



Chapter 5

**Adults with a kidney transplant
(Tx) in the UK at the end of
2017**

Contents

Introduction	3
Rationale for analyses	5
Key findings.....	7
Analyses.....	8
Kidney Tx activity.....	8
Early kidney Tx outcomes	8
Changes to the prevalent adult kidney Tx population	11
Demographics of prevalent adult kidney Tx patients	15
Graft function and anaemia in prevalent adult kidney Tx patients.....	17
Blood pressure in prevalent adult kidney Tx patients.....	19
Biochemistry parameters in prevalent adult kidney Tx patients.....	20
Survival of adult kidney Tx patients.....	21
Cause of death in adult kidney Tx patients.....	21

Introduction

This chapter describes the population of patients with end-stage kidney disease (ESKD) who had a functioning kidney transplant (Tx) in the UK at the end of 2017 (figure 5.1). Patients can receive their first Tx either pre-emptively, i.e. without spending any time on dialysis, or while on dialysis. Donors in both pathways may be either a living kidney donor (LKD) or a deceased kidney donor – receiving a kidney from a donor after brain death (DBD) or a donor after circulatory death (DCD). If a Tx begins to fail a patient may be considered for a second (or subsequent) Tx, which again can come from a living or deceased donor.

Potential Tx recipients who pass rigorous assessments are wait-listed, which can occur before or after they have started dialysis. The majority of kidneys received through wait-listing are from deceased donors. The cohort of patients living with a kidney Tx in a centre not only reflects differences in underlying population case-mix, but also differences in the rates of acceptance onto renal replacement therapy (RRT). This includes wait-listing rates and live donor programmes, survival of the Tx graft and its recipient, as well as the care and survival of patients on dialysis therapies, as described in other chapters of this report.

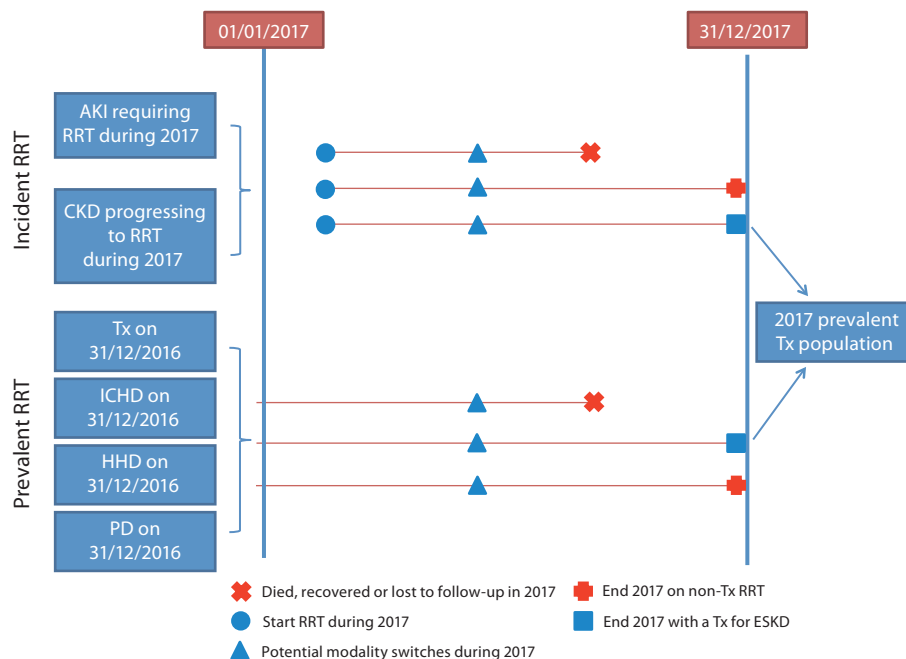


Figure 5.1 Pathways adult patients could follow to be included in the UK 2017 prevalent Tx population
 AKI – acute kidney injury; CKD – chronic kidney disease; HHD – home haemodialysis; ICHD – in-centre haemodialysis; PD – peritoneal dialysis

Patient survival, graft survival and cause of death analyses were undertaken on historic incident and prevalent cohorts to allow sufficient follow-up time.

The analyses were undertaken using UK Renal Registry (UKRR) data combined with NHS Blood and Transplant (NHSBT) data through a data sharing agreement.

This chapter addresses the following key aspects of the care of patients with a functioning kidney Tx for which there are Renal Association guidelines ([table 5.1](#)):

- **Complications associated with CKD and kidney transplantation** – these include anaemia, mineral bone disorders and dyslipidaemia
- **Blood pressure** – attainment of blood pressure targets are reported, although data completeness does not allow differentiation based on levels of proteinuria.

Rationale for analyses

The analyses begin with a brief summary of the number and type of kidney Tx undertaken in recent years in the UK as well as early graft and patient survival. More detailed results are available at <https://www.organdonation.nhs.uk/statistics/>. The 2017 prevalent adult Tx population is described, including the number transplanted per million population (pmp).

The Renal Association guidelines (<https://renal.org/guidelines/>) provide audit measures relevant to the care of patients with a Tx, and where data permit, their attainment by UK renal centres in 2017 is reported in this chapter (table 5.1).

Some audit measures in current guidelines cannot be reported because the completeness of the required data items is too low. Further detail about the completeness of data returned to the 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, such as with the revised targets for blood pressure published in 2017 as detailed below.

Table 5.1 The Renal Association audit measures relevant to Tx that are reported in this chapter

The Renal Association guideline	Audit criteria	Related analysis/analyses
Post-operative care in the kidney Tx recipient (2017)	Proportion of patients receiving a target blood pressure of 140/90 mmHg or 130/80 mmHg in the presence of proteinuria – protein : creatinine ratio >100 mg/mmol or albumin : creatinine ratio >70 mg/mmol	Table 5.8, figures 5.11, 5.12 (proteinuria was not adequately collected)
	Proportion of patients achieving dyslipidaemia targets	Table 5.8
	Incidence of hyperparathyroidism	Table 5.8
	Prevalence of anaemia	Table 5.8, figures 5.9, 5.10
Anaemia (2017)	Treatment guidelines for anaemia in kidney Tx patients should be similar to those for CKD patients not on dialysis	Table 5.8, figures 5.9, 5.10

In 2017, 23 of the 71 adult renal centres in the UK were Tx centres – 19 in England, two in Scotland and one in each of Northern Ireland and Wales.

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 Tx 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), a Tx centre, 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

- 35,823 adult patients had a kidney Tx for ESKD in the UK on 31/12/2017, which represented 55.2% of the RRT population
- The median age of kidney Tx patients was 54.8 years and 60.6% were male
- There was a 4% increase in overall kidney Tx numbers performed in 2017 compared to 2016, with an increase in kidney Tx from DBDs (10%), but falls from DCDs (−2%) and from LKDs (−1%)
- The median eGFR for kidney Tx patients 1 year after transplantation was 57.2 mL/min/1.73 m² from LKD, 52.3 mL/min/1.73 m² from DBD and 47.6 mL/min/1.73 m² from DCD
- 15.9% of kidney Tx patients had eGFR <30 mL/min/1.73 m²
- The median decline in eGFR slope beyond the first year after transplantation was 0.77 mL/min/1.73 m²/year
- There was no cause of death data available for 38.3% of deaths. For those Tx patients with data, the leading cause of death was malignancy (25.7%), followed by cardiac disease (20.5%), which overtook infection (19.3%) since 2016.

Analyses

Kidney Tx activity

NHSBT provided the UKRR with summary data on kidney Tx activity (table 5.2). More detailed results are available at <https://www.organdonation.nhs.uk/statistics/>. The number of patients receiving a pre-emptive Tx is reported by centre in chapter 1.

Table 5.2 Number of kidney and kidney plus other organ Tx (adult and paediatric) in the UK, 2015–2017 calendar years

Organ	2015	2016	2017	% change 2016–2017
Kidney DBD ^a	1,130	1,234	1,362	10
Kidney DCD ^b	802	909	894	–2
Kidney LKD	1,047	1,021	1,015	–1
Kidney and liver	21	18	14	–22
Kidney and heart ^c	0	1	0	
Kidney and pancreas ^d	175	147	172	17
Kidney and pancreas islets ^c	0	0	4	
Small bowel (inc kidney)	2	1	1	0
Total kidney Tx	3,177	3,331	3,462	4

^aIncludes en bloc kidney Tx (4 in 2015, 6 in 2016 and 3 in 2017) and double kidney Tx (15 in 2015, 15 in 2016 and 14 in 2017)

^bIncludes en bloc kidney Tx (8 in 2015, 8 in 2016 and 7 in 2017) and double kidney Tx (31 in 2015, 39 in 2016 and 26 in 2017)

^cIncludes DCD Tx (1 kidney and heart Tx in 2016 and 1 kidney and pancreas islet Tx in 2017)

^dIncludes DCD Tx (50 in 2015, 44 in 2016 and 48 in 2017)

DBD – donor after brain death; DCD – donor after circulatory death; LKD – living kidney donor

Early kidney Tx outcomes

Kidney Tx recipient outcome data from NHSBT are reported against the Tx centre rather than the referring centre (table 5.3). Note that the survival rates were risk-adjusted and used financial year cohorts as per NHSBT methodology (see table footnote).

Table 5.3 Risk-adjusted first adult kidney-only Tx, graft and patient survival by Tx type and Tx centre* (cohorts detailed in footnote)

Centre	Deceased donor				Living donor			
	Adj 1 yr survival (%)		Adj 5 yr survival (%)		Adj 1 yr survival (%)		Adj 5 yr survival (%)	
	Graft	Patient	Graft	Patient	Graft	Patient	Graft	Patient
B QEH	94	97	82	92	97	98	93	92
Belfast	94	97	85	81	97	100	95	81
Bristol	96	95	87	89	97	100	95	89
Camb	96	97	89	88	99	99	94	88
Cardff	96	95	91	88	96	96	92	88
Covnt	94	94	77	85	100	100	92	85
Edin	96	98	86	89	100	100	89	89
Glasgw	92	96	91	91	96	100	92	91
L Barts	90	94	83	83	98	99	89	83
L Guy's	93	97	90	90	98	98	94	90
L Rfree	94	98	89	91	99	100	95	91
L St.G	93	98	89	94	98	99	94	94
L West	96	97	85	91	97	99	90	91
Leeds	94	97	84	86	98	99	89	86
Leic	95	98	88	90	98	98	90	90

Table 5.3 Continued

Centre	Deceased donor				Living donor			
	Adj 1 yr survival (%)		Adj 5 yr survival (%)		Adj 1 yr survival (%)		Adj 5 yr survival (%)	
	Graft	Patient	Graft	Patient	Graft	Patient	Graft	Patient
Liv Roy	95	95	87	81	97	98	88	81
M RI	97	96	88	90	97	99	95	90
Newc	95	95	83	83	99	100	94	83
Nottm	95	98	86	85	96	98	89	85
Oxford	95	98	89	87	96	99	94	87
Plymth	91	94	81	91	98	100	90	91
Ports	91	95	86	88	100	99	94	88
Sheff	95	97	86	89	98	98	97	89
UK total	95	97	87	88	98	99	93	88

Cohorts for survival rate estimation: 1 year survival: 1/4/2012–31/03/2016; 5 year survival: 1/4/2008–31/3/2012; first grafts only – re-grafts excluded for patient survival estimation. Since the cohorts to estimate 1 and 5 year survival are different, some centres may appear to have 5 year survival better than 1 year survival

*Information courtesy of NHSBT: number of Tx, patients and 95% confidence interval (CI) for each estimate; statistical methodology for computing risk-adjusted estimates can be obtained from the NHSBT website (<https://nhsbtde.blob.core.windows.net/umbraco-assets-corp/4607/kidney-annual-report-2016-17.pdf>)

Kidney graft function at one year post-Tx was assessed using median eGFR by donor type and by centre using a seven year cohort (patients with graft failure including death with a functioning graft were excluded). The data completeness for eGFR at one year (2010–2016) was 97.2%.

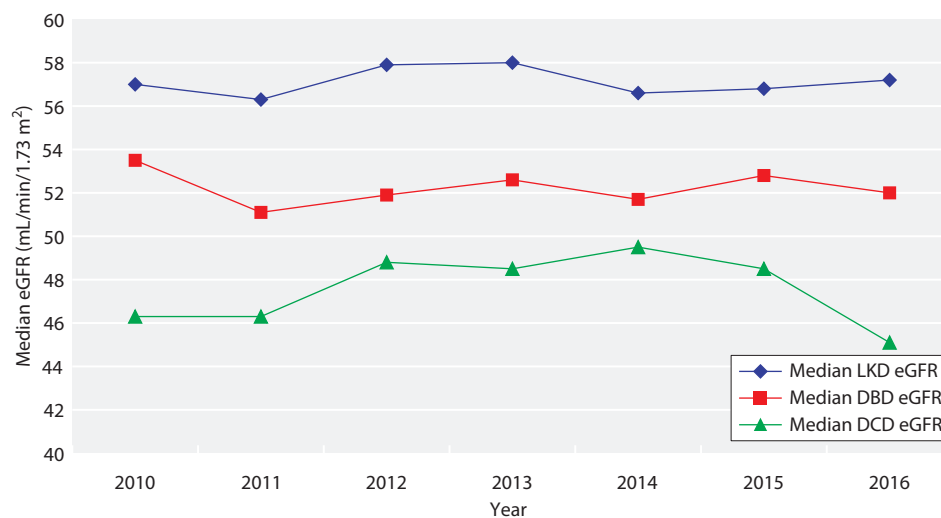


Figure 5.2 Median estimated glomerular filtration rate (eGFR) for kidney Tx at 1 year by donor type and year of transplantation between 2010 and 2016

DBD – donor after brain death; DCD – donor after circulatory death; LKD – living kidney donor

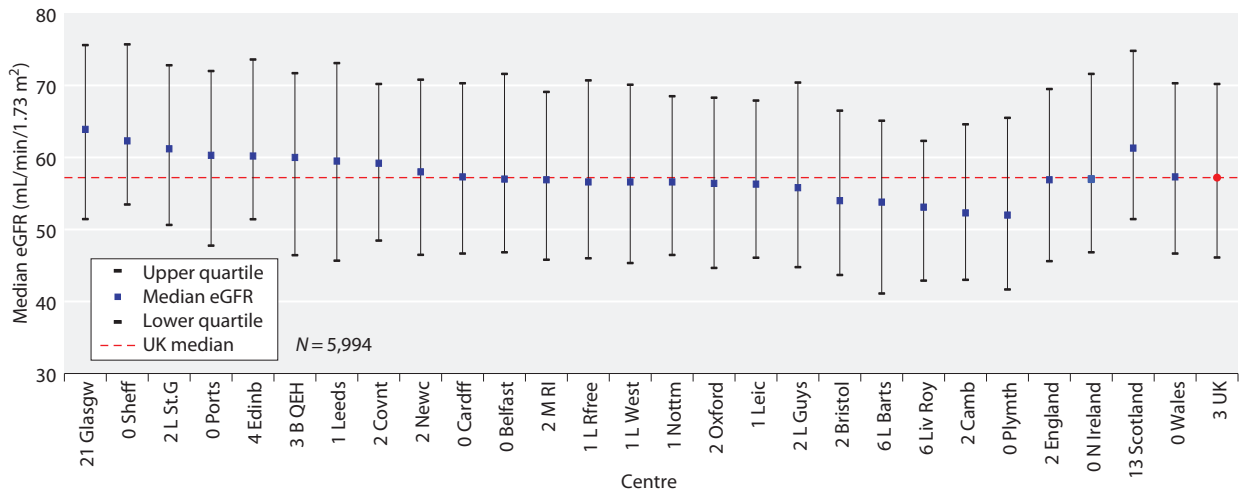


Figure 5.3 Median estimated glomerular filtration rate (eGFR) at 1 year post-living kidney donor (LKD) Tx by centre and year of transplantation between 2010 and 2016

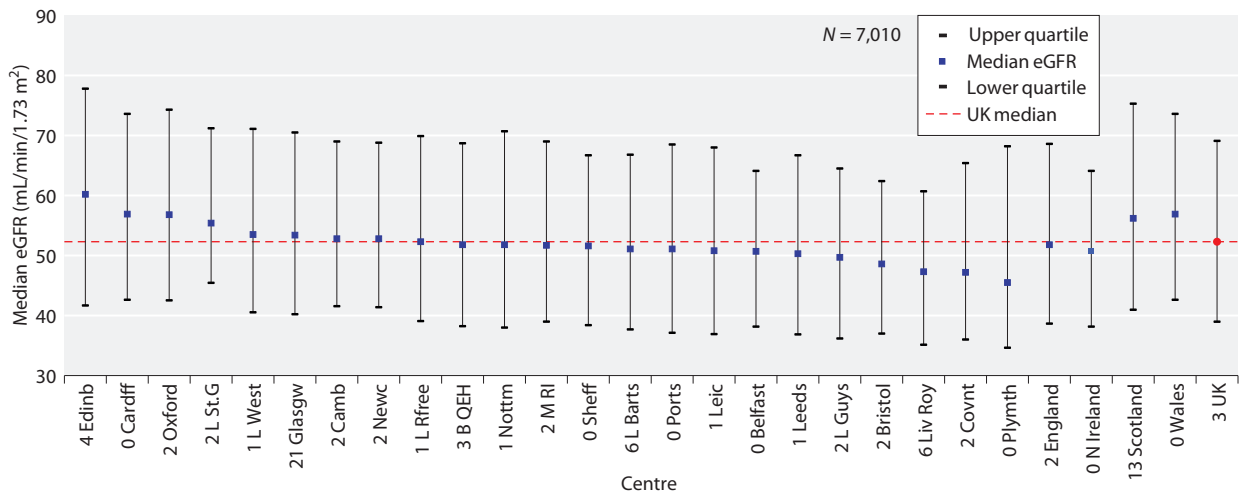


Figure 5.4 Median estimated glomerular filtration rate (eGFR) at 1 year post-donor after brain death (DBD) Tx by centre and year of transplantation between 2010 and 2016

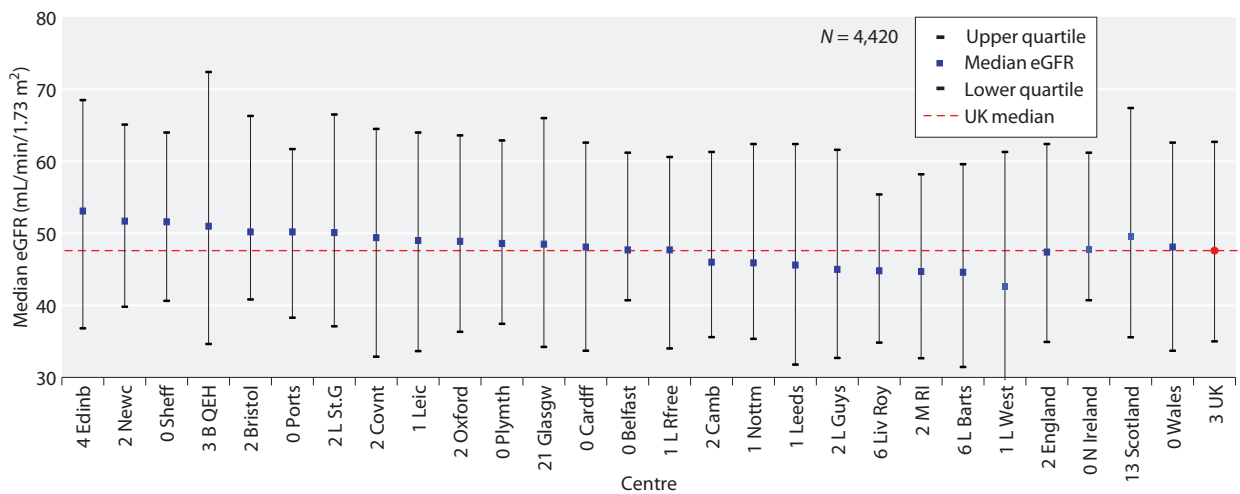


Figure 5.5 Median estimated glomerular filtration rate (eGFR) at 1 year post-donor after circulatory death (DCD) Tx by centre and year of transplantation between 2010 and 2016

Changes to the prevalent adult kidney Tx population

Tx recipients are under the care of a Tx centre around the time of transplantation, but the policy of when to repatriate to the referring centre varies. When data entries for patients were received from more than one centre they were attributed to the referring centre.

Table 5.4 Percentage completeness of estimated glomerular filtration rate (eGFR), blood pressure, haemoglobin, total cholesterol, adjusted calcium, phosphate and parathyroid hormone (PTH) by centre for adult patients prevalent to Tx on 31/12/2017

Centre	N with Tx	Data completeness (%)						
		eGFR	Blood pressure	Haemoglobin	Total cholesterol	Adjusted calcium	Phosphate	PTH
TX CENTRES								
B QEH	1,313	94.8	94.5	94.7	95.1	94.7	94.0	0.0
Belfast	604	99.2	84.4	98.5	99.7	98.7	98.5	31.6
Bristol	885	99.6	79.4	99.2	94.5	99.3	99.1	98.5
Camb								
Cardff	1,020	98.3	95.0	97.9	94.1	97.8	97.8	20.7
Covnt	543	93.9	78.1	94.3	70.4	92.3	59.7	35.7
Edinb	463	76.0		47.1		48.8	48.8	
Glasgw	1,083	98.4		98.6		98.3	97.6	
L Barts	1,150	66.3	0.0	99.0	98.8	98.9	98.9	97.0
L Guys	1,379	98.6	0.0	98.3	59.3	96.2	96.1	31.3
L Rfree	1,308	97.9	85.8	97.4	65.1	93.3	93.1	67.7
L St.G	469	96.6	65.7	96.2	84.7	96.4	96.4	46.7
L West	1,857	94.6	0.0	94.5	44.6	94.2	94.6	33.9
Leeds	976	99.1	94.6	98.9	97.8	97.3	96.7	31.9
Leic	1,276	95.3	17.9	94.4	95.2	94.0	93.8	53.9
Liv Roy	764	95.9	0.1	95.7	60.7	94.2	94.9	73.2
M RI	1,347	97.6	4.5	97.5	67.3	97.5	97.5	63.6
Newc	693	98.9	96.8	98.9	87.9	98.9	98.9	78.2
Nottm	690	99.3	95.4	97.4	77.4	97.3	97.4	89.7
Oxford	1,276	99.0	7.4	98.8	45.4	98.7	98.5	36.4
Plymth	328	97.9	91.8	97.9	72.0	96.0	95.4	64.6
Ports	1,010	95.5	34.1	95.3	59.6	94.9	88.6	33.4
Sheff	771	97.8	94.2	97.8	60.4	97.5	97.4	0.0
DIALYSIS CENTRES								
Abrdn	300	99.3		99.3		96.7	96.7	
Airdrie	246	41.5		98.0		97.6	96.3	
Antrim	107	100.0	72.9	100.0	98.1	100.0	100.0	94.4
B Heart	168	95.8	0.0	95.8	75.0	95.2	95.2	32.1
Bangor	88	97.7	83.0	97.7	96.6	97.7	97.7	23.9
Basldn	93	97.9	91.4	97.9	77.4	97.9	89.3	22.6
Bradfd	371	97.6	74.1	97.6	76.8	86.5	61.2	40.7
Brightn	472	97.9	29.0	97.9	72.9	95.1	95.1	39.6
Carlis	149	85.9	0.0	85.9	66.4	84.6	77.9	36.9
Carsh	697	84.7	4.3	84.8	46.2	82.5	81.9	23.5
Chelms	113	83.2	92.9	79.7	82.3	79.7	47.8	11.5
Clwyd	94	96.8	31.9	96.8	98.9	96.8	96.8	73.4
D&Gall	74	97.3		98.7		98.7	90.5	
Derby	223	97.3	96.0	97.3	93.3	96.4	96.4	95.5
Donc	113	99.1	99.1	99.1	88.5	98.2	98.2	20.4
Dorset	381	88.5	58.5	87.1	67.2	85.6	68.2	33.6
Dudley	93	98.9	41.9	97.9	82.8	97.9	97.9	49.5
Dundee	227	98.7		98.2		97.8	96.0	
Exeter	500	99.6	93.6	99.2	88.8	98.8	98.6	44.0
Glouc	206	95.6	80.1	95.6	62.1	94.7	94.7	19.4

Table 5.4 Continued

Centre	N with Tx	Data completeness (%)						
		eGFR	Blood pressure	Haemoglobin	Total cholesterol	Adjusted calcium	Phosphate	PTH
Hull	451	96.5	3.3	93.4	30.8	92.2	91.8	21.7
Inverns	160	81.9		83.8		71.3	71.3	
Ipswi	227	99.6	96.0	99.1	67.4	98.7	98.2	58.6
Kent	576	99.0	96.7	98.1	68.2	96.7	96.5	15.8
Klmarnk	153	98.7		97.4		98.0	97.4	
Krkcdy	148	89.2		54.1		50.7	50.0	
L Kings	448	98.7	99.1	98.7	76.8	98.7	98.7	71.2
Liv Ain	13	100.0	0.0	100.0	30.8	100.0	100.0	92.3
Middlbr	539	94.8	27.3	94.3	32.1	93.3	92.2	12.6
Newry	137	99.3	89.1	98.5	100.0	97.8	98.5	98.5
Norwch	403	98.5	1.7	98.5	97.5	97.8	97.5	28.5
Prestn	645	98.3	0.0	98.3	69.6	96.0	94.6	45.9
Redng	435	98.2	91.5	97.7	60.2	97.5	81.6	43.7
Salford	561	98.9	0.0	98.6	72.7	98.9	98.8	0.2
Shrew	126	93.7	9.5	94.4	87.3	89.7	89.7	26.2
Stevng	361	96.1	0.0	98.1	32.4	92.8	92.2	67.3
Sthend	93	100.0	83.9	96.8	37.6	94.6	89.3	10.8
Stoke	397	99.5	0.3	99.5	99.5	99.5	99.5	72.5
Sund	247	98.4	0.0	98.0	54.7	98.4	98.0	93.5
Swanse	327	99.1	96.6	99.1	80.1	99.1	98.8	72.8
Truro	230	99.6	6.1	99.1	97.4	99.6	99.6	95.7
Ulster	66	98.5	95.5	98.5	97.0	93.9	98.5	9.1
West NI	180	98.9	97.2	97.2	98.3	97.8	97.8	91.1
Wirral	132	90.9	3.8	88.6	43.9	88.6	88.6	46.2
Wolve	190	92.6	64.2	91.1	62.1	89.0	70.5	34.7
Wrexm	165	99.4	96.4	99.4	99.4	99.4	99.4	99.4
York	310	98.7	78.4	98.1	71.0	97.1	95.2	31.6
TOTALS								
England	27,998	95.4	42.6	96.5	70.5	95.4	93.2	45.8
N Ireland	1,094	99.2	86.6	98.5	99.2	98.3	98.5	54.6
Scotland	2,854	88.6		87.0		86.0	85.2	
Wales	1,694	98.5	91.3	98.2	92.3	98.2	98.1	41.5
UK	33,640	95.2	42.8	95.8	66.6	94.8	93.0	42.0

Blank cells – no data returned by the centre

Scottish centres were excluded from blood pressure, cholesterol and PTH analyses because data were not provided by the Scottish Renal Registry. UK completeness excludes Scotland for these analyses

Patients with missing ethnicity were classed as White for the eGFR calculation

For the 71 adult renal centres, the number of prevalent patients with a Tx 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 5.5 Number of prevalent adult Tx patients and proportion of adult RRT patients with a Tx by year and by centre; number of Tx patients as a proportion of the catchment population

Centre	N with Tx					% with Tx					Estimated catchment population (millions)	2017 crude rate (pmp)
	2013	2014	2015	2016	2017	2013	2014	2015	2016	2017		
TX CENTRES												
B QEH	976	1,038	1,099	1,234	1,355	47.7	48.7	48.9	51.7	53.7	1.78	762
Belfast	487	527	564	601	638	67.1	70.5	73.2	73.4	75.7	0.66	970
Bristol	846	862	895	907	906	59.4	59.1	60.6	61.8	61.5	1.51	601
Camb	791	850	912	1,099	1,043	66.3	68.8	59.3	70.9	73.5	1.21	860
Cardff	1,022	1,021	1,035	1,035	1,045	64.6	64.1	64.2	63.6	62.1	1.50	695
Covnt	469	498	518	531	567	50.5	51.9	54.0	54.4	58.9	0.93	607
Edinb	435	458	458	453	486	59.0	61.3	59.6	58.2	58.1	0.99	492
Glasgw	941	1,001	1,048	1,105	1,137	59.4	62.3	61.4	63.0	64.1	1.66	684
L Barts	948	1,026	1,067	1,139	1,200	45.4	46.5	46.9	48.1	48.1	1.92	626
L Guys	1,169	1,231	1,302	1,365	1,413	63.9	64.3	64.7	65.1	65.4	1.13	1,247
L Rfree	1,073	1,153	1,224	1,288	1,346	55.9	57.5	58.5	59.2	61.4	1.59	847
L St.G	426	432	456	460	485	56.4	54.7	54.2	54.1	57.5	0.84	581
L West	1,659	1,749	1,799	1,840	1,916	53.2	54.2	54.3	53.9	54.8	2.51	763
Leeds	886	916	953	977	1,001	60.5	61.1	62.6	63.1	61.8	1.75	572
Leic	1,016	1,116	1,155	1,250	1,306	49.2	52.1	53.0	54.3	55.0	2.55	512
Liv Roy	848	836	787	777	789	67.1	66.0	63.7	64.1	62.9	1.05	754
M RI	1,253	1,202	1,293	1,385	1,412	67.6	67.0	68.7	70.2	68.6	1.60	881
Newc	646	638	647	679	711	67.2	65.3	64.1	64.6	63.6	1.17	606
Nottm	619	612	644	678	718	57.7	57.7	57.9	58.8	61.2	1.14	630
Oxford	1,031	1,109	1,165	1,224	1,343	66.0	67.0	68.9	69.3	71.5	1.77	759
Plymth	331	327	332	328	339	65.9	65.1	66.0	64.1	62.8	0.49	689
Ports	864	896	929	978	1,052	56.0	56.3	55.7	57.9	60.3	2.12	496
Sheff	668	715	728	754	787	50.3	52.6	52.6	53.0	54.6	1.44	548
DIALYSIS CENTRES												
Abrdn	269	271	287	303	314	52.0	54.1	54.0	54.6	55.8	0.61	511
Airdrie	184	205	214	231	258	47.3	51.9	50.4	52.5	55.1	0.57	457
Antrim	82	93	97	105	113	36.6	40.6	40.6	43.0	45.6	0.30	371
B Heart	179	186	183	169	170	27.4	29.3	28.0	25.9	26.0	0.77	220
Bangor	0	3	83	89	93	0.0	2.9	45.6	49.7	47.9	0.23	403
Basldn	80	78	75	80	98	29.6	28.1	27.4	29.1	32.6	0.43	225
Bradfd	289	305	330	361	376	55.6	55.7	56.5	56.8	55.8	0.68	551
Brightn	392	421	451	472	489	45.0	46.1	47.5	47.6	48.3	1.36	360
Carlis	132	149	162	149	155	58.1	59.6	57.7	53.6	55.2	0.34	461
Carsh	600	633	644	681	716	40.6	40.8	40.7	41.5	42.6	2.00	357
Chelms	97	99	114	109	117	40.2	37.9	40.0	39.8	41.3	0.53	219
Clwyd	63	64	81	89	95	41.4	38.6	43.8	50.3	52.5	0.20	473
D&Gall	57	67	65	71	76	47.9	51.5	50.0	54.2	56.3	0.15	500
Derby	169	193	214	224	234	36.4	37.6	39.7	41.3	42.1	0.74	318
Donc	61	74	97	109	117	23.6	26.1	32.1	33.0	35.1	0.43	272
Dorset	311	335	347	369	395	49.6	50.5	51.0	53.7	53.8	0.90	438
Dudley	80	75	83	93	96	25.8	24.6	26.4	27.0	26.1	0.46	208
Dundee	207	210	216	219	232	52.0	52.4	51.4	52.3	52.8	0.47	489
Exeter	413	436	446	477	512	46.5	46.1	46.1	47.1	48.6	1.14	449
Glouc	165	172	177	185	211	40.3	40.2	40.0	39.3	41.9	0.61	343
Hull	406	395	422	453	461	49.9	49.3	49.4	53.2	52.9	1.07	431
Inverns	133	141	147	155	165	61.6	62.7	58.1	59.8	62.7	0.28	597
Ipswi	202	210	223	230	232	56.9	57.2	55.2	55.6	53.8	0.42	555
Kent	504	540	554	584	595	52.6	53.3	53.3	54.4	54.5	1.28	464
Klmarnk	116	128	137	143	160	39.2	42.8	44.2	45.1	47.3	0.37	433
Krkldy	117	119	125	132	149	41.3	43.0	42.4	44.9	49.8	0.32	460
L Kings	361	391	428	435	457	37.5	38.2	39.5	39.2	39.9	1.23	373
Liv Ain	5	15	14	14	14	2.6	6.9	6.3	6.2	6.5	0.51	28

Table 5.5 Continued

Centre	N with Tx					% with Tx					Estimated catchment population (millions)	2017 crude rate (pmp)
	2013	2014	2015	2016	2017	2013	2014	2015	2016	2017		
Middlbr	470	506	524	531	539	56.8	59.3	58.2	59.7	60.0	1.05	513
Newry	89	99	115	127	138	44.7	47.8	51.1	53.6	57.3	0.27	511
Norwch	323	327	366	392	417	46.9	47.7	49.5	50.8	53.7	0.82	506
Prestn	485	551	588	600	668	44.5	47.1	48.4	49.8	52.7	1.56	427
Redng	373	397	409	431	449	51.0	52.2	52.8	54.6	56.4	0.95	471
Salford	407	465	478	510	570	46.2	47.9	49.1	50.0	51.1	1.56	365
Shrew	118	124	134	131	128	34.9	35.5	36.5	34.9	34.0	0.52	244
Stevng	251	265	297	346	382	33.2	34.1	36.4	38.7	42.4	1.26	303
Sthend	83	102	103	92	96	37.7	42.9	41.9	39.0	38.1	0.33	289
Stoke	328	356	380	402	408	45.3	45.9	48.2	48.7	50.2	0.93	438
Sund	213	223	220	239	261	50.6	49.6	47.9	47.1	48.2	0.65	403
Swanse	305	318	330	328	335	44.1	45.1	43.1	42.4	42.4	0.94	358
Truro	198	210	231	239	239	53.4	55.4	55.9	56.1	56.5	0.43	552
Ulster	43	46	56	60	68	27.7	30.9	32.9	35.7	37.0	0.27	247
West NI	109	143	158	169	188	45.8	52.2	53.9	55.0	60.1	0.36	517
Wirral	5	51	74	117	156	2.0	18.3	26.3	34.7	40.3	0.60	260
Wolve	182	182	185	186	193	32.1	31.7	31.8	32.6	33.2	0.70	276
Wrexm	128	139	144	155	170	51.0	49.3	49.1	50.0	53.3	0.25	669
York	242	289	301	303	323	59.2	62.7	61.4	56.7	58.3	0.52	627
TOTALS												
England	24,643	25,961	27,159	28,606	29,963	51.5	52.3	52.7	53.7	54.7	55.62	539
N Ireland	810	908	990	1,062	1,145	52.5	56.5	58.3	59.8	62.6	1.87	612
Scotland	2,459	2,600	2,697	2,812	2,977	54.2	56.8	55.7	56.9	58.2	5.42	549
Wales	1,518	1,545	1,673	1,696	1,738	54.7	54.2	55.1	55.3	54.8	3.13	556
UK	29,430	31,014	32,519	34,176	35,823	51.9	52.9	53.2	54.2	55.2	66.04	543

Country Tx populations were calculated by summing the Tx patients from centres in each country. Estimated country populations were derived from the 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 kidney Tx patients

The proportion of Tx 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 5.6 Demographics of adult patients prevalent to Tx on 31/12/2017 by centre

Centre	N on RRT	N with Tx	% with Tx	Median age (yrs)	% male	Ethnicity				
						% White	% South Asian	% Black	% Other	% missing
TX CENTRES										
B QEH	2,524	1,355	53.7	52.8	58.4	65.0	25.5	6.7	2.8	1.2
Belfast	843	638	75.7	54.4	59.9	97.4	1.3	0.6	0.6	2.8
Bristol	1,473	906	61.5	55.5	60.7	90.8	3.9	3.5	1.8	0.1
Camb										
Cardff	1,684	1,045	62.1	54.4	63.9	93.3	4.0	0.2	2.5	0.2
Covnt	962	567	58.9	53.5	63.1	82.0	14.1	3.2	0.7	0.0
Edinb	837	486	58.1	54.8	62.8					71.0
Glasgw	1,774	1,137	64.1	54.5	60.2					73.1
L Barts	2,497	1,200	48.1	51.9	59.6	42.8	29.2	17.8	10.2	0.0
L Guys	2,159	1,413	65.4	52.5	59.2	68.2	8.8	17.5	5.5	0.8
L Rfree	2,193	1,346	61.4	53.6	59.1	49.4	19.8	19.8	10.9	1.6
L St.G	843	485	57.5	56.0	59.4	53.3	21.0	16.9	8.8	3.7
L West	3,498	1,916	54.8	56.4	62.5	45.5	29.9	13.9	10.6	0.1
Leeds	1,621	1,001	61.8	54.4	59.7	81.0	13.5	3.6	1.9	0.1
Leic	2,374	1,306	55.0	55.3	57.7	76.0	19.2	3.1	1.6	2.1
Liv Roy	1,255	789	62.9	54.4	60.2	93.2	1.8	1.7	3.3	0.5
M RI	2,059	1,412	68.6	54.1	59.8	78.3	14.2	4.7	2.8	1.6
Newc	1,118	711	63.6	55.2	59.8	94.1	3.7	0.6	1.7	0.0
Nottm	1,174	718	61.2	53.5	59.5	86.3	7.1	4.3	2.2	0.1
Oxford	1,878	1,343	71.5	54.5	62.5	83.0	10.2	3.0	3.7	6.3
Plymth	540	339	62.8	57.0	64.0	96.2	0.6	0.3	2.9	0.0
Ports	1,746	1,052	60.3	55.6	59.9	93.8	4.0	0.8	1.3	1.1
Sheff	1,441	787	54.6	53.6	61.8	91.2	4.9	1.1	2.8	0.5
DIALYSIS CENTRES										
Abrdn	563	314	55.8	50.3	57.0					45.5
Airdrie	468	258	55.1	53.3	59.7					34.9
Antrim	248	113	45.6	54.5	61.1	100.0	0.0	0.0	0.0	0.0
B Heart	654	170	26.0	54.1	64.7	66.5	24.1	7.6	1.8	0.0
Bangor	194	93	47.9	55.1	64.5	97.8	0.0	1.1	1.1	0.0
Basldn	301	98	32.6	53.5	70.4	85.7	5.1	4.1	5.1	0.0
Bradfd	674	376	55.8	52.7	60.4	55.7	40.8	2.7	0.8	0.3
Brightn	1,013	489	48.3	55.5	61.3	91.4	4.9	2.0	1.6	0.0
Carlis	281	155	55.2	56.0	65.8	97.4	2.6	0.0	0.0	0.0
Carsh	1,681	716	42.6	55.9	62.4	74.4	13.1	7.0	5.5	0.6
Chelms	283	117	41.3	58.0	71.8	88.0	0.9	3.4	7.7	0.0
Clwyd	181	95	52.5	56.8	63.2	96.8	2.1	0.0	1.1	0.0
D&Gall	135	76	56.3	54.8	60.5					69.7
Derby	556	234	42.1	55.5	62.4	81.1	12.9	2.1	3.9	0.4
Donc	333	117	35.1	56.1	70.9	94.0	3.4	0.0	2.6	0.0
Dorset	734	395	53.8	58.7	57.2	98.0	0.5	0.0	1.5	0.0
Dudley	368	96	26.1	58.0	69.8	80.2	13.5	4.2	2.1	0.0
Dundee	439	232	52.8	54.5	58.6					46.6
Exeter	1,054	512	48.6	55.6	59.2	98.2	0.2	1.0	0.6	0.0
Glouc	504	211	41.9	55.7	58.8	93.8	3.8	0.9	1.4	0.0
Hull	871	461	52.9	54.5	63.1	96.5	1.5	0.4	1.5	0.9
Inverns	263	165	62.7	52.7	53.9	95.9	0.8	3.3	0.0	25.5
Ipswi	431	232	53.8	57.5	65.9	83.3	1.8	1.8	13.2	2.2

Table 5.6 Continued

Centre	N on RRT	N with Tx	% with Tx	Median age (yrs)	% male	Ethnicity				
						% White	% South Asian	% Black	% Other	% missing
Kent	1,091	595	54.5	56.0	58.7	93.3	3.9	0.7	2.2	0.0
Klmarnk	338	160	47.3	55.4	57.5					38.1
Krkcldy	299	149	49.8	55.0	59.7					68.5
L Kings	1,145	457	39.9	56.4	63.9	51.4	10.7	31.1	6.8	0.0
Liv Ain	216	14	6.5	46.0	57.1	100.0	0.0	0.0	0.0	0.0
Middlbr	898	539	60.0	56.1	63.5	95.0	3.7	0.2	1.1	0.0
Newry	241	138	57.3	54.7	55.1	99.3	0.0	0.0	0.7	0.0
Norwch	776	417	53.7	56.5	59.7	97.6	1.0	0.5	1.0	0.0
Prestn	1,268	668	52.7	55.3	61.1	87.4	11.4	0.6	0.6	0.0
Redng	796	449	56.4	57.1	63.3	68.1	24.5	4.9	2.6	4.5
Salford	1,115	570	51.1	54.7	57.0	86.8	10.4	1.2	1.6	0.0
Shrew	376	128	34.0	56.4	60.9	93.0	3.9	1.6	1.6	0.0
Stevng	901	382	42.4	54.1	63.1	70.9	18.9	7.6	2.6	0.3
Sthend	252	96	38.1	55.9	54.2	87.5	2.1	2.1	8.3	0.0
Stoke	813	408	50.2	53.7	60.3	93.4	5.2	0.5	1.0	0.2
Sund	541	261	48.2	56.1	61.3	96.9	2.3	0.8	0.0	0.0
Swanse	791	335	42.4	56.7	60.6	97.6	2.1	0.0	0.3	0.0
Truro	423	239	56.5	58.4	56.5	97.9	0.4	0.4	1.3	0.0
Ulster	184	68	37.0	53.5	55.9	97.1	1.5	1.5	0.0	0.0
West NI	313	188	60.1	51.5	59.0	98.4	0.5	0.5	0.5	0.0
Wirral	387	156	40.3	56.5	62.8	96.8	1.3	0.6	1.3	0.0
Wolve	581	193	33.2	52.4	59.1	74.0	18.2	7.3	0.5	0.5
Wrexm	319	170	53.3	52.2	65.3	97.1	1.2	0.6	1.2	0.0
York	554	323	58.3	55.8	57.9	97.8	1.3	0.0	1.0	2.5
TOTALS										
England	53,353	28,920	54.2	54.9	60.6	77.2	12.6	6.3	3.9	0.9
N Ireland	1,829	1,145	62.6	54.0	59.0	98.0	0.9	0.5	0.5	1.6
Scotland	5,116	2,977	58.2	54.1	59.6					59.6
Wales	3,169	1,738	54.8	55.0	63.4	94.9	3.1	0.2	1.8	0.1
UK	63,467	34,780	54.8	54.8	60.6	79.0	11.5	5.8	3.6	5.9

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

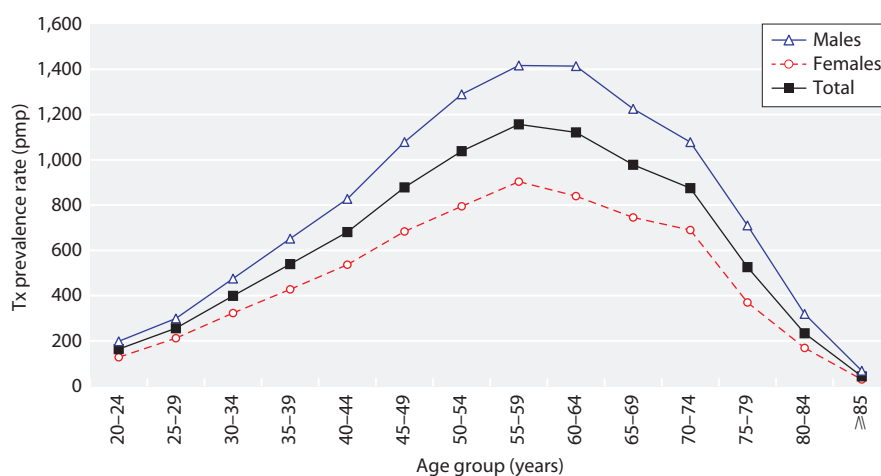


Figure 5.6 Adult Tx prevalence rate on 31/12/2017 by age group and sex
pmp – per million population

The distribution of primary renal diseases (PRDs) as a cause of ESKD in the incident Tx population is compared to the prevalent Tx population. Comparisons to dialysis populations are shown in chapters 1 and 2. PRDs were grouped into categories as shown in table 5.7, with the mapping of disease codes into groups explained in more detail in appendix A. The proportion of Tx 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 5.7 Primary renal diseases (PRDs) of adult patients incident to Tx in 2017 and adult patients prevalent to Tx on 31/12/2017

PRD	Incident Tx		Prevalent Tx	
	N	%	N	%
Diabetes	503	17.2	3,856	11.3
Glomerulonephritis	703	24.0	8,017	23.4
Hypertension	175	6.0	1,825	5.3
Polycystic kidney	367	12.5	4,745	13.9
Pyelonephritis	259	8.8	4,185	12.2
Renal vascular disease	40	1.4	396	1.2
Other	496	16.9	6,122	17.9
Uncertain aetiology	389	13.3	5,051	14.8
Total (with data)	2,932	100.0	34,197	100.0
Missing	208	6.6	583	1.7

Graft function and anaemia in prevalent adult kidney Tx patients

Accepting the limitations of interpreting eGFR in the post-Tx population, analyses by centres are divided into the proportion of patients with eGFR greater or less than 30 mL/min/1.73 m² and the proportion of patients achieving an adequate haemoglobin level (defined as a haemoglobin ≥ 100 g/L).

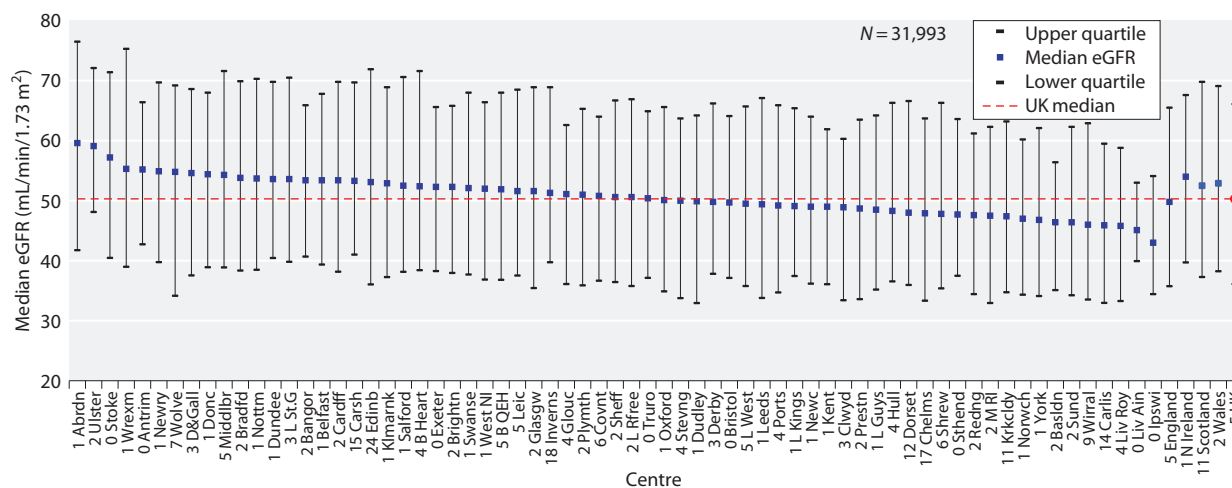


Figure 5.7 Median estimated glomerular filtration rate (eGFR) in adult patients prevalent to Tx on 31/12/2017 by centre

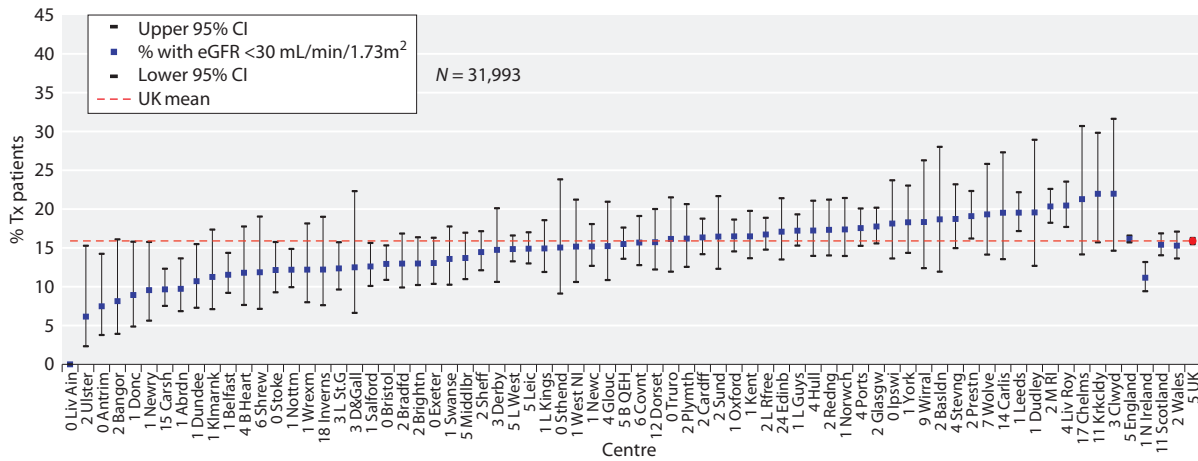


Figure 5.8 Percentage of adult patients prevalent to Tx on 31/12/2017 with an estimated glomerular filtration rate (eGFR) <30 mL/min/1.73 m² by centre
CI – confidence interval

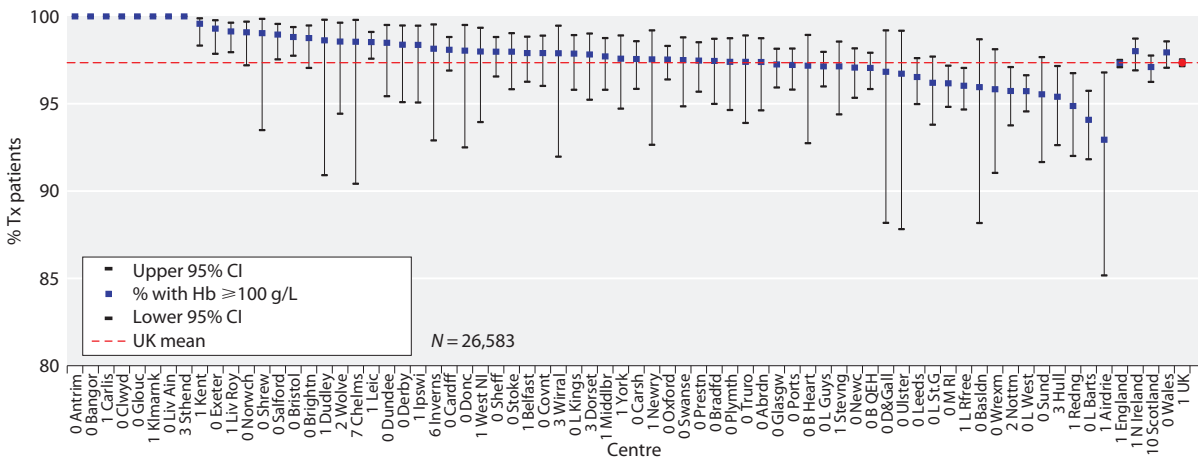


Figure 5.9 Percentage of adult patients prevalent to Tx on 31/12/2017 with an estimated glomerular filtration rate (eGFR) ≥30 mL/min/1.73 m² achieving haemoglobin ≥100 g/L by centre
CI – confidence interval; Hb – haemoglobin

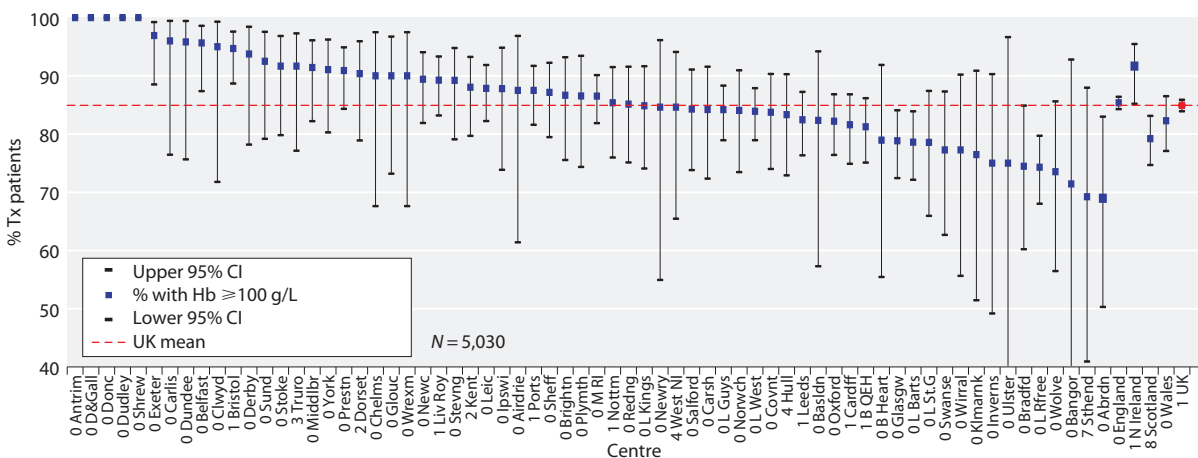


Figure 5.10 Percentage of adult patients prevalent to Tx on 31/12/2017 with an estimated glomerular filtration rate (eGFR) <30 mL/min/1.73 m² achieving haemoglobin ≥100 g/L by centre
CI – confidence interval; Hb – haemoglobin

Blood pressure in prevalent adult kidney Tx patients

Blood pressure data completeness was variable (table 5.4) and only centres with $\geq 70\%$ data completeness were included in the analysis. It is possible that bias may be introduced if blood pressure readings in particular ranges are more frequently reported. A lack of data on proteinuria did not allow differentiation for the purposes of reporting against the audit measure.

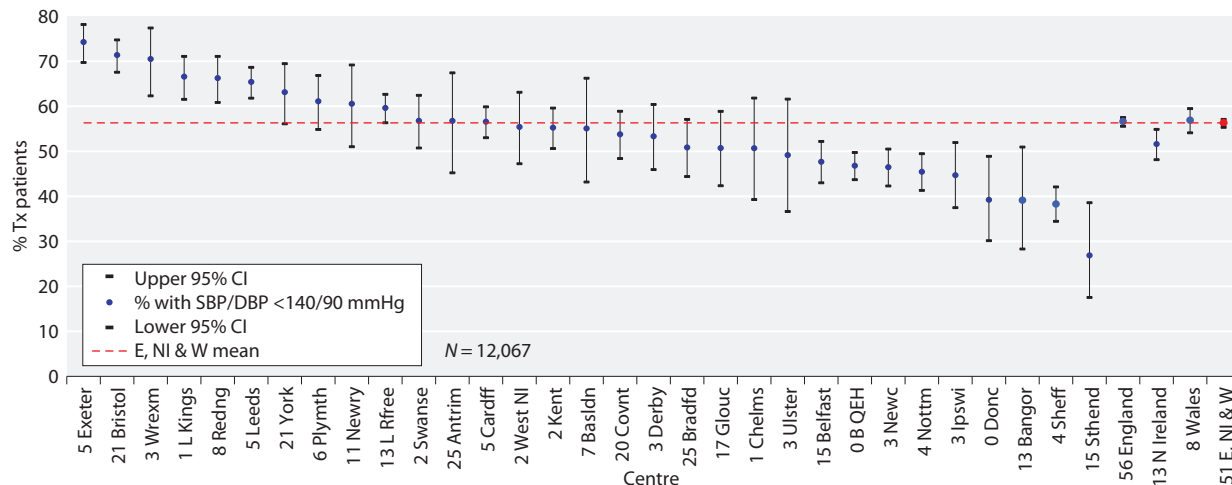


Figure 5.11 Percentage of adult patients prevalent to Tx on 31/12/2017 with estimated glomerular filtration rate (eGFR) ≥ 30 mL/min/1.73 m² achieving blood pressure of <140/90 mmHg by centre
CI – confidence interval; DBP – diastolic blood pressure; SBP – systolic blood pressure

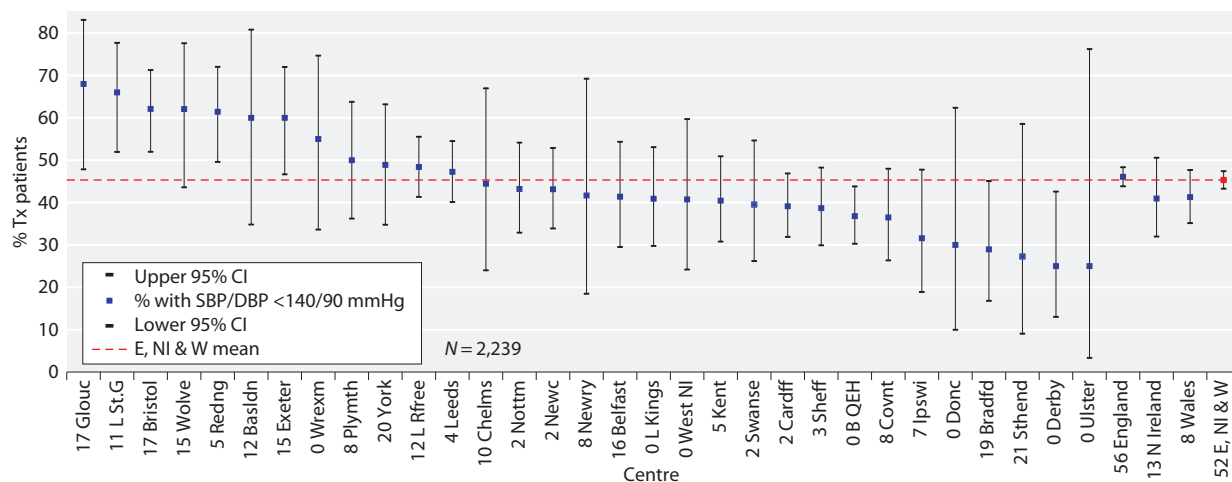


Figure 5.12 Percentage of adult patients prevalent to Tx on 31/12/2017 with estimated glomerular filtration rate (eGFR) <30 mL/min/1.73 m² achieving blood pressure of <140/90 mmHg by centre
CI – confidence interval; DBP – diastolic blood pressure; SBP – systolic blood pressure

Biochemistry parameters in prevalent adult kidney Tx patients

The attainment of audit standards is shown by stage of Tx function in the prevalent Tx population and by comparing to the prevalent dialysis population.

Table 5.8 Estimated glomerular filtration rate (eGFR), blood pressure and biochemical parameters in adult patients prevalent to Tx on 31/12/2017 compared with adult patients prevalent to dialysis on 31/12/2017 by CKD stage

	Tx CKD stage (eGFR)				Prevalent dialysis Stage 5D
	Stage 1–2T (≥60 mL/min/1.73 m ²)	Stage 3T (30–59 mL/min/1.73 m ²)	Stage 4T (15–29 mL/min/1.73 m ²)	Stage 5T (<15 mL/min/1.73 m ²)	
N	10,725	16,200	4,356	727	21,869
%	33.5	50.6	13.6	2.3	
eGFR (mL/min/1.73 m²)					
mean ± SD	76.8 ± 13.4	45.3 ± 8.4	23.6 ± 4.1	11.6 ± 2.5	
median	73.5	45.5	24.1	12.1	
SBP (mmHg)					
mean ± SD	134.6 ± 16.4	137.1 ± 17.3	141.1 ± 19.6	144.4 ± 20.4	134.3 ± 24.9
% ≥ 140 mmHg	35.4	41.4	50.9	58.4	39.1
DBP (mmHg)					
mean ± SD	80.0 ± 10.4	79.5 ± 10.9	79.3 ± 11.6	81.6 ± 13.1	69.0 ± 14.9
% ≥ 90 mmHg	16.1	16.5	17.5	23.8	8.9
Total cholesterol (mmol/L)					
mean ± SD	4.5 ± 1.0	4.6 ± 1.1	4.6 ± 1.2	4.7 ± 1.4	3.9 ± 1.1
% ≥ 4.0 mmol/L	68.3	69.8	70.0	67.8	43.2
Haemoglobin (g/L)					
mean ± SD	137 ± 16	129 ± 17	117 ± 16	106 ± 16	110 ± 14
% < 100 g/L	1.5	3.4	12.0	33.5	19.8
Phosphate (mmol/L)					
mean ± SD	0.9 ± 0.2	1.0 ± 0.2	1.1 ± 0.3	1.5 ± 0.4	1.6 ± 0.5
% > 1.7 mmol/L	0.0	0.2	1.9	19.9	34.7
Adjusted Ca (mmol/L)					
mean ± SD	2.4 ± 0.1	2.4 ± 0.1	2.4 ± 0.2	2.4 ± 0.2	2.4 ± 0.2
% > 2.5 mmol/L	26.6	26.5	22.8	17.4	16.6
% < 2.2 mmol/L	3.0	3.6	6.8	17.0	15.8
PTH (pmol/L)					
median	8.3	9.7	15.2	28.5	31.7
% > 72 pmol/L	0.3	0.5	3.4	11.9	18.0

Ca – calcium; DBP – diastolic blood pressure; PTH – parathyroid hormone; SBP – systolic blood pressure; SD – standard deviation

Differences in the median eGFR slope in Tx patients is reported by patient and Tx graft characteristics. All UK patients aged at least 18 years receiving their first kidney Tx between 01/01/2006 and 31/12/2015 were considered for inclusion. A minimum duration of 18 months graft function was required and three or more creatinine measurements from the second year of graft function onwards were used to plot eGFR slope. If a Tx failed, but there were at least three creatinine measurements between one year post-Tx and graft failure, the patient was included, but no creatinine measurements after the quarter preceding the recorded date of Tx failure were analysed. These data are currently being analysed further in a separate piece of research work.

Table 5.9 Differences in median estimated glomerular filtration rate (eGFR) slope between subgroups of adult patients prevalent to Tx on 31/12/2017

	Subgroup	N	Median slope	Lower quartile	Upper quartile
Age at Tx (yrs)	<40	4,726	-1.31	-4.54	0.80
	40-55	6,567	-0.55	-2.83	1.28
	>55	6,831	-0.64	-3.09	1.16
Ethnicity	White	13,259	-0.63	-2.99	1.17
	South Asian	2,063	-1.33	-4.37	0.87
	Black	1,242	-1.35	-4.62	0.94
	Other	596	-0.84	-3.76	1.08
Sex	Male	11,112	-0.49	-2.85	1.30
	Female	7,012	-1.27	-3.98	0.80
Diabetes	No diabetes	15,154	-0.66	-3.12	1.15
	Diabetes	2,797	-1.47	-4.26	0.81
Tx donor	Deceased	11,614	-0.79	-3.34	1.18
	Living	6,510	-0.72	-3.27	1.04
Year of Tx	2007	1,584	-0.77	-2.47	0.45
	2008	1,811	-0.70	-2.50	0.57
	2009	1,900	-0.87	-2.74	0.56
	2010	1,993	-0.77	-2.71	0.73
	2011	1,963	-0.62	-2.94	1.10
	2012	2,175	-0.85	-3.39	1.19
	2013	2,351	-1.00	-3.79	1.29
	2014	2,227	-0.67	-4.21	2.14
	2015	2,120	-0.62	-6.27	4.12
Status of Tx patients at end of follow-up	Died	1,367	-1.00	-4.13	1.34
	Graft failed	1,422	-6.36	-12.42	-3.15
	Re-transplanted	75	-3.69	-7.21	-1.30
	Graft functioning	15,335	-0.49	-2.61	1.28
Total		18,124	-0.77	-3.31	1.12

Survival of adult kidney Tx patients

Survival of incident and prevalent RRT patients is described in detail in chapters 1 and 2, respectively. Survival of incident Tx patients is reported in [table 5.3](#). NHSBT reports the survival of Tx recipients.

Cause of death in adult kidney Tx patients

Cause of death was analysed in patients prevalent to RRT on 31/12/2016 and followed-up for one year in 2017, with comparisons between Tx and dialysis presented in [table 5.10](#). Work is being undertaken to better understand and code the cause of death in Tx recipients. The proportion of RRT 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.

Table 5.10 Cause of death in adult patients prevalent to RRT on 31/12/2016 followed-up in 2017 by modality

Cause of death	All modalities		Dialysis		Tx	
	N	%	N	%	N	%
Cardiac disease	747	22.7	631	23.2	116	20.5
Cerebrovascular disease	123	3.7	101	3.7	22	3.9
Infection	659	20.0	550	20.2	109	19.3
Malignancy	356	10.8	211	7.7	145	25.7
Treatment withdrawal	592	18.0	576	21.1	16	2.8
Other	592	18.0	485	17.8	107	18.9
Uncertain aetiology	221	6.7	171	6.3	50	8.8
Total (with data)	3,290	100.0	2,725	100.0	565	100.0
Missing	2,038	38.3	1,688	38.3	350	38.3

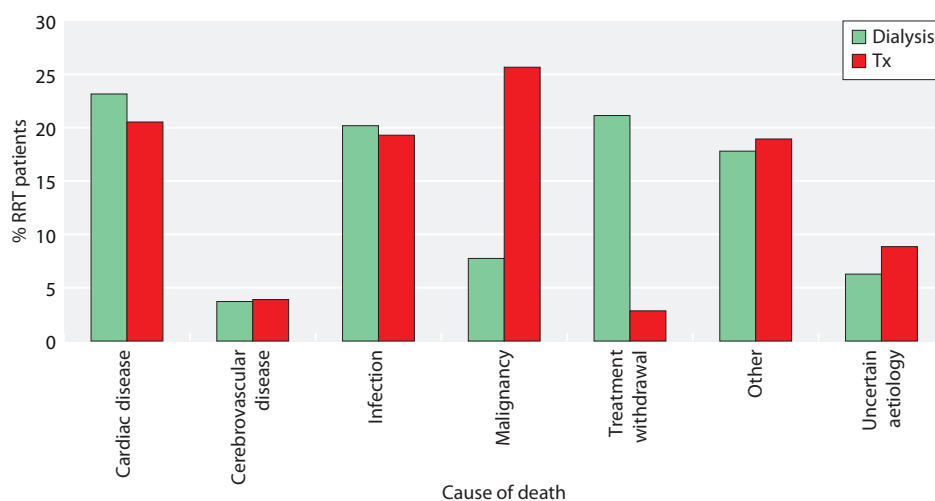


Figure 5.13 Cause of death for adult patients prevalent to RRT on 31/12/2016 followed-up in 2017 by modality

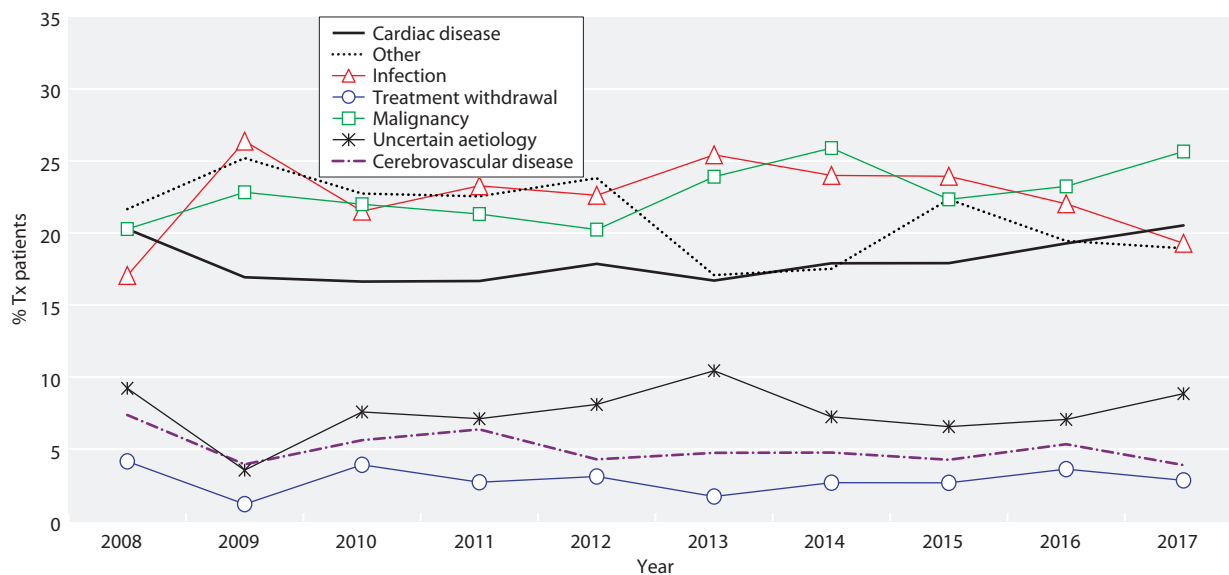


Figure 5.14 Cause of death for adult patients prevalent to Tx between 2008 and 2017