SUPPLEMENTAL MATERIAL

TABLE OF CONTENTS

Supplemental table 1. Patient and transplant characteristics with additional data

Variable	Total n	n	%
Male sex	5121	3107	60.7
Ethnic group			
White	4918	3955	80.4
Asian		579	11.8
Black		215	4.4
Mixed/other		169	3.4
Index of multiple deprivation quintile[1]			
1 (most deprived)	5101	1132	22.2
2		1072	21.0
3		886	17.4
4		992	19.5
5 (least deprived)		1019	20.0
Primary kidney disease group[2]			
Glomerular disease	5065	1467	29.0
Systemic diseases affecting the kidney		304	6.0
Familial/hereditary nephropathies		593	11.7
Tubulointerstitial disease		1808	35.7
Miscellaneous kidney disorders		893	17.6
Late presentation[3]	3366	867	25.8
Age when first seen (years) (median, IQR)	3389	13.1	2.7, 20.0
Age at KRT start (years) (median, IQR)	5085	19.1	12.9, 24.1
Years to KRT start from first nephrology review (median, IQR)	3370	2.0	0.2. 5.4
Tertiles of year started KRT (median, IQR)	5085	2006	2001, 2009
1983-2003	5085	1936	38.1
2004-2008		1607	31.6
2009-2014		1542	30.3
Start modality			
Haemodialysis	5102	2011	39.4
Peritoneal dialysis		1839	36.0
Transplant		1252	24.5
UK Renal Registry database			
Paediatric database only	5121	300	5.9
Transplanted before transfer to adult services		1662	32.5
Transplanted after transfer to adult services		100	2.0
Adult database only		3059	59.7
Age at transfer (years) (median, IQR)	1455	18	17.4, 18.5
Died	5121	260	5.1
Age at death (years) (median, IQR)	260	27.6	20.3, 32.3
Transplanted during study period			
Graft 1	4750	4377	85.5
Graft 2		371	7.2
Graft 3		2	0.04
Re-transplanted during study period			
Graft 2	371	369	7.2

Graft 3		2	0.04
Age at transplant (years) (median, IQR)			
Graft 1	4377	21.8	14.6, 26.5
Graft 2	740	19.4	14.5, 24.7
Graft 3	4	28.5	24.6, 29.5
Time from listing to transplant (years) (median, IQR)	4416	0.8	0.3, 1.8
Time to transplant from KRT start (years) (median, IQR)	5085	1.1	0.2, 2.6
None		1113	21.9
<6 months		535	10.5
≥6 months		3435	67.6
Transplant centre location			
England	5121	4349	84.9
Scotland		475	9.3
Wales		170	3.3
Northern Ireland		127	2.5
Year of transplant			
1998-2003	5121	1291	25.2
2004-2009		1930	37.7
2010-2014		1900	37.1
Distance from transplant centre (kilometres)[4]	5093	26.2	10.7, 54.8
Donor type			
Live donation	5121	2462	48.1
Donation after brainstem death		2356	46.0
Donation after circulatory death		303	5.9
Donor age (years) (median, IQR)	5115	41	27, 49
Donor Epstein-Barr status			
Positive	989	375	37.9
Negative		59	6.0
Other/Unknown		555	56.1
Cytomegalovirus status			
Donor negative, recipient negative	2123	901	42.4
Donor negative, recipient positive		369	17.4
Donor positive, recipient negative		562	26.5
Donor positive, recipient positive		291	13.7
Donor cause of death			
Death from intracranial event	2648	1717	64.8
Death from trauma		642	24.2
Death from infection		110	4.15
Death from other cause		179	6.76
Donor ethnic group			
White	4802	4401	91.7
Asian		237	4.9
Black		102	102
Mixed/Other		62	62
Cold ischaemic time (hours) (median, IQR)	4651	9.3	2.8, 16.3
Calculated reaction frequency (%) (median, IQR)[5]	5118	0	0, 12
HLA mismatch group[6]			
0 mismatches	5120	544	10.6

[0 HLA-DR and 0/1 HLA-B] mismatches		2016	39.4
[0 HLA-DR and 2 HLA-B] or [1 HLA-DR and 0/1 HLA-B] mismatches		2272	44.4
[1 HLA-DR and 2 HLA-B] or [2 HLA-DR] mismatches		288	5.6
First eGFR (mL/min/1.73m^2) (mean, SD)[7]	4882	62	23
Median eGFR (mL/min/1.73m^2) (mean, SD)	4882	58	21
Rate of eGFR change (mL/min/1.73m^2/year) (mean, SD)	4487	-3.14	7.69
Graft failure	5111	1376	26.9
Follow up time (years) (median, IQR)	5111	7.0	4.0, 10.9
Time to event (years) (median, IQR)	1376	4.2	1.5, 7.6
Patient death	4750	238	5.0
Follow up time (years) (median, IQR)	4750	8.8	5.1, 13.0
Time to event (years) (median, IQR)	238	6.6	3.0, 10.6
Age at event (mean, SD)	5111	27.5	8.7

IQR – interquartile range; KRT – kidney replacement therapy; SD – standard deviation; HLA – human leucocyte antigen; eGFR – estimated glomerular filtration rate.

Ages are based on dates of birth rounded to mid-month.

[1]Postcodes were used to derive UK–wide index of multiple deprivation quintiles[1].

[2]Primary kidney disease was using a 2012 European coding system[2]. The pediatric diagnosis was used where discordant between pediatric and adult databases[3].

[3]Late presentation defined as ≤90 days from first nephrology review to RRT start.

[4]Distances were created using the Office for National Statistics Postcode Directory[4].

[5]Calculated reaction frequency is defined as the percentage of ABO-identical patients within the donor pool that are HLA incompatible with an individual patient and is dependent on blood group and antibodies[5].

[6]HLA mismatch groups were derived from the UK 2006 National Kidney Allocation scheme[6]. The HLA-A:B:DR mismatches included in each group are as follows:

- [0 HLA-DR and 0/1 HLA-B]
    - 1:0:0, 0:1:0, 1:1:0, 2:0:0, 2:1:0
- [0 HLA-DR and 2 HLA-B] or [1 HLA-DR and 0/1 HLA-B]
    - 0:2:0, 1:2:0, 2:2:0, 0:0:1, 1:0:1, 2:0:1, 0:1:1, 1:1:1, 2:1:1
- [1 HLA-DR and 2 HLA-B] or [2 HLA-DR]
    - 0:2:1, 1:2:1, 2:2:1, 0:0:2, 1:0:2, 2:0:2, 0:1:2, 1:1:2, 2:1:2, 0:2:2, 1:2:2, 2:2:2.

[7]eGFR post-transplant calculated from the first biochemical data recorded by the UK Renal Registry following transplantation. Returns are annual for paediatrics and quarterly for adults.

Supplemental table 2. Hazard ratios and 95% confidence intervals for each variable in the graft loss model in univariable analyses, for comparison to the mutually adjusted model shown in figure 2.

Variable	Hazard Ratio	95% confidence interval		p-value
		Lower	Upper	
Female sex	**1.14**	1.03	1.28	0.02
Live donor (cf. deceased donor)	**0.79**	0.71	0.88	<0.0001
Human Leucocyte Antigen mismatches [One DR & two B locus OR two DR locus mismatches]	**1.46**	1.19	1.79	<0.0001
Higher first reported eGFR post-transplant (per 10mL/min/1.73 m^2)	**0.83**	0.80	0.86	<0.0001
Glomerular diseases	**1.23**	1.10	1.38	<0.0001
Age group (cf. 25-29 years)				
2-4	**0.91**	0.64	1.30	0.6
5-9	**0.54**	0.39	0.74	<0.0001
10-14	**0.87**	0.71	1.06	0.2
15-19	**1.37**	1.18	1.60	<0.0001
20-24	**1.24**	1.07	1.44	0.004
30-34	**0.84**	0.68	1.04	0.1
35-39	**0.82**	0.58	1.16	0.3
40-44	**0.87**	0.43	1.77	0.7
Ethnicity (compared to White)				
Asian	**1.04**	0.88	1.22	0.7
Black	**1.33**	1.04	1.71	0.02
Mixed/Other	**0.95**	0.70	1.29	0.7
Year of transplant (cf. 1998-2005)				
2006-2010	**0.84**	0.74	0.95	0.005
2011-2014	**0.79**	0.67	0.93	0.005

eGFR – estimated glomerular filtration rate

Supplemental table 3. Piecewise multivariable Cox proportional hazards examining associations with death-censored kidney transplant failure in UK patients transplanted under 30 years of age, split at one year of follow-up time.

Variable	≤1 year				>1 year			
	Hazard Ratio	95% confidence interval Lower	Upper	p-value	Hazard Ratio	95% confidence interval Lower	Upper	p-value
Female sex	**0.77**	0.52	1.16	0.2	**0.90**	0.79	1.03	0.1
Live donor (cf. deceased donor)	**0.61**	0.39	0.95	0.03	**0.89**	0.78	1.01	0.06
Human Leucocyte Antigen mismatches [One DR & two B locus OR two DR locus mismatches]	**1.30**	0.63	2.68	0.5	**1.51**	1.18	1.92	0.001
Higher first reported eGFR post-transplant (per 10mL/min/1.73 m^2)	**0.57**	0.49	0.67	<0.0001	**0.86**	0.82	0.89	<0.0001
Glomerular diseases	**2.05**	1.34	3.14	0.001	**1.24**	1.08	1.43	0.002
Age group (cf. 25-29 years)								
2-4	**1.19**	0.35	4.00	0.8	**0.68**	0.38	1.21	0.2
5-9	**0.62**	0.19	1.97	0.4	**0.49**	0.32	0.74	0.001
10-14	**0.61**	0.24	1.56	0.3	**0.97**	0.76	1.23	0.8
15-19	**1.07**	0.61	1.87	0.8	**1.59**	1.32	1.91	<0.0001
20-24	**1.37**	0.84	2.22	0.2	**1.42**	1.19	1.69	<0.0001
30-34	**-**	-	-	-	**0.78**	0.62	0.98	0.03
35-39	**-**	-	-	-	**0.81**	0.57	1.16	0.3
40-44	**-**	-	-	-	**0.86**	0.41	1.78	0.7
Ethnicity (compared to White)								
Asian	**0.90**	0.43	1.86	0.8	**1.03**	0.84	1.26	0.8
Black	**1.15**	0.46	2.85	0.8	**1.52**	1.15	2.01	0.004
Mixed/Other	**1.09**	0.35	3.40	0.9	**1.01**	0.69	1.46	0.98
Year of transplant (cf. 1998-2005)								
2006-2010	**1.03**	0.65	1.63	0.9	**1.05**	0.90	1.22	0.5
2011-2014	**0.88**	0.50	1.55	0.7	**1.24**	1.01	1.52	0.04

eGFR – estimated glomerular filtration rate

Supplemental table 4. Coefficients and 95% confidence intervals for each variable in the eGFR decline model in univariable analyses, for comparison to the mutually adjusted model shown in figure 3.

Variable	Coefficient	95% confidence interval		p-value
		Lower	Upper	
Female sex	**-1.18**	-1.64	-0.72	<0.0001
Glomerular diseases	**-0.72**	-1.23	-0.22	0.005
First reported eGFR post-transplant (cf. <60 mL/min/1.73m^2)				
60-90	**-0.78**	-1.25	-0.31	0.001
>90	**-3.88**	-4.65	-3.11	<0.0001
Age group (cf. 25-29 years)				
2-4	**-2.78**	-4.48	-1.09	0.001
5-9	**-0.54**	-1.59	0.52	0.3
10-14	**-0.30**	-1.17	0.56	0.5
15-19	**-1.28**	-1.99	-0.58	<0.0001
20-24	**-1.49**	-2.13	-0.86	<0.0001
30-34	**0.81**	0.06	1.55	0.03
35-39	**1.42**	0.25	2.59	0.02
40-44	**2.02**	-0.33	4.37	0.09
Ethnicity (compared to White)				
Asian	**0.04**	-0.68	0.77	0.9
Black	**-1.68**	-2.84	-0.53	0.004
Mixed/Other	**0.26**	-1.05	1.57	0.7

eGFR – estimated glomerular filtration rate

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