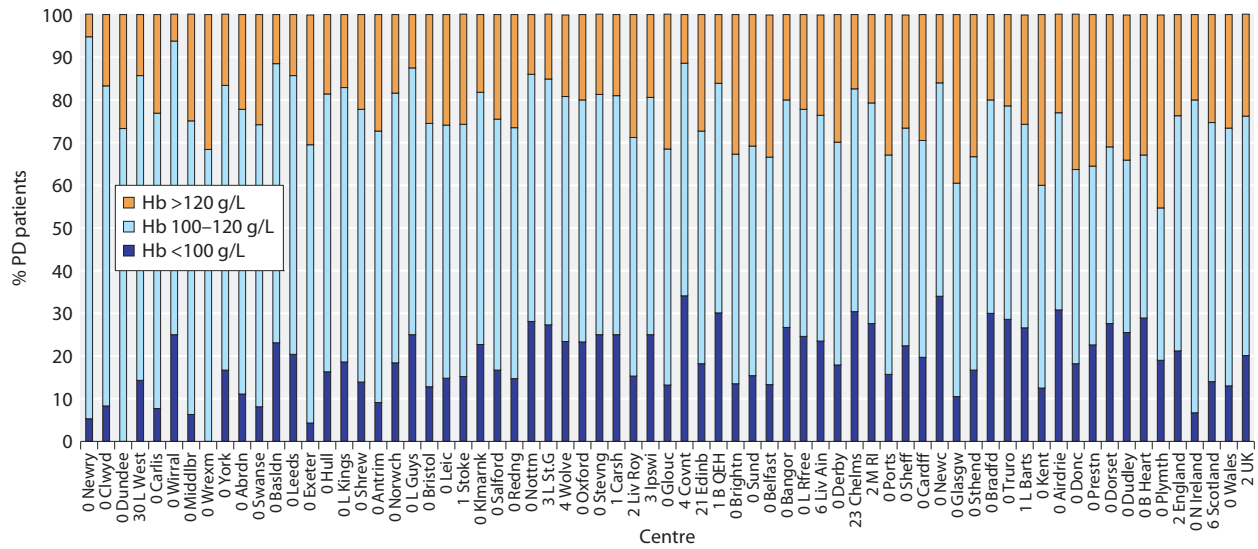


Figure 4.9 Distribution of haemoglobin in adult patients prevalent to PD on 31/12/2017 by centre
Hb – haemoglobin

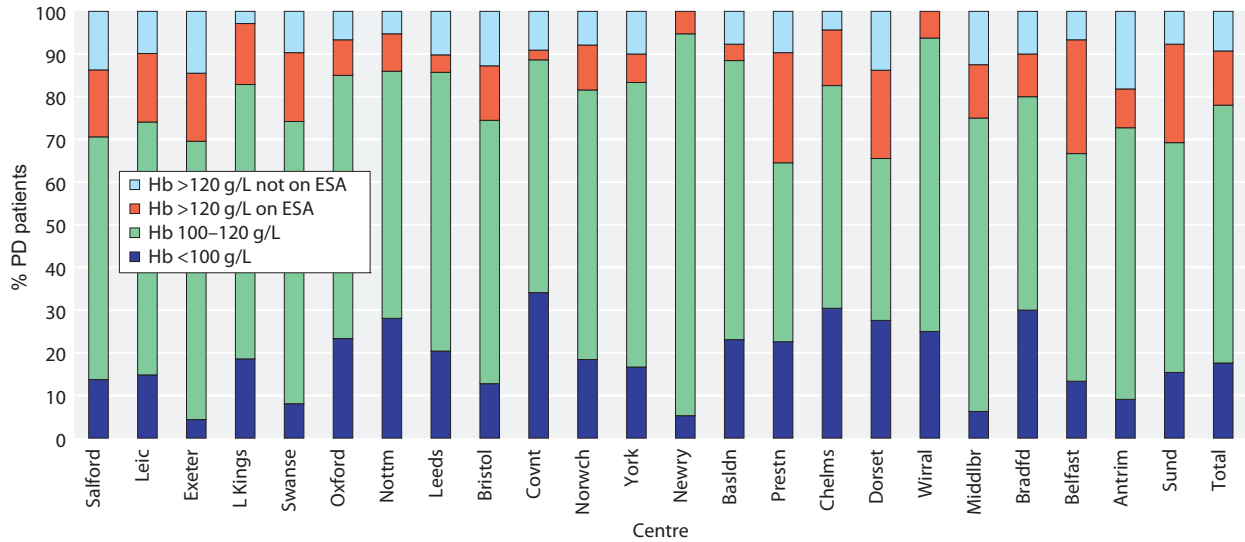


Figure 4.10 Distribution of haemoglobin in adult patients prevalent to PD on 31/12/2017 and the proportion with haemoglobin > 120 g/L receiving erythropoiesis stimulating agent (ESA) by centre
Figure (including total) does not include centres with <70% data completeness (or <70% ESA use)
Hb – haemoglobin

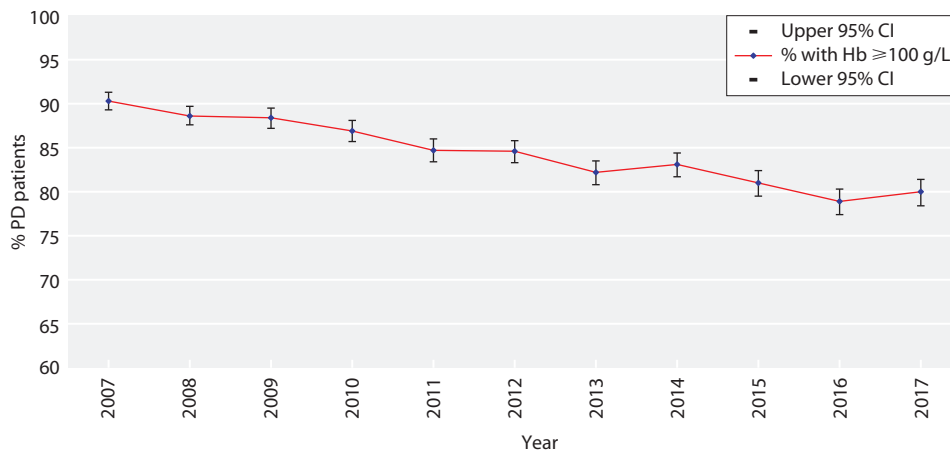


Figure 4.11 Percentage of prevalent adult PD patients with haemoglobin ≥ 100 g/L between 2007 and 2017
CI – confidence interval; Hb – haemoglobin

PD catheter insertion techniques and catheter patency in prevalent adult PD patients

PD catheter insertion techniques and PD catheter patency at one year are presented in chapter 1.

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. 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. 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 3. These analyses include all patients on HD, whether on HHD or ICHD.

Table 4.8 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 2016 to December 2017

	Infection			
	MRSA	MSSA	<i>C. difficile</i>	<i>E.coli</i>
Number of episodes				
HD	86	1,149	498	858
PD	3	32	76	65
Rate per 100 patient years (with range between centres)				
HD	0.19 (0.0–0.80)	2.55 (0.74–5.56)	1.11 (0.26–3.34)	1.91 (0.61–4.45)
PD	0.05 (0.0–1.53)	0.48 (0.0–2.61)	1.15 (0.0–9.35)	0.98 (0.0–4.65)

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 and have previously been available to centres as part of the renal indicators dashboard. The funnel plot below shows each centre’s rolling two year (2016–2017) peritonitis rate per 100 PD patient years against the number of patient years at risk to take into account the greater variation expected as centre size decreases. In future, results will be published allowing centres to be identified.

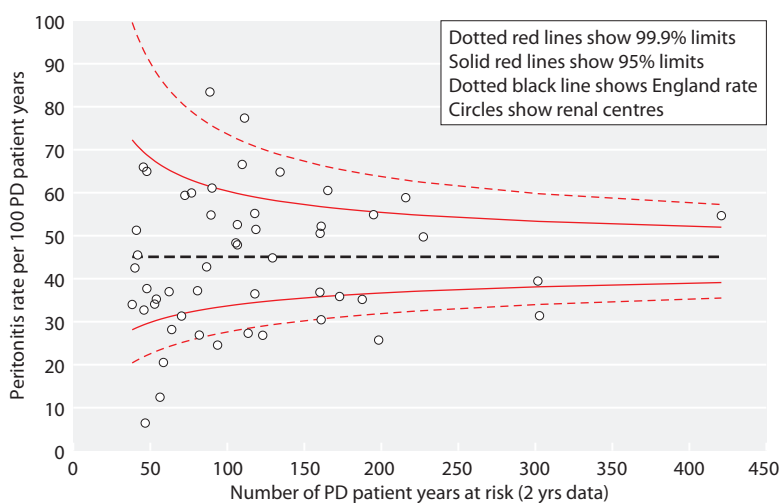


Figure 4.12 PD peritonitis rates by centre per 100 PD patient years (2016–2017 data)

Cause of death in adult PD patients

Cause of death was analysed in prevalent patients receiving PD on 31/12/2016 and followed-up for one year in 2017. 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 2.

Table 4.9 Cause of death in adult patients prevalent to PD on 31/12/2016 followed-up in 2017 by age group

Cause of death	PD all ages		PD <65 yrs		PD ≥ 65 yrs	
	N	%	N	%	N	%
Cardiac disease	62	21.4	25	30.1	37	17.9
Cerebrovascular disease	15	5.2	8	9.6	7	3.4
Infection	59	20.3	14	16.9	45	21.7
Malignancy	17	5.9	6	7.2	11	5.3
Treatment withdrawal	61	21.0	9	10.8	52	25.1
Other	52	17.9	16	19.3	36	17.4
Uncertain aetiology	24	8.3	5	6.0	19	9.2
Total (with data)	290	100.0	83	100.0	207	100.0
Missing	193	40.0	57	40.7	136	39.7

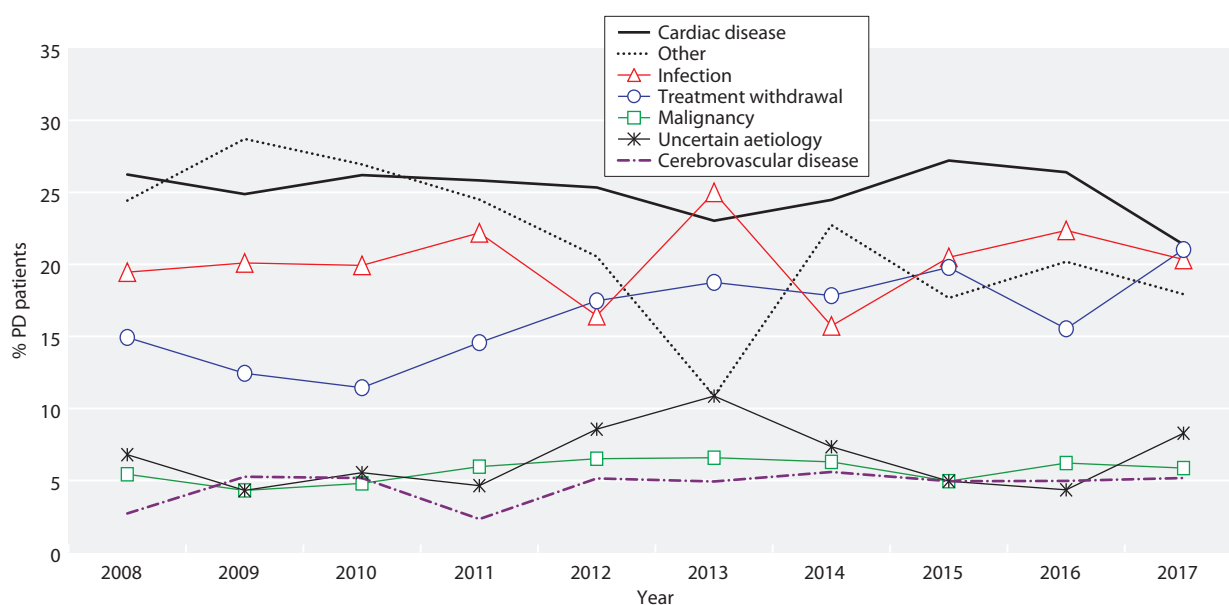


Figure 4.13 Cause of death for prevalent adult PD patients between 2008 and 2017