Chapter 1

Adults with chronic kidney disease (CKD) and estimated glomerular filtration rate (eGFR) <30mL/min/1.73m² in the UK at the end of 2019

Contents

Introduction

From this year onwards, the UKRR will routinely publish data in the annual report about patients with chronic kidney disease (CKD) outside the context of renal replacement therapy (RRT) or acute kidney injury (AKI). The primary aim of this chapter is to present the demographic and clinical features of patients receiving treatment for CKD stages G4 and 5 at UK renal centres at the end of 2019 (figure 1.1). A '2019 prevalent CKD population' is described, comprising individuals who:

- were reported by an adult renal centre as receiving treatment for CKD at the end of 2019, and

- had an eGFR of <30mL/min/1.73m^2 on their last recorded creatinine measurement.
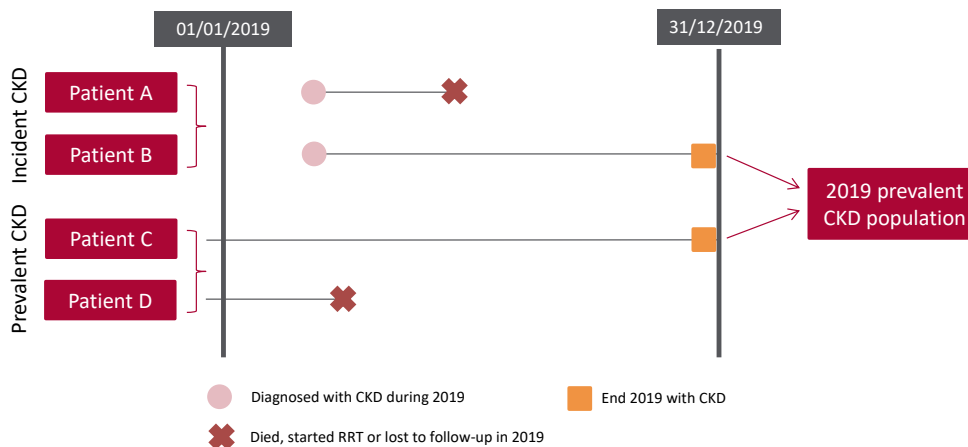

Figure 1.1 Pathways adult patients could follow to be included in the UK 2019 prevalent CKD population

Auditable aspects of care for this population are highlighted and described. For the purpose of this chapter, individuals are categorised as having CKD stage G5 (estimated glomerular filtration rate [eGFR] <15 mL/min/1.73m^2) or CKD stage G4 (eGFR 15–30mL/min/1.73m^2) using their last recorded creatinine measurement. Patients whose last measurement was over two years old are included, but are reported as 'CKD stage unknown'. Further categorisation, e.g. by eGFR trend or albuminuria is not possible using UKRR data.

Information about completeness of primary renal disease (PRD) data are presented. Whilst PRD data are known to be incomplete, no triangulation was performed using other datasets available to the UKRR, e.g. Hospital Episode Statistics (HES). The UKRR is developing approaches to combine CKD and AKI reporting systems with HES and will publish these elsewhere. Data relating to survival and initiation of RRT/conservative care (CC) are also being prepared separately.

It is important to highlight that the individuals described in this chapter represent a sub-population of those with CKD in the UK. Many individuals with diagnosed CKD receive care without referral to a renal centre, particularly those with earlier stages. Furthermore, not all renal centres are yet submitting CKD data to the UKRR. For this reason, it is not appropriate to generalise findings from this chapter to the wider CKD population, even to those cared for in renal centres.

Consequently, this first-ever CKD chapter asks simple questions:

- Which individuals with CKD are currently reported to the UKRR?

- What data are captured and which aspects of CKD care can be audited using them?

Rationale for analyses

Since 2016, renal centres in England and Wales have been asked by the National Clinical Reference Group to report individuals with CKD under their care to the UKRR. Data collection has increased from almost 17,000 patients with CKD stages G4 and 5 at the end of 2016, to more than 34,000 patients at the end of 2019. These numbers will continue to rise – in 2019 the UKRR received data from only 17 of the UK's 70 adult renal centres.

Reliable estimates of CKD prevalence in secondary care are required to inform CKD management and policy planning. The presented analyses will be performed annually to help clinicians and policy makers in this task and will be expanded as data quality and quantity improve. The Renal Association guidelines (renal.org/health-professionals/guidelines/guidelines-commentaries) provide audit measures relevant to the care of patients with CKD, and where data permit, their attainment by UK renal centres in 2019 is reported in this chapter (table 1.1). Some audit measures cannot be reported because the completeness of the required data items is too low. Audit measures in guidelines that have been archived are not included. For consistency with other chapters, table 1.1 is provided to outline the addressed Renal Association audit measures. However, data completeness is poor even for the analyses presented, necessitating caution in interpretation. Further detail about the completeness of data returned to the UKRR is available through the UKRR data portal (renal.org/audit-research/data-portal).

Table 1.1 The Renal Association audit measures relevant to CKD that are reported in this chapter

The Renal Association guideline	Audit criteria	Related analysis/analyses
Commentary on the Kidney Disease Improving Global Outcomes (KDIGO) guideline on the diagnosis, evaluation, prevention and treatment of CKD mineral bone disorder (2018)	Percentage of adult CKD G5 patients with serum calcium above the normal reference range 2.2–2.5 mmol/L	Figure 1.3
Cardiovascular disease in CKD (2008)	Blood pressure in CKD stages G1–4 should be managed according to National Institute for Health and Care Excellence (NICE) guidance: <140/90 mmHg in patients without significant proteinuria and <130/80 mmHg in those with proteinuria or with diabetes	Table 1.4 (partly addressed)
Anaemia of CKD (updated 2020)	Proportion of CKD patients with eGFR <30mL/min/1.73m^2 (using CKD-EPI equation) and an annual haemoglobin level measurement	Figure 1.4
	Proportion of CKD stage G4–5 patients with haemoglobin 100–120 g/L	Figures 1.5–1.6
Commentary on the National Institute for Health and Care Excellence (NICE) guideline on RRT and conservative management (2020)	The number of patients with stage G5 CKD who were reported as being under conservative care	Table 1.2

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.

Adults with CKD in the UK at the end of 2019

Key findings

- Data about patients with CKD stages G4 and 5 who were not on RRT were reported by just 17 of the UK's 70 adult renal centres

- The 2019 prevalent CKD population comprised 21,368 patients, with a median age of 78.0 years, compared to a median age of 59.6 years for those on RRT

- CKD prevalence was 1,301 per million population (pmp) overall, but ranged from 149 to 2,793 pmp between centres. There were also substantial differences in the ages and distribution of disease stages between centres. Such large variation suggests discrepancies in the definitions used for processes of care or reporting of people with CKD between centres

- The data reported in this chapter highlight the need for improved capture and reporting of CKD data to enable national quality assurance. Concordance with audit measures for the CKD not on RRT population cannot be addressed until this is achieved.

Analyses

Stage and demographics of adult CKD patients

For the 17 adult renal centres, the number of prevalent patients with CKD and eGFR ≤30 mL/min/1.73m² was calculated as a proportion of the estimated centre catchment population (details in appendix A). Only a few centres reported patients with kidney failure as undergoing conservative care (CC). It is not clear whether a CC code means the same thing at all centres and for each patient. In particular, it is unclear which CC codes represent planned RRT for the eventuality of kidney failure, and which represent active treatment for an individual who might otherwise have started RRT. As such, people coded as receiving CC are included throughout this chapter.

Table 1.2 Number of adult patients prevalent to CKD stages G4 and 5 on 31/12/2019, including those on conservative care (CC) by stage and centre; number of CKD and RRT patients as a proportion of the adult catchment population

Centre	N with CKD	N on CC	Total	% stage G4	% stage G5	% stage unknown	Estimated catchment population (millions)	CKD 2019 crude rate (pmp)	RRT 2019 crude rate (pmp)
Bham[1]	805	69	874	70.9	28.7	0.3	2.03	430	1,627
Camb	189	1	190	65.3	28.9	5.8	0.93	205	1,584
Carlis	513	77	590	75.1	15.8	9.2	0.25	2,334	1,199
Covnt	1,588	0	1,588	87.0	12.4	0.6	0.79	2,016	1,366
Derby	1,085	1	1,086	82.1	16.2	1.7	0.56	1,954	1,173
Glouc	1,099	1	1,100	85.5	13.2	1.3	0.51	2,178	1,039
L Rfree	1,961	0	1,961	68.7	27.1	4.2	1.32	1,491	1,782
Leic	3,966	1	3,967	80.5	17.3	2.2	2.07	1,920	1,252
Middlbr	585	0	585	64.3	32.1	3.6	0.80	732	1,188
Oxford	2,166	3	2,169	73.2	22.4	4.4	1.43	1,515	1,375
Plymth	1,076	1	1,077	85.4	13.6	1.0	0.40	2,710	1,336
Ports	2,082	1	2,083	76.6	23.2	0.2	1.73	1,202	1,087
Salford	168	2	170	92.9	7.1	0.0	1.14	149	1,084
Stevng	416	103	519	69.4	28.5	2.1	1.10	472	878
Sthend	491	0	491	81.7	17.5	0.8	0.27	1,812	974
Swanse	2,065	32	2,097	87.2	12.8	0.0	0.75	2,793	1,156
Truro	764	57	821	85.9	14.1	0.0	0.35	2,316	1,266
Total	**21,019**	**349**	**21,368**	**79.0**	**19.0**	**2.0**	**16.42**	**1,301**	**1,302**

[1]The catchment population and 2019 crude rate for RRT reflect the combined Bham population (QEH and Heartlands renal centres), but CKD patients were only reported for QEH.

The proportion of patients with CKD and eGFR ≤30 mL/min/1.73m² from each ethnic group is shown for patients with ethnicity data – the proportion of centre patients with no ethnicity is shown separately. The completeness of PRD data varies greatly between centres, making interpretation difficult. PRD completeness is shown for each centre overall and by CKD stage.

Table 1.3 Demographics and completeness of primary renal disease (PRD) data of adult patients prevalent to CKD stages G4 and 5 on 31/12/2019 by centre

Centre	N with CKD	Median age (yrs)	% male	Ethnicity					PRD completeness		
				% White	% Asian	% Black	% Other	% missing	% all stages	% stage G4	% stage G5
Bham	874	69.0	57.2	61.5	24.9	10.1	3.6	10.3	16.6	6.9	39.4
Camb	190	77.1	54.2	95.5	2.2	1.1	1.1	6.3	47.9	31.5	92.7
Carlis	590	78.8	51.2	99.6	0.4	0.0	0.0	20.7	11.2	11.3	14.0
Covnt	1,588	80.0	54.5	90.9	7.9	1.2	0.0	8.0	84.3	83.6	89.8
Derby	1,086	78.3	55.7	92.2	5.3	1.1	1.3	9.9	89.0	88.6	92.6
Glouc	1,100	80.1	59.0	95.5	2.1	1.4	0.9	2.4	55.4	53.8	67.6
L Rfree	1,961	76.0	54.7	57.5	19.9	12.7	10.0	21.7	52.5	51.0	59.8
Leic	3,967	78.8	53.5	82.5	14.5	1.8	1.2	26.4	56.6	54.7	67.2
Middlbr	585	73.3	58.1	93.9	6.1	0.0	0.0	46.5	15.7	12.2	23.9
Oxford	2,169	76.8	57.4	87.2	5.3	3.5	4.0	71.1	15.9	12.0	30.2
Plymth	1,077	80.8	49.9	98.7	0.3	0.1	0.9	4.3	19.8	18.7	26.7
Ports	2,083	76.0	59.3	97.0	2.0	0.4	0.6	34.9	27.4	20.0	52.2
Salford	170	75.6	57.6	82.8	14.1	1.2	1.8	4.1	2.9	1.9	16.7
Stevng	519	81.2	56.1	85.3	9.7	2.5	2.5	46.2	42.8	29.4	77.0
Sthend	491	79.8	56.6	94.1	1.9	1.3	2.7	2.9	39.3	34.2	64.0
Swanse	2,097	79.4	53.3	99.7	0.0	0.3	0.0	81.0	21.9	19.5	38.4
Truro	821	80.2	56.2	99.3	0.4	0.1	0.2	0.1	12.3	8.7	34.5
Total	**21,368**	**78.0**	**55.3**	**86.6**	**8.5**	**2.8**	**2.1**	**30.4**	**40.7**	**38.0**	**53.5**
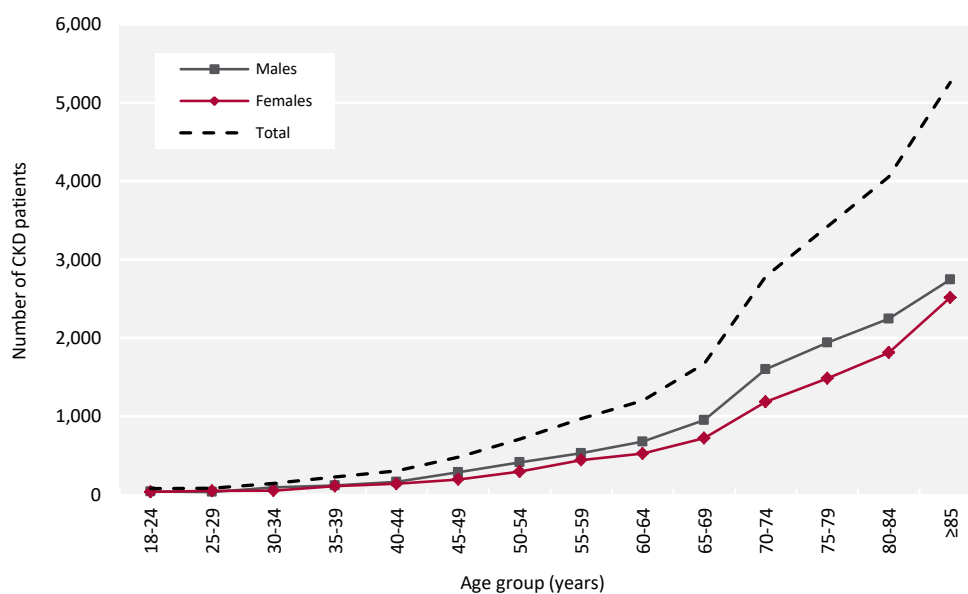
Figure 1.2 Number of adult patients prevalent to CKD stages G4 and 5 on 31/12/2019 by age group and sex

Blood pressure in adult CKD patients

Only 7 centres submitted sufficient blood pressure data for analysis (Bham, Derby, Glouc, L Rfree, Plymth, Ports, Swanse).

Table 1.4 Blood pressures in adult patients prevalent to CKD stages G4 and 5 on 31/12/2019 by stage

	All stages				Stage G4				Stage G5			
	N (% complete)	Median SBP	Median DBP	N (%) <140/90[1]	N (% complete)	Median SBP	Median DBP	N (%) <140/90[1]	N (% complete)	Median SBP	Median DBP	N (%) <140/90[1]
All	3866 (37.6)	141	75	1706 (44.1)	2749 (33.8)	140	75	1276 (46.4)	1115 (55.7)	145	75	429 (38.5)
Age group (yrs)												
18-29	56 (62.9)	136	82	32 (57.1)	37 (58.7)	130	81	25 (67.6)	19 (73.1)	141	87	7 (36.8)
30-39	92 (50.0)	137	86	44 (47.8)	72 (49.3)	135	85	37 (51.4)	20 (57.1)	142	86	7 (35.0)
40-49	236 (57.7)	137	84	111 (47.0)	177 (56.2)	136	83	89 (50.3)	59 (67.0)	140	86	22 (37.3)
50-59	397 (47.9)	141	81	172 (43.3)	280 (44.8)	139	80.5	131 (46.8)	117 (60.3)	145	81	41 (35.0)
60-64	287 (48.6)	142	78	130 (45.3)	199 (44.9)	139	77	96 (48.2)	88 (65.2)	146	80	34 (38.6)
65-69	348 (43.0)	140	74	166 (47.7)	246 (39.3)	138	74.5	124 (50.4)	102 (58.3)	143.5	73	42 (41.2)
70-74	548 (39.7)	141	74	240 (43.8)	387 (35.2)	140	75	173 (44.7)	161 (58.8)	145	72	67 (41.6)
75-79	652 (38.7)	144	73	268 (41.1)	484 (35.5)	144	73	204 (42.1)	167 (56.0)	146	73	63 (37.7)
80-84	662 (34.8)	140	71	303 (45.8)	473 (30.8)	140	71	230 (48.6)	189 (55.3)	146	72	73 (38.6)
≥85	588 (24.5)	144	70	240 (40.8)	394 (20.5)	142	70	167 (42.4)	193 (44.5)	147	70	73 (37.8)
Sex												
Male	2187 (38.3)	140	75	997 (45.6)	1543 (34.3)	140	75	723 (46.9)	642 (55.5)	142	75	273 (42.5)
Female	1679 (36.8)	142	75	709 (42.2)	1206 (33.0)	140	75	553 (45.9)	473 (56.0)	148	76	156 (33.0)

[1]% <140/90 mmHg of patients with complete blood pressure data.
The total includes the patients with old eGFR measurements who were classed as 'unknown stage'.
DBP – diastolic blood pressure; SBP – systolic blood pressure (both measured in mmHg)

Biochemistry parameters in adult CKD 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.
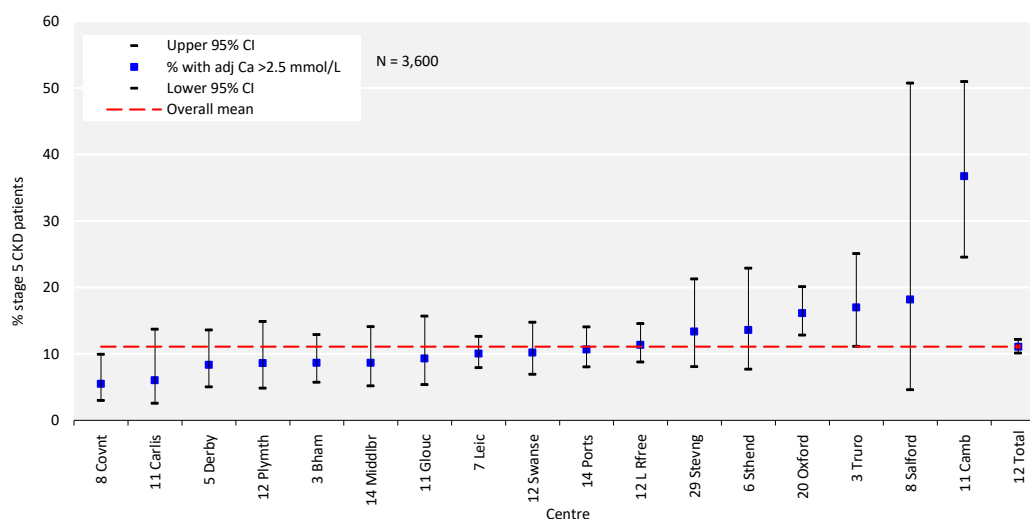

Figure 1.3 Percentage of adult patients prevalent to CKD stage G5 on 31/12/2019 with adjusted serum calcium (Ca) >2.5 mmol/L by centre

Anaemia in adult CKD patients

The percentage of patients with haemoglobin (Hb) 100–120 g/L is presented overall and by CKD stage. Inadequate data completeness in relation to erythropoiesis stimulating agents (ESAs) makes auditing against national guidelines difficult. Completeness of ESA data in the prevalent CKD population with eGFR ≤30 mL/min/1.73m² is shown in table 1.5.
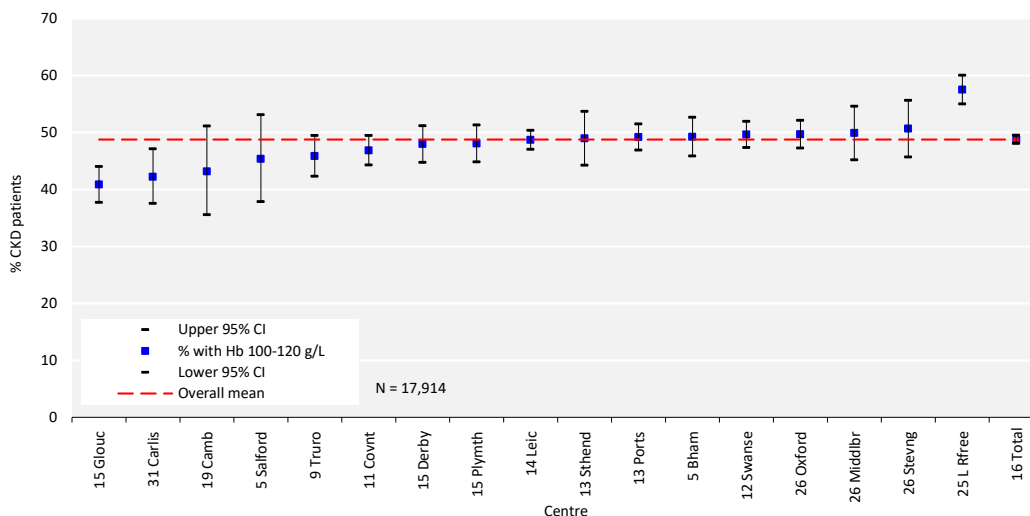

Figure 1.4 Percentage of adult patients prevalent to CKD stages G4 and 5 on 31/12/2019 with haemoglobin (Hb) 100–120 g/L by centre
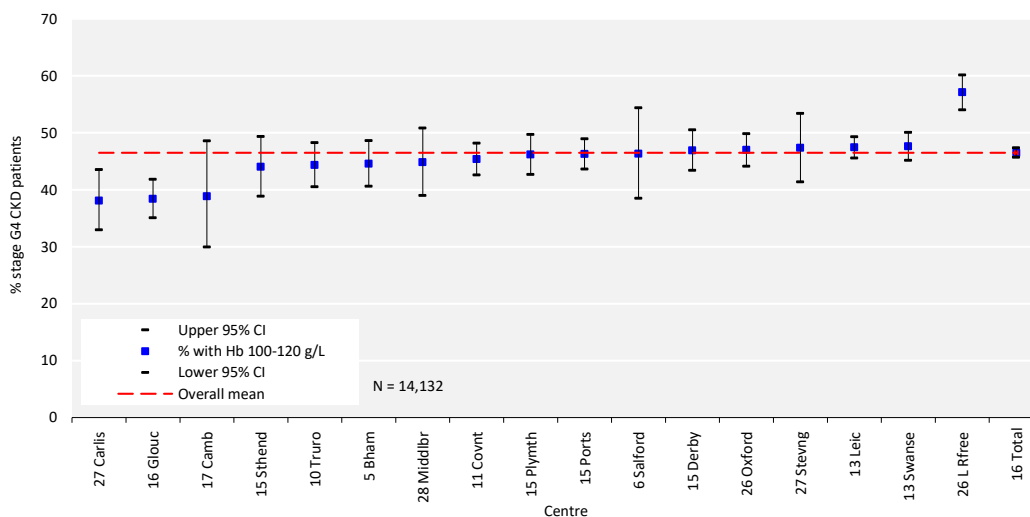

Figure 1.5 Percentage of adult patients prevalent to CKD stage G4 on 31/12/2019 with haemoglobin (Hb) 100–120 g/L by centre
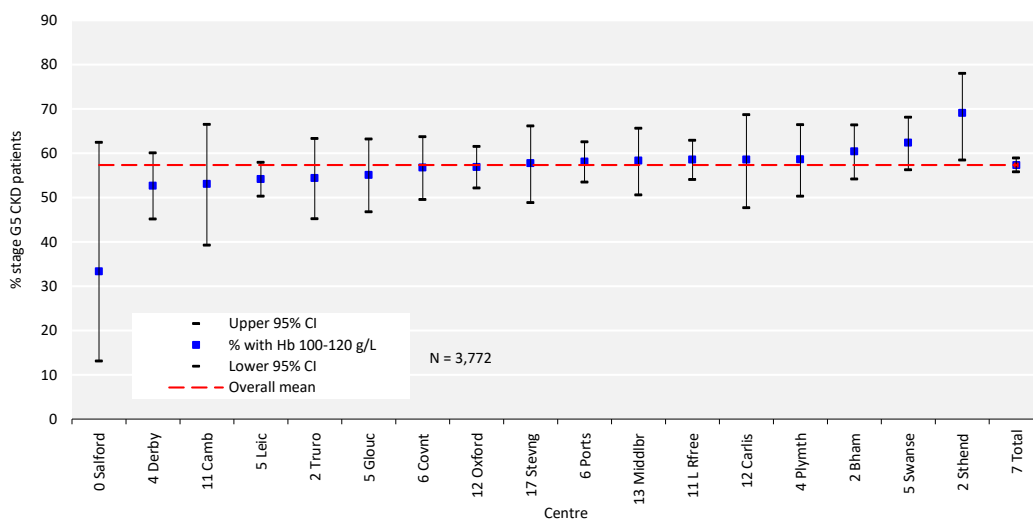
Figure 1.6 Percentage of adult patients prevalent to CKD stage G5 on 31/12/2019 with haemoglobin (Hb) 100-120 g/L by centre

Table 1.5 Completeness of erythropoiesis stimulating agent (ESA) data for adult patients prevalent to CKD stages G4 and 5 on 31/12/2019

	All stages	Stage G4	Stage G5
Number of centres	7	7	7
N on ESA	986	570	412
% on ESA	14.7	10.8	34.1
Range of % on ESA	8.2–21.2	7–15.8	23.4–42.4

The total includes the patients with old eGFR measurements who were classed as 'unknown stage'.