

## *Chapter 1*

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**Adults with chronic kidney disease (CKD) and estimated glomerular filtration rate (eGFR) <30mL/min/1.73m<sup>2</sup> in the UK at the end of 2021**

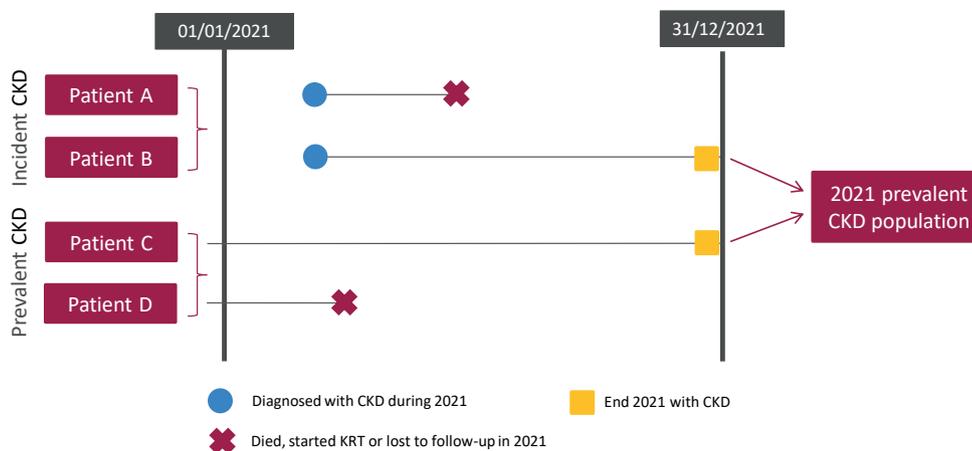
# Contents

Introduction .....	3
Rationale for analyses .....	4
Key findings .....	5
Analyses .....	6
Stage and demographics of adult CKD patients .....	6
Blood pressure in adult CKD patients .....	8
Biochemistry parameters in adult CKD patients .....	8
Anaemia in adult CKD patients .....	9

## Introduction

This is the third year the UKRR has published data in the annual report about patients with chronic kidney disease (CKD) outside the context of kidney replacement therapy (KRT) 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 kidney centres at the end of 2021 (figure 1.1). A ‘2021 prevalent CKD population’ is described, comprising individuals who:

- were reported by an adult kidney centre as receiving treatment for CKD at the end of 2021, and
- had an eGFR of  $<30\text{mL}/\text{min}/1.73\text{m}^2$  on their last recorded creatinine measurement.



**Figure 1.1** Pathways adult patients could follow to be included in the UK 2021 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]  $<15\text{ mL}/\text{min}/1.73\text{m}^2$ ) or CKD stage G4 (eGFR  $15\text{--}29\text{ mL}/\text{min}/1.73\text{m}^2$ ). The eGFR was calculated with CKD-EPI 2009 equation without racial adjustment using their last recorded creatinine from the last 2 years. 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 KRT/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 kidney centre, particularly those with earlier stages. Furthermore, not all kidney 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 kidney centres.

Consequently, this 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, kidney 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. In 2021 the UKRR received data from 18 units of the 54 adult centres in England and Wales (one less than in 2020).

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 UK Kidney Association guidelines ([ukkidney.org/health-professionals/guidelines/guidelines-commentaries](http://ukkidney.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 kidney centres in 2021 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 UK Kidney 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 ukkidney.org/audit-research/data-portals](http://data.portal.ukkidney.org/audit-research/data-portals)).

**Table 1.1** The UK Kidney Association audit measures relevant to CKD that are reported in this chapter

The UK Kidney 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 <sup>2</sup> (using CKD-EPI equation) and a 6 monthly 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 KRT 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.

## Key findings

- Data about patients with CKD stages G4 and 5 who were not on KRT was reported by just 18 of the UK's adult kidney centres.
- The 2021 prevalent CKD population comprised 21,334 patients, with a median age of 77.2 years, compared to a median age of 59.7 years for those on KRT.
- CKD prevalence was 1,176 per million population (pmp) overall, but ranged from 154 to 2,463 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 KRT population cannot be addressed until this is achieved.

## Analyses

### Stage and demographics of adult CKD patients

For the 18 adult kidney centres, the number of prevalent patients with CKD and eGFR  $\leq 30$  mL/min/1.73m<sup>2</sup> 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 KRT for the eventuality of kidney failure, and which represent active treatment for an individual who might otherwise have started KRT. 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 31/12/2021, including those on conservative care (CC) by stage and centre; completeness of proteinuria; number of CKD and KRT patients as a proportion of the adult catchment population

Centre	N with CKD	N on CC	Total	% stage G4	% stage G5	% with proteinuria data (either PCR or ACR)	Estimated catchment population (millions)	CKD 2021 crude rate (pmp)	KRT 2021 crude rate (pmp)
Bham <sup>1</sup>	828	25	853	69.4	30.6	0.0	2.05	415	1,611
Camb	144	0	144	62.5	37.5	0.7	0.94	154	1,739
Carlisle	439	60	499	82.6	17.4	60.7	0.26	1,954	1,194
Covnt	1,581	0	1,581	87.7	12.3	4.0	0.80	1,987	1,407
Derby	1,099	0	1,099	82.1	17.9	0.0	0.56	1,957	1,227
EssexMS <sup>2</sup>	493	0	493	82.8	17.2	52.5	0.99	496	896
Glouc	1,101	0	1,101	85.8	14.2	0.1	0.51	2,158	1,070
L Guys	951	0	951	71.7	28.3	48.9	1.01	945	2,307
L Kings	391	0	391	35.3	64.7	22.3	0.93	419	1,428
L Rfree	1,708	219	1,927	73.4	26.6	57.9	1.33	1,451	1,792
Leic	3,756	0	3,756	82.5	17.5	44.8	2.09	1,800	1,265
Middlbr	495	0	495	66.1	33.9	0.0	0.81	613	1,183
Oxford	1,903	0	1,903	76.7	23.3	0.0	1.45	1,316	1,385
Plymth	988	1	989	84.5	15.5	35.1	0.40	2,463	1,365
Ports	2,003	2	2,005	73.7	26.3	41.6	1.75	1,145	1,109
Salford	480	1	481	92.5	7.5	63.0	1.15	417	1,054
Swanse	1,815	25	1,840	84.8	15.2	0.0	0.76	2,426	1,125
Truro	764	62	826	82.9	17.1	46.1	0.36	2,306	1,287
<b>Total</b>	<b>20,939</b>	<b>395</b>	<b>21,334</b>	<b>79.0</b>	<b>21.0</b>	<b>27.4</b>	<b>18.14</b>	<b>1,176</b>	<b>1,386</b>

<sup>1</sup>The catchment population and 2021 crude rate for KRT reflect the combined Bham population (QEH and Heartlands kidney centres), but CKD patients were only reported for QEH

<sup>2</sup>The catchment population and 2021 crude rate for KRT reflect the combined population for middle-south Essex (Basildon, Chelmsford and Southend renal centres) though CKD patients were only reported for Southend

CC - conservative care

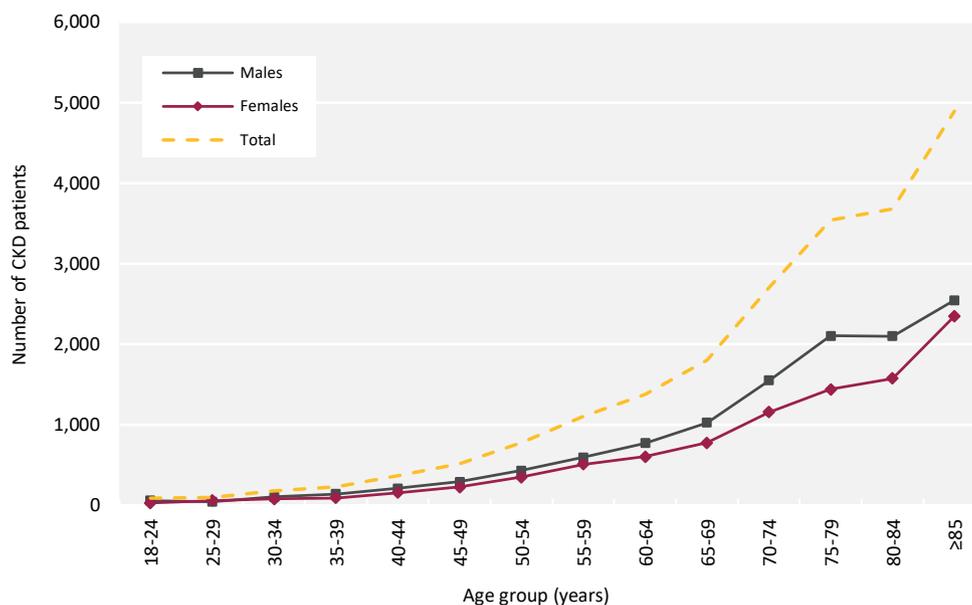
PCR - protein creatinine ratio

ACR - albumin creatinine ratio

The proportion of patients with CKD and eGFR  $\leq 30$  mL/min/1.73m<sup>2</sup> 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 31/12/2021 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	853	68.3	58.6	57.5	25.7	13.6	3.2	12.9	11.3	3.5	28.7
Camb	144	73.3	56.3	95.6	2.2	0.7	1.5	6.3	45.1	34.4	63.0
Carlisle	499	77.7	54.9	99.4	0.3	0.3	0.0	32.1	17.8	14.6	33.3
Covnt	1,581	79.6	55.6	88.7	9.1	2.2	0.0	7.8	81.5	80.8	86.6
Derby	1,099	77.7	55.1	90.4	6.4	2.4	0.7	14.4	93.6	92.9	97.0
EssexMS	493	79.2	55.8	93.4	2.5	1.6	2.5	1.0	24.3	19.1	49.4
Glouc	1,101	79.5	58.6	95.2	2.1	1.5	1.2	6.1	49.8	47.6	62.8
L Guys	951	71.0	58.0	59.2	8.0	28.3	4.5	26.0	50.8	44.7	66.2
L Kings	391	66.2	58.1	44.7	9.0	44.1	2.3	20.5	19.7	8.0	26.1
L Rfree	1,927	75.5	54.9	58.0	18.1	13.6	10.3	19.6	46.2	42.2	57.1
Leic	3,756	78.3	54.4	80.7	15.6	2.3	1.3	26.4	58.8	57.0	67.1
Middlbr	495	72.0	56.6	94.6	4.9	0.0	0.5	21.6	21.0	15.0	32.7
Oxford	1,903	76.2	57.6	87.4	5.3	3.2	4.2	75.0	13.9	10.6	24.6
Plymth	989	80.0	51.6	98.6	0.4	0.1	0.8	4.0	17.0	15.6	24.8
Ports	2,005	76.0	57.7	98.1	1.0	0.5	0.4	40.6	15.0	10.8	26.7
Salford	481	75.1	59.9	85.4	11.0	2.1	1.6	9.1	13.3	13.7	8.3
Swanse	1,840	79.2	56.0	98.3	0.8	0.3	0.6	40.7	30.2	27.1	47.5
Truro	826	80.2	55.4	98.3	0.6	0.4	0.7	0.4	20.6	14.9	48.2
<b>Total</b>	<b>21,334</b>	<b>77.2</b>	<b>56.0</b>	<b>84.1</b>	<b>8.5</b>	<b>5.2</b>	<b>2.2</b>	<b>25.9</b>	<b>39.9</b>	<b>37.7</b>	<b>48.3</b>

**Figure 1.2** Number of adult patients prevalent to CKD stages G4 and 5 on 31/12/2021 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, Swansea).

**Table 1.4** Blood pressures in adult patients prevalent to CKD stages G4 and 5 on 31/12/2021 by stage

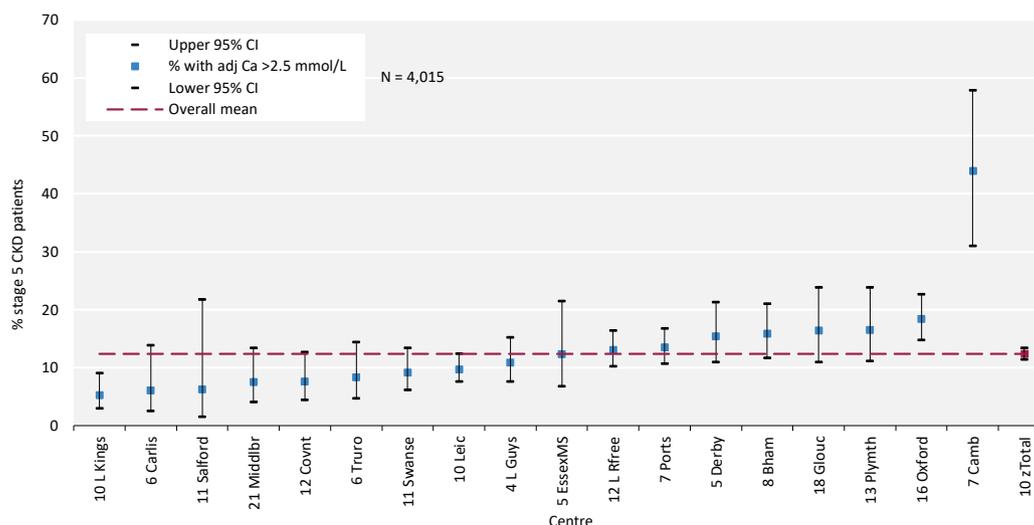
	All stages				Stage G4				Stage G5			
	N (%) complete)	Median SBP	Median DBP	N (%) <140/90 <sup>1</sup>	N (%) complete)	Median SBP	Median DBP	N (%) <140/90 <sup>1</sup>	N (%) complete)	Median SBP	Median DBP	N (%) <140/90 <sup>1</sup>
<b>All</b>	4524 (46.1)	142	75	1909 (42.2)	3198 (41.4)	142	75	1398 (43.7)	1326 (63.5)	144	76	511 (38.5)
<b>Age group (yrs)</b>												
18-29	56 (66.7)	133	85	32 (57.1)	38 (63.3)	132	84.5	23 (60.5)	18 (75)	134.5	85	9 (50)
30-39	113 (64.6)	133	84	69 (61.1)	85 (63)	133	83	55 (64.7)	28 (70)	132	84.5	14 (50)
40-49	264 (62.6)	139	84	121 (45.8)	170 (56.7)	138	83	83 (48.8)	94 (77)	142	84	38 (40.4)
50-59	498 (58.8)	141	82	212 (42.6)	326 (54.2)	140	81	146 (44.8)	172 (70.2)	143	82	66 (38.4)
60-64	329 (52.3)	143	78	137 (41.6)	214 (45.6)	143.5	78	92 (43)	115 (71.9)	143	77	45 (39.1)
65-69	412 (51.9)	145	77	163 (39.6)	294 (48.7)	143	77	120 (40.8)	118 (62.1)	146	76.5	43 (36.4)
70-74	647 (50.3)	142	74	273 (42.2)	473 (45.9)	142	75	202 (42.7)	174 (67.7)	144.5	74	71 (40.8)
75-79	746 (44.3)	142	73	326 (43.7)	538 (39.2)	141	73	238 (44.2)	208 (66.7)	142	72.5	88 (42.3)
80-84	717 (42.8)	145	72	279 (38.9)	527 (38.8)	144	71	211 (40)	190 (59.9)	150	73	68 (35.8)
≥85	742 (33.5)	145	70	297 (40)	533 (29.7)	143	70	228 (42.8)	209 (49.6)	149	72	69 (33)
<b>Sex</b>												
Male	2618 (47.6)	142	75	1130 (43.2)	1857 (42.9)	141	75	821 (44.2)	761 (64.5)	144	76	309 (40.6)
Female	1906 (44.2)	143	76	779 (40.9)	1341 (39.4)	142	76	577 (43)	565 (62.2)	145	77	202 (35.8)

<sup>1</sup>% <140/90 mmHg of patients with complete blood pressure data

DBP – diastolic blood pressure; SBP – systolic blood pressure (both measured in mmHg)

## Biochemistry parameters in adult CKD patients

The UK Kidney 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.

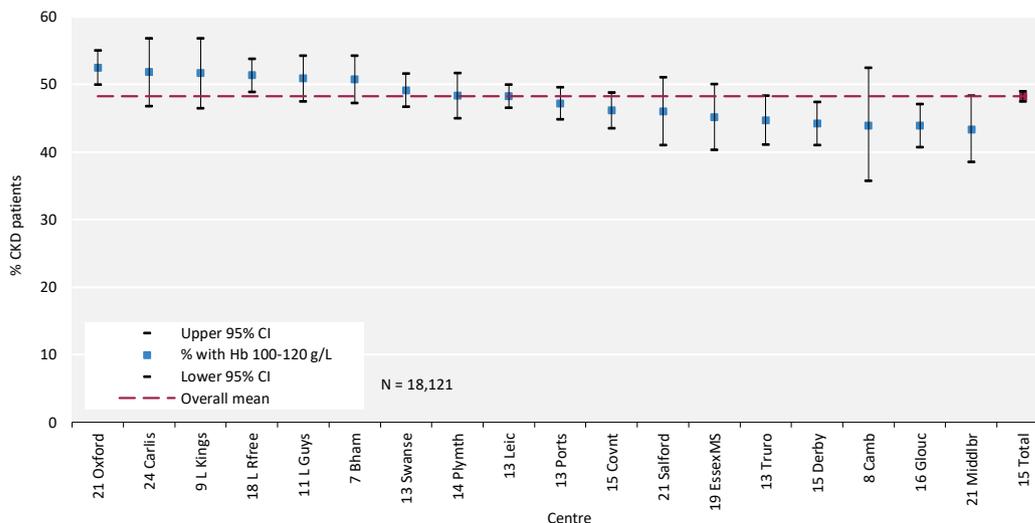


**Figure 1.3** Percentage of adult patients prevalent to CKD stage G5 on 31/12/2021 with adjusted serum calcium (Ca) >2.5 mmol/L by centre

CI - confidence interval

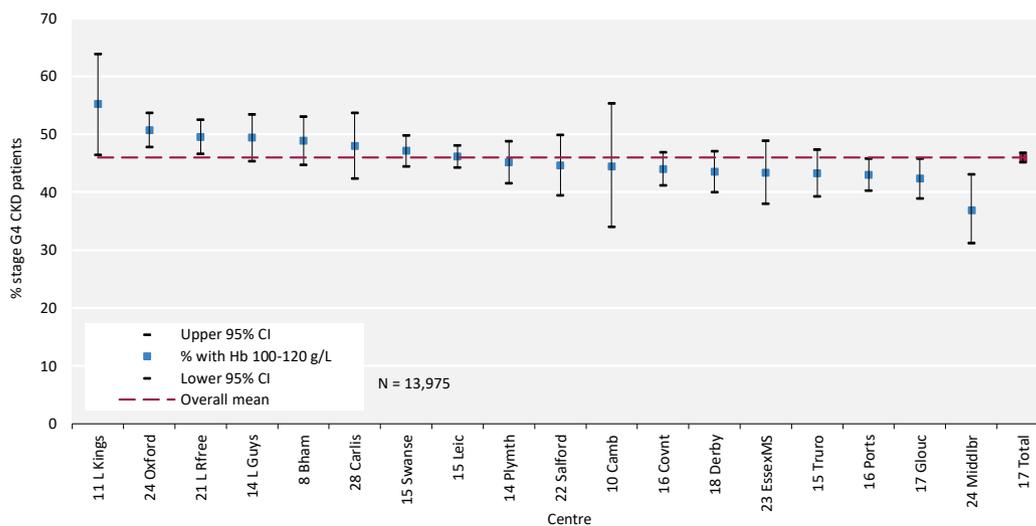
## Anaemia in adult CKD patients

The percentage of patients with haemoglobin (Hb) 100–120 g/L is presented overall and by CKD stage.



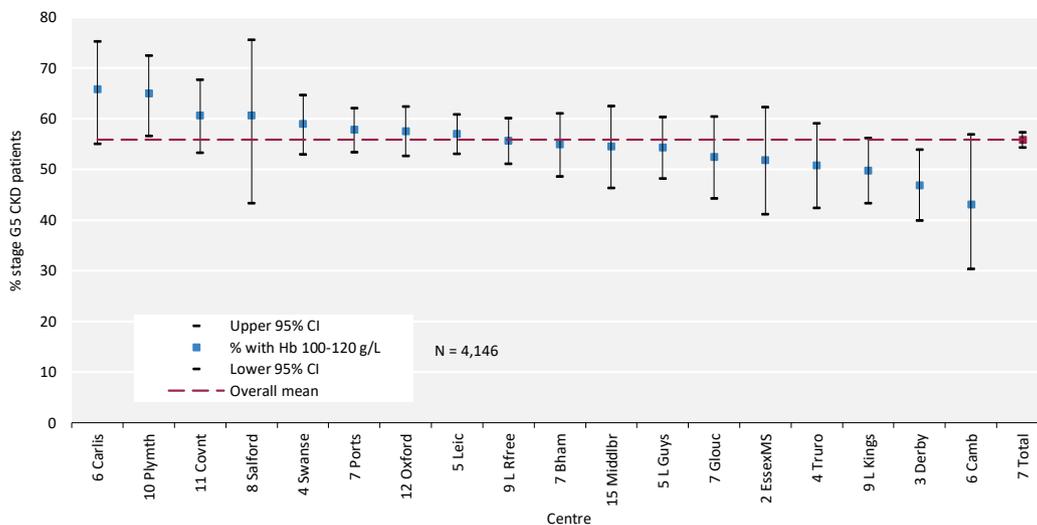
**Figure 1.4** Percentage of adult patients prevalent to CKD stages G4 and 5 on 31/12/2020 with haemoglobin (Hb) 100–120 g/L by centre

CI - confidence interval



**Figure 1.5** Percentage of adult patients prevalent to CKD stage G4 on 31/12/2021 with haemoglobin (Hb) 100–120 g/L by centre

CI - confidence interval



**Figure 1.6** Percentage of adult patients prevalent to CKD stage G5 on 31/12/2021 with haemoglobin (Hb) 100-120 g/L by centre

CI - confidence interval