Disclosures

I have the following relationships to disclose, but none are relevant to this presentation

- Consultant/independent contractor: Transplant Genomics, Inc., Novartis
- Grant/research support: Pfizer
- Speaker's bureau: Sanofi

AST | AMERICAN SOCIETY OF TRANSPLANTATION

CUTTING EDGE OF TRANSPLANTATION 2016
RESOLVING THE ORGAN SHORTAGE
PRACTICE | POLICY | POLITICS

Overview

- High KDPI organs

- High CPRA recipients

- Longevity matching

High KDPI Organ Allocation

- Broader sharing of high KPDI organs to quickly get them to where they will be utilized in the region
- 1st level of allocation is regional

Discard rate

Kidney Donor Profile Index (KDPI)
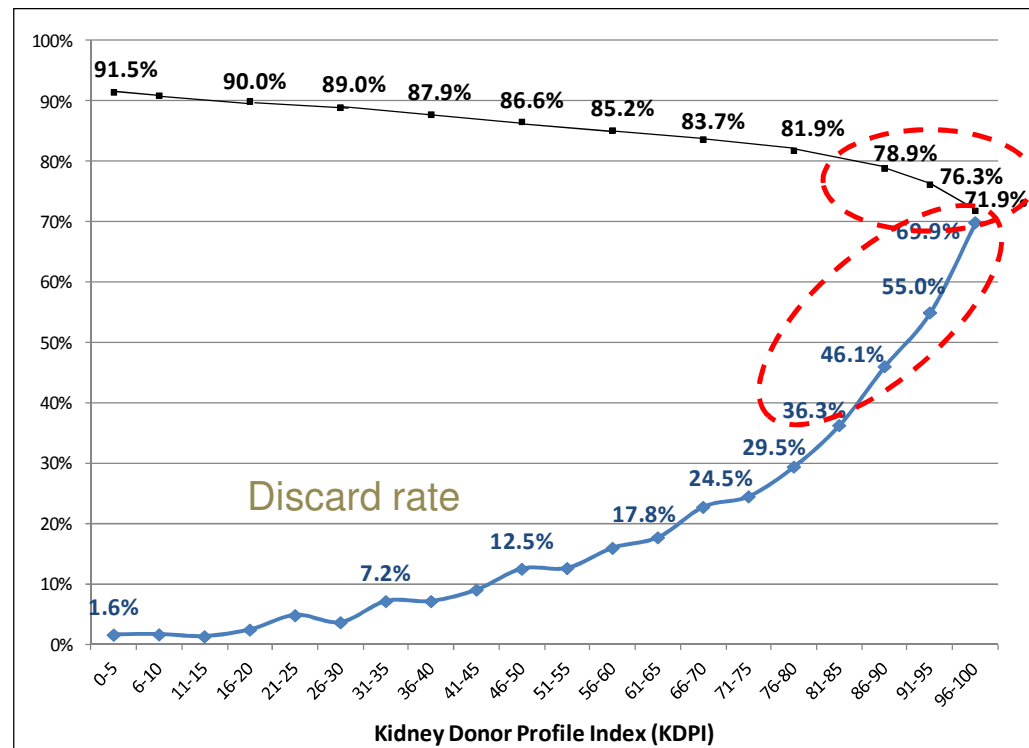
Source: Darren Stewart, UNOS

Potential Pitfalls

- The increased distance between procuring DSA and transplant centers in the region may be problematic and increase discards

- Regional centers may rarely accept offers, making the extra work and cost of offering to a region useless and expensive

Early Returns - Discards

Utilization

Figure 5: Pre vs. Post-KAS Kidney Recovery and Discard Rates
Jan 1, 2014 through May 31, 2015

Source: UNOS.ORG
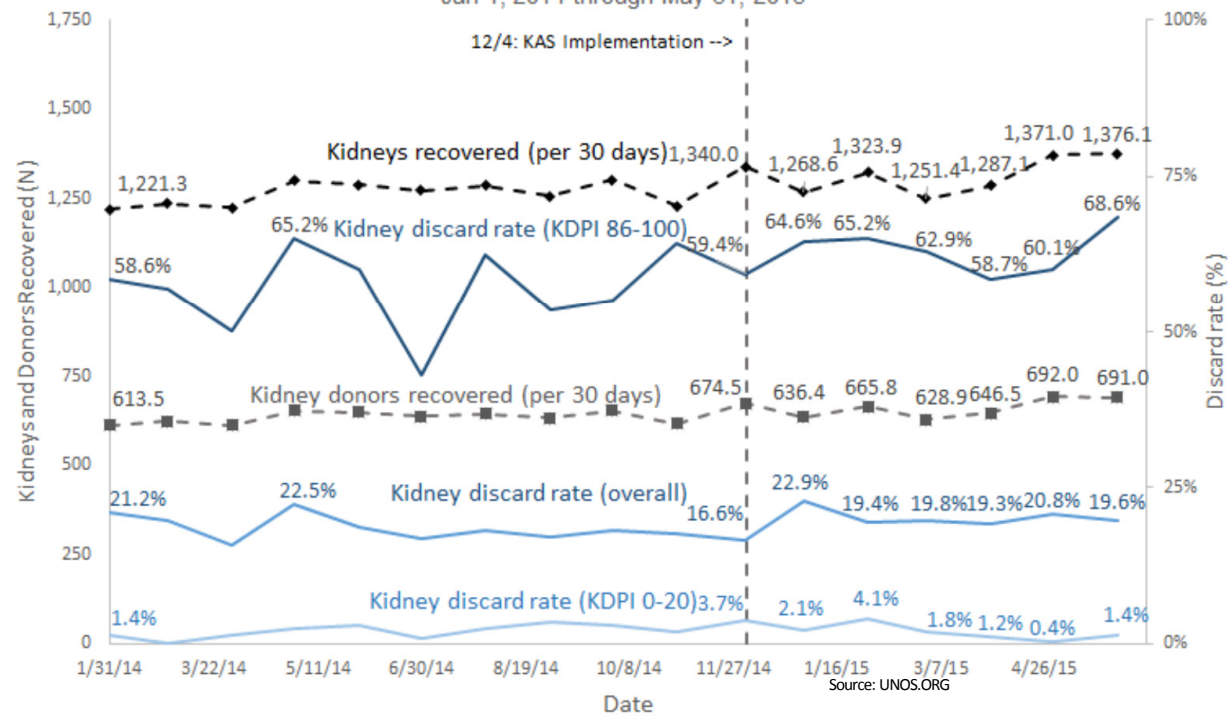
Updates

- With data through September 2015, the rate of high KDPI discard is back to "pre-KAS" levels

- The overall rate of discard is back to "pre-KAS" levels

- Given these trends, more data needed to see if high KDPI usage might continue to improve

AMERICAN SOCIETY OF TRANSPLANTATION

CUTTING EDGE OF TRANSPLANTATION 2016
RESOLVING THE ORGAN SHORTAGE
PRACTICE | POLICY | POLITICS

Possible Corrections

- Would be fairly easy (be design) to make the first level of allocation local then regional (revert to prior policy) if high KDPI organ utilization does not increase as planned or even decreases

- Other fixes in the works for high KDPI utilization (possible exclusion from PSRs)
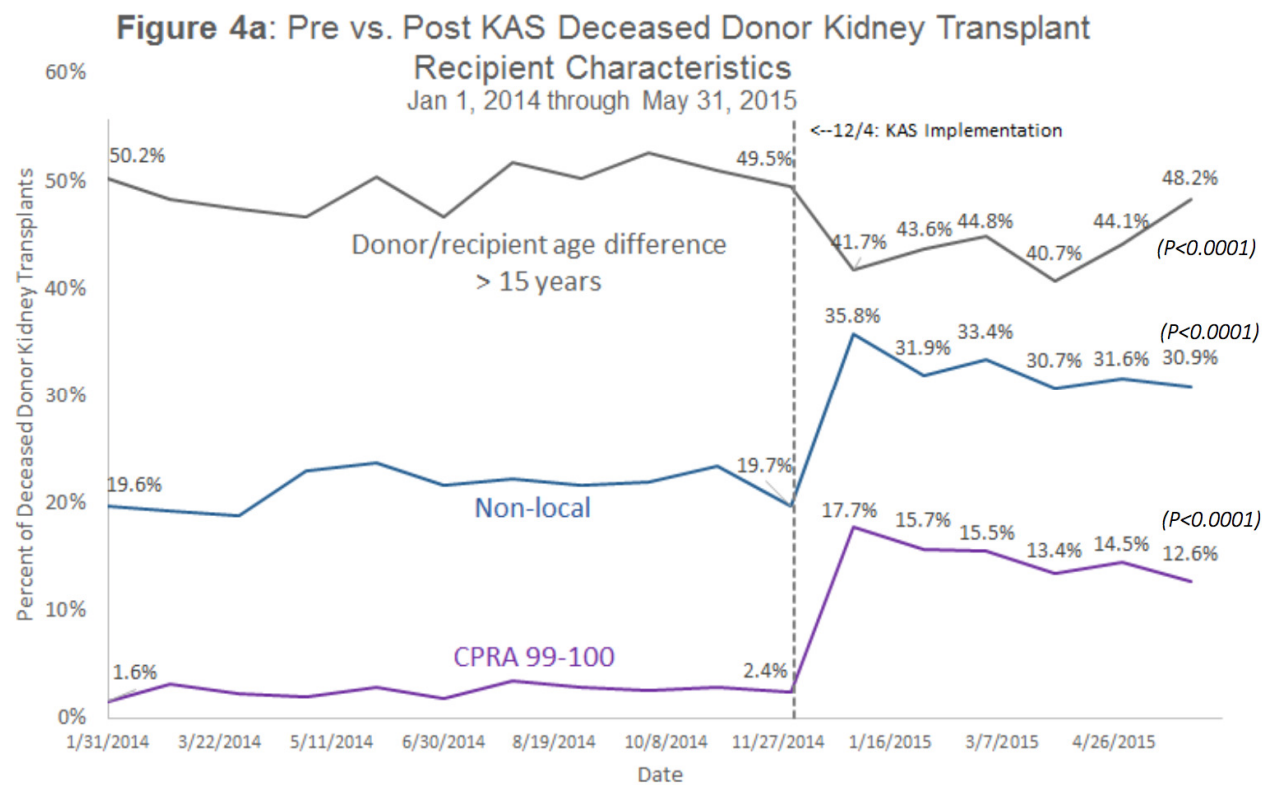
High CPRA Recipients

- Candidates with CPRA 98, 99, 100 receive high priority to increase their transplant rate

- 100% CPRA candidates get national priority behind multiorgan candidates, 99% regional priority, and 98% local priority

Sequence A KDPI <=20%	Sequence B KDPI >20% but <35%	Sequence C KDPI >=35% but <=85%	Sequence D KDPI>85%
Local CPRA 100	Local CPRA 100	Local CPRA 100	Local CPRA 100
Regional CPRA 100	Regional CPRA 100	Regional CPRA 100	Regional CPRA 100
National CPRA 100	National CPRA 100	National CPRA 100	National CPRA 100
Local CPRA 99			
Regional CPRA 99			
Local CPRA 98	Local CPRA 99	Local CPRA 99	Local CPRA 99
Zero mismatch (top 20% EPTS)	Regional CPRA 99	Regional CPRA 99	Regional CPRA 99
Prior living donor	Local CPRA 98	Local CPRA 98	Local CPRA 98
Local pediatrics	Zero mismatch	Zero mismatch	Zero mismatch
Local top 20% EPTS	Prior living donor	Prior living donor	Local + Regional
Zero mismatch (all)	Local pediatrics	Local	National
Local (all)	Local adults	Regional	
Regional pediatrics	Regional pediatrics	National	*
Regional (top 20%)	Regional adults		
Regional (all)	National pediatrics		
National pediatrics	National adults		
National (top 20%)			
National (all)			

New categories for highly sensitized candidates

Source: unos.org

The Bolus Effect - An Unintended but Expected Consequence

Figure 4a: Pre vs. Post KAS Deceased Donor Kidney Transplant Recipient Characteristics Jan 1, 2014 through May 31, 2015

Source: unos.org

The Upside

- High CPRA candidates are getting organ offers and transplants at a high rate, when previously many of these candidates never received a transplant – this was the main goal of the policy change

The Downside

- There was an initial dip in pediatric transplants (although it returned to pre-KAS levels)
- Significant increase in shipped organs (cost, complexity)
- Increase in amount of tissue typing required – crossmatches at a distance, extended donor typing, etc.
- Decrease in 0-ABDR mismatch transplants

Figure 4b: Pre vs. Post KAS Deceased Donor Kidney Transplant Recipient Characteristics
Jan 1, 2014 through May 31, 2015
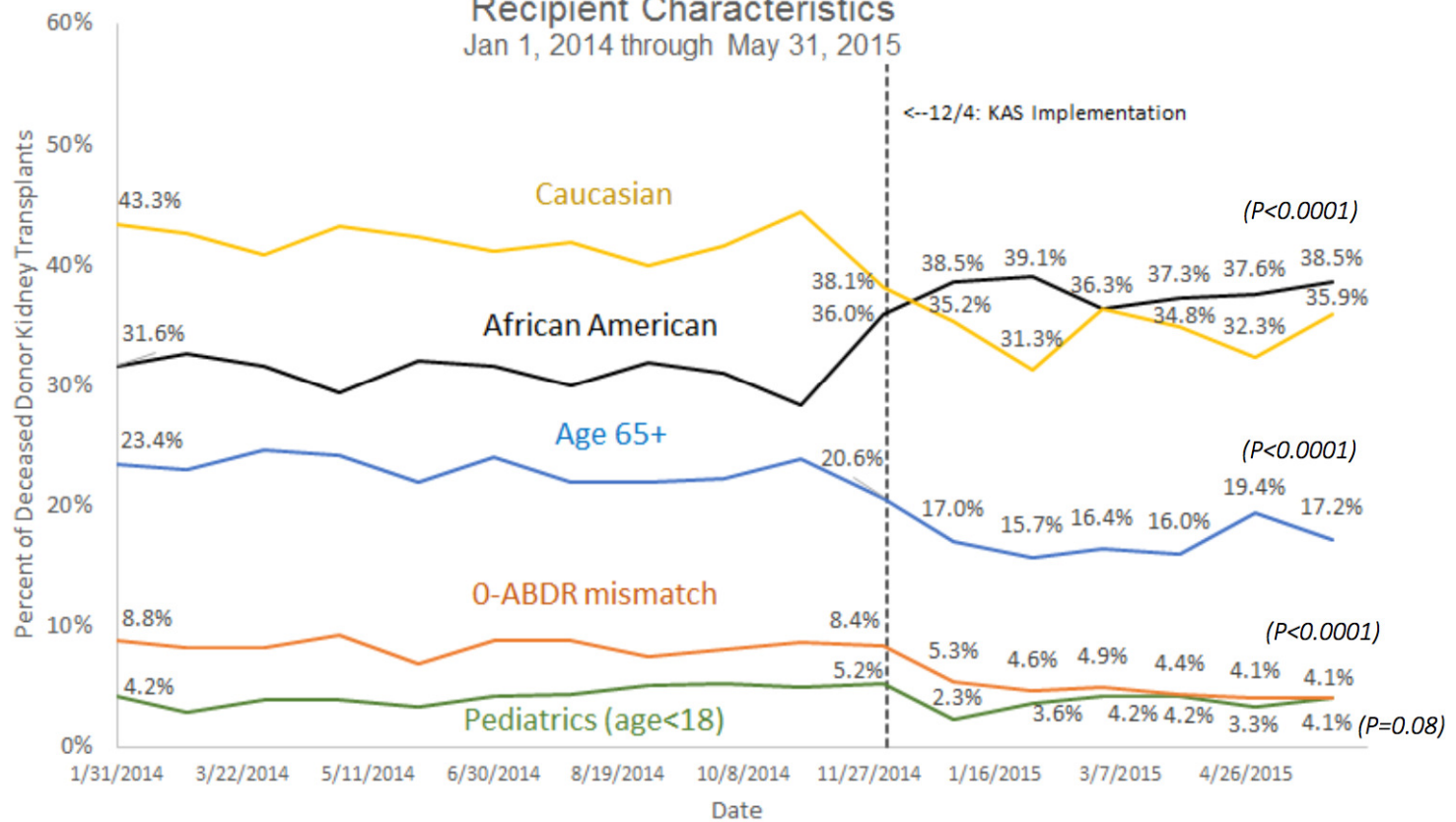
Source: unos.org

Possible Corrections

- Once the "bolus" period is finished, if transplant rates remain disproportionally high in the high CPRA group, then the level of allocation could be downshifted (CPRA = 100 would get regional, not national priority; and CPRA = 99 only local priority, etc.)
- By design, a relatively easy correction if needed, the issue will be knowing when the bolus is done

Possible Corrections

- Another potential correction would be from the tissue typing end rather than the allocation end

- Not all CPRA 99 and 100 patients are the same in terms of their unacceptable antigens – potentially more granular assessment and classification (e.g., true 100% vs. 99.5% makes a difference)

- The decrease in 0-ABDR MM transplants is concerning to many and needs to be addressed as well – but more analysis as to exactly why is needed

Longevity Matching

- Top 20% of candidates by EPTS offered kidneys with KDPI < 20% first

Estimated Post Transplant Survival (EPTS) and Longevity Matching

- Considering longevity for some candidates could reduce the need for repeat transplants
- Four medical factors used to calculate EPTS
  - Age
  - History of diabetes
 - Length of time on dialysis
  - History of a prior transplant

Kidney becomes available

KDPI<=20%

KDPI 21 -34%
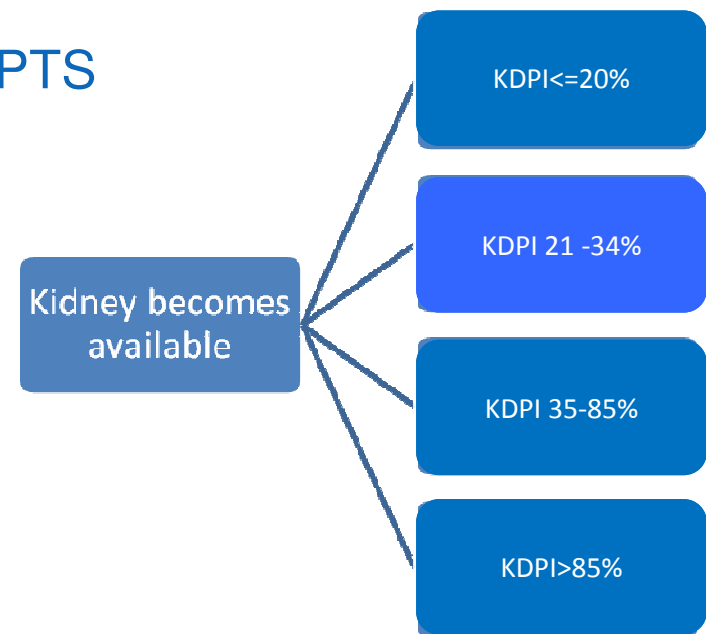
KDPI 35-85%

KDPI>85%

Source: unos.org

Sequence A KDPI <=20%	Sequence B KDPI >20% but <35%	Sequence C KDPI >=35% but <=85%	Sequence D KDPI>85%
Local CPRA 100	Local CPRA 100	Local CPRA 100	Local CPRA 100
Regional CPRA 100	Regional CPRA 100	Regional CPRA 100	Regional CPRA 100
National CPRA 100	National CPRA 100	National CPRA 100	National CPRA 100
Local CPRA 99	Local CPRA 99	Local CPRA 99	Regional CPRA 99
Regional CPRA 99	Regional CPRA 99	Regional CPRA 99	Local CPRA 98
Local CPRA 98	Local CPRA 98	Local CPRA 98	Zero mismatch
Zero mismatch (top 20% EPTS)	Zero mismatch	Zero mismatch	Local + Regional
Prior living donor	Prior living donor	Prior living donor	National
Local pediatrics	Local pediatrics	Local	
Local top 20% EPTS	[pediatrics]	Regional	
Zero mismatch (all)		National	
Local (all)			
Regional pediatrics			
Regional (top 20%)			
Regional (all)			
National pediatrics			
National (top 20%)			
National (all)			

Longevity matching
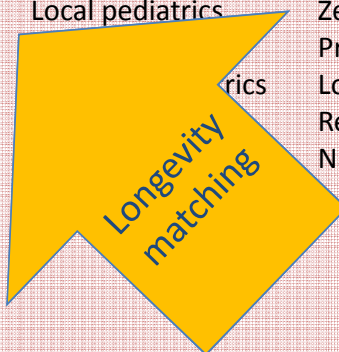
Source: unos.org

Early Returns

Figure 4b: Pre vs. Post KAS Deceased Donor Kidney Transplant Recipient Characteristics
Jan 1, 2014 through May 31, 2015
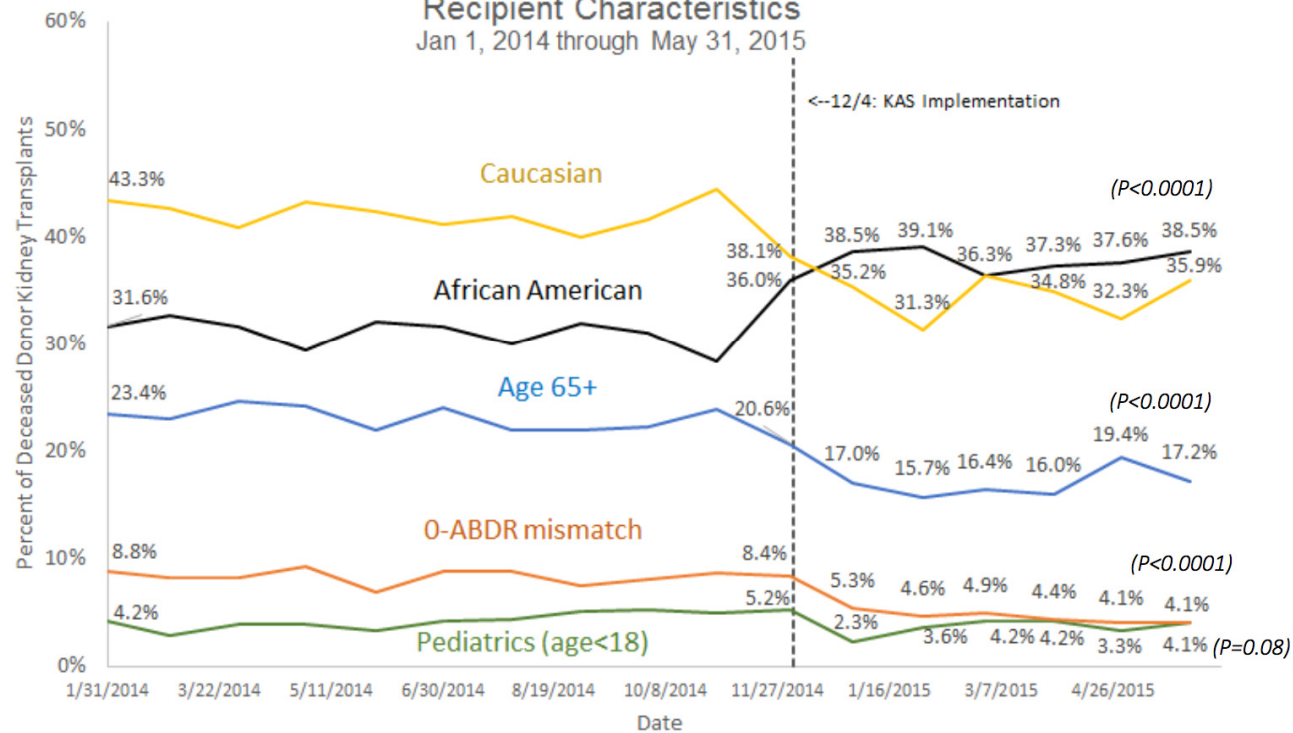
Source: unos.org

Figure 1a: EPTS by KDPI matrix highlighting severe longevity mismatches among deceased donor kidney transplants

Recipient EPTS (expected recipient longevity*)	Deceased Donor KDPI (expected kidney longevity**)				
	0-20% (~15 years)	21-40% (~13 years)	41-60% (~12 years)	61-80% (~11 years)	81-100% (~8 years)
Pediatric (>25 years)			Mismatch	Mismatch	Mismatch
0-20% (~21 years)				Mismatch	Mismatch
21-40% (~15 years)					Mismatch
41-60% (~11 years)	Mismatch				
61-80% (~9 years)	Mismatch	Mismatch			
81-100% (~7 years)	Mismatch	Mismatch	Mismatch		

Mismatch type (2): High risk of early graft failure, return to W/L

Mismatch type (1): High risk of DWFG, unrealized graft years

Figure 1b: Heat map of pre vs. post-KAS differences in % of deceased donor kidney transplants by recipient EPTS and donor KDPI

Recipient EPTS (expected recipient longevity*)	Deceased Donor KDPI				
	0-20% (~15 years)	21-40% (~13 years)	41-60% (~12 years)	61-80% (~11 years)	81-100% (~8 years)
Pediatric (>25 years)	0.2%	0.4%	-0.3%	0.0%	0.0%
0-20% (~21 years)	9.4%	-1.8%	-1.1%	-0.9%	-0.3%
21-40% (~15 years)	-2.3%	-0.5%	0.4%	0.8%	-0.5%
41-60% (~11 years)	-1.7%	-0.4%	0.2%	0.3%	-0.7%
61-80% (~9 years)	-1.2%	-0.4%	0.4%	0.0%	0.3%
81-100% (~7 years)	-1.8%	1.1%	0.9%	0.0%	-0.4%

Legend:
- sharp ↑
- modest ↑
- no change ↔
- modest ↓
- sharp ↓

* Median recipient survival after solitary deceased donor kidney transplant, per Kaplan-Meier method.

** Average of two Kaplan-Meier half-life estimates: (a) death-censored, (b) all-cause graft failure.

Mean recipient age (years) by EPTS group: peds (11), 0-20% (35), 21-40% (49), 41-60% (55), 61-80% (60), 81-100% (66)

CEOT 2016 Poster Presentation:
The Two Sides of Longevity Matching Under KAS: One's Working, the Other Needs Work

Darren Stewart, MS[1], Richard Formica, MD[2], John Friedewald, MD[3]

Longevity Matching

- Lingering questions
    - How does it play in different DSAs?
        - DSAs with more than one multi-organ program or pediatric program will likely take a large % of the KDPI< 20 organs before adult kidney-alone candidates ever see them – need more data here
- Possible Corrections
    - So far the predicted 5% decline to older candidates is correct – if this slides further (and cannot be explained by other factors such as fear of bad outcomes), then adjustments could be made (by design) to the 20% (15%, 10%, etc.)

Summary

- So far, most of the new features of KAS are achieving their stated goals, with the notable exception of broader sharing of high KDPI organs
- Several simple corrections were designed in the system to allow for fine-tuning if needed once more comprehensive data are available