

## Supplemental Figure and Table Legends

Supplemental Figure 1: Estimated hazard ratios for post-transplant survival according to center volume for liver transplants

- Estimated hazard ratios for post-transplant survival, comparing liver transplant alone to simultaneous liver-kidney transplant among patients initially listed for simultaneous liver-kidney transplant, according to center volume of liver transplants.

Supplemental Figure 2: Estimated hazard ratios for post-transplant survival according to center annual volume of simultaneous liver-kidney transplants

- Estimated hazard ratios for post-transplant survival, comparing liver transplant alone to simultaneous liver-kidney transplant among patients initially listed for simultaneous liver-kidney transplant, according to center annual volume of simultaneous liver-kidney transplants.

Supplemental Figure 3: Post-transplant survival curves according to center volume for simultaneous liver-kidney transplants

- Kaplan-Meier post-transplant survival curves, according to center volume for SLK recipients based on classification of centers by the lowest 50% of centers, next highest 25% of centers, and top 25% of centers. Log-rank tests of center volume category demonstrated  $p = 0.277$ .

Supplemental Figure 4: Post-transplant survival curves according to center volume for liver transplant alone transplants

- Kaplan-Meier post-transplant survival curves, according to center volume for liver transplantation alone recipients based on classification of centers by the lowest 50% of centers, next highest 25% of centers, and top 25% of centers. Log-rank tests of center volume category demonstrated  $p = 0.050$ .

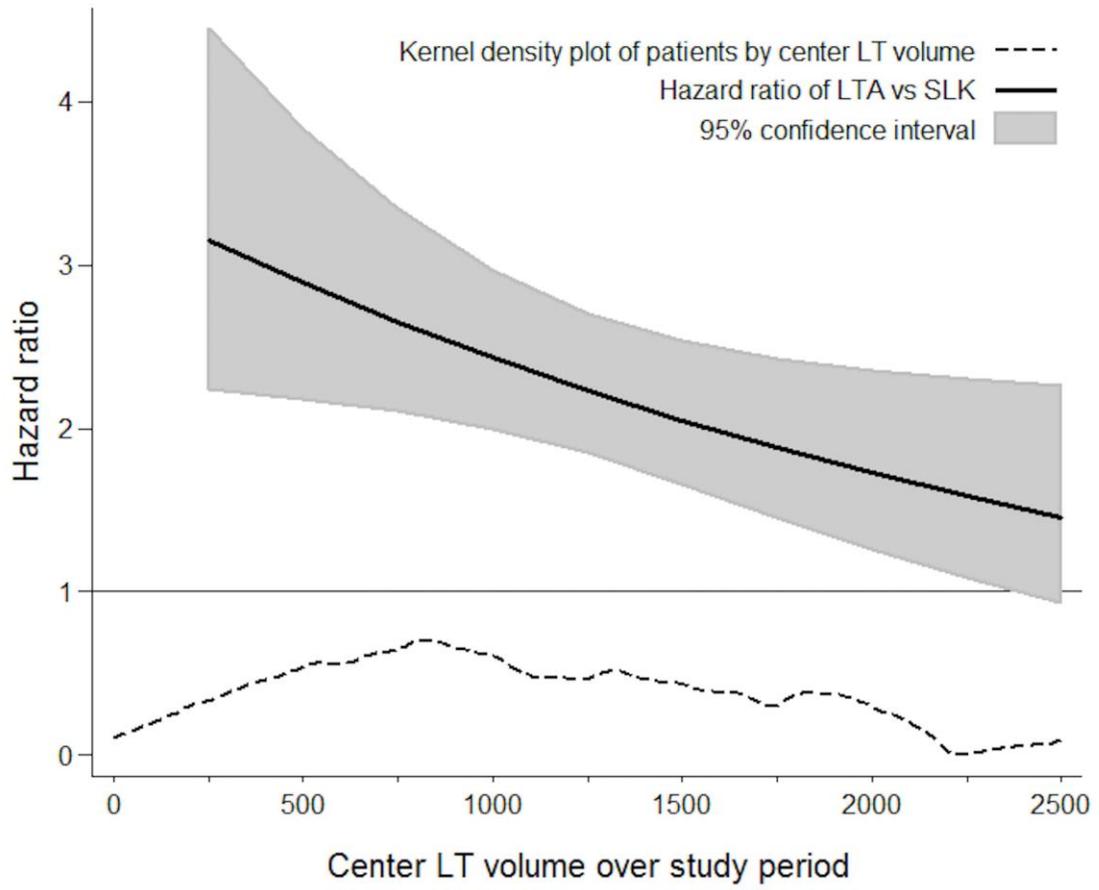
Supplemental Table 1: Hazard model of survival after transplant among patients listed for liver and kidney transplant

- Multivariable Cox proportional hazards model, with the baseline hazard stratified on the transplant center, of survival after liver transplant alone or simultaneous liver-kidney transplant among patients listed for liver and kidney transplant in 2002-2015 (N=4257).

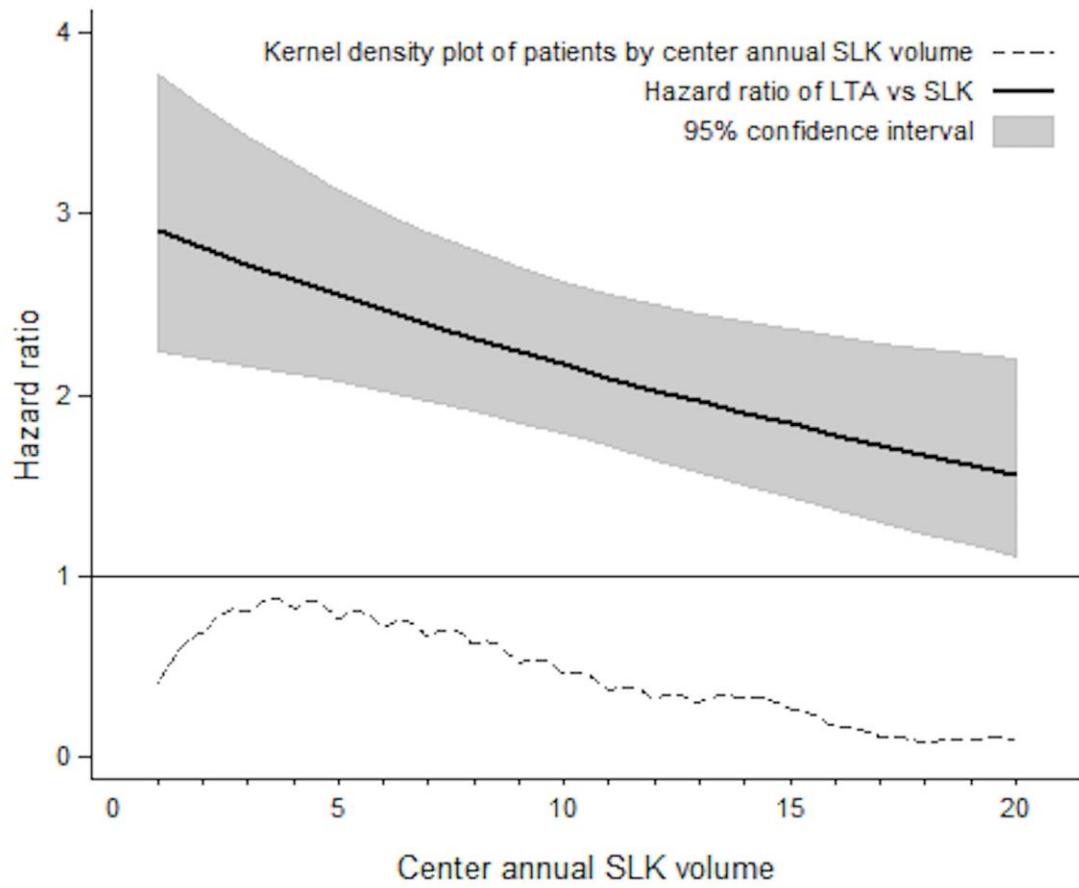
Supplemental Table 2: Characteristics of recipients of simultaneous liver-kidney by total center volume

- Descriptive characteristics by total center volume of simultaneous liver-kidney transplant among patients listed for liver and kidney transplant in 2002-2015 (N=4580).

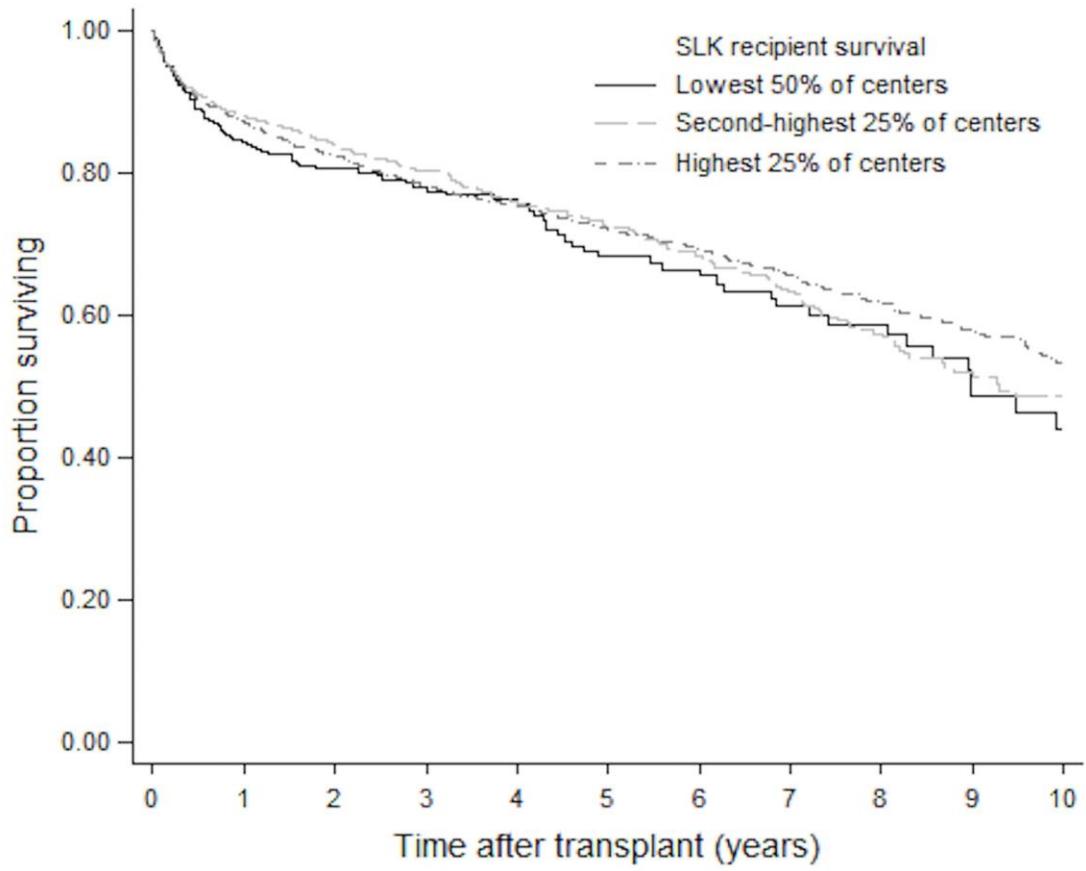
Supplemental Figure 1



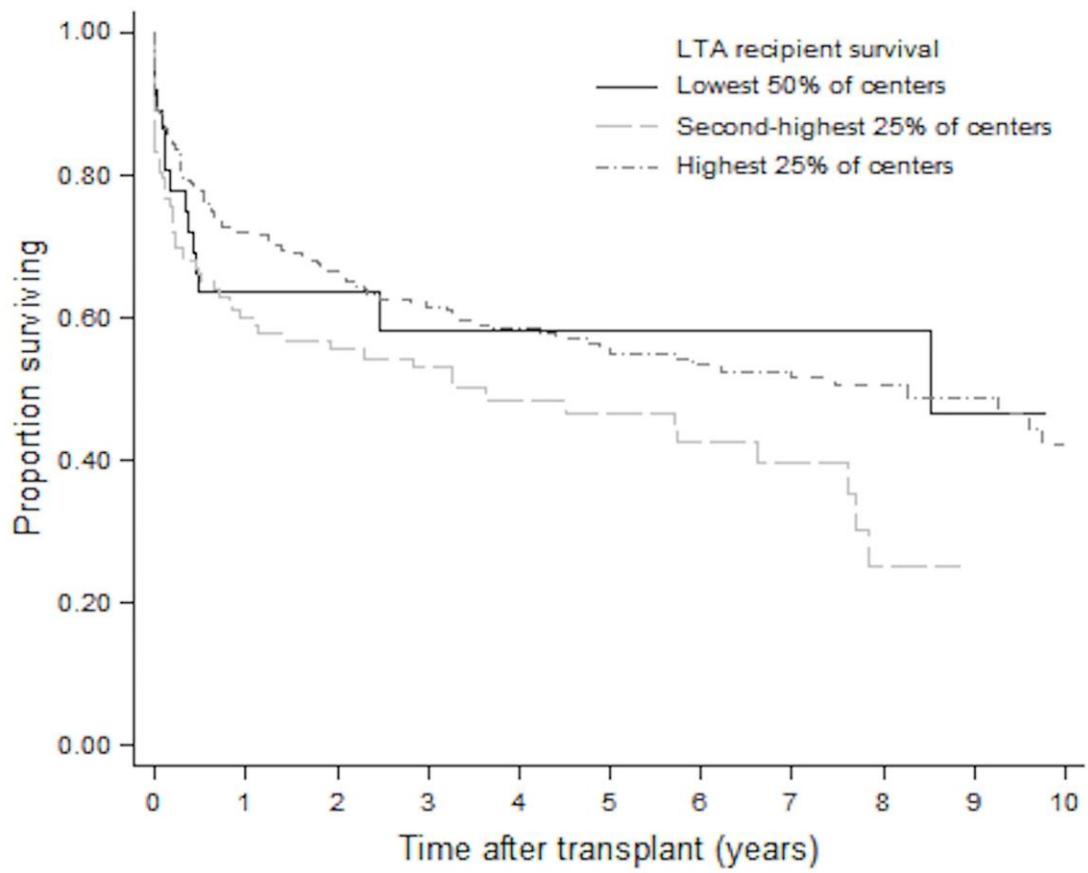
Supplemental Figure 2



Supplemental Figure 3



Supplemental Figure 4



**Supplemental Table 1**

Variable <sup>1</sup>	HR	95% CI	P
Transplant received			
SLK	ref.		
LTA	2.72	(2.16, 3.42)	<0.001
Center annual SLK volume <sup>2</sup>	1.00	(0.98, 1.02)	0.940
Interaction with receiving LTA vs. SLK	0.97	(0.94, 0.99)	0.008
Age (y)	1.01	(1.01, 1.02)	<0.001
Male	1.08	(0.94, 1.24)	0.283
Race			
White	ref.		
Black	1.17	(0.98, 1.40)	0.078
Other	0.79	(0.66, 0.94)	0.008
Etiology of liver disease			
Viral	ref.		
Cryptogenic	0.77	(0.61, 0.98)	0.034
Autoimmune	0.57	(0.41, 0.79)	0.001
NASH	0.80	(0.63, 1.02)	0.070
Alcoholic	0.65	(0.54, 0.77)	<0.001
HCC	1.04	(0.83, 1.30)	0.712
AHN	1.11	(0.75, 1.64)	0.602
Other	0.77	(0.62, 0.97)	0.023
Diabetes	1.23	(1.07, 1.40)	0.003
Dialysis	1.41	(1.19, 1.67)	<0.001
BMI (kg/m <sup>2</sup> )	0.98	(0.97, 0.99)	0.003
Serum creatinine (mg/dL)	0.97	(0.93, 1.01)	0.092
Bilirubin (mg/dL)	1.00	(0.98, 1.01)	0.379
Albumin (mg/dL)	0.88	(0.80, 0.96)	0.003
INR	0.92	(0.81, 1.05)	0.214
MELD score	1.00	(0.99, 1.02)	0.645
eGFR	1.00	(1.00, 1.01)	0.603
Hepatic encephalopathy on wait list	1.10	(0.95, 1.29)	0.211
Liver allograft cold ischemia time	1.00	(0.98, 1.02)	0.824

Year of transplant	0.98	(0.96, 1.00)	0.121
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<sup>1</sup> Covariates assessed at wait listing, apart from center volume over study period, hepatic encephalopathy on the wait list, liver allograft cold ischemic time, and year of transplant.

<sup>2</sup> Number of SLK performed in a given calendar year, centered at 3. Main effect represents within-center variation in SLK volume from year to year.

HR, hazard ratio; CI, confidence interval; SLK, simultaneous liver-kidney transplant; LTA, liver transplant alone; NASH, non-alcoholic steatohepatitis; HCC, hepatocellular carcinoma; AHN, acute hepatic necrosis; BMI, body mass index; INR, international normalized ratio; MELD, Model for End-Stage Liver Disease; eGFR, estimated glomerular filtration rate.

**Supplemental Table 2**

Variable <sup>1</sup>	Bottom tertile (n = 79)	Middle tertile (n = 974)	Top tertile (n = 3527)	P <sup>2</sup>
	Mean (SD) or N (%)	Mean (SD) or N (%)	Mean (SD) or N (%)	
<b>Transplant center SLKT volume</b>	6 (2)	26 (8)	113 (65)	<0.001
<b>Transplant center LTA volume<sup>3</sup></b>	224 (238)	508 (369)	1306 (562)	<0.001
Age (y)	53.0 (11.0)	54.5 (9.3)	54.8 (9.7)	0.167
<b>Male</b>	48 (61%)	675 (69%)	2289 (65%)	0.024
Race				0.001
White	47 (59%)	643 (66%)	2228 (63%)	
Black	10 (13%)	168 (17%)	508 (14%)	
Other	22 (28%)	163 (17%)	791 (22%)	
<b>Etiology of liver disease</b>				0.295
Viral	30 (38%)	267 (27%)	999 (28%)	
Cryptogenic	4 (5%)	70 (7%)	290 (8%)	
Autoimmune	7 (9%)	49 (5%)	172 (5%)	
NASH	6 (8%)	123 (13%)	368 (10%)	
Alcoholic	12 (15%)	232 (24%)	827 (23%)	
HCC	5 (6%)	89 (9%)	310 (9%)	
AHN	2 (3%)	17 (2%)	82 (2%)	
Other	13 (16%)	127 (13%)	479 (14%)	
<b>Diabetes</b>	26 (33%)	422 (44%)	1340 (39%)	0.007
<b>Dialysis</b>	38 (48%)	444 (46%)	1590 (45%)	0.842
BMI (kg/m <sup>2</sup> )	27.7 (6.0)	28.7 (5.8)	28.2 (5.9)	0.072
<b>Serum creatinine (mg/dL)</b>	3.9 (2.2)	3.9 (2.6)	3.6 (2.5)	0.019
<b>Bilirubin (mg/dL)</b>	8.4 (11.7)	5.5 (9.2)	5.9 (9.5)	0.031
Albumin (mg/dL)	3.0 (0.8)	3.0 (0.7)	3.0 (0.7)	0.934
<b>INR</b>	1.7 (0.9)	1.6 (0.7)	1.7 (0.8)	0.177
MELD score	27.2 (10.2)	25.0 (8.8)	25.3 (8.8)	0.097
<b>eGFR</b>	23.8 (17.8)	26.1 (21.7)	28.3 (23.5)	0.012
<b>Hepatic encephalopathy on wait</b>	55 (71%)	654 (68%)	2481 (71%)	0.218

<b>list</b>				
Liver allograft cold ischemia time	8.3 (4.9)	7.2 (3.5)	6.7 (3.4)	<0.001
<b>Year of transplant</b>	2010 (4)	2011 (4)	2010 (4)	<0.001

<sup>1</sup> Covariates assessed at wait listing, apart from center volume over study period, hepatic encephalopathy on the wait list, liver allograft cold ischemic time, and year of transplant.

<sup>2</sup> P-value by ANOVA for continuous variables and Chi-square test for categorical variables.

<sup>3</sup> Includes all liver transplants, not limited to LTA among patients listed for SLK.

SD, standard deviation; SLK, simultaneous liver-kidney transplant; LTA, liver transplant alone; BMI, body mass index; INR, international normalized ratio; MELD, Model for End-Stage Liver Disease; eGFR, estimated glomerular filtration rate.