

Chapter 8

Children and young people with chronic kidney disease (CKD) and on kidney replacement therapy (KRT) for end-stage kidney disease (ESKD) in the UK in 2024

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Introduction

This chapter describes the population of children and young people aged <18 years with end-stage kidney disease (ESKD) who were on kidney replacement therapy (KRT) in the UK for at least 90 days in 2024 (figure 8.1). This included patients with a kidney transplant (Tx) and patients on dialysis – in-centre haemodialysis (ICHD), home haemodialysis (HHD) and peritoneal dialysis (PD). Patients coded as acute kidney injury (AKI) or ESKD who recovered within the first 90 days of KRT were excluded from the analyses. For the second time, this report includes a dedicated section on children and young people (<18 years) with chronic kidney disease (CKD), outside the context of KRT or AKI. The content of this section is expected to evolve as data submission and completeness become more complete.

There are 13 paediatric kidney centres in the UK, all of which are equipped to provide both haemodialysis (HD) and PD. Ten of these centres also perform kidney transplantation. Children aged 16 to <18 years may be managed in either paediatric or adult services. This is variable across the UK and dependent on local practices, social factors and patient/family wishes. Children (aged <16 years) and young people (aged 16 to <18 years) are reported separately. Data about young people also include those managed in adult centres, to provide a more complete epidemiological picture for this population.

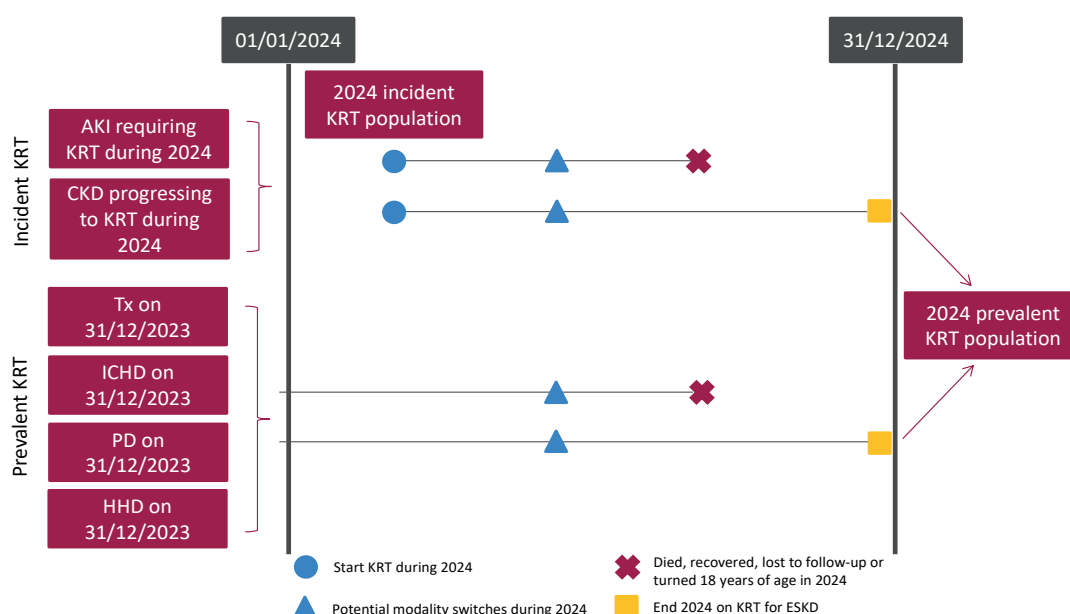


Figure 8.1 Pathways children and young people could follow to be included in the UK 2024 incident and/or prevalent KRT populations

Note that patients who recovered kidney function before 90 days on dialysis are not included in the KRT population
CKD – chronic kidney disease

For children aged <16 years, the following populations included in this chapter are:

- **Incident population:** patients who started KRT during 2024 and remained on KRT for at least 90 days.
- **Prevalent population:** patients who were on KRT at the end of 2024 and still under the care of a paediatric kidney centre.
- **Five-year populations:** patients who started KRT and remained on KRT for at least 90 days in the periods 2010-2014, 2015-2019 and 2020-2024.

For young people aged 16 to <18 years, the following populations included in this chapter are:

- **Incident population:** patients who started KRT during 2024 in either an adult or paediatric centre and remained on KRT for at least 90 days.
- **Prevalent population:** patients who were on KRT at the end of 2024 in either an adult or paediatric centre.

This chapter addresses the following key aspects of the care of children incident to or on KRT for which there are evidence-based guidelines (table 8.1):

- **Growth:** this includes age- and sex-adjusted heights and weights.
- **Cardiovascular risk factors:** these include age-adjusted blood pressure, cholesterol and body mass index (BMI).
- **Complications associated with KRT:** these include anaemia and mineral and bone disorders.

The sections for these aspects (and tables 8.3 and 8.4) use a restricted prevalent cohort. Children who have moved centre, or changed or started treatment in the quarter are not included for consistency of measurements.

For young people, the following aspects of care are addressed:

- **Cardiovascular risk factors:** these include blood pressure using raw systolic and diastolic values which are audited against European Society of Hypertension guidelines for the management of high blood pressure in children and adolescents (2016).
- **Complications associated with KRT:** these include anaemia and mineral and bone disorders. Paediatric reference ranges for children and young people up to 18 years are used as the standard measure.

For children and young people aged <18 years with CKD not on KRT, the following population is included in the chapter:

A 2024 prevalent CKD population is described, comprising individuals who:

- were reported by a paediatric kidney centre as receiving treatment for CKD at the end of 2024, and
- had an eGFR of <30 mL/min/1.73m² on their last recorded creatinine measurement.

Individuals are categorised as having CKD stage G5 (estimated glomerular filtration rate [eGFR] <15 mL/min/1.73m²) or CKD stage G4 (eGFR 15–29 mL/min/1.73m²). Further categorisation, e.g. by eGFR trend or albuminuria is not possible using UK Renal Registry (UKRR) data.

Possible pathways that a child could follow to be included in the 2024 prevalent CKD children population can be seen in figure 1.1 of Chapter 1 on the adult CKD population.

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, particularly those with earlier stages, may receive care outside specialist kidney centres and are therefore not captured here. In addition, not all paediatric kidney centres are currently submitting CKD data to the UKRR.

Rationale for analyses

For both the children and young people sections, the analyses begin with a description of the 2024 incident and prevalent KRT populations, including the number on KRT per million age-related population (pmarp).

For children, height and weight are measures of healthy growth, which may be affected by kidney disease as well as its treatment. These measures are therefore presented for each centre in comparison to the UK median for this cohort.

The published guidelines listed below provide audit measures relevant to the care of children and young people on KRT and, where data permit, their attainment by UK paediatric kidney centres in 2024 is reported in this chapter (table 8.1). Due to the small numbers of young people identified, we have omitted reporting by centre for this population.

For children, reporting estimated glomerular filtration rate (eGFR) is dependent on the completeness of both creatinine and height data. For young people, the Full Age Spectrum (FAS) equation was used to calculate eGFR – height data for young people managed in adult centres were incomplete and therefore a height-free calculation was used to standardise reporting and enable direct comparison within this population.

Table 8.1 Audit measures relevant to KRT incidence and prevalence that are reported in this chapter

Audit guideline	Audit criteria	Related analysis/analyses
The UK Kidney Association: Treatment of adults and children with kidney failure: standards and audit measures (2002)	Height and weight to be monitored at each clinic visit and plotted on the growth charts of healthy children and adolescents	Figures 8.6–8.13
	Blood pressure during PD or after HD to be maintained at <90 th percentile for age, sex and height.	Tables 8.15–8.16, figures 8.14–8.15
	Blood pressure in Tx patients to be maintained at <90 th percentile for age, sex and height	
	Serum phosphate and calcium should be kept within the normal range. Parathyroid hormone (PTH) levels should be maintained within twice the upper limit of the normal range but, contrary to adult standards, may be kept within the normal range if growth is normal	Table 8.18
	Serum bicarbonate concentrations should be 20–26 mmol/L	Table 8.18
National Heart Lung and Blood Institute and Kidney Disease Improving Global Outcomes (KDIGO) (2013)	Typically maintain the aspirational haemoglobin range 100–120 g/L for young people and children aged ≥2 years and 95–115 g/L for children <2 years, reflecting the lower normal range in that age group	Table 8.18
	Screening children at risk of secondary dyslipidaemias including those with CKD is recommended	Tables 8.3–8.4, 8.16

Detail about the completeness of data returned to the UKRR is available through the UKRR data portal (ukkidney.org/audit-research/data-portals). The completeness of both transferrin saturation and percentage hypochromic red cells was too low to be reported as measures of iron stores. Audit measures that cannot be reported because the required data items were not collected by the UKRR are omitted – this includes reticulocyte haemoglobin content.

For children, data for height, weight, BMI and blood pressure vary with age, sex and size and are therefore presented as z-scores. Z-scores are a way of expressing the deviation of a given measurement from the age and size-specific population mean. This relies on the completeness of height data during the period in question.

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. A patient first seen by kidney services within 90 days of starting KRT for ESKD is defined as a 'late presentation'. In this report 'late presentation' is used interchangeably with 'late referral'.

For information on data quality issues relating to the following centres see Appendix A section 2.2: Antrim, Belfast, Cambridge, Ipswich, Manchester Royal Infirmary, Ulster, Manchester Children's Hospital and Royal Belfast Hospital for Sick Children.

Key findings

Children

- In 2024, 108 patients aged under 16 years commenced KRT for ESKD in the UK, a decrease from 118 patients in 2023. This corresponds to an incidence rate of 9 pmarp, similar to that in 2023.
- 816 patients aged under 16 years were receiving KRT at UK paediatric kidney centres on 31/12/2024, less than in 2023. The prevalence was 65 pmarp, with 77.0% having a functioning transplant (53.0% from living donors and 24.0% from deceased donors), 12.2% on haemodialysis, and 10.8% on peritoneal dialysis.
- Tubulointerstitial disease accounted for approximately 50% of all primary renal diseases (PRDs) in prevalent paediatric patients, with a high male:female ratio (3:1).
- At the time of transfer to adult services, 79% of paediatric patients had a functioning kidney Tx.
- The median height z-score for children on dialysis was -1.8 compared with -1.1 for those with a functioning Tx.
- The median weight z-score for children on dialysis was -1.3 compared with -0.3 for those with a functioning Tx.
- The median eGFR of children with a kidney transplant on 31/12/2024 was 59 mL/min/1.73m² and 8.0% had eGFR <30 mL/min/1.73m².
- Of those with complete data, 71.4% of the prevalent paediatric KRT population had 1 or more risk factors for cardiovascular disease; 3.6% had 3 risk factors.
- 64.0% and 64.7% of prevalent HD patients achieved systolic blood pressure (SBP) and diastolic blood pressure (DBP) values <90th percentile, respectively.
- 71.4% and 76.9% of prevalent PD patients achieved SBP and DBP values <90th percentile, respectively.
- 81.9% and 78.8% of prevalent Tx patients achieved SBP and DBP values <90th percentile, respectively.

Young people

- In 2024, 33 young people aged 16 to <18 years started KRT for ESKD in the UK, corresponding to an incidence rate of 20 pmarp.
- In young people aged 16 to <18 years, KRT prevalence was 165 pmarp, with 274 patients receiving KRT, 83% of whom were managed in paediatric kidney centres.
- Tubulointerstitial disease accounted for 37.4% of all PRDs in prevalent young people, followed by glomerular disease (19.4%) and familial/hereditary nephropathies (16.7%).
- The overall median eGFR of young people with a kidney transplant on 31/12/2024 was 68 mL/min/1.73m² and 4.9% had an eGFR of <30 mL/min/1.73m².
- 56.8% of young people on dialysis and 61.0% of those transplanted had a blood pressure in the 'normal' range (<130/80 mmHg).

CKD

- In 2024, 135 patients aged under 18 years had CKD stage G4/5 across four paediatric centres, with a prevalence rate of 22 pmarp with the majority (70%) classified as CKD stage G4. The median age was 10.3 years (interquartile range (IQR) 5.5 - 13.9) and 65.9% were male.

Analyses – children

Changes to the prevalent paediatric KRT population

For the 13 paediatric kidney centres, the number of prevalent children on KRT was calculated as a proportion of the estimated centre catchment population (calculated as detailed in appendix A).

Table 8.2 Number of prevalent paediatric KRT patients by year and by centre; number of KRT patients as a proportion of the catchment population

Centre	N on KRT					Estimated catchment population <16 (millions)	2024 crude rate (pmarp)
	2020	2021	2022	2023	2024		
Bham_P	105	98	103	94	83	1.24	67
Blfst_P	27	25	25	22	22	0.40	56
Brstl_P	49	52	48	46	47	0.92	51
Cardf_P	29	28	26	29	31	0.39	79
Glasg_P	58	56	58	54	49	0.91	54
L Eve_P	80	81	82	78	76	1.56	49
L GOSH_P	157	157	158	169	159	2.59	61
Leeds_P	57	59	58	59	62	0.80	78
Livpl_P	39	42	47	54	49	0.59	82
Manch_P	87	86	82	96	84	0.95	88
Newc_P	35	34	31	32	30	0.53	56
Nottm_P	85	83	79	84	80	1.26	63
Soton_P	34	44	45	46	44	0.46	95
UK	842	845	842	863	816	12.60	65

pmarp – per million age-related population

Total prevalent numbers for Manch_P have been used in this table for 2023 and 2024, but not elsewhere in this chapter (except where noted)

Data completeness for prevalent paediatric KRT patients

Data returns of key variables for Tx and dialysis patients <16 years old at the end of 2024 are shown in tables 8.3 and 8.4, respectively, with further detail available through the UKRR data portal (ukkidney.org/audit-research/data-portals).

Table 8.3 Data completeness for paediatric patients (<16 years old) prevalent to Tx on 31/12/2024 by centre

Centre	N with Tx	Data completeness (%)											
		Height	Weight	BMI	SBP	DBP	Hb	Creat	Chol	Bicarb	PTH	Ca	Phos
Bham_P	58	0.0	0.0	0.0	0.0	0.0	98.3	100.0	93.1	100.0	84.5	100.0	100.0
Blfst_P	21	0.0	14.3	0.0	0.0	0.0	100.0	100.0	4.8	100.0	71.4	100.0	100.0
Brstl_P	39	0.0	97.4	0.0	97.4	94.9	97.4	97.4	23.1	94.9	82.1	94.9	97.4
Cardf_P	25	92.0	92.0	92.0	92.0	16.0	92.0	92.0	8.0	92.0	20.0	92.0	92.0
Glasg_P	45	95.6	95.6	95.6	97.8	97.8	88.9	88.9	55.6	95.6	82.2	88.9	88.9
L Eve_P	56	100.0	100.0	100.0	100.0	100.0	75.0	100.0	57.1	100.0	100.0	100.0	100.0
L GOSH_P	121	29.8	35.5	29.8	24.0	24.0	100.0	100.0	72.7	5.8	93.4	0.0	100.0
Leeds_P	44	0.0	0.0	0.0	0.0	0.0	100.0	100.0	90.9	100.0	100.0	100.0	100.0
Livpl_P	33	0.0	0.0	0.0	3.0	0.0	100.0	100.0	60.6	100.0	97.0	100.0	100.0
Newc_P	22	0.0	0.0	0.0	100.0	9.1	100.0	100.0	81.8	100.0	81.8	100.0	100.0
Nottm_P	46	91.3	91.3	91.3	89.1	78.3	95.7	95.7	84.8	93.5	93.5	95.7	95.7
Soton_P	34	100.0	100.0	100.0	67.7	50.0	79.4	79.4	50.0	79.4	76.5	79.4	79.4
UK	544	43.0	51.8	43.0	50.9	41.4	94.1	96.9	63.4	76.1	86.4	74.5	96.9

Bicarb – bicarbonate; BMI – body mass index; Ca – calcium; Chol – cholesterol; Creat – creatinine; DBP – diastolic blood pressure; Hb – haemoglobin; Phos – phosphate; PTH – parathyroid hormone; SBP – systolic blood pressure

Children who have moved centre, or changed or started treatment in the quarter are not included

Table 8.4 Data completeness for paediatric patients (<16 years old) prevalent to dialysis on 31/12/2024 by centre

Centre	N on dialysis	Data completeness (%)										
		Height	Weight	BMI	SBP	DBP	Hb	Chol	Bicarb	PTH	Ca	Phos
Bham_P	22	0.0	0.0	0.0	0.0	0.0	100.0	100.0	100.0	59.1	100.0	100.0
Blfst_P	1	0.0	0.0	0.0	0.0	0.0	100.0	0.0	100.0	100.0	100.0	100.0
Brstl_P	6	0.0	100.0	0.0	100.0	66.7	100.0	100.0	100.0	100.0	100.0	100.0
Cardf_P	3	100.0	100.0	100.0	33.3	0.0	100.0	100.0	100.0	100.0	100.0	100.0
Glasg_P	3	100.0	100.0	100.0	100.0	100.0	100.0	33.3	100.0	100.0	100.0	100.0
L Eve_P	15	100.0	100.0	100.0	100.0	100.0	86.7	86.7	93.3	93.3	93.3	93.3
L GOSH_P	30	70.0	96.7	70.0	76.7	76.7	100.0	50.0	16.7	100.0	0.0	100.0
Leeds_P	16	0.0	31.3	0.0	31.3	0.0	100.0	50.0	93.8	100.0	93.8	93.8
Livpl_P	13	0.0	0.0	0.0	0.0	0.0	100.0	53.9	100.0	100.0	100.0	100.0
Newc_P	8	0.0	0.0	0.0	62.5	12.5	100.0	50.0	100.0	87.5	100.0	100.0
Nottm_P	28	85.7	85.7	85.7	85.7	57.1	85.7	46.4	85.7	85.7	85.7	85.7
Soton_P	9	100.0	100.0	100.0	88.9	66.7	88.9	66.7	88.9	88.9	88.9	88.9
UK	154	48.7	61.0	48.7	58.4	44.2	95.5	63.6	79.2	89.6	76.0	95.5

Bicarb – bicarbonate; BMI – body mass index; Ca – calcium; Chol – cholesterol; Creat – creatinine; DBP – diastolic blood pressure; Hb – haemoglobin; Phos – phosphate; PTH – parathyroid hormone; SBP – systolic blood pressure

Children who have moved centre, or changed or started treatment in the quarter are not included

Changes to the incident paediatric KRT population

The number of incident patients on KRT <16 years old was used to calculate age-related rates per million population and were grouped by age, sex, five year time period, ethnicity, centre and PRD.

Table 8.5 Paediatric patients (<16 years old) incident to KRT in 2024 by age and sex

Age group (yrs)	All patients		Male		Female	
	N	pmarp	N	pmarp	N	pmarp
0-<2	5	4	3	4	2	3
2-<4	10	7	4	5	6	8
4-<8	20	6	11	7	9	6
8-<12	24	7	14	8	10	6
12-<16	33	10	16	9	17	10
<16 yrs	92	7	48	7	44	7

pmarp – per million age-related population

Including Manch_P the overall N was 108 and pmarp 9

Table 8.6 Paediatric patients (<16 years old) incident to KRT by age and 5 year time period

Age group (yrs)	2010-2014		2015-2019		2020-2024	
	N	pmarp	N	pmarp	N	pmarp
0-<2	102	13	108	14	76	11
2-<4	71	9	67	8	49	7
4-<8	94	6	114	7	79	5
8-<12	126	9	129	8	149	9
12-<16	177	12	180	13	192	12
<16 yrs	570	10	598	10	545	9

pmarp – per million age-related population

Including Manch_P the overall N for 2020-2024 was 573 and pmarp 9

Table 8.7 Paediatric patients (<16 years old) incident to KRT by ethnicity and 5 year time period

Ethnicity	2010-2014		2015-2019		2020-2024	
	N	%	N	%	N	%
White	398	69.8	401	67.6	332	66.0
Asian	110	19.3	115	19.4	96	19.1
Black	21	3.7	41	6.9	30	6.0
Other	41	7.2	36	6.1	45	8.9
<16 yrs	570	100.0	593	100.0	503	100.0

5 children in 2015-2019 and 42 in 2020-2024 with no ethnicity recorded were excluded

Table 8.8 Paediatric patients (<16 years old) incident to KRT by centre and 5 year time period

Centre	2010-2014		2015-2019		2020-2024	
	N	%	N	%	N	%
Bham_P	62	10.9	81	13.5	66	11.5
Blfst_P	21	3.7	10	1.7	8	1.4
Brstl_P	39	6.8	30	5.0	23	4.0
Cardf_P	22	3.9	21	3.5	21	3.7
Glasg_P	35	6.1	45	7.5	31	5.4
L Eve_P	57	10.0	65	10.9	66	11.5
L GOSH_P	100	17.5	100	16.7	114	19.9
Leeds_P	50	8.8	42	7.0	40	7.0
Livpl_P	31	5.4	27	4.5	42	7.3
Manch_P	61	10.7	69	11.5	52	9.1
Newc_P	21	3.7	35	5.9	13	2.3
Nottm_P	51	8.9	50	8.4	64	11.2
Soton_P	20	3.5	23	3.8	33	5.8
<16 yrs	570	100.0	598	100.0	573	100.0

Total incident numbers for Manch_P have been used in this table for 2023 and 2024, but not elsewhere in this chapter (except where noted)

Primary renal diseases (PRDs) were grouped into categories as shown in table 8.9, with the mapping of disease codes into groups explained in more detail in appendix A.

Table 8.9 Paediatric patients (<16 years old) incident to KRT by primary renal disease (PRD) and 5 year time period

PRD	2010-2014		2015-2019		2020-2024	
	N	%	N	%	N	%
Tubulointerstitial disease	283	49.9	282	47.2	188	42.3
- CAKUT	275	48.5	272	45.6	176	39.6
- Non-CAKUT	8	1.4	10	1.7	12	2.7
Glomerular disease	72	12.7	107	17.9	97	21.8
Familial/hereditary nephropathies	109	19.2	91	15.2	71	16.0
Systemic diseases affecting the kidney	20	3.5	23	3.9	16	3.6
Miscellaneous renal disorders	83	14.6	94	15.7	72	16.2
Total (with data)	567	100.0	597	100.0	444	100.0
Missing	3	0.5	1	0.2	101	18.5

CAKUT – congenital anomalies of the kidneys and urinary tract

Start modality of incident paediatric KRT patients

Start modality used by patients <16 years old starting KRT between 2010 and 2024 was grouped by five year time periods.

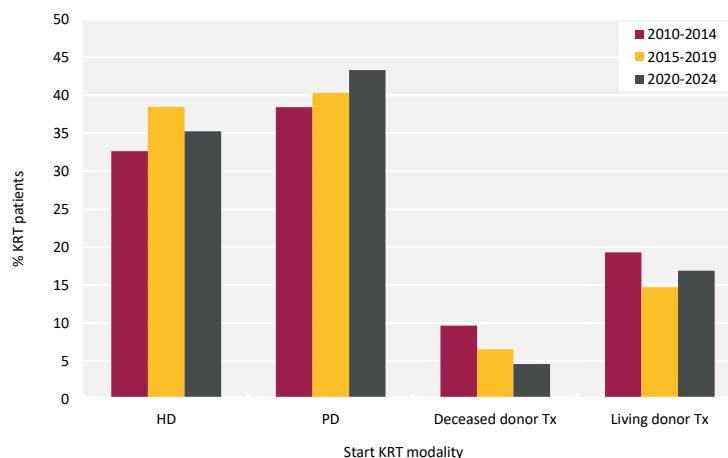


Figure 8.2 Start KRT modality for paediatric patients (<16 years old) incident to KRT by 5 year time period

Pre-emptive transplantation in incident paediatric KRT patients

The analysis of pre-emptive transplantation excluded patients starting KRT aged <3 months and patients known to have presented late.

Table 8.10 Pre-emptive transplantation in the incident paediatric KRT population aged 3 months to 16 years by 5 year time period, sex, ethnicity, age at start of KRT and primary renal disease (PRD)

	N on KRT	N (%) with pre-emptive Tx
Total cohort analysed (2010-2024)	1,312	403 (30.7)
Time period		
2010-2014	430	162 (37.7)
2015-2019	453	125 (27.6)
2020-2024	429	116 (27.0)
Sex		
Male	819	278 (33.9)
Female	493	125 (25.4)
Ethnicity		
White	871	314 (36.1)
Asian	247	48 (19.4)
Black	67	14 (20.9)
Other	91	21 (23.1)
Age at start of RRT (yrs)		
3 mths-<2	157	6 (3.8)
2-<4	162	50 (30.9)
4-<8	231	102 (44.2)
8-<12	326	104 (31.9)
12-<16	436	141 (32.3)
PRD		
Tubulointerstitial disease	631	266 (42.2)
Glomerular disease	200	8 (4.0)
Familial/hereditary nephropathies	203	54 (26.6)
Systemic diseases affecting the kidney	40	14 (35.0)
Miscellaneous renal disorders	156	41 (26.3)

74 children were excluded because they were aged <3 months; 327 children were excluded because they presented late

Demographics of prevalent paediatric KRT patients

The number of prevalent patients on KRT <16 years old was used to calculate age-related rates per million population and were grouped by age, sex and ethnicity.

Table 8.11 Age and sex breakdown of paediatric patients (<16 years old) prevalent to KRT on 31/12/2024

Age group (yrs)	All patients		Male		Female		M/F pmarp ratio
	N	pmarp	N	pmarp	N	pmarp	
0-<2	8	6	5	7	3	5	1.6
2-<4	43	29	25	33	18	25	1.3
4-<8	144	46	93	59	51	34	1.7
8-<12	221	67	139	83	82	51	1.6
12-<16	400	118	241	139	159	96	1.4
<16 yrs	816	65	503	78	313	51	1.5

pmarp – per million age-related population
Manch_P is included in this table

Table 8.12 Age and ethnicity breakdown of paediatric patients (<16 years old) prevalent to KRT on 31/12/2024

Age group (yrs)	N			
	White	Asian	Black	Other
0-<4	25	3	4	4
4-<8	74	25	8	7
8-<12	138	35	9	18
12-<16	232	59	22	37
<16 yrs	469	122	43	66

32 children with no ethnicity recorded were excluded

Treatment modality in prevalent paediatric KRT patients

The current and start KRT modalities for prevalent KRT patients aged <16 years are shown in figures 8.3 and 8.4, respectively. Table 8.13 breaks down current modality for prevalent patients by age group.

Table 8.13 KRT modality used by paediatric patients (<16 years old) prevalent to KRT on 31/12/2024 by age group

Age group (yrs)	Total N	HD		PD		Living donor Tx		Deceased donor Tx	
		N	%	N	%	N	%	N	%
0-<2	8	2	25.0	6	75.0	0	0.0	0	0.0
2-<4	38	8	21.1	16	42.1	12	31.6	2	5.3
4-<8	122	13	10.7	18	14.8	69	56.6	22	18.0
8-<12	205	24	11.7	18	8.8	114	55.6	49	23.9
12-<16	359	42	11.7	21	5.8	193	53.8	103	28.7
<16 yrs	732	89	12.2	79	10.8	388	53.0	176	24.0

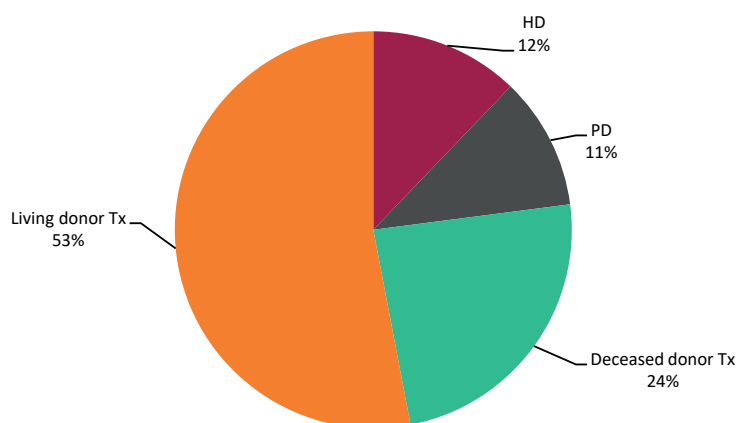


Figure 8.3 KRT modality used by paediatric patients (<16 years old) prevalent to KRT on 31/12/2024

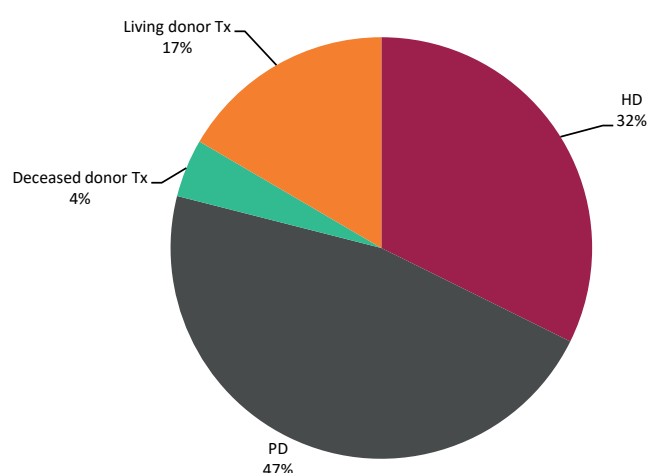


Figure 8.4 KRT modality used at the start of KRT by paediatric patients (<16 years old) prevalent to KRT on 31/12/2024

Causes of ESKD in prevalent paediatric KRT patients

Primary renal diseases (PRDs) were grouped into categories as shown in table 8.14. with the mapping of disease codes into groups explained in more detail in appendix A.

Table 8.14 Primary renal diseases (PRDs) of paediatric patients (<16 years old) prevalent to KRT on 31/12/2024 by sex and ethnicity

PRD	N	%	N male	N female	M/F ratio	% White
Tubulointerstitial disease	333	50.9	255	78	3.3	70.0
- CAKUT	323	49.4	250	73	3.4	70.6
- Non-CAKUT	10	1.5	5	5	1.0	50.0
Glomerular disease	118	18.0	52	66	0.8	66.4
Familial/hereditary nephropathies	98	15.0	48	50	1.0	69.8
Systemic diseases affecting the kidney	28	4.3	12	16	0.8	82.1
Miscellaneous renal disorders	77	11.8	35	42	0.8	64.4
Total (with data)	654	100.0	402	252	1.6	69.2
Missing	78	10.7	44	34	1.3	42.1

CAKUT – congenital anomalies of the kidneys and urinary tract

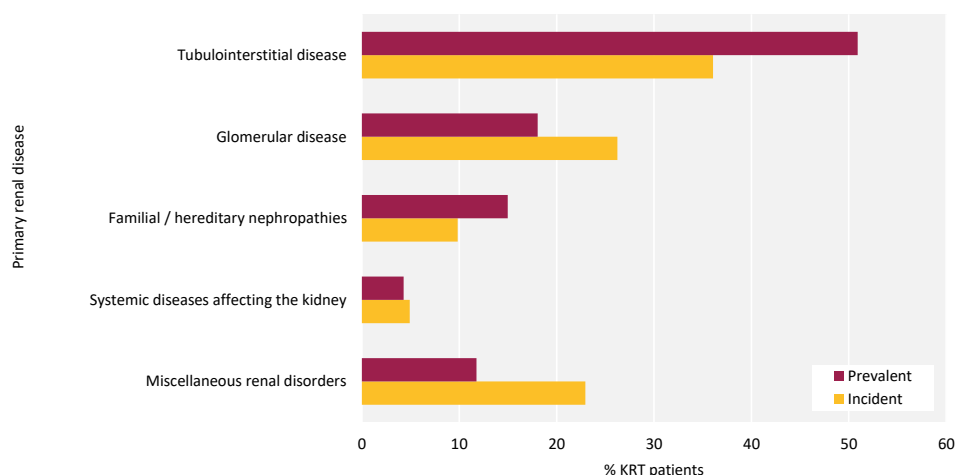


Figure 8.5 Comparison of primary renal diseases for paediatric patients (<16 years old) incident and prevalent to KRT in 2024 excluding missing data

Growth of prevalent paediatric KRT patients

The height and weight of children receiving KRT were compared to the age- and sex-matched general childhood population. The UK median score for each measure is represented by a red dotted line.

Height of paediatric KRT patients

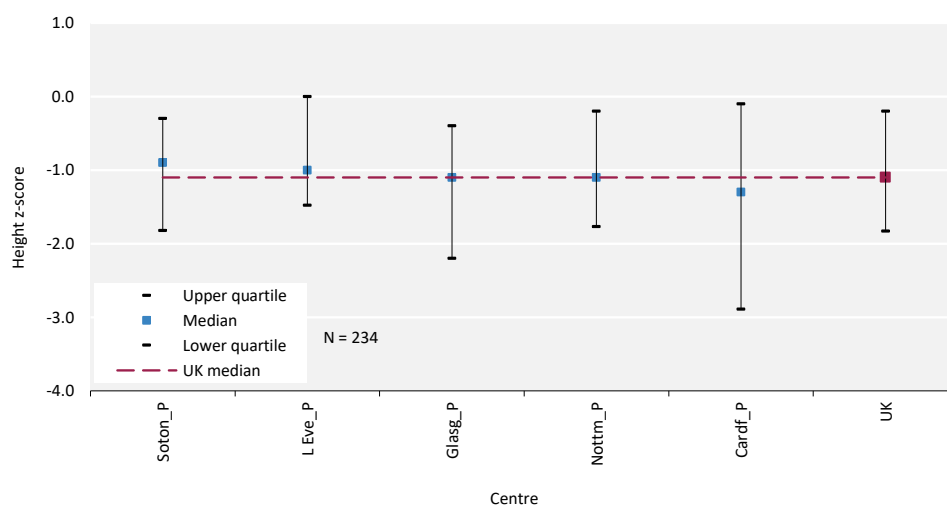


Figure 8.6 Median height z-scores for paediatric patients (<16 years old) prevalent to Tx on 31/12/2024 by centre

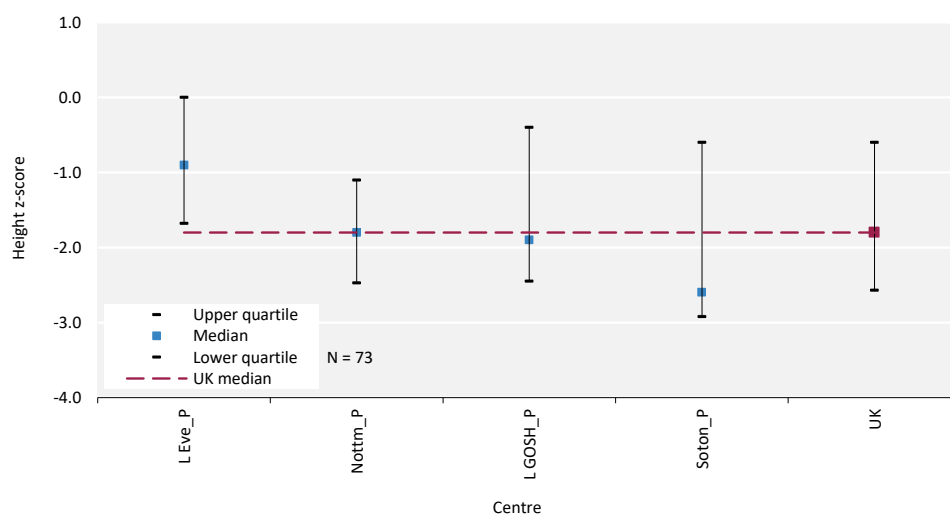


Figure 8.7 Median height z-scores for paediatric patients (<16 years old) prevalent to dialysis on 31/12/2024 by centre (the usual centre exclusion criteria have been relaxed here)

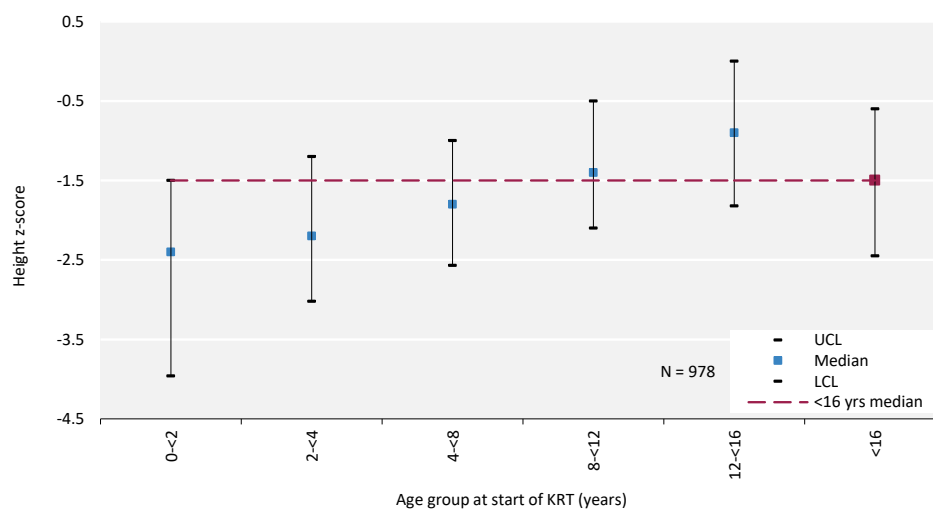


Figure 8.8 Median height z-scores at start of KRT for incident paediatric KRT patients (<16 years old) between 2010 and 2024 by age group at start of KRT

Weight of paediatric KRT patients

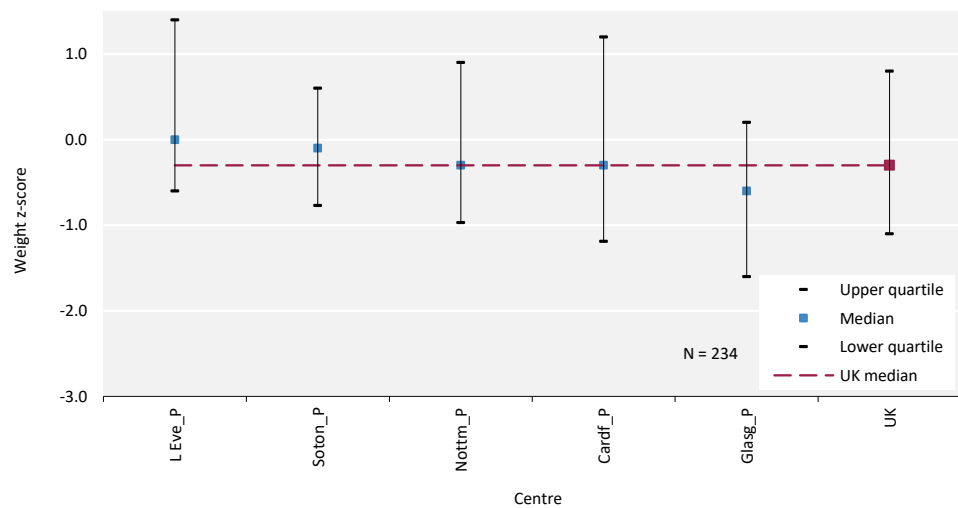


Figure 8.9 Median weight z-scores for paediatric patients (<16 years old) prevalent to Tx on 31/12/2024 by centre

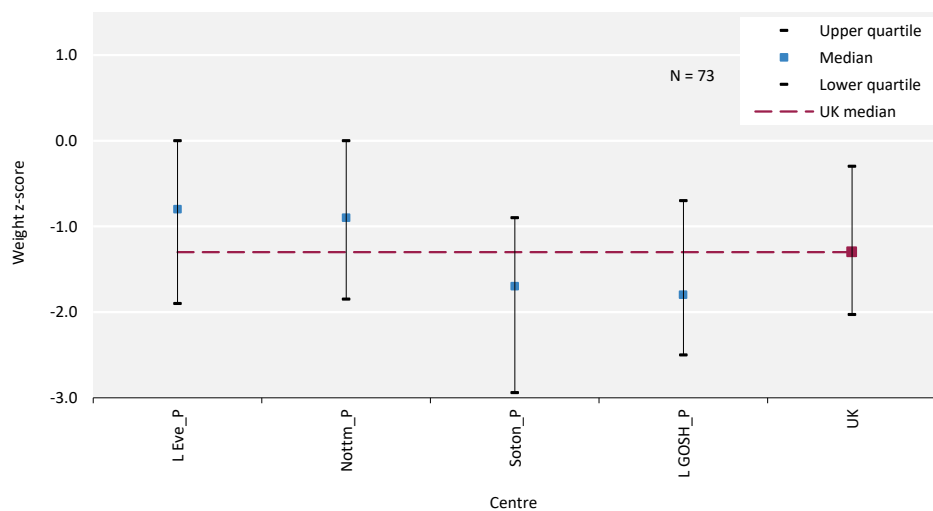


Figure 8.10 Median weight z-scores for paediatric patients (<16 years old) prevalent to dialysis on 31/12/2024 by centre (the usual centre exclusion criteria have been relaxed here)

Cardiovascular risk factor evaluation in prevalent paediatric KRT patients

Obesity in paediatric KRT patients

BMI was calculated using the formula $BMI = \text{weight (kg)} / \text{height}^2 \text{ (m)}$. Height and weight were adjusted for age. To account for discrepancies in linear growth secondary to kidney disease, BMI was expressed according to height age, rather than chronological age. Height age corresponds to the age when a child's height is plotted at the 50th percentile on a UK growth chart.

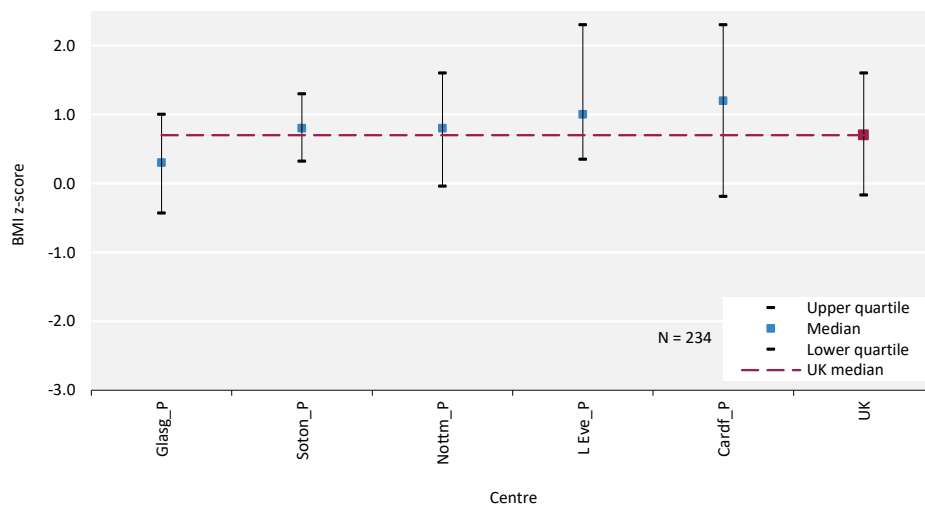


Figure 8.11 Median body mass index (BMI) z-scores for paediatric patients (<16 years old) prevalent to Tx on 31/12/2024 by centre

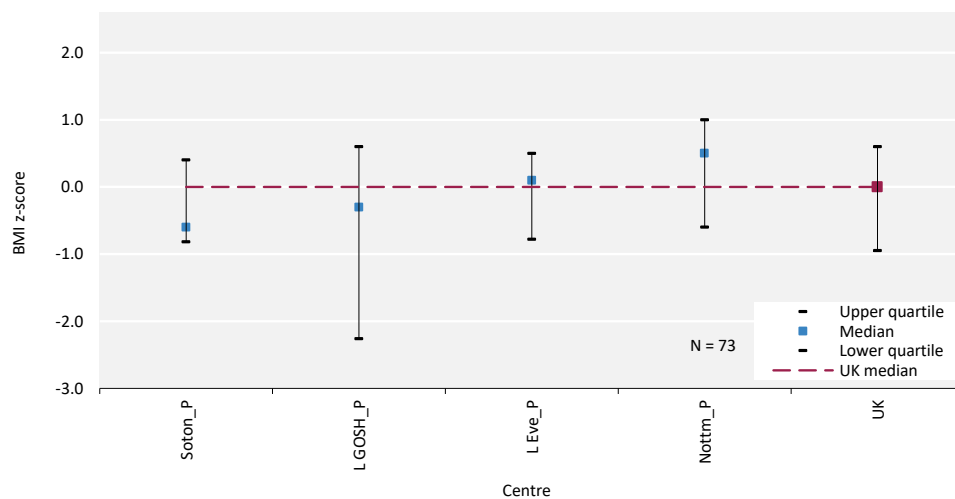


Figure 8.12 Median body mass index (BMI) z-scores for paediatric patients (<16 years old) prevalent to dialysis on 31/12/2024 by centre (the usual centre exclusion criteria have been relaxed here)

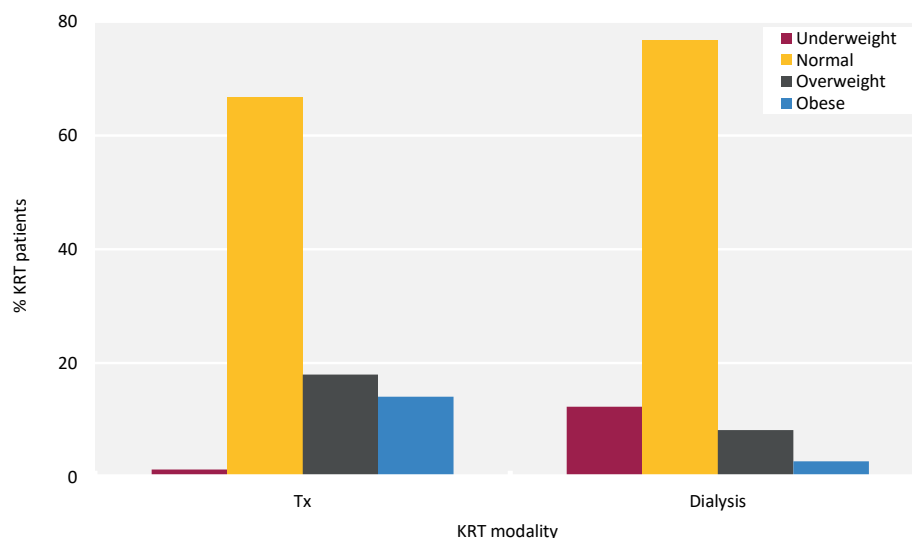


Figure 8.13 Body mass index (BMI) categorisation of paediatric patients (<16 years old) prevalent to KRT on 31/12/2024 by KRT modality

Hypertension in paediatric KRT patients

In paediatric KRT patients, the systolic blood pressure (SBP) should be maintained at <90th percentile for age, sex and height.

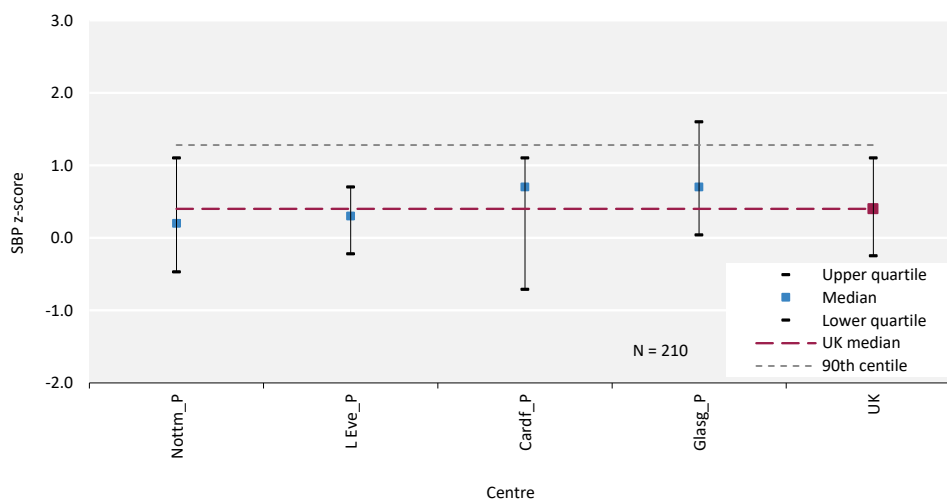


Figure 8.14 Median systolic blood pressure (SBP) z-scores for paediatric patients (<16 years old) prevalent to Tx on 31/12/2024 by centre

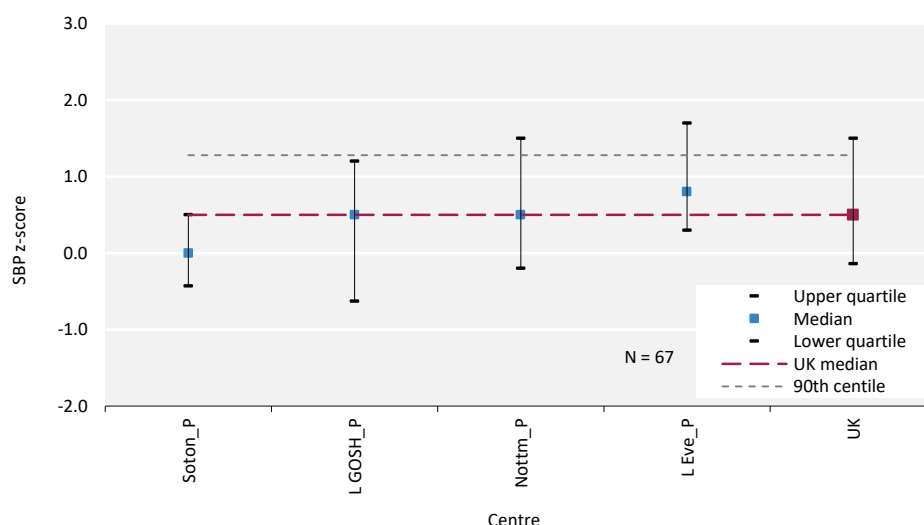


Figure 8.15 Median systolic blood pressure (SBP) z-scores for paediatric patients (<16 years old) prevalent to dialysis on 31/12/2024 by centre (the usual centre exclusion criteria have been relaxed here)

Table 8.15 Percentage of paediatric patients (<16 years old) prevalent to KRT on 31/12/2024 achieving the standards for blood pressures

Characteristic	SBP		DBP	
	N	% <90th percentile	N	% <90th percentile
Total	277	78.7	235	77.5
Age group (yrs)				
0-<5	28	64.3	22	63.6
5-<12	115	74.8	96	79.2
12-<16	134	85.1	117	78.6
Sex				
Male	167	82.6	141	77.3
Female	110	72.7	94	77.7
Ethnicity				
White	187	79.7	161	77.0
Asian	34	67.7	28	85.7
Black	19	84.2	17	64.7
Other	30	80.0	24	79.2
Modality				
HD	25	64.0	17	64.7
PD	42	71.4	39	76.9
Tx	210	81.9	179	78.8

DBP – diastolic blood pressure; SBP – systolic blood pressure
HD – haemodialysis; PD – peritoneal dialysis; Tx – transplant

Cardiovascular risk factors in paediatric KRT patients

The analysis of the percentage of prevalent KRT patients with identified cardiovascular risk factors was restricted to the 168 of the 698 patients (24.1%) with data for all three risk factors.

Table 8.16 Frequency of number of cardiovascular risk factors in paediatric patients (<16 years old) prevalent to KRT on 31/12/2024

N cardiovascular risk factors	Hypertensive	Overweight/Obese	Hypercholesterolaemic	N	%	Total %
0	No	No	No	48	28.6	28.6
1	Yes	No	No	22	13.1	42.9
	No	Yes	No	19	11.3	
	No	No	Yes	31	18.5	
2	Yes	Yes	No	6	3.6	25.0
	Yes	No	Yes	19	11.3	
	No	Yes	Yes	17	10.1	
3	Yes	Yes	Yes	6	3.6	3.6
				168		100.0
Total N with the risk factor	53	48	73			
Total % with the risk factor	31.5	28.6	43.5			

Biochemistry parameters in prevalent paediatric KRT patients

The median values and the percentage with eGFR <30 mL/min/1.73m² for prevalent 2024 paediatric Tx patients are presented in table 8.17.

Table 8.17 Median estimated glomerular filtration rate (eGFR) and percentage with eGFR <30 mL/min/1.73m² in paediatric patients (<16 years old) prevalent to Tx on 31/12/2024 by centre

Centre	N with Tx	Median eGFR (mL/min/1.73m ²)	% eGFR <30 mL/min/1.73m ²	% data completeness
Bham_P	58			0.0
Blfst_P	21			0.0
Brstl_P	39			0.0
Cardf_P	25	71	4.4	92.0
Glasg_P	45	75	2.4	93.3
L Eve_P	56	55	7.1	100.0
L GOSH_P	121			29.8
Leeds_P	44			0.0
Livpl_P	33			0.0
Newc_P	22			0.0
Nottm_P	46	53	11.9	91.3
Soton_P	34	79	0.0	79.4
UK	544	59	8.0	41.5

Blank cells – centres with <70% data completeness or <10 patients
For the centres with missing data, completeness of creatinine data was good but completeness of height was low (heights are needed to calculate eGFRs from creatinine)

Table 8.18 Attainment of targets for haemoglobin, calcium, phosphate, parathyroid hormone and bicarbonate in paediatric patients (<16 years old) (a) prevalent to dialysis on 31/12/2024 by centre and (b) prevalent to Tx on 31/12/2024 with estimated glomerular filtration rate (eGFR) <30 mL/min/1.73 m² in the UK

Centre	N	% Hb below target	% Hb within target	% Ca below target	% Ca within target	% phos below target	% phos within target	% PTH within target	% bicarb below target	% bicarb within target
DIALYSIS PATIENTS										
Bham_P	22	22.7	36.4	4.6	68.2	13.6	45.5		18.2	68.2
Blfst_P	1									
Brstl_P	6									
Cardf_P	3									
Glasg_P	3									
L Eve_P	15	15.4	61.5	7.1	64.3	0.0	64.3	14.3	42.9	57.1
L GOSH_P	30	30.0	46.7			3.3	50.0	50.0		
Leeds_P	16	25.0	56.3	0.0	93.3	6.7	66.7	37.5	0.0	73.3
Livpl_P	13	38.5	46.2	0.0	92.3	15.4	30.8	61.5	0.0	100.0
Newc_P	8									
Nottm_P	28	20.8	54.2	0.0	66.7	4.2	33.3	25.0	0.0	75.0
Soton_P	9									
UK	154	25.9	46.9	1.7	75.2	10.2	47.6	37.7	12.3	73.0
TX PATIENTS WITH EGFR <30 ML/MIN/1.73 M ²										
UK	18	25.0	75.0	0.0	100.0	0.0	82.4	47.1	58.3	41.7

Blank cells – centres with <70% data completeness or <10 patients

See appendix A for biochemical target ranges

Bicarb – bicarbonate; Ca – calcium; Hb – haemoglobin; Phos – phosphate; PTH – parathyroid hormone

Table 8.19 Median estimated glomerular filtration rate (eGFR) in paediatric patients (<16 years old) prevalent to Tx on 31/12/2024 by time since transplantation and age group

Time since transplantation	Age group (yrs)					
	0-<5		5-<12		12-<16	
	N	Median eGFR (mL/min/1.73 m ²)	N	Median eGFR (mL/min/1.73 m ²)	N	Median eGFR (mL/min/1.73 m ²)
< 3 mths			1			
3 months-<2 years	11	86	20	63	29	61
2-<4 years	4		24	69	24	72
4-<7 years			39	57	17	64
≥ 7 years			11	69	45	45
Total (IQR)	15	80 (66-108)	95	60 (48-82)	115	55 (39-73)

IQR – interquartile range

As seen in table 8.17, completeness of eGFR is 41.5% of N=544

Transfer to adult kidney services for prevalent paediatric KRT patients

One hundred and eighteen paediatric patients transitioned to adult kidney centres in 2024. The median age of patients at transfer was 17.9 years with an IQR of 17.3-18.0 years. Overall, the demographics of this population reflected those of the prevalent paediatric KRT population.

Survival in paediatric KRT patients

Of patients aged <16 years, 1,600 started KRT between 2010 and 2023 at paediatric kidney centres and were included in survival analyses, to allow at least one year follow-up. At the end of 2024, 108 deaths had been reported in these children. Patients included in the analysis must have been alive on KRT for 90 days. The median follow-up time (beyond day 90) was 7.3 years (range 1 day to 14.8 years).

Table 8.20 Unadjusted Kaplan-Meier survival (from day 90) of incident paediatric KRT patients (<16 years old) between 2010 and 2023 by age group at start of KRT

	Age group (yrs)				
	0-<2	2-<4	4-<8	8-<12	12-<16
Survival at 1 year (%)	94.1	98.2	98.9	99.2	99.6
95% CI	90.6-96.4	94.6-99.4	96.5-99.6	97.5-99.7	98.4-99.9
Survival at 2 years (%)	92.2	97.0	96.5	98.0	98.8
95% CI	88.3-94.9	93.0-98.7	93.3-98.1	95.9-99.1	97.3-99.4
Survival at 3 years (%)	89.0	96.3	95.2	97.7	98.1
95% CI	84.5-92.2	92.0-98.3	91.7-97.2	95.5-98.9	96.3-99.0
Survival at 5 years (%)	84.9	95.6	94.2	96.6	97.3
95% CI	79.8-88.8	91.0-97.9	90.4-96.5	94.0-98.1	95.2-98.4
Survival at 10 years (%)	83.1	95.6	91.3	94.3	93.9
95% CI	77.6-87.3	91.0-97.9	86.1-94.6	90.3-96.6	90.4-96.1

CI – confidence interval

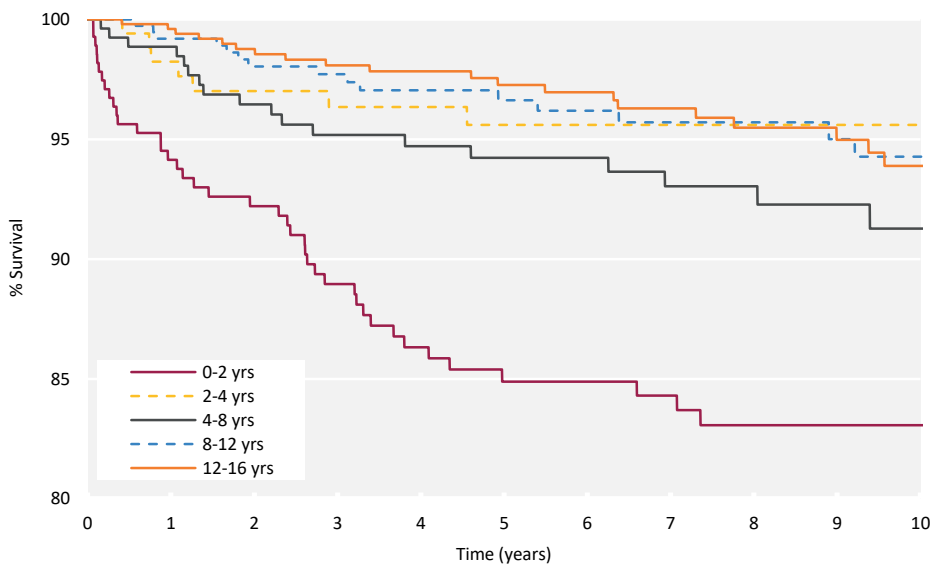


Figure 8.16 Unadjusted Kaplan-Meier survival (from day 90) of incident paediatric KRT patients (<16 years old) between 2010 and 2023 by age group at start of KRT

Analyses – young people

KRT incidence and prevalence in young people

Table 8.21 reports the numbers of young people (16-<18 years old) who started KRT in 2024 (incidence) as well as those on KRT as of 31/12/2024 (prevalence) in both paediatric and adult centres, as an estimated total pmarp and grouped by sex, ethnicity and PRD. For incident young people, start modality is reported; current treatment modality is reported for prevalent patients.

Table 8.21 Demographics of young people (16-<18 years) incident to KRT in 2024 and/or prevalent to KRT on 31/12/2024, by care setting

Characteristic	Incident			Prevalent		
	Paediatric centres	Adult centres	All	Paediatric centres	Adult centres	All
N	13	20	33	228	46	274
Rate (pmarp)			20			165
Median age (yrs)	18.0	17.1	16.9	16.9	17.6	17.0
% male	58.3	60.0	59.4	56.1	53.3	55.6
Ethnicity¹ (%)						
White	54.6	33.3	42.3	69.4	45.0	65.3
Asian	18.2	40.0	30.8	16.3	35.0	19.5
Black	18.2	13.3	15.4	5.6	10.0	6.4
Other	9.1	13.3	11.5	8.7	10.0	8.9
Missing ethnicity	8.3	25.0	18.8	4.4	11.1	5.6
PRD¹ (%)						
Tubulointerstitial disease	0.0	28.6	19.1	38.0	35.0	37.4
Glomerular disease	28.6	28.6	28.6	19.8	17.5	19.4
Familial/hereditary nephropathies	28.6	0.0	9.5	16.6	17.5	16.7
Systemic diseases affecting the kidney	0.0	0.0	0.0	4.8	5.0	4.9
Diabetes	0.0	0.0	0.0	0.0	0.0	0.0
Miscellaneous renal disorders	42.9	42.9	42.9	20.9	25.0	21.6
Missing PRD	41.7	30.0	34.4	8.8	11.1	9.2
Modality (%)						
HD	58.3	45.0	50.0	15.6	28.9	18.0
PD	33.3	40.0	37.5	7.3	8.9	7.6
Tx	8.3	15.0	12.5	77.1	62.2	74.4

¹Percentages by ethnicity and PRD were calculated for those with data (excluding patients with missing data)

pmarp – per million age-related population; PRD – primary renal disease

HD – haemodialysis; PD – peritoneal dialysis; Tx – transplant

Table 8.22 details the number and type of centres (adult or paediatric) that have contributed to the incident and prevalent numbers reported. The small proportion of adult centres identified may reflect that young people are often directed to centres with an established transition programme for early adult care; however, under-reporting of young people may also account for this finding.

Table 8.22 Number of centres that submitted data for young people (16-<18 years) incident to KRT in 2024 and/or prevalent to KRT on 31/12/2024, by care setting

	Incident	Prevalent
Paediatric centres	6 out of 13	12 out of 13
Adult centres	15 out of 67	22 out of 67

Transplant parameters in young people

The median values for age, creatinine and eGFR, and the proportion with an eGFR <30 mL/min/1.73m² for young people prevalent to Tx on 31/12/2024 are presented by care setting (adult or paediatric centre).

Table 8.23 Measures of graft function in young people (16-<18 years) prevalent to Tx on 31/12/2024, by care setting

	N on Tx	Median age (yrs)	N with creatinine data	Median creatinine (μmol/L)	Median FAS-eGFR (mL/min/1.73m ²)	% FAS-eGFR <30 mL/min/1.73m ²	% creatinine completeness
Paediatric centres	158	16.9	157	105	69	5.7	99.4
Adult centres	28	17.6	25	130	58	0.0	89.3

eGFR – estimated glomerular filtration rate; FAS – Full Age Spectrum

Table 8.24 reports the median eGFR for all young people prevalent to Tx on 31/12/2024 by time since transplantation. Small numbers preclude further analysis by care setting (adult or paediatric centre).

Table 8.24 Estimated glomerular filtration rate (eGFR) in young people (16-<18 years) prevalent to Tx on 31/12/2024 by time since transplantation

Time since transplantation	N	Median FAS-eGFR (mL/min/1.73m ²)
< 3 months	4	
3 months-<2 years	42	73
2-<4 years	29	71
4-<7 years	30	66
≥ 7 years	74	63
Total (IQR)	179	68 (54-83)

eGFR – estimated glomerular filtration rate; FAS – Full Age Spectrum; IQR - inter-quartile range

Biochemical and blood pressure measures in young people

Table 8.25 shows attainment of biochemical and blood pressure measures for young people prevalent to dialysis and transplant on 31/12/2024 for the total population and by care setting (adult or paediatric). Attainment of targets including haemoglobin, calcium, phosphate and bicarbonate are shown; median systolic and diastolic blood pressure values and the percentage of young people with blood pressure values within 'normal' range or that are 'high' are also reported.

Table 8.25 Attainment of biochemical and blood pressure measures in young people (16-<18 years) prevalent to KRT on 31/12/2024, by modality and care setting

Characteristic	Dialysis			Tx		
	Paediatric centres	Adult centres	All	Paediatric centres	Adult centres	All
N	47	17	64	158	28	186
Median (IQR) Hb (g/L)	115 (95-123)	97 (91-109)	110.5 (93-122)	129 (114-137)	125 (113-136)	128.5 (114-137)
% Hb <100g/L	26.2	56.3	34.5	6.7	7.7	6.8
Median (IQR) Ca (mmol/L)	2.5 (2.3-2.5)	2.3 (2.2-2.5)	2.4 (2.2-2.5)	2.4 (2.4-2.5)	2.5 (2.4-2.5)	2.4 (2.4-2.5)
% Ca in range	72.7	71.4	72.3	92.7	90	92.3
Median (IQR) Phos (mmol/L)	1.8 (1.1-2.2)	1.7 (1.3-2.3)	1.8 (1.1-2.2)	1.2 (1-1.3)	1.1 (1-1.2)	1.2 (1-1.3)
% phos in range	27.9	43.8	32.2	64.3	72.0	65.4
Median (IQR) bicarb (mmol/L)	23 (21-26)	23.5 (22-26)	23 (21-26)	23 (21-25)	23 (22-25)	23 (21-25)
% bicarb in range	69.7	71.4	70.2	78.3	71.4	77.3
Median (IQR) SBP (mmHg)	120 (108-126)	122 (119-138)	120 (114-128)	118 (108-125)	132 (128-141)	121 (110-128)
Median (IQR) DBP (mmHg)	75 (57-88)	74 (64-82)	74 (60-84)	72 (64-81)	80 (71-83)	72 (64-82)
% 'normal' BP range (<130/80 mmHg)	57.7	54.5	56.8	68.1	23.1	61.0
% high BP (≥140/90 mmHg)	23.1	18.2	21.6	7.2	30.8	11.0

See appendix A for biochemical target ranges

bicarb – bicarbonate; BP – blood pressure; Ca – calcium; DBP – diastolic blood pressure; Hb – haemoglobin; IQR – inter-quartile range; phos – phosphate; SBP – systolic blood pressure

Analyses - Under 18 yrs old with CKD

For the 4 paediatric centres that were able to submit data on their CKD population, the number of prevalent patients with CKD is presented as crude rate per million age-related population (pmarp).

Table 8.26 Demographics and CKD stage of under 18s on 31/12/2024

Centre	N with CKD <18yrs old	Median (IQR) age in yrs	% male	% stage G4	% stage G5	CKD 2024 crude rate (pmarp)
Glasg_P	20	11.8 (4.3-15.6)	70.0	90.0	10.0	19.5
L GOSH_P	55	9.3 (3.6-12.8)	65.5	67.3	32.7	18.8
Leeds_P	24	9.8 (5.2-14.0)	58.3	79.2	20.8	26.7
Nottm_P	36	10.4 (7.0-15.6)	69.4	55.6	44.4	25.2
Total	135	10.3 (5.5-13.9)	65.9	69.6	30.4	21.5

pmarp - per million age-related population

IQR - interquartile range