

Multiple Listing in Kidney Transplantation

Following Implementation of the Concentric Circle (250NM) Allocation Policy

Vishnu Potluri, MD MPH¹; Amelia Tran, MS²; Nicole Kye³; Nadia Al Haddad, MD⁴; Srijan Tandukar, MD¹; Ty Dunn, MD⁵; Peter Reese, MD PhD^{1,2}; Douglas Schaebel, PhD²

¹Renal-Electrolyte and Hypertension Division, University of Pennsylvania; ²Department of Biostatistics and Epidemiology, University of Pennsylvania; ³Cornell University; ⁴Lankenau Medical Center;

⁵Department of Surgery, University of Pennsylvania

Background

- To improve their access to a transplant, people who need a kidney transplant are allowed to list at more than one center (multiple listing)
- The kidney allocation system was changed to share deceased donor kidneys over a wider geographic area (250 nautical miles) to reduce geographic disparities in access to a transplant
- It is unknown if wider sharing of deceased donor kidneys has reduced the benefit of listing at multiple centers

Objectives

- Evaluate the effect of kidney allocation policy change on the benefit of multiple listing
- Evaluate the effect of multiple listing on access to transplantation according to UNOS geographic region

Methods

- Adult (≥ 18 years) candidates listed for a kidney alone transplant between 1/1/2010 and 6/30/2022
- Candidates must overlap for at least 90 days at two or more transplant centers to be considered as multiple listed
- Excluded prior organ transplant recipients, candidates listed for a multi-organ transplant, and pediatric candidates

Results

- The final cohort consisted of 318,055 kidney transplant candidates

Figure 1: Demographic characteristics of multiple listed candidates according to allocation era

Level	Pre-Kidney Allocation System 1/1/10 – 12/4/14		Kidney Allocation System 12/5/14 – 3/14/21		Concentric Circle (250 nautical mile) 3/15/21 – 6/20/22	
	Multiple Listed		Multiple Listed		Multiple Listed	
	No	Yes	No	Yes	No	Yes
Race/Ethnicity (%)						
White	45	47	42	43	39	38
Black	30	30	30	32	30	35
Hispanic	18	14	20	16	22	17
Asian	7	9	8	10	9	10
Cause of ESRD (%)						
Diabetes	46	40	47	40	49	44
Hypertension	18	19	18	19	18	19
Glomerular	11	13	11	13	10	12
Cystic	7	10	7	10	6	9
Other	17	18	16	18	16	16
Education Level (%)						
Less than High School	7	4	7	4	3	4
High school	41	31	39	29	37	29
Some College	25	25	25	27	25	27
Bachelor's degree	24	35	26	37	27	37
Unknown	3	5	3	3	3	3
Insurance Status (%)						
Private	45	44	44	41	44	42
Medicare	47	53	46	56	43	54
Medicaid	8	2	9	3	12	3
Pre-emptive Listing (%)						
	22	16	23	14	29	16
Calculated PRA (%)						
0-20	94	93	93	90	93	89
21-80	4	5	5	7	4	9
81-100	2	2	2	3	2	3
Social Deprivation Index Quartile (%)						
Low	26	30	25	29	24	27
Medium-low	26	27	25	27	25	27
Medium-high	24	22	24	23	24	24
High	26	21	26	20	26	22

Results

Figure 2: Prevalence of Multiple Listing on 1/1/2022

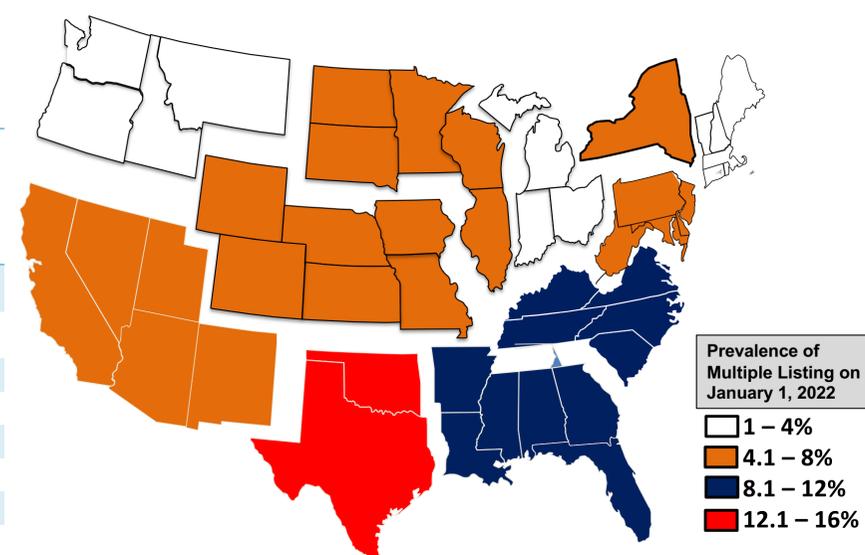
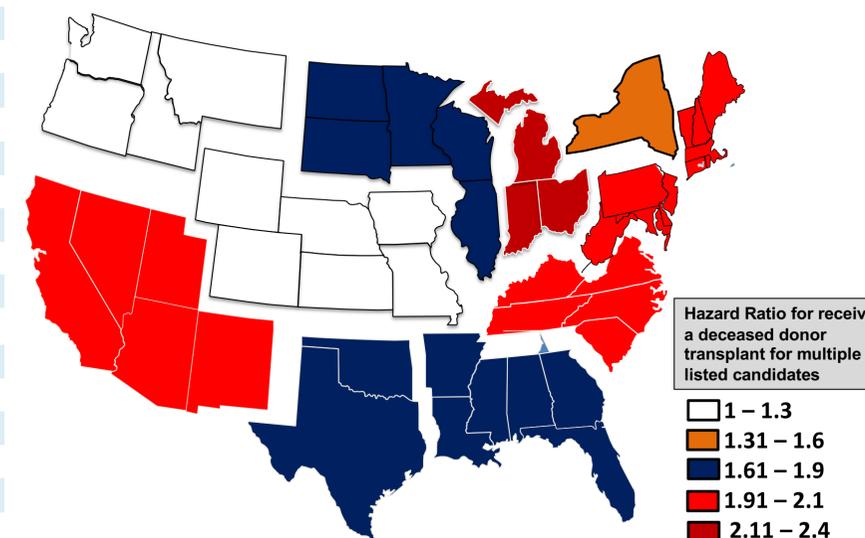


Figure 3: Hazard ratio for receiving a transplant for multiple center listed patients (vs single center listed) in the Concentric Circle Era



Conclusions

- Disparities in access to multiple listing:**
 - Candidates who have higher education attainment, and live in ZIP Codes that are less deprived are more likely to list at multiple centers
 - Candidates with Medicaid insurance, and those who live in highly deprived ZIP Codes are less likely to list at multiple centers
- Benefit of Multiple Listing:**
 - Multiple listing continues to provide benefit in access to kidney transplantation
 - The benefit of multiple listing reduced in the concentric circle era when compared to prior eras, however, patients still had a benefit in access to receiving a transplant
- Geographic variation:**
 - There is wide geographic variation in the prevalence and benefit of multiple listing

In summary, even though kidneys are now shared over a wider geographic region to improve equity, candidates who list at multiple centers continue to have a benefit in access to transplant