

## SUPPLEMENTAL DIGITAL CONTENT

**Table S1a:** Donor characteristics by biopsy performed (excluded vs. included)

		All (N=1664)	No Biopsy (N=774)	Biopsy performed (N=890)	P
Age, years		46 [29, 55]	32 [23, 46]	53 [44, 61]	<0.001
Male		994 (60%)	494 (64%)	500 (56%)	0.002
Black race		267 (16%)	110 (14%)	157 (18%)	0.057
Hispanic		203 (12%)	87 (11%)	116 (13%)	0.265
Body mass index, Kg/m <sup>2</sup>		27 [24, 32]	26 [23, 30]	28 [24, 34]	<0.001
Hypertension		597 (36%)	100 (13%)	497 (56%)	<0.001
Diabetes		139 (8%)	18 (2%)	121 (14%)	<0.001
Cause of death	Head Trauma	444 (28%)	291 (41%)	153 (17%)	<0.001
	Anoxia	530 (33%)	246 (35%)	284 (32%)	
	Stroke	587 (37%)	161 (23%)	426 (49%)	
	Other	23 (1%)	10 (1%)	13 (1%)	
Hepatitis C seropositive		70 (4%)	41 (5%)	29 (3%)	0.039
Expanded criteria donor		429 (26%)	33 (4%)	396 (44%)	<0.001
Donation after cardiac death		256 (15%)	125 (16%)	131 (15%)	0.42
KDRI		1.28 [1.01, 1.65]	1.04 [0.87, 1.24]	1.56 [1.28, 1.9]	<0.001
KDPI		54 [30, 77]	33 [15, 50]	73 [54, 88]	<0.001
Terminal serum creatinine, mg/dL		1 [0.7, 1.4]	0.9 [0.7, 1.2]	1.1 [0.79, 1.6]	<0.001
Year of procurement	2010	239 (18%)	138 (19%)	101 (17%)	0.055
	2011	425 (32%)	238 (33%)	187 (31%)	
	2012	412 (31%)	232 (32%)	180 (30%)	
	2013	253 (19%)	119 (16%)	134 (22%)	
Participating organ procurement organization	A	79 (5%)	66 (9%)	13 (1%)	<0.001
	B	191 (11%)	57 (7%)	134 (15%)	
	C	280 (17%)	176 (23%)	104 (12%)	
	D	254 (15%)	32 (4%)	222 (25%)	
	E	860 (52%)	443 (57%)	417 (47%)	

Values are N (%) or median [interquartile range]. KDRI, kidney donor risk index; KDPI, kidney donor profile index.

**Table S1b:** Recipient, transplant and kidney characteristics by biopsy performed (excluded vs. included)

Recipient and transplant characteristics		All (N=2613)	No Biopsy (N=1469)	Biopsy performed (N=1144)	P*
Age, years		55 [45, 64]	51 [41, 61]	60 [50, 66]	<0.001
Male		1595 (61%)	889 (61%)	706 (62%)	0.534
Black race		1021 (39%)	548 (37%)	473 (41%)	0.036
Hispanic		294 (11%)	153 (10%)	141 (12%)	0.125
Body mass index, Kg/m <sup>2</sup>		28 [24, 32]	27 [23, 31]	28 [25, 32]	<0.001
Cause of ESRD	Other or unknown	541 (21%)	331 (23%)	210 (18%)	<0.001
	Diabetes	786 (30%)	411 (28%)	375 (33%)	
	Hypertension	681 (26%)	358 (24%)	323 (28%)	
	Glomerulonephritis	424 (16%)	256 (17%)	168 (15%)	
	Graft failure	181 (7%)	113 (8%)	68 (6%)	
Duration of ESRD, months		42 [16, 66]	39 [14, 64]	47 [21, 68]	<0.001
Preemptive Transplant		293 (11%)	172 (12%)	121 (11%)	0.363
Kidney machine perfusion used		1010 (39%)	279 (19%)	731 (64%)	<0.001
Kidney cold ischemia time, hours		14.1 [10.0, 19.2]	12.3 [8.8, 17.0]	16.5 [12.1, 22.0]	<0.001
Human leukocyte antigen mismatch level	0	163 (6%)	106 (7%)	57 (5%)	<0.001
	1	23 (1%)	13 (1%)	10 (1%)	
	2	86 (3%)	55 (4%)	31 (3%)	
	3	318 (12%)	190 (13%)	128 (11%)	
	4	686 (26%)	412 (28%)	274 (24%)	
	5	883 (34%)	452 (31%)	431 (38%)	
	6	447 (17%)	236 (16%)	211 (18%)	
Panel reactive antibody	0%	1677 (64%)	878 (60%)	799 (70%)	<0.001
	1-20%	183 (7%)	97 (7%)	86 (8%)	
	21-80%	344 (13%)	202 (14%)	142 (12%)	
	>80%	409 (16%)	292 (20%)	117 (10%)	
Delayed graft function		821 (31%)	363 (25%)	458 (40%)	<0.001
1-year eGFR, ml/min/1.73m <sup>2</sup>		54 [40, 71]	61 [46, 77]	48 [35, 63]	<0.001
3-year eGFR, ml/min/1.73m <sup>2</sup>		52 [34, 70]	59 [41, 76]	46 [30, 61]	<0.001
Kidney characteristics		All (N=3320)	No Biopsy (N=1591)	Biopsy performed (N=1729)	P
Glomerulosclerosis	GS <10%	1307 (39%)		1307 (76%)	NA
	GS 10%-20%	226 (7%)		226 (13%)	
	GS >20%	196 (6%)		196 (11%)	
IFTA	None (≤5%)	810 (24%)		810 (47%)	NA
	Mild (6-25%)	815 (45%)		815 (47%)	
	Moderate (26-50%)	99 (3%)		99 (6%)	
	Severe (>50%)	5 (0%)		5 (0%)	
Kidney Leuven score		59 [49, 69]		59 [49, 59]	NA
Kidney discarded		707 (21%)	122 (8%)	585 (34%)	<0.001

Values are N (%) or median [interquartile range]. ESRD, end-stage renal disease; IFTA, interstitial fibrosis/tubular atrophy; eGFR, estimated glomerular filtration rate; NA, not applicable.

**S2: Biopsy rates and percentages of substantial pathology in biopsy reports by OPO**

<b>OPO</b>	<b># of donors biopsied</b>	<b># of kidneys biopsied</b>	<b>Kidney GS &gt;20%</b>	<b>Kidney IFTA moderate-severe</b>
<b>A</b> (n=79 donors)	13 (16%)	25	2 (8%)	4 (16%)
<b>C</b> (n=280 donors)	104 (37%)	202	25 (12%)	21 (10%)
<b>E</b> (n=860 donors)	417 (48%)	817	106 (13%)	40 (5%)
<b>B</b> (n=191 donors)	134 (70%)	259	44 (17%)	32 (12%)
<b>D</b> (n=254 donors)	222 (87%)	426	19 (4%)	7 (2%)

Values are N (%). OPO, organ procurement organization; GS, glomerulosclerosis; IFTA, interstitial fibrosis/tubular atrophy.

**Table S3:** Recipient, transplant and kidney characteristics by Leuven score median

Recipient and transplant characteristics		All (N=1144)	Leuven Score ≤59 (N=694)	Leuven Score >59 (N=450)	P
Age, years		60 [50, 66]	57 [47, 64]	63 [56, 69]	<0.001
Male		706 (62%)	433 (62%)	273 (61%)	0.558
Black race		473 (41%)	291 (38%)	182 (40%)	0.618
Hispanic		141 (12%)	75 (11%)	66 (15%)	0.052
Body mass index, Kg/m <sup>2</sup>		28 [25, 32]	28 [24, 32]	28 (25, 32]	0.103
Cause of ESRD	Other or unknown	210 (18%)	143 (21%)	67 (15%)	<0.001
	Diabetes	375 (33%)	205 (30%)	170 (38%)	
	Hypertension	323 (28%)	182 (26%)	141 (31%)	
	Glomerulonephritis	169 (15%)	116 (17%)	52 (12%)	
	Graft failure	68 (6%)	48 (7%)	20 (4%)	
Duration of ESRD, months		20 [0, 56]	33 [0, 62]	0 [0, 49]	0.007
Preemptive Transplant		121 (11%)	75 (11%)	46 (10%)	0.753
Kidney machine perfusion used		731 (64%)	417 (60%)	314 (70%)	<0.001
Kidney cold ischemia time, hours		16.5 [12.1, 22]	16.5 [12, 22]	16.5 [12.3, 21.5]	0.429
Human leukocyte antigen mismatch level	0	57 (5%)	39 (6%)	18 (4%)	0.563
	1	10 (1%)	6 (1%)	4 (1%)	
	2	31 (3%)	21 (3%)	10 (2%)	
	3	128 (11%)	83 (12%)	45 (10%)	
	4	274 (24%)	176 (25%)	98 (22%)	
	5	431 (38%)	243 (35%)	188 (42%)	
	6	211 (18%)	125 (18%)	86 (19%)	
Panel reactive antibody	0%	799 (70%)	468 (67%)	331 (74%)	0.001
	1-20%	86 (8%)	50 (7%)	36 (8%)	
	21-80%	142 (12%)	85 (12%)	57 (13%)	
	>80%	117 (10%)	91 (13%)	26 (6%)	
Delayed graft function		458 (40%)	289 (42%)	169 (38%)	0.168
1-year eGFR, ml/min/1.73m <sup>2</sup>		48 [35, 63]	53 [40, 67]	43 [29, 53]	<0.001
3-year eGFR, ml/min/1.73m <sup>2</sup>		46 [30, 61]	51 [33, 66]	40 [24, 51]	<0.001
Kidney characteristics		All (N=1729)	Leuven Score ≤59 (N=874)	Leuven Score >59 (N=855)	P
Glomerulosclerosis	GS < 10%	1307 (76%)	786 (90%)	521 (61%)	<0.001
	GS 10%-20%	226 (13%)	53 (6%)	173 (20%)	
	GS >20%	196 (11%)	35 (4%)	161 (19%)	
IFTA	None (≤5%)	810 (47%)	577 (66%)	233 (27%)	<0.001
	Mild (6-25%)	815 (47%)	291 (33%)	524 (61%)	
	Moderate (26-50%)	99 (6%)	6 (1%)	93 (11%)	
	Severe (>50%)	5 (0%)		5 (1%)	
Kidney discarded		585 (34%)	180 (21%)	405 (47%)	<0.001
KDRI		1.57 [1.3, 1.91]	1.34 [1.1, 1.57]	1.82 [1.56, 2.2]	<0.001

Values are N (%) or median [interquartile range]. ESRD, end-stage renal disease; IFTA, interstitial fibrosis/tubular atrophy; eGFR, estimated glomerular filtration rate; KDRI, kidney donor risk index.