# Challenges and opportunities for improving organ use at the transplant center

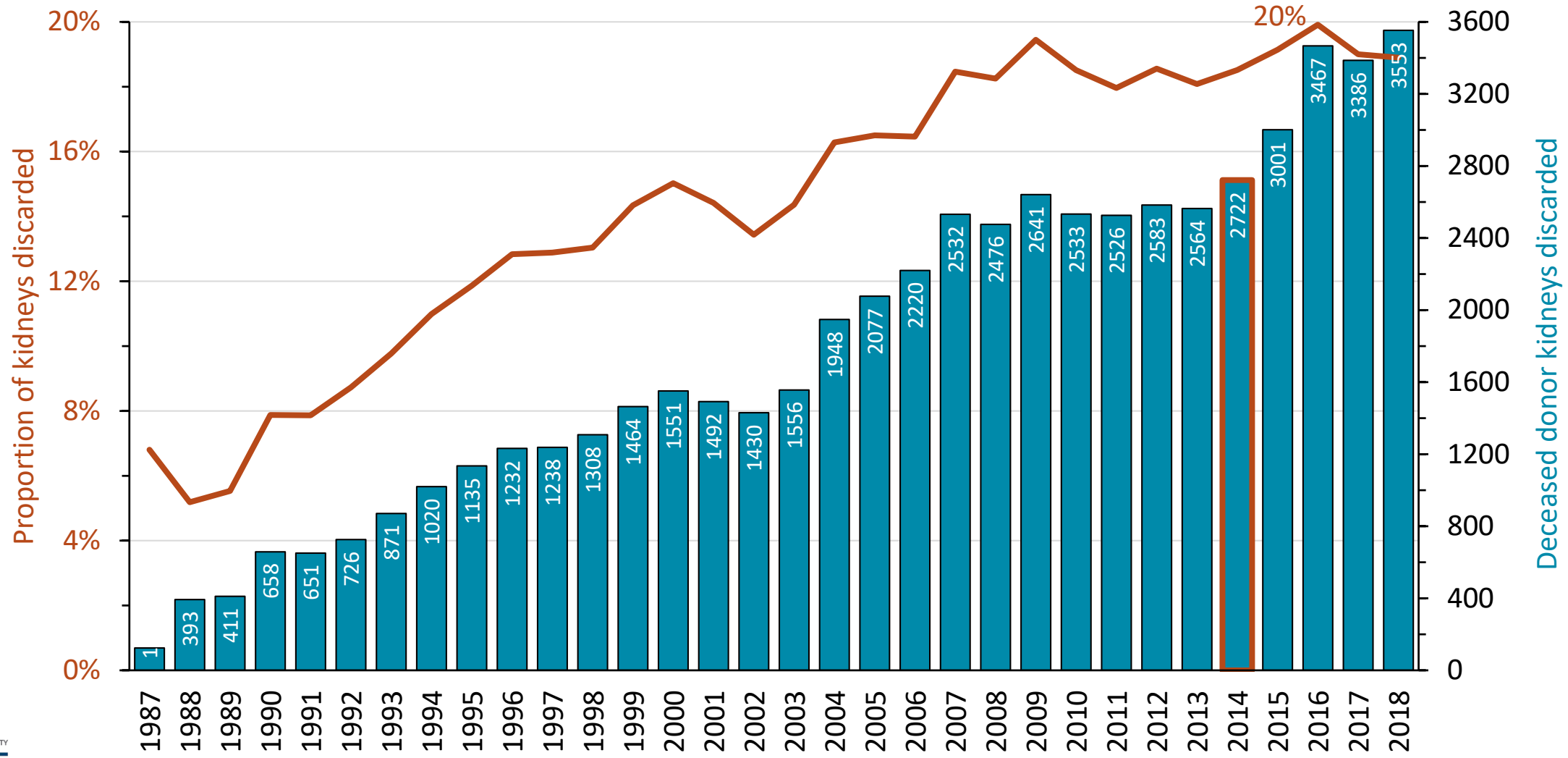
Sumit Mohan, MD, MPH
Associate Professor of Medicine & Epidemiology
Columbia University, New York, NY

sm2206@cumc.columbia.edu

# Disclosures

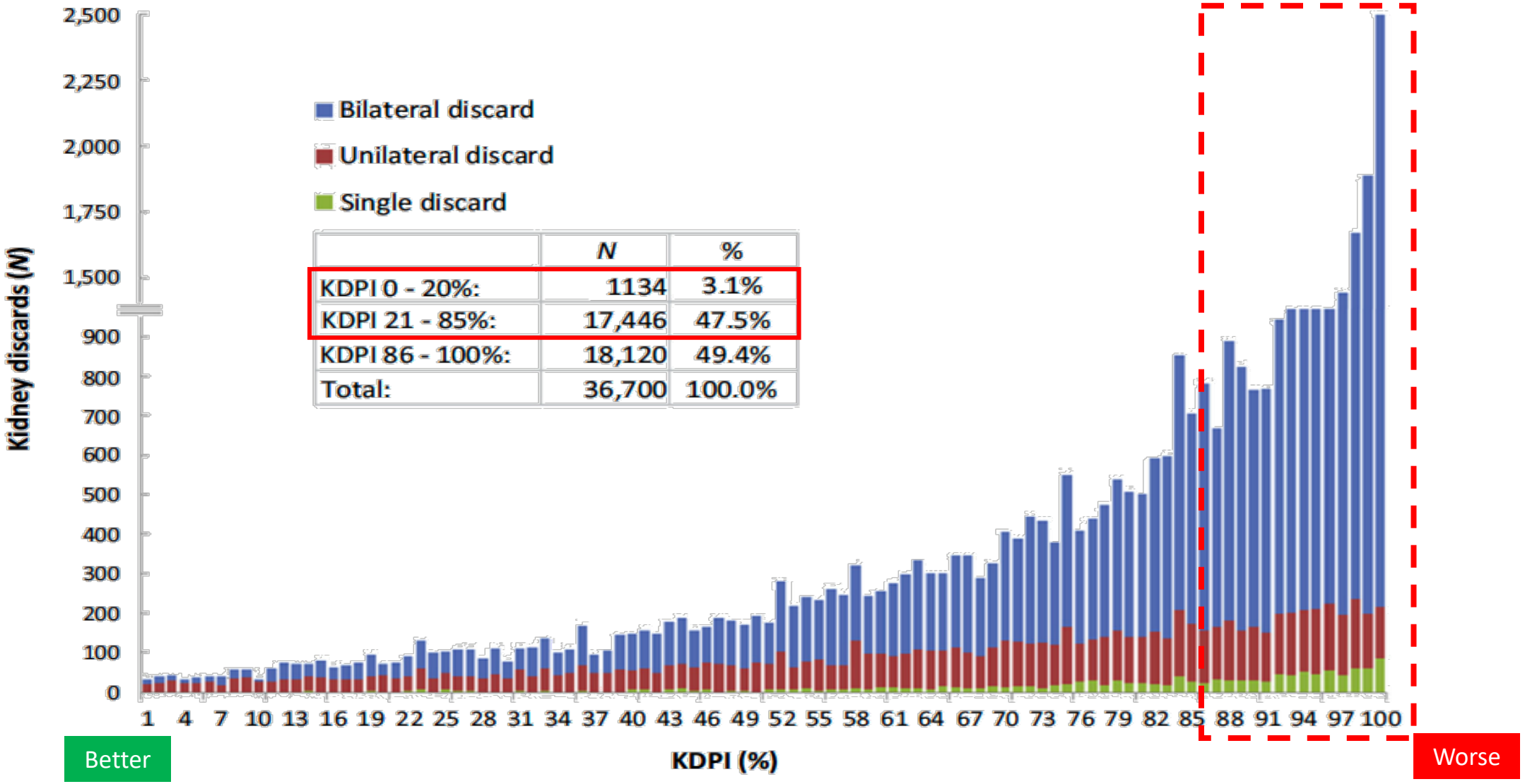
- Vice Chair, UNOS/OPTN Data Advisory Committee
- Member, UNOS/OPTN Policy Oversight Committee
- Member, SRTR Review Committee
- Deputy Editor, *Kidney International Reports*
- Scientific Advisory Board, Angion Biomedica

# Discards have increased over time with a large increase following KAS




COLUMBIA UNIVERSITY CURE RENAL EPIDEMIOLOGY

# Over 50% of kidneys discarded have a KDPI better than 85%

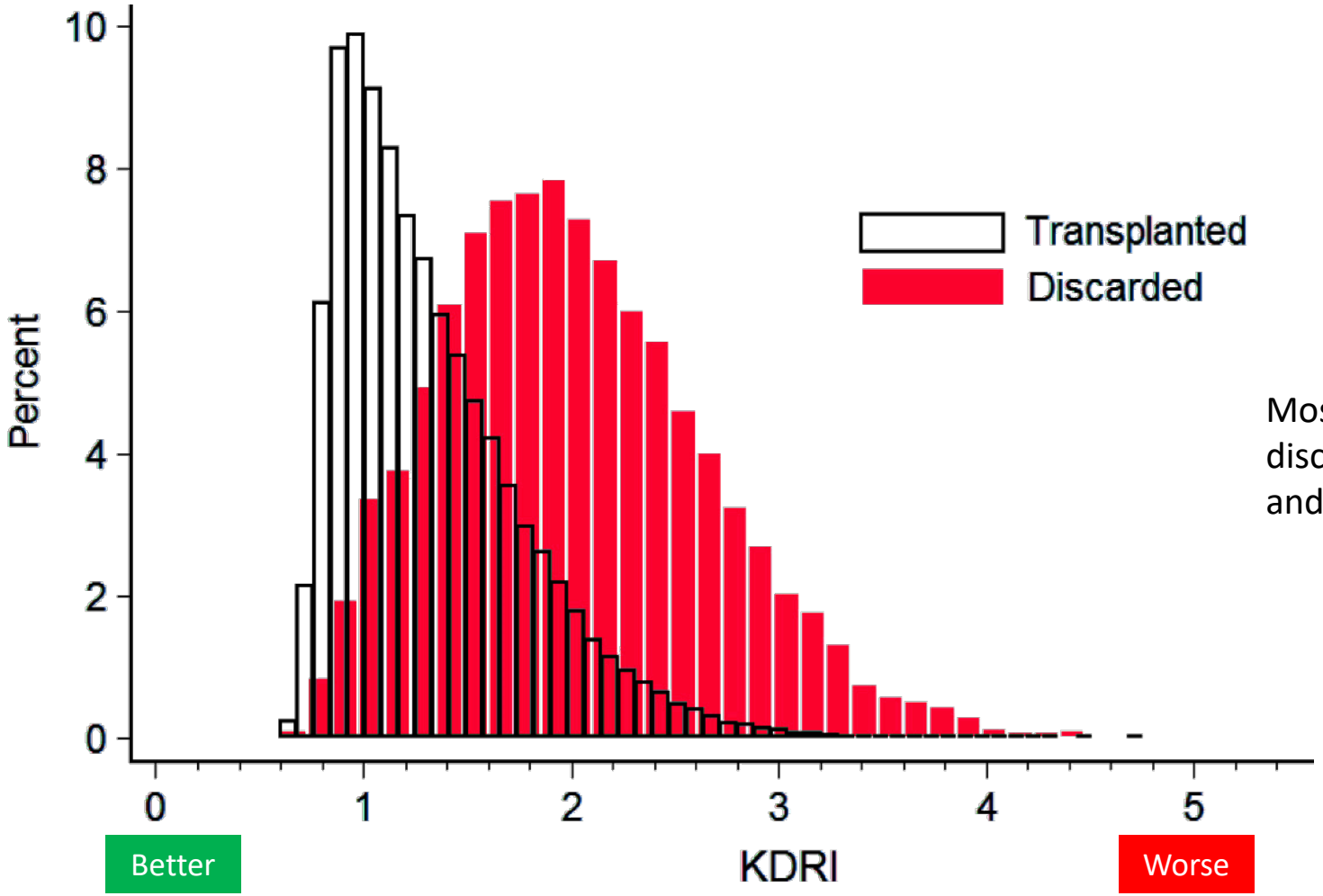



| | N | % |
|---|---|---|
| KDPI 0 - 20%: | 1134 | 3.1% |
| KDPI 21 - 85%: | 17,446 | 47.5% |
| KDPI 86 - 100%: | 18,120 | 49.4% |
| Total: | 36,700 | 100.0% |

COLUMBIA UNIVERSITY CURE RENAL EPIDEMIOLOGY

*Mohan S. et al. Kidney Int 2016*

# Significant overlap in quality of organs transplanted and discarded

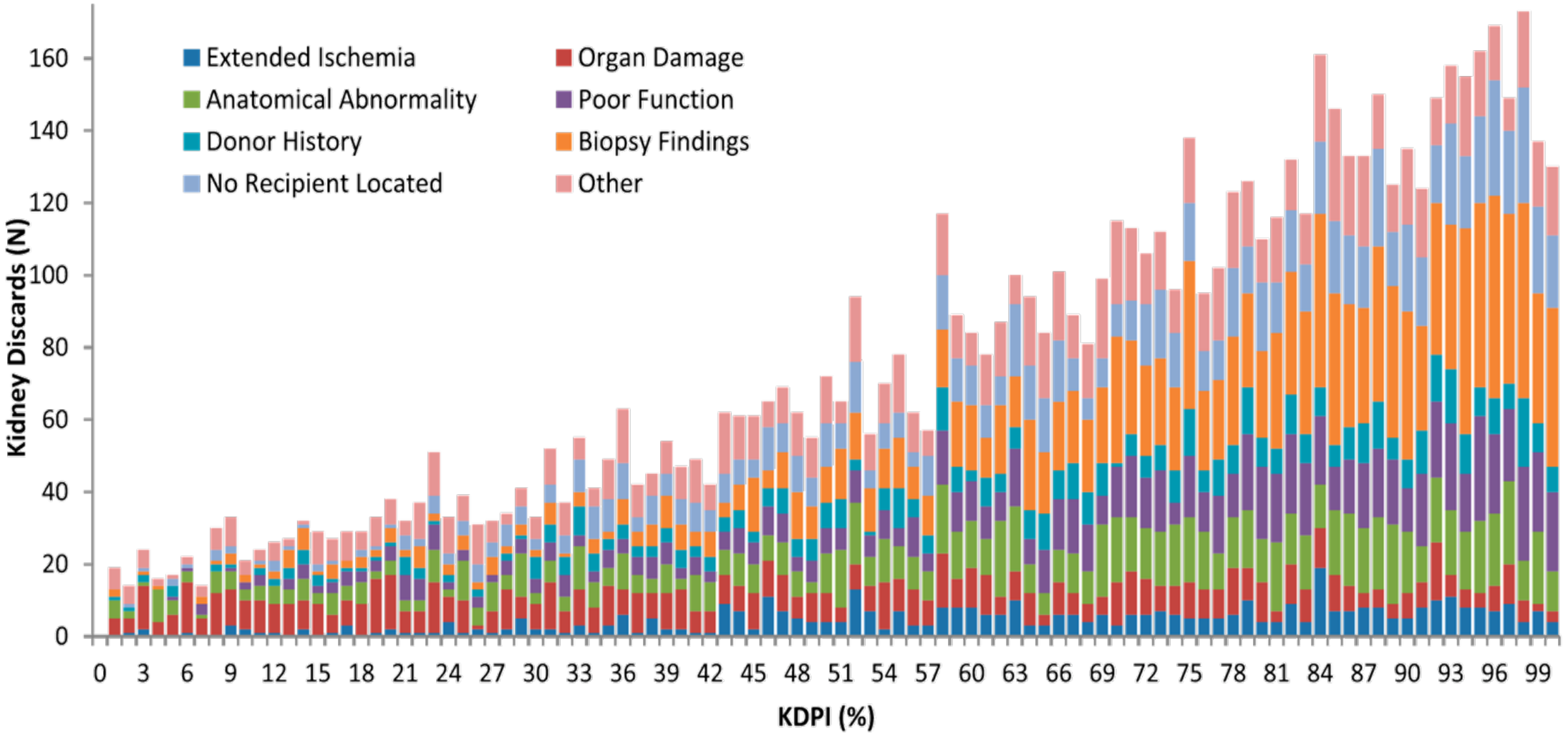



Most common reasons cited for discard are donor characteristics and biopsy findings

*Calculated using data from 2000 through 2015*

*Mohan S. et al. Kidney Int 2016*

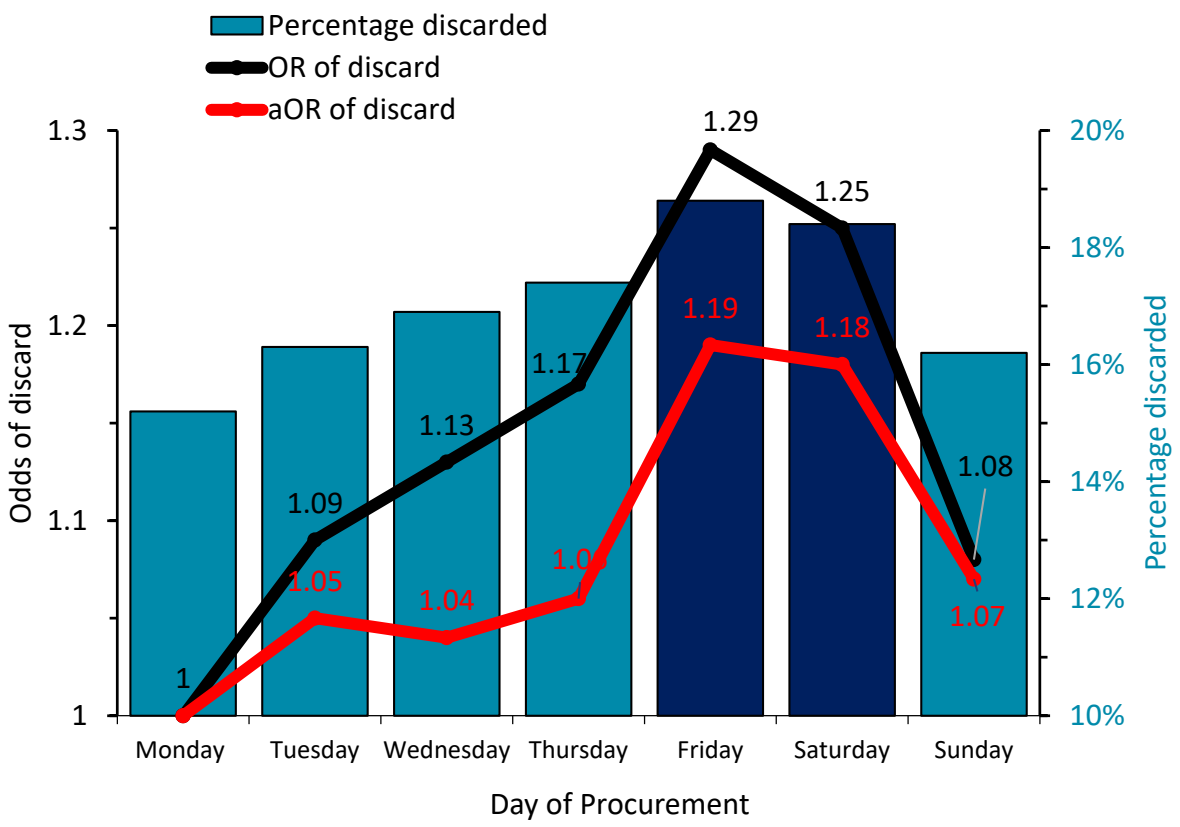
# Unilateral discards are associated with excellent outcomes from the partner kidney



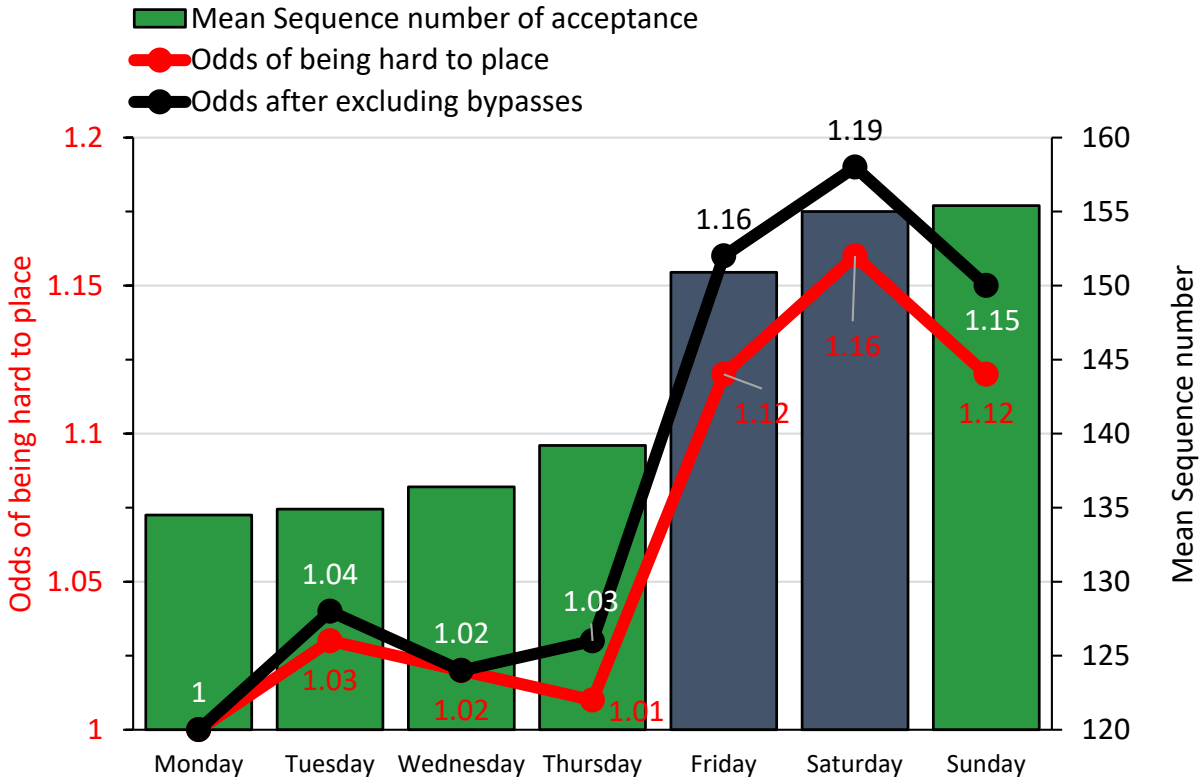

*Discard data calculated using data from 2000 - 15*

*Husain SA et al. CJASN 2018*

## Odds of discard increases on the weekend




## Weekend kidneys are harder to place




*Mohan S. et al. Kidney Int 2016*
*King K et al. CJASN 2018*

# 1/3 of patients who were offered a kidney that was eventually used for someone else died or were delisted without a transplant

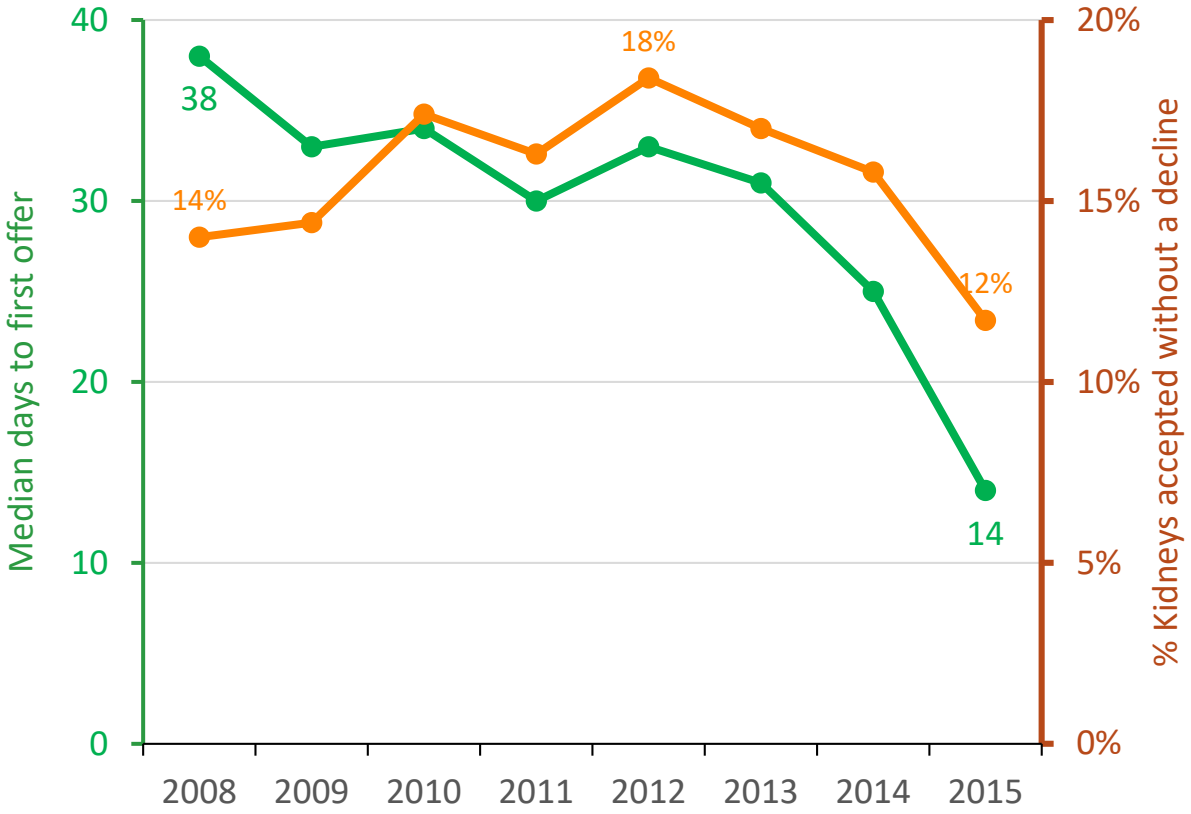
| Variable[a] | Total | Event Group | | | | |
|---|---|---|---|---|---|---|
| | | Died While on Waiting List | Received Allograft From DD | Received Allograft From LD | Removed From Waiting List | Remaining on Waiting List |
| No. (%) | 280 041 | 25 967 (9.3) | 81 750 (29.2) | 30 870 (11.0) | 59 359 (21.2) | 82 095 (29.3) |
| Started dialysis between wait-listing and event, No. (%)[d] | 14 953 (5.3) | 750 (2.9) | 2059 (2.5)[b] | 950 (3.1) | 2190 (3.7) | 9004 (11.0) |
| Days between listing and first offer, median (IQR) | 48 (13-232) | 78 (17-401) | 79 (16-426)[b] | 34 (11-103) | 62 (16-302) | 30 (9-104) |
| Days between first offer and event, median (IQR)[d] | 526 (193-1041) | 651 (304-1117) | 422 (106-909) | 188 (83-403) | 690 (326-1192) | 650 (276-1255) |
| No. of offers before event, median (IQR)[d] | 16 (5-40) | 16 (6-41) | 17 (6-44) | 7 (3-16) | 15 (6-37) | 21 (8-51) |
| Days between first and last offers, median (IQR) | 386 (122-829) | 390 (140-764) | 420 (103-907) | 144 (40-350) | 392 (149-775)[b] | 490 (191-984) |

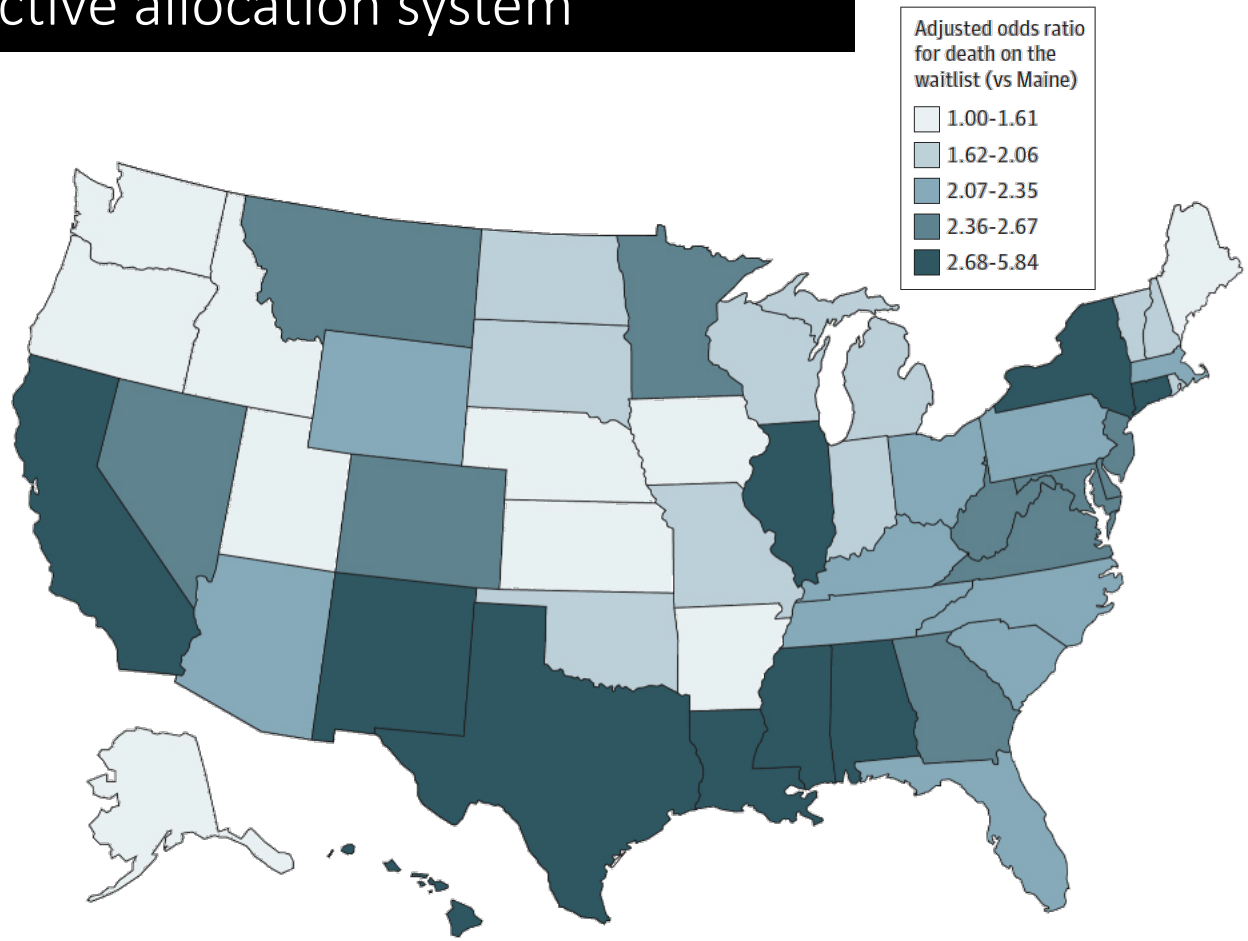
Reasons for decline a kidney that was subsequently accepted for a different patient:
91% - organ quality, 1% - logistical , 6% immunological and **ONLY 2.5% recipient related**

COLUMBIA UNIVERSITY CURE RENAL EPIDEMIOLOGY

*Husain SA et al. JAMA Netw Open 2019*

# Organ offer declines disrupt an objective allocation system



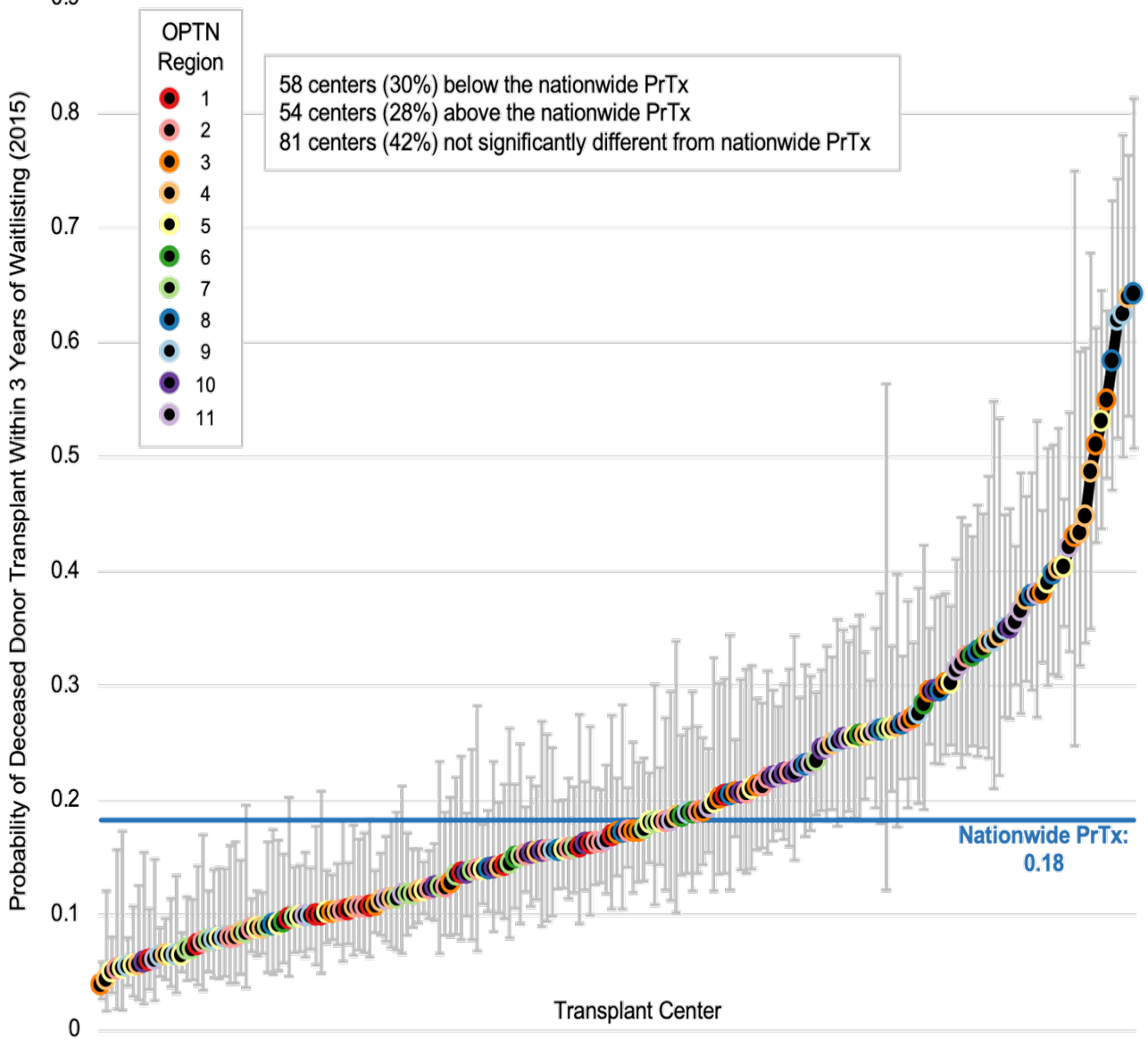

Only 12% of kidneys are transplanted without a decline

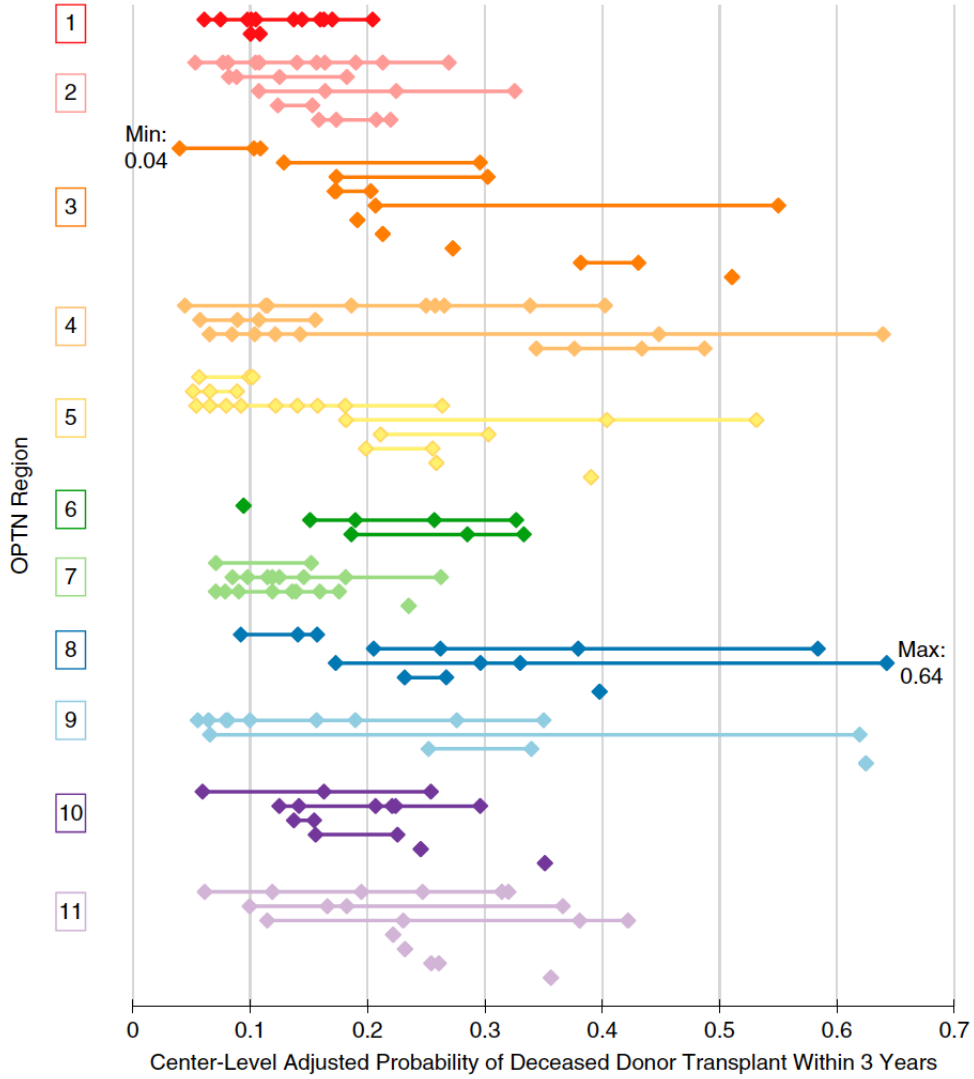
Median time to the first offer - just 14 days from waitlisting

6-fold variation in the adjusted odds ratio for death on the waitlist after receiving an offer for a kidney that was eventually transplanted.

COLUMBIA UNIVERSITY CURE RENAL EPIDEMIOLOGY

*Husain SA et al. JAMA Netw Open 2019*



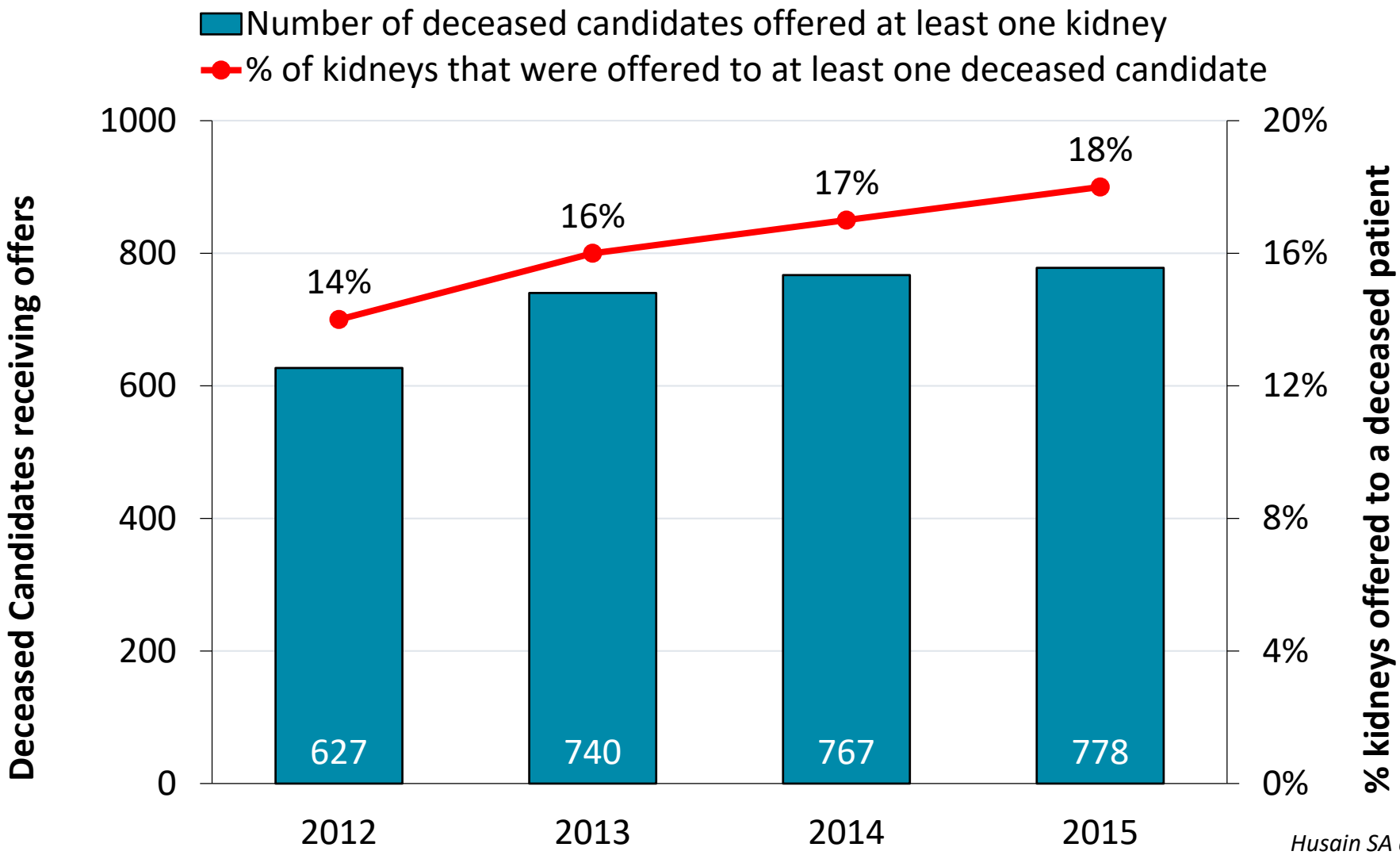

There is a wide variation in the probability of transplantation

Several-fold variation in probability exists within DSA suggesting that this is not being driven by the organ supply

COLUMBIA UNIVERSITY CURE RENAL EPIDEMIOLOGY

*King K et al. JASN 2020*

# Poor communication between dialysis and transplant centers impedes allocation




*Husain SA et al. Am J Transplant. 2018*

# In summary

- Discard of kidneys does not appear to be driven by organ quality as evidenced by
  - Overlapping quality
  - Unilateral discards
  - Systemic challenges such as weekend discards
- Frequent organ offer declines
  - occur without knowledge/participation of patients in 98% of the time
  - drive the observed variation in probability of transplantation
  - Contribute to disparities in transplantation
  - Have introduced subjectivity into an otherwise objective allocation system
- Current system
  - Does not provide any transparency for patients
  - Including transitions of care that create hurdles for patient
  - Supported by antiquated data systems are not designed to help centers learn or patients navigate the system

# Recommendation

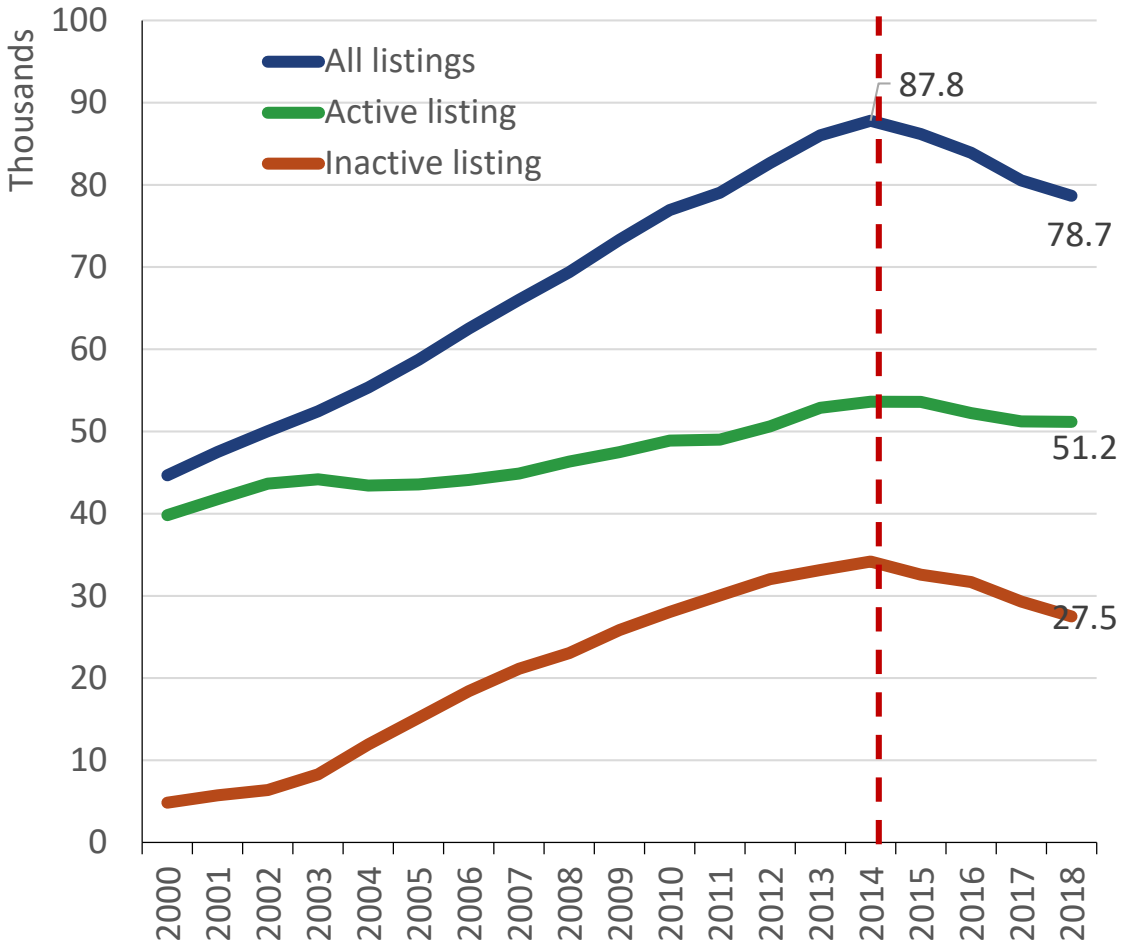
- Improve patient engagement in transplantation with asynchronous engagement in organ offer acceptance decisions
- Creation of learning health system within transplantation and focuses on patient priorities/preferences

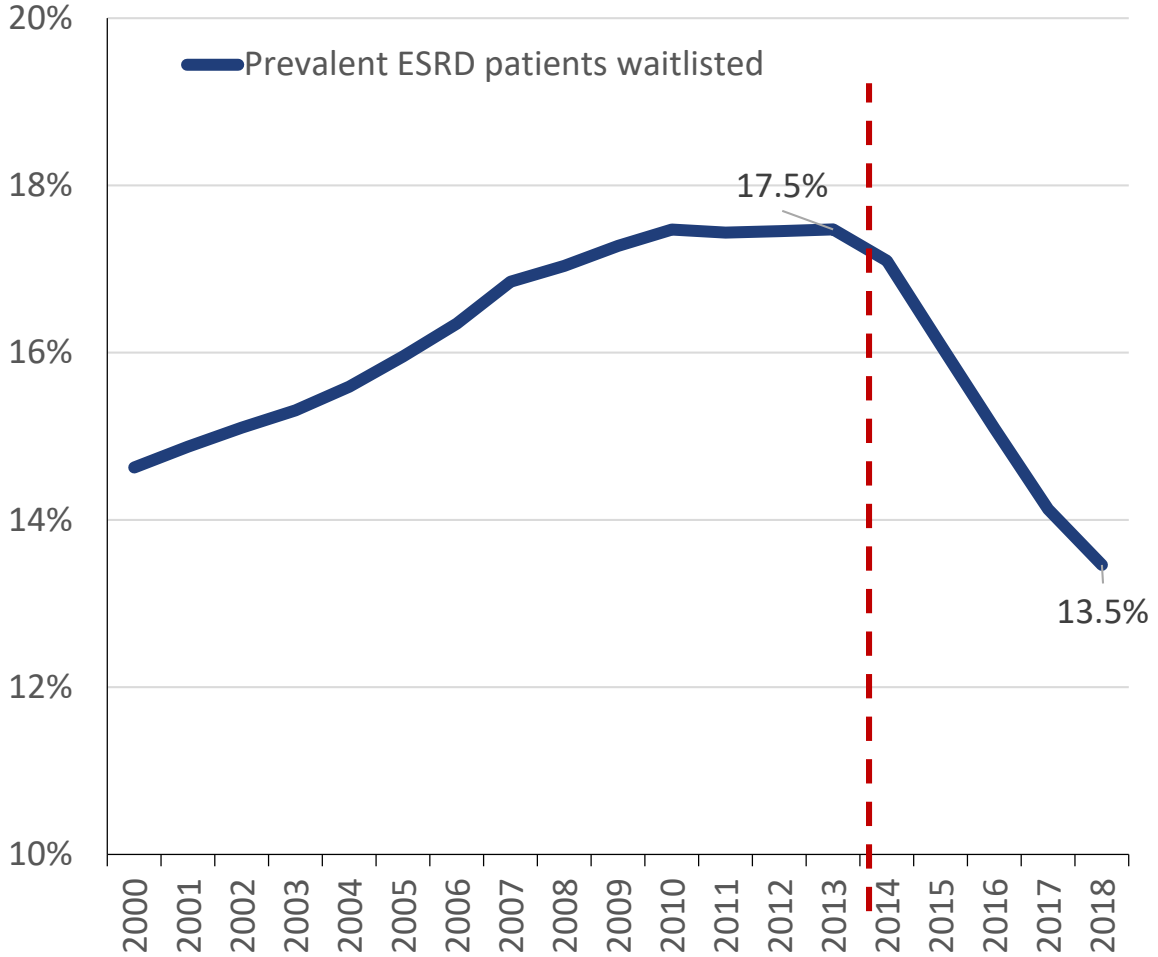
COLUMBIA UNIVERSITY
CURE
RENAL EPIDEMIOLOGY

sm2206@cumc.columbia.edu

# Appendix

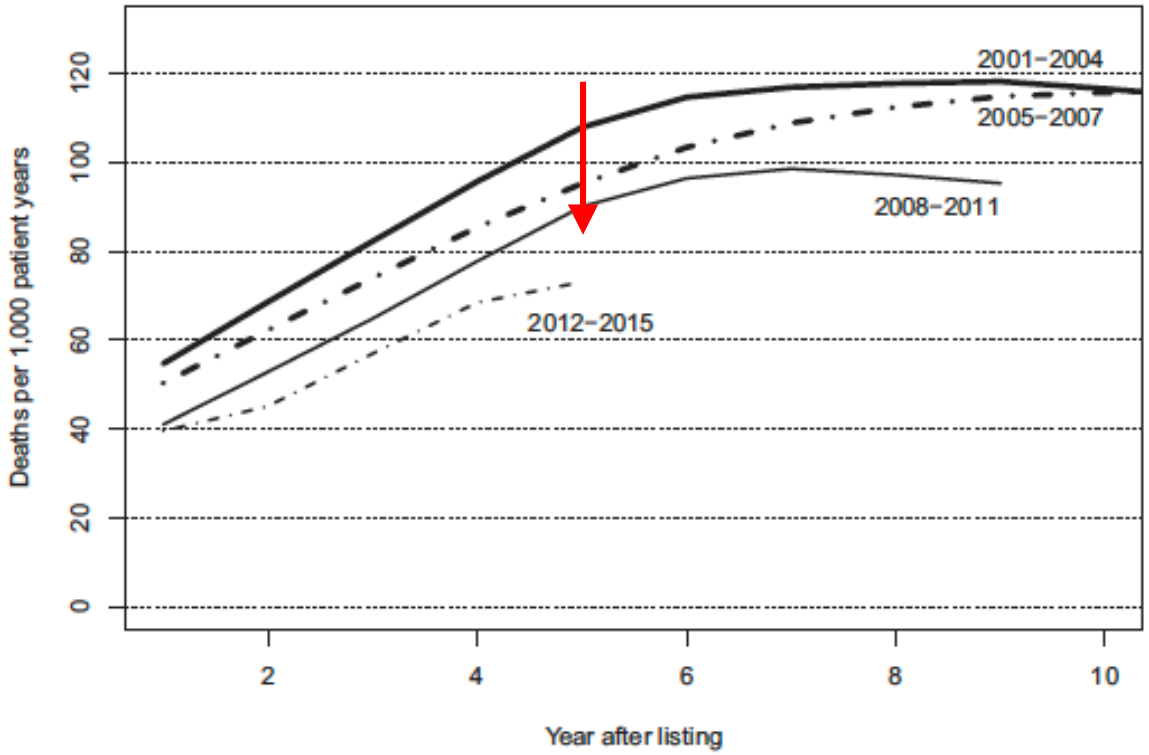
# KAS changes has lead to a shrinking waitlist despite increasing need



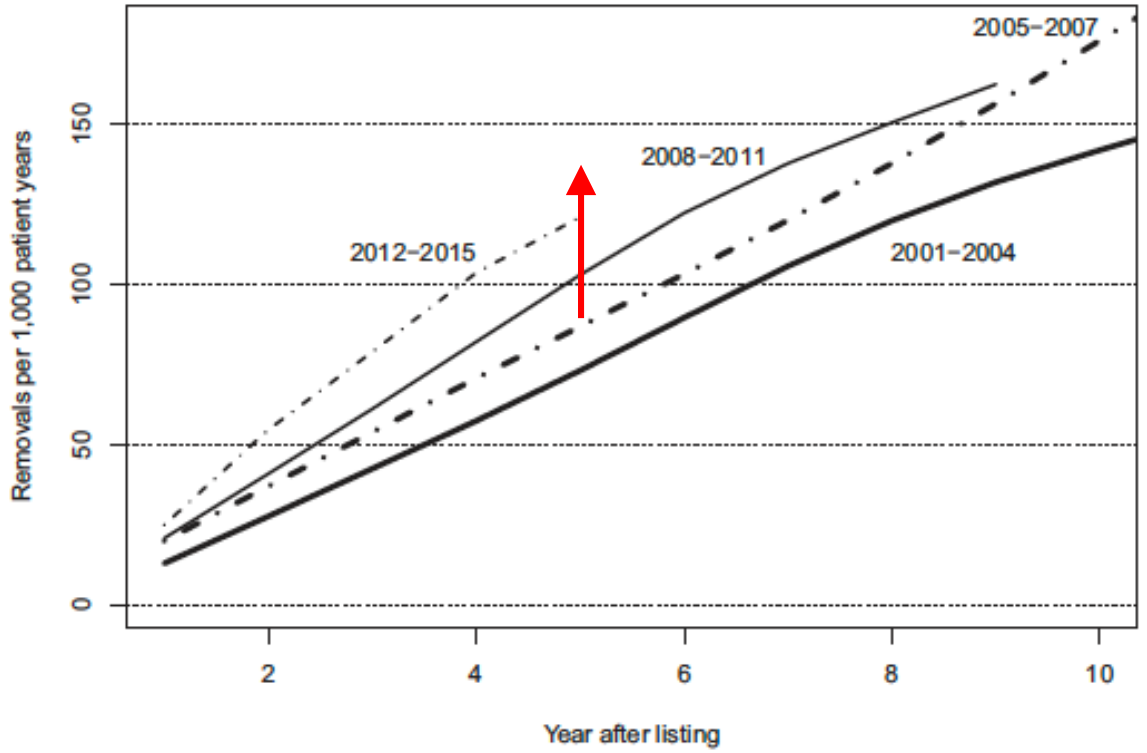



# Evidence of increasing selectivity of patients are being waitlisted for a transplant – with no external accountability for these choices

## Mortality rates dropping on the waitlist

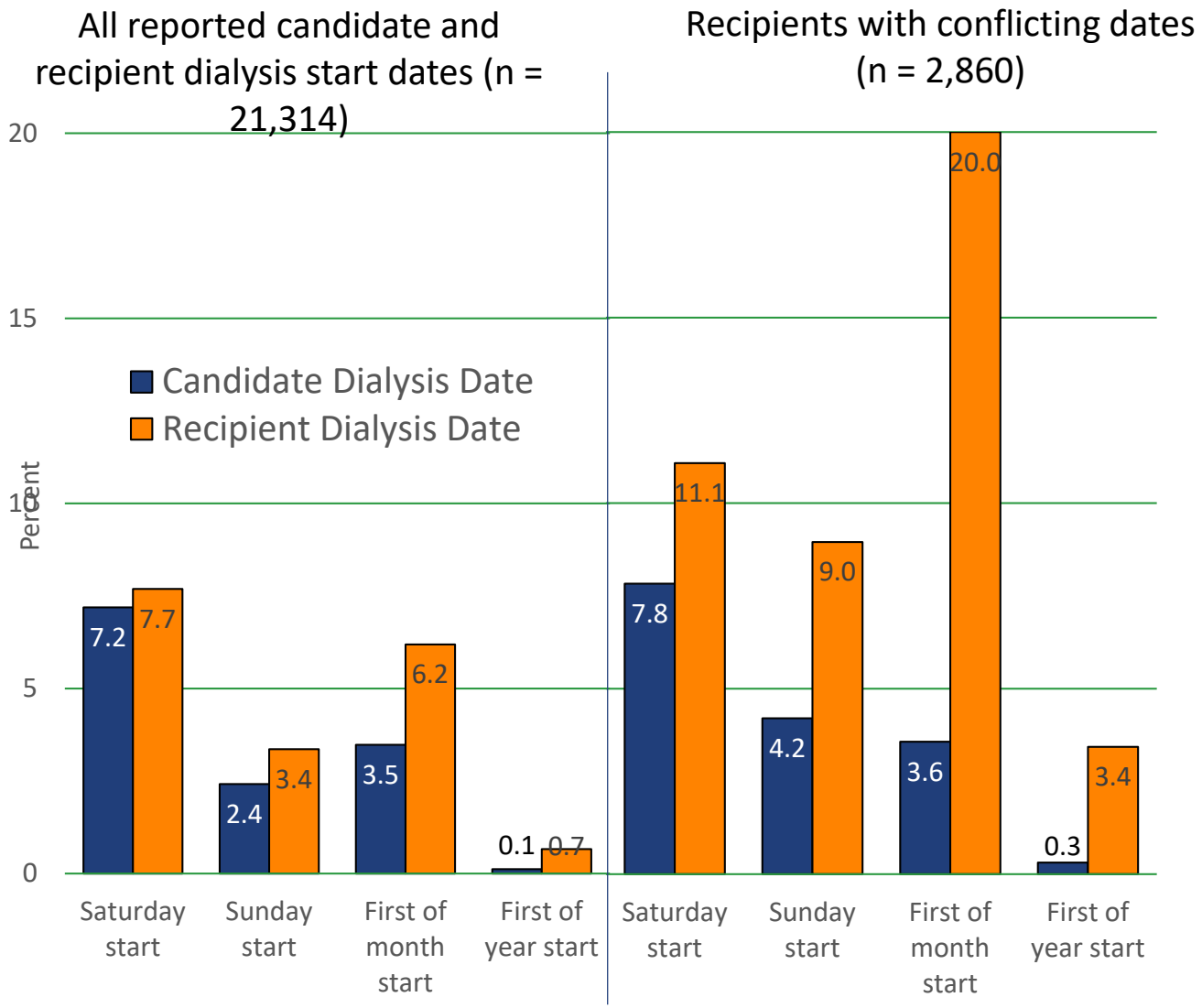


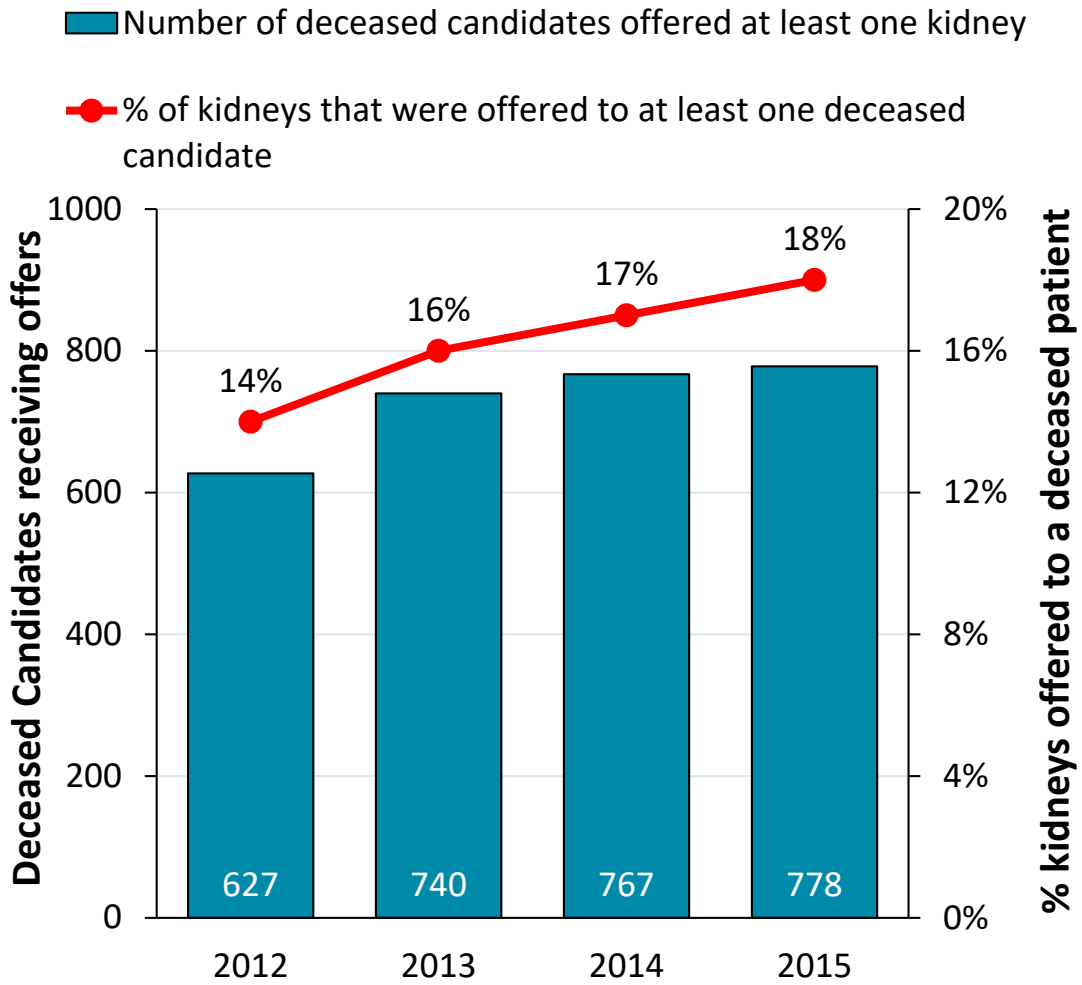

## Removals from the waitlist are increasing




*Schold et al. AJT 2018*

# Poor communication between dialysis and transplant centers hurts patients with inaccurate data and organ offers to candidates who have died




*Husain SA et al. Am J Transplant. 2018*
*Tsapepas D et al. Am J Transplant 2019*

# Declined offers increase the subjectivity in an otherwise objective allocation system thus creatining disparities in organ acceptance patterns

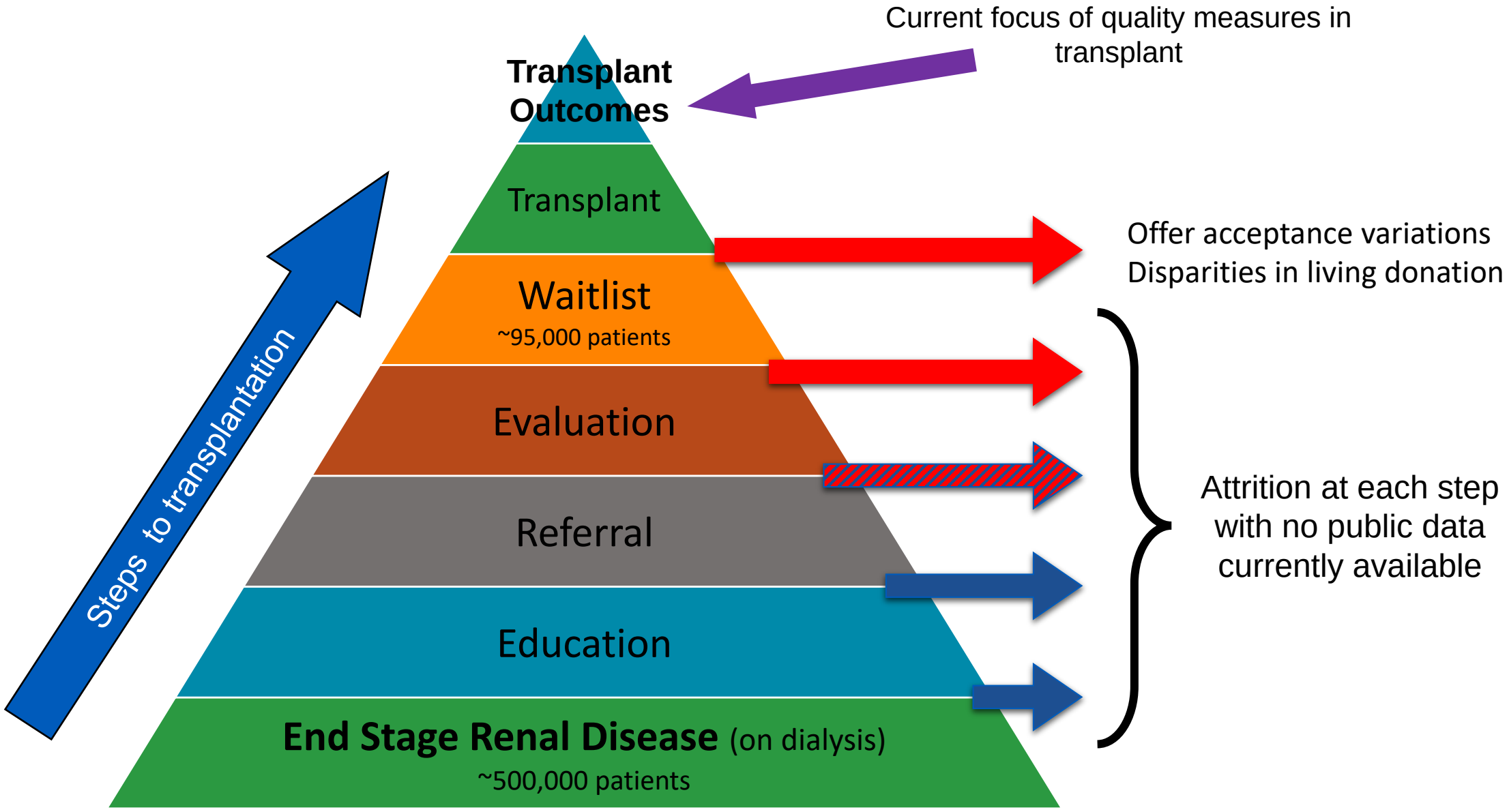
## Donor factors

| | |
|---|---|
| Age, yr | |
| ≤25 | 1.00 |
| 26–45 | 1.13 (1.10 to 1.16) |
| 46–60 | 1.19 (1.15 to 1.23) |
| >60 | 1.01 (0.96 to 1.06) |
| Race/ethnicity | |
| White | 1.00 |
| Black | 0.91 (0.88 to 0.94) |
| Hispanic | 0.81 (0.78 to 0.84) |
| Other | 1.21 (1.14 to 1.29) |

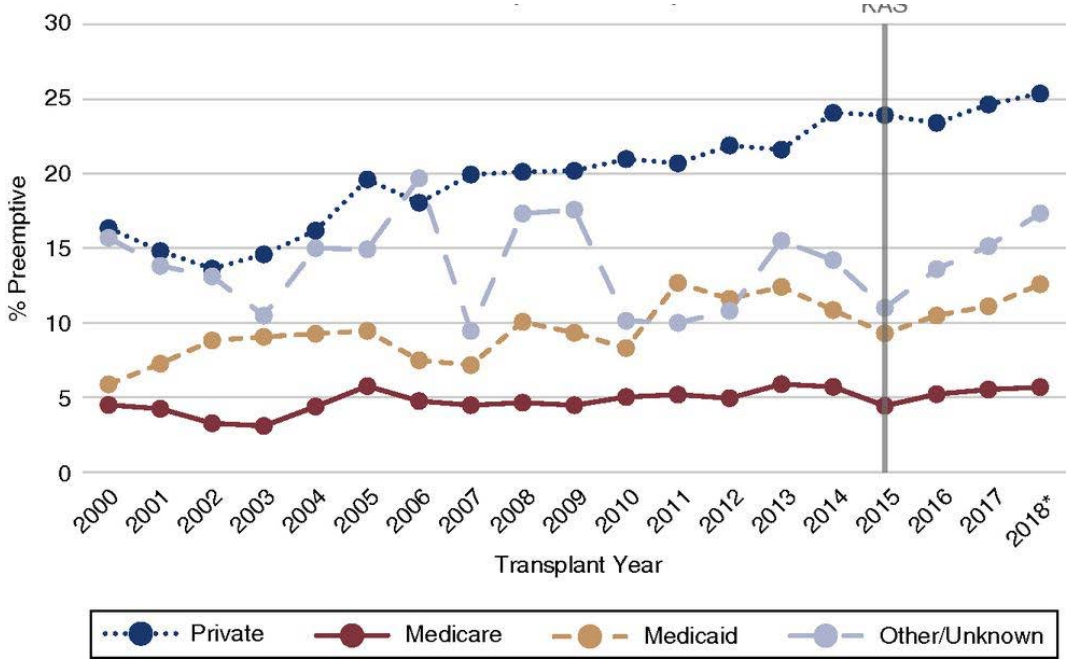
## Recipient factors

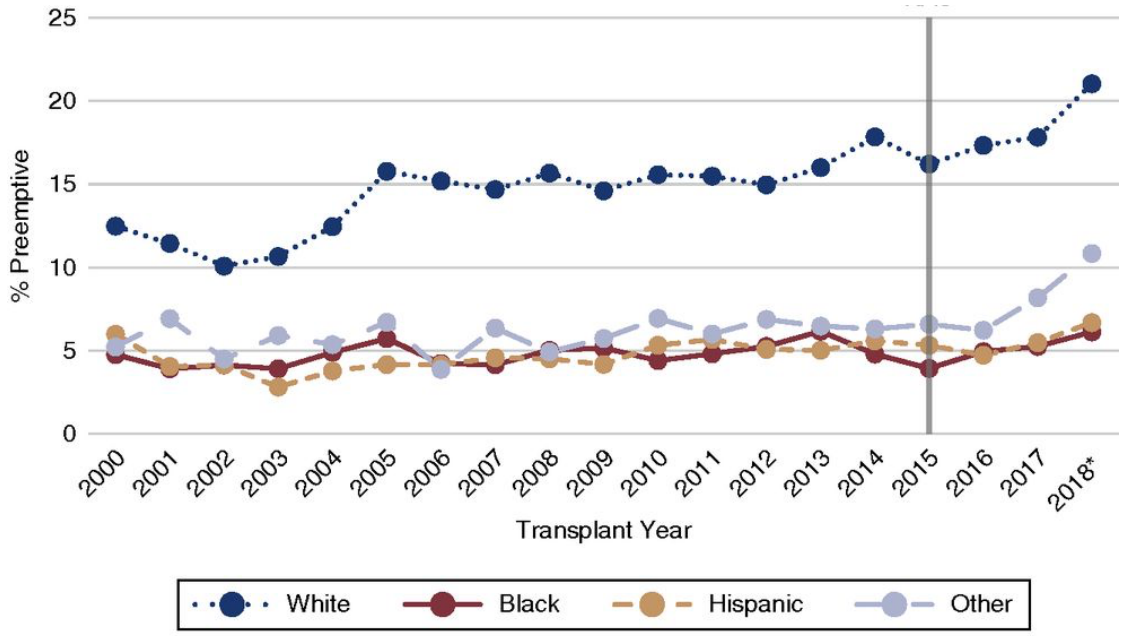
| | |
|---|---|
| Race/ethnicity | |
| White | 1.00 |
| Black | 0.99 (0.96 to 1.01) |
| Hispanic | 0.96 (0.93 to 0.99) |
| Other | 0.92 (0.88 to 0.96) |
| Sex | |
| Female | 1.00 |
| Male | 0.93 (0.91 to 0.95) |
| Cause of ESRD[a] | |
| Hypertension | 1.00 |
| Diabetes | 0.91 (0.88 to 0.93) |
| GN | 1.04 (1.01 to 1.07) |
| Other | 0.99 (0.97 to 1.02) |
| Body mass index, kg/m$^2$ | |
| <18.5 | 1.00 |
| 18.5–24.9 | 0.93 (0.91 to 0.95) |
| 25–29.9 | 1.02 (0.96 to 1.09) |
| ≥30 | 0.85 (0.83 to 0.87) |

*Huml et al. CJASN 2017*


Current focus of quality measures in transplant
Transplant Outcomes
Transplant
Waitlist
~95,000 patients
Evaluation
Referral
Education
End Stage Renal Disease (on dialysis)
~500,000 patients
Steps to transplantation
Offer acceptance variations
Disparities in living donation
Attrition at each step with no public data currently available

# Disparities in kidney transplant persist even after changes in the allocation system

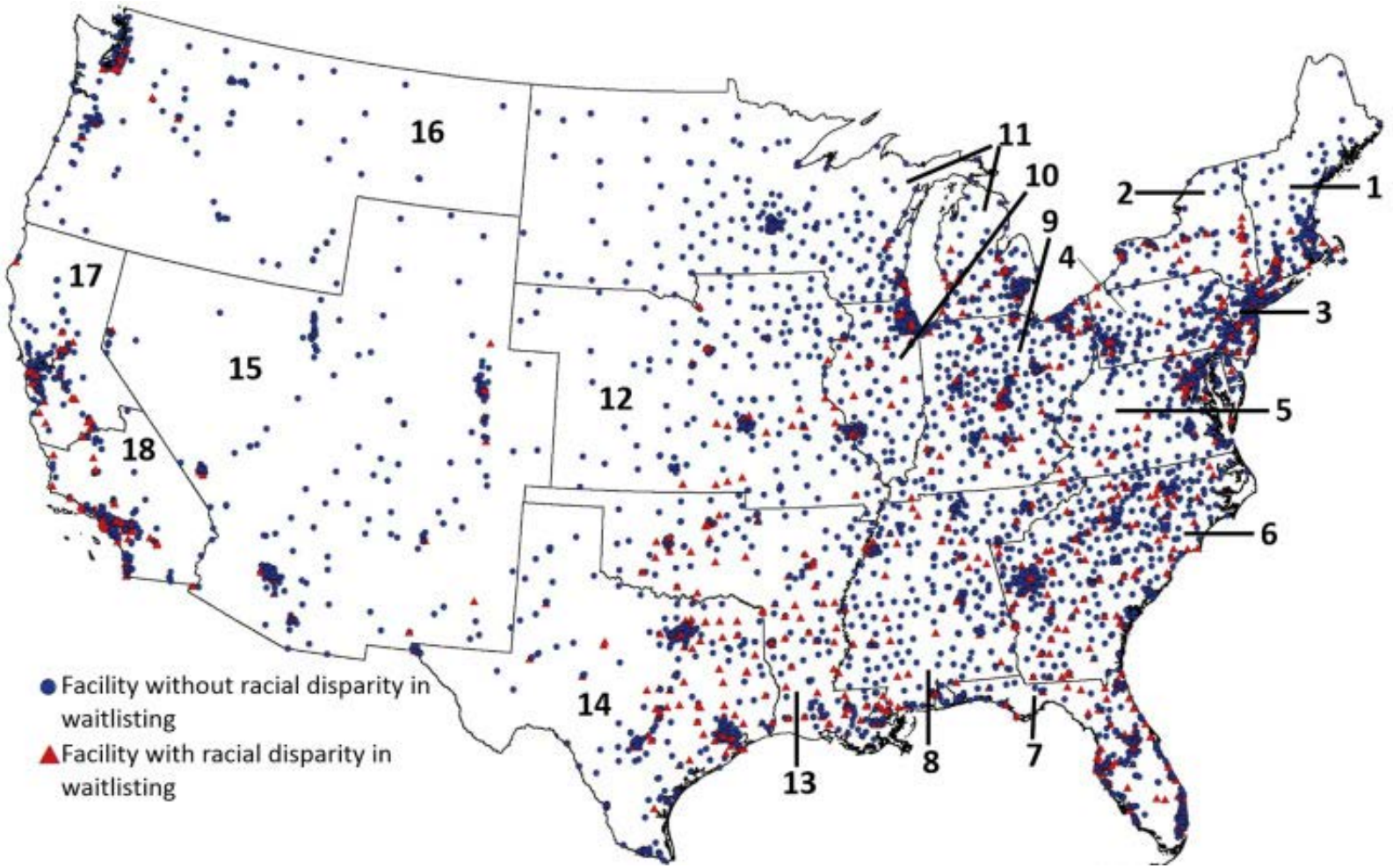


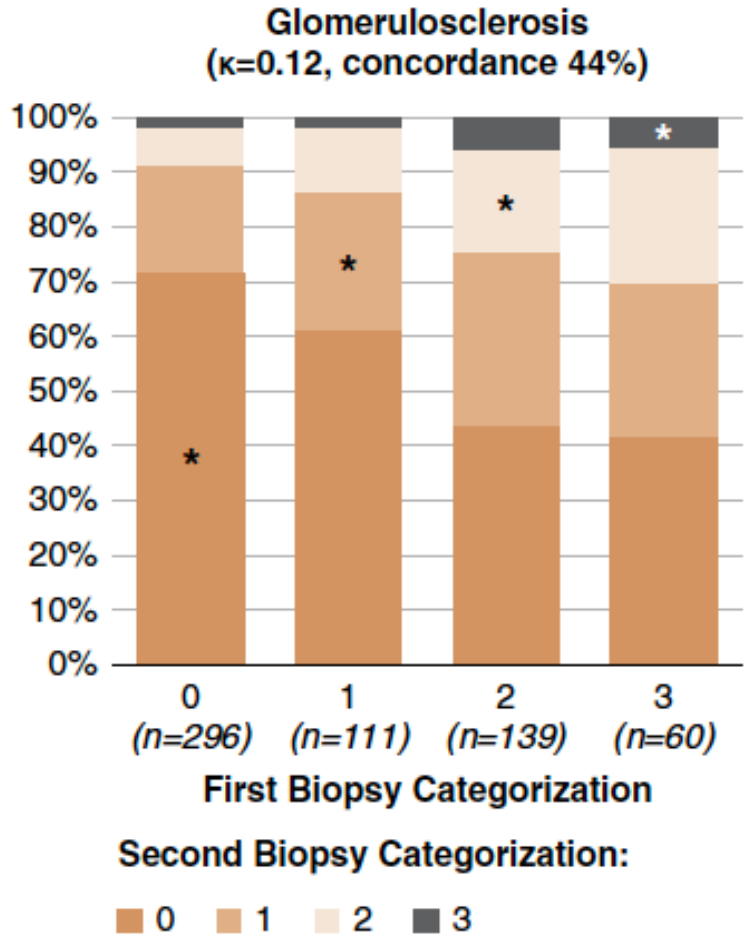

COLUMBIA UNIVERSITY CURE RENAL EPIDEMIOLOGY

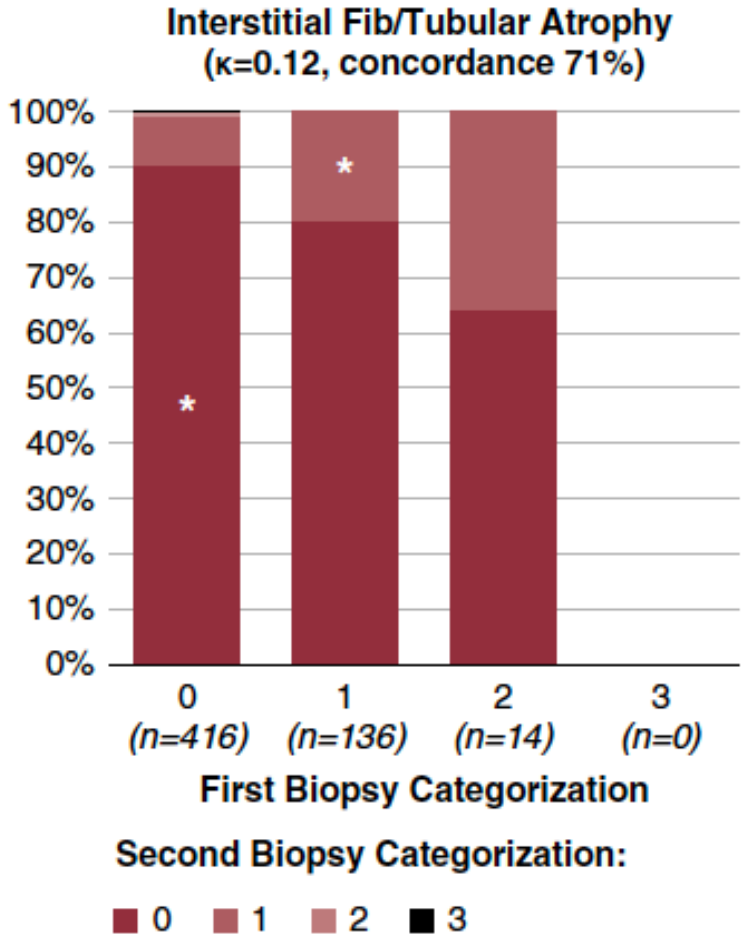
*King KI et al. CJASN 2019*

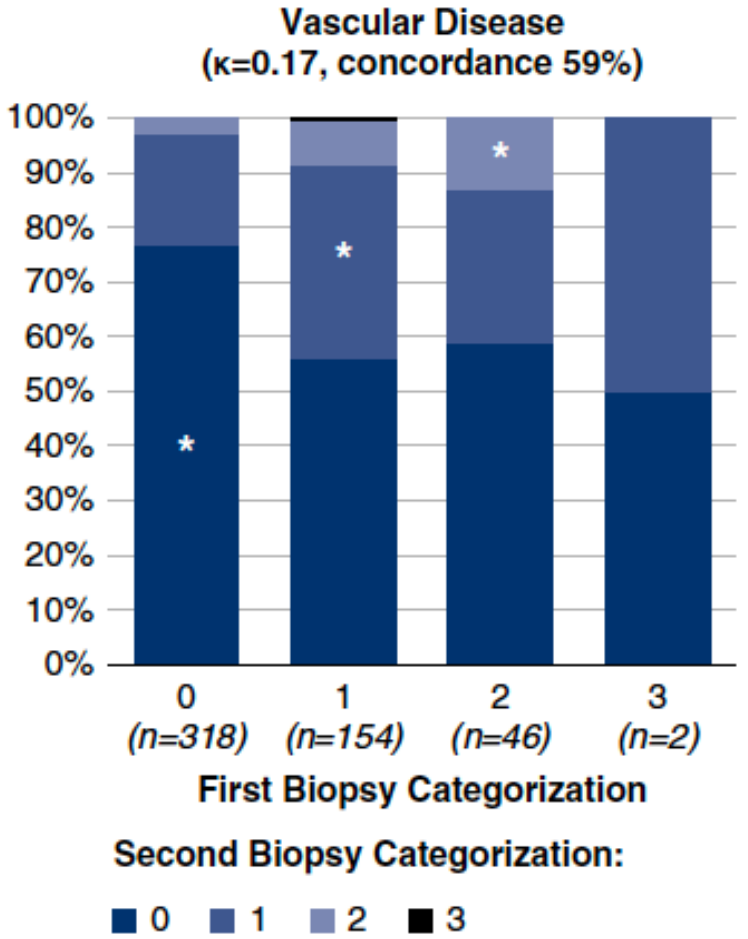
# Racial disparities in waitlisting is widespread across dialysis facilities



# Nearly 60% of kidneys underwent multiple procurement biopsies during allocation with poor concordance and poor discrimination for outcomes



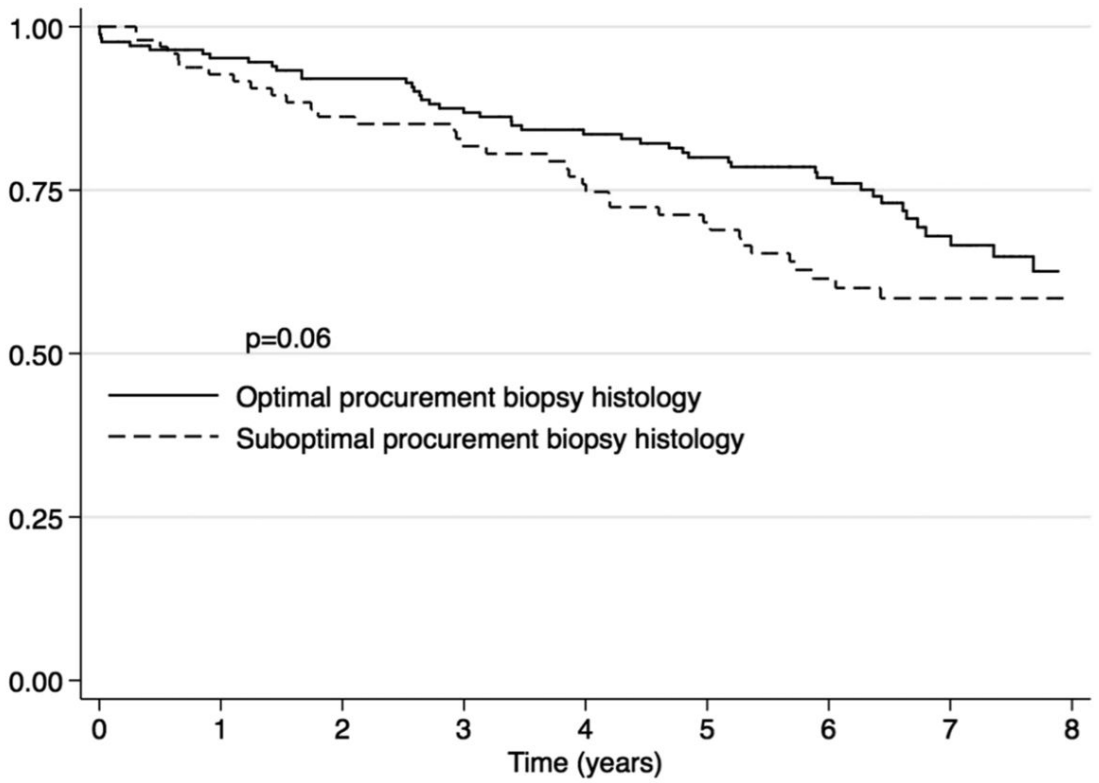



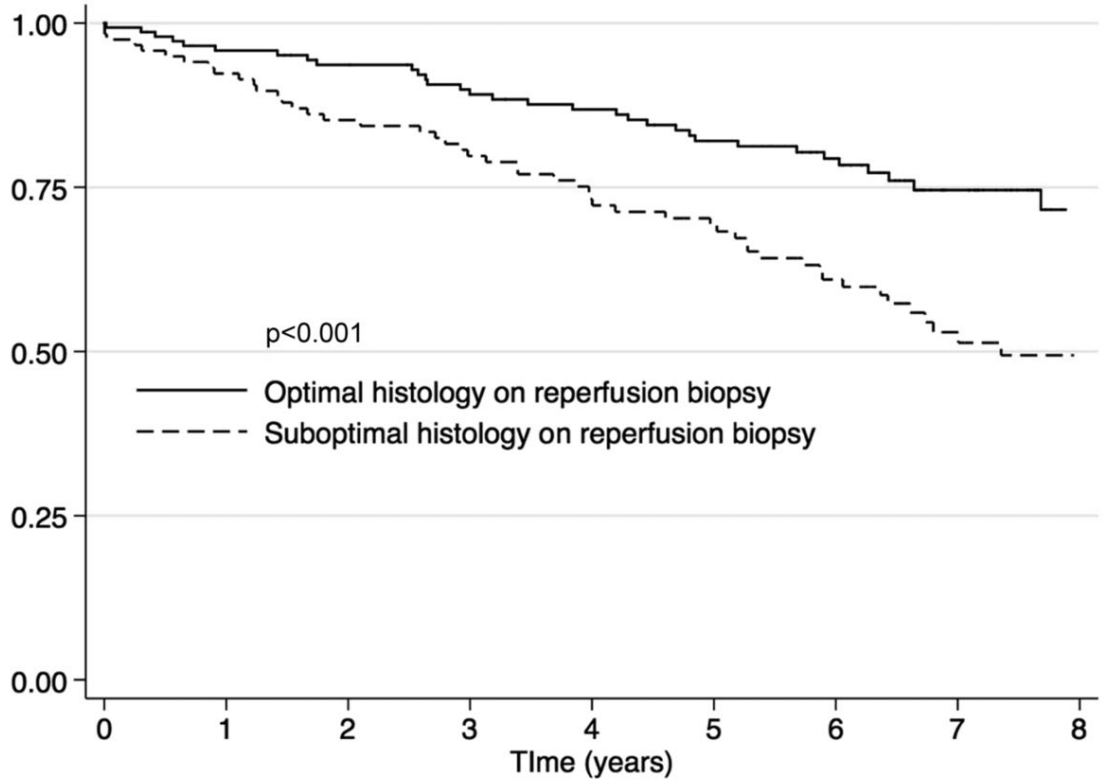




COLUMBIA UNIVERSITY CURE RENAL EPIDEMIOLOGY

*Husain SA et al. CJASN 2020*

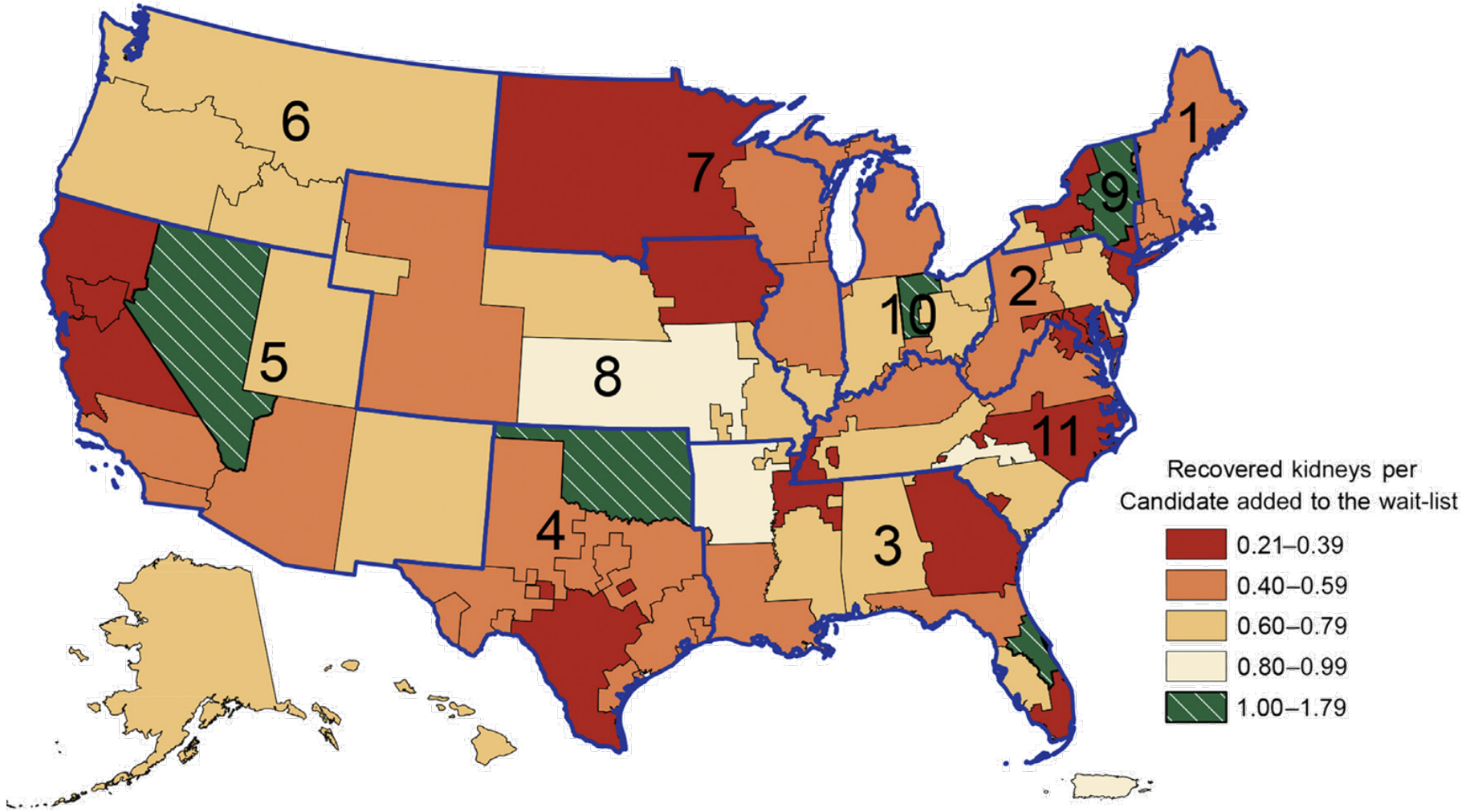
# Procurement biopsies are error prone and should not be used to evaluate organ quality



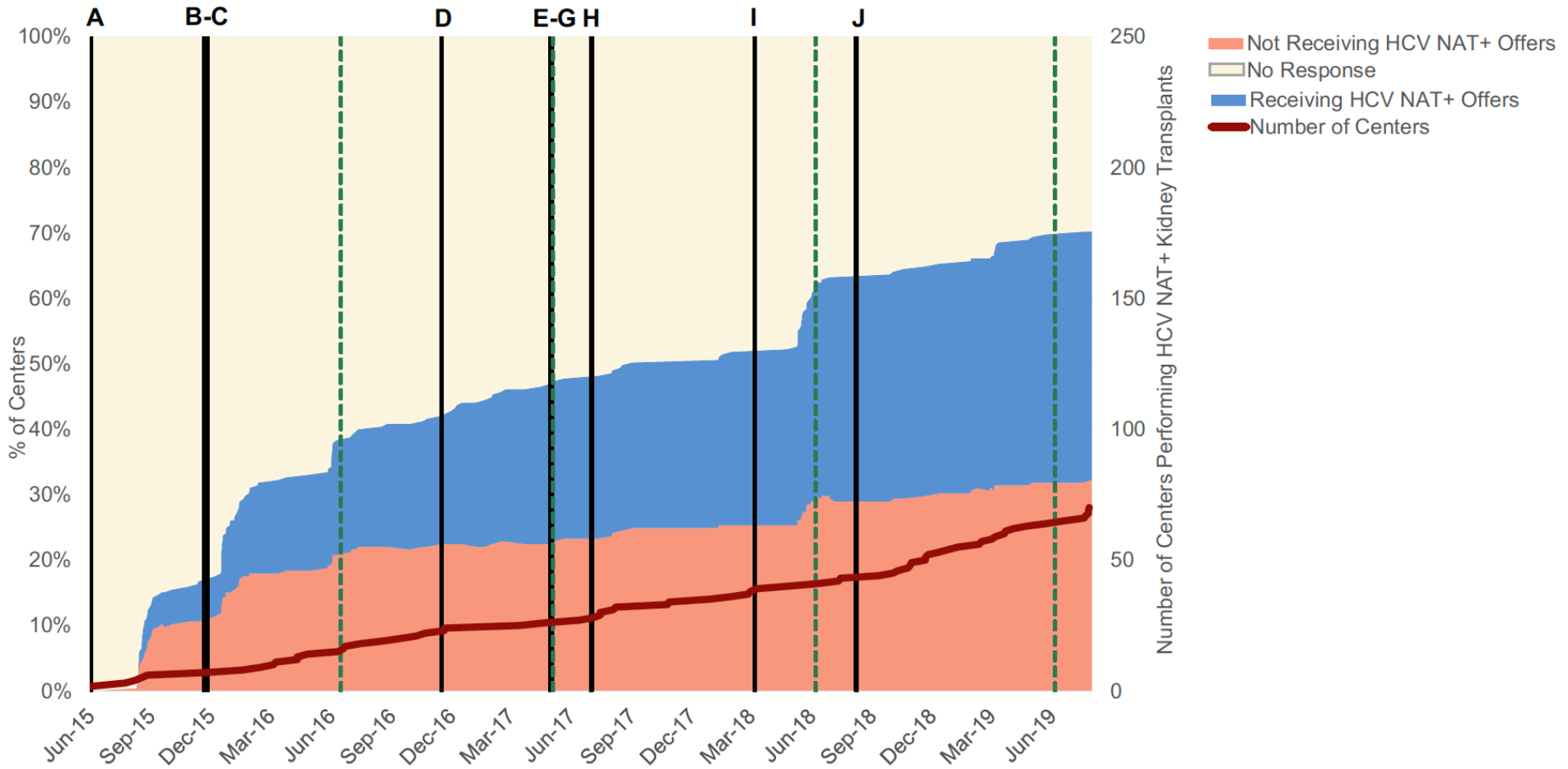




*Husain et al. CJASN 2018*

# Many DSA have more kidneys procured each year than patients added to the waitlist



# Number of centers opting to be bypassed for HCV kidneys has increased despite increasing evidence of the safety of this approach

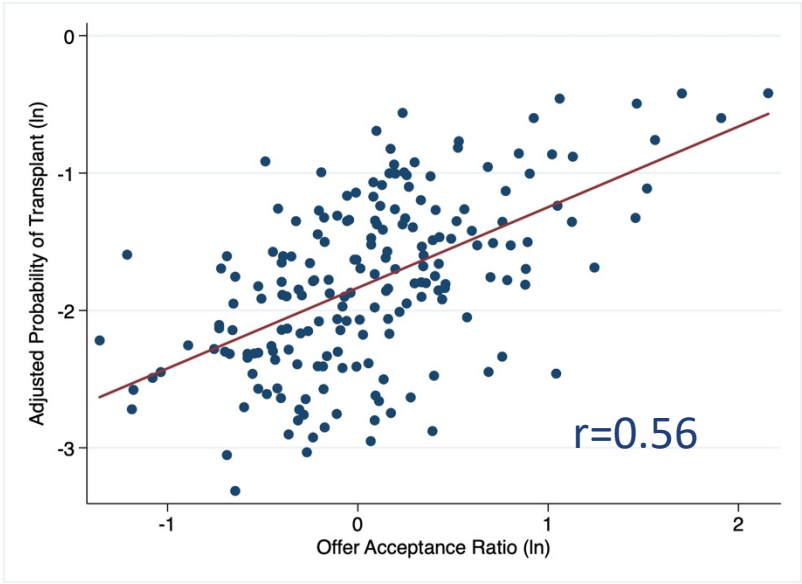


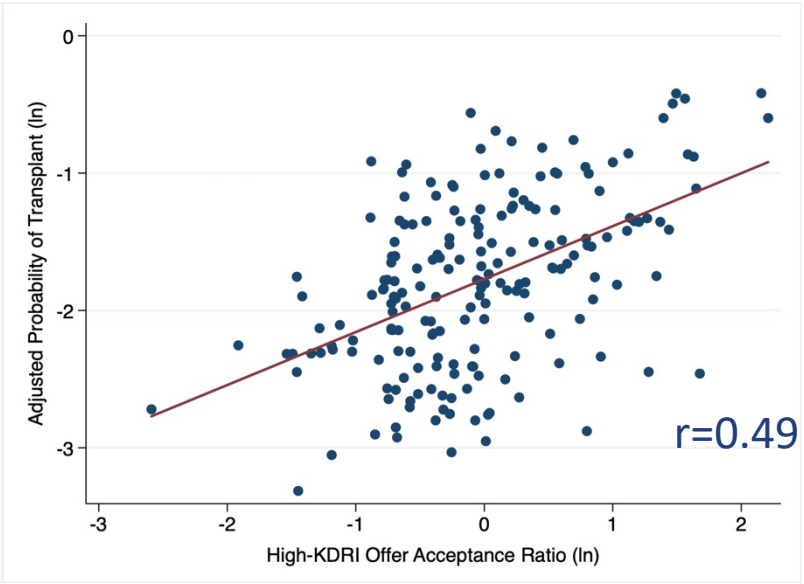

COLUMBIA UNIVERSITY CURE RENAL EPIDEMIOLOGY

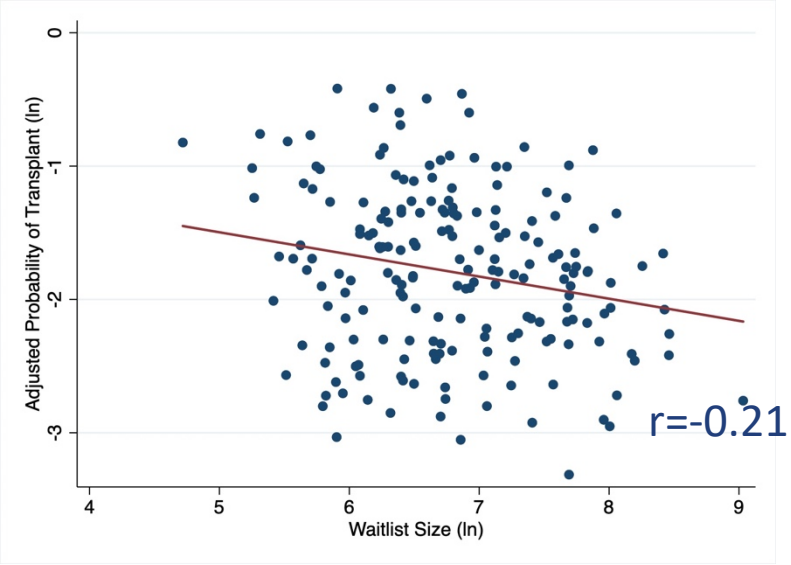
*King K et al. AJKD 2019*

# Correlations with the adjusted 3-year probability of transplant (2015 cohort)

| | Range Between Centers or OPOs | Pearson Correlation Coefficient | P value |
|---|---|---|---|
| SRTR Offer Acceptance Ratios | | | |
| Overall | 0.26 – 8.64 | 0.56 | <0.001 |
| High-Risk (KDRI>1.75) | 0.00 – 9.11 | 0.49 | <0.001 |
| Hard-to-Place (100+ offers) | 0.07 – 21.88 | 0.59 | <0.001 |
| Center Waitlist Size | 58 – 8,369 | -0.21 | 0.004 |
| OPO-level Recovered-Kidneys-to-Waitlist Ratio | 0.10 – 1.38 | 0.47 | <0.001 |
| % of Waitlist Initially Inactive | 0 – 99% | -0.17 | 0.02 |

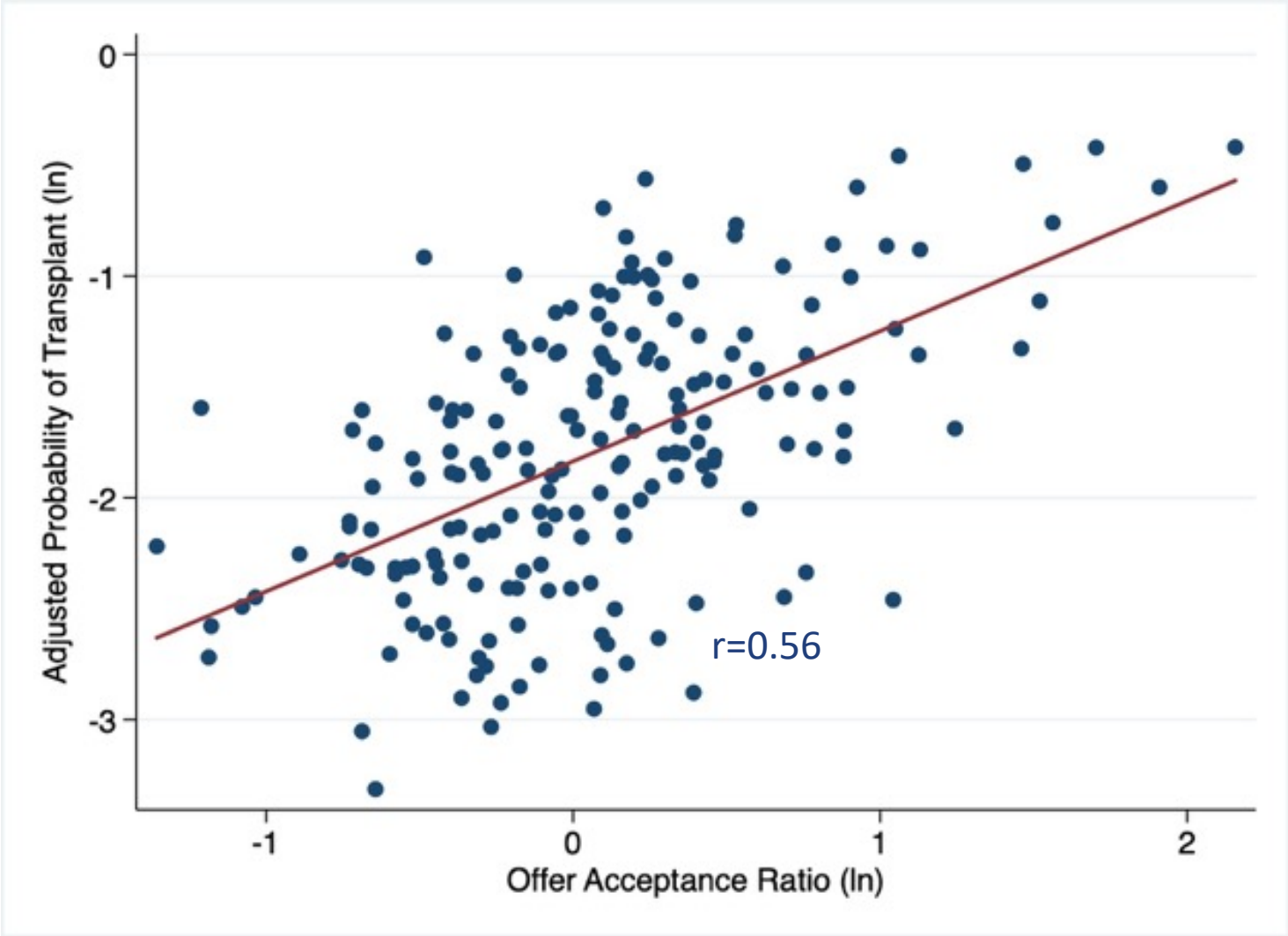


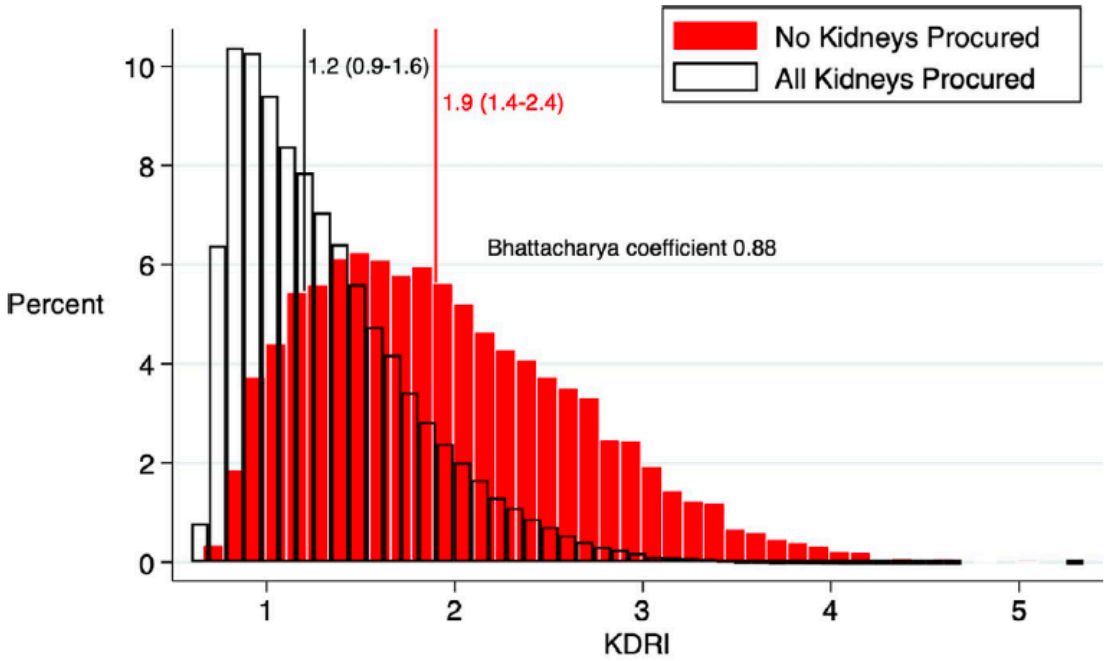



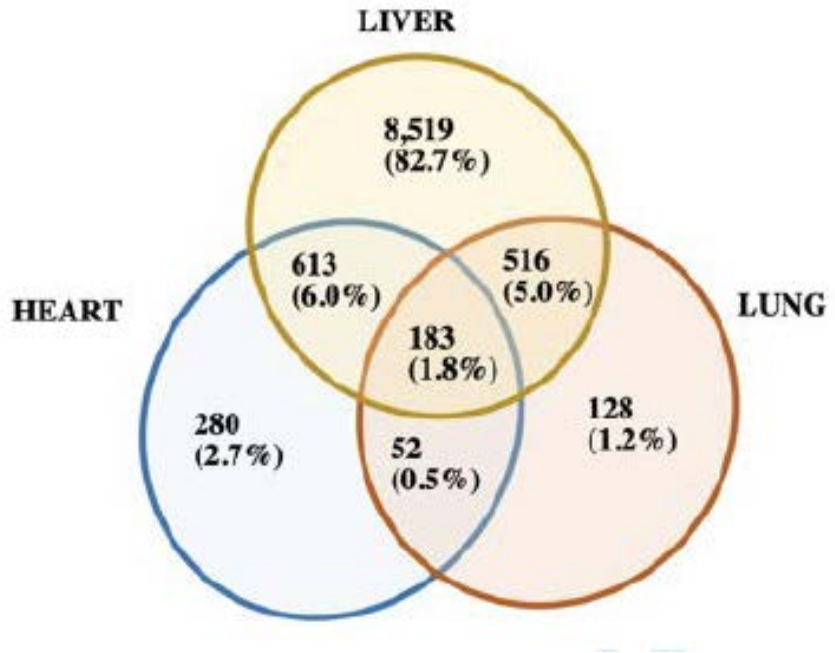

*King K et al. JASN 2020*

# Adjusted 3-year probability of transplant correlates with center offer acceptance behavior



# OPO behavior is influenced by transplant center behavior




*Yu et al. AJT 2020*