The New Kidney Allocation System (KAS): The First 18 Months

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Background

- KAS implemented Dec 4, 2014
- Key goals:
  - Make better use of available kidneys
  - Increase transplant opportunities for difficult-to-match patients (increased equity)
  - Increase fairness by awarding waiting time points based on dialysis start date
  - Have minimal impact on most candidates
Analysis periods

- **Pre-KAS:** Dec 4, 2013 – Dec 3, 2014 (12 months)

- **Post-KAS:** Dec 4, 2014 – May 31, 2016 (~18 months)

  Some slides include a longer post-KAS evaluation (e.g., 19 or 20 months, as indicated)
Solitary deceased donor kidney transplants under KAS
Pre vs. post-KAS trends

**Over time (per 30 days)**

- Transplant volume increased 6.9%, from 896.0 to 955.7 per month.
Most changes in % of transplants by Region were very small.

Largest relative changes: Region 9↑; Region 6↓.
Trends in pediatric transplants
Percent of DD Kidney Transplants to Pediatrics (results through July 31, 2016)

- Pediatrics represent 0.9% of the kidney WL and account for about 4% of transplants.
- Small Post-KAS increase for age 6-10, decreases for age 0-5, 11-17, and overall.
Most regions had higher or similar percent of pediatric transplants post-KAS.

However, the % of pediatric transplants occurring in region 5 dropped from 21.4% to 15.2%. 26.3% of pediatric candidates are registered in Region 5.
CPRA 99-100% recipient “bolus effect”

- Transplants to CPRA 99-100% patients rose sharply after KAS but have tapered to around 10%.
After KAS, the % of transplants to recipients with 10+ years of dialysis rose sharply to nearly 19% but has tapered to about 7%.
Kidney Utilization by KDPI

- "Discard rate" = percentage of kidneys recovered for transplant but not transplanted. Rate increased, fell, then rose again post-KAS.
Overall, the discard rate rose from 18.5% to 19.8% (p=0.001). The increase was most evident for KDPI 86-100% kidneys.
Delayed graft function (DGF) rates (1 year pre vs. 18-months post KAS)

**DGF = dialysis within first week**

- The percentage of recipients requiring dialysis within the first week after transplant increased from 24.3% pre-KAS to 29.5% after KAS.
- Increase driven by more high dialysis time recipients and other factors.
Slight decline in DGF rate post-KAS (p=0.03), likely due to diminishing bolus effects (e.g., fewer high dialysis time recipients).
Six Month Survival

- Six month graft survival rate over 95%. Patient survival over 97% but slightly lower than pre-KAS (p<0.05).
Many very highly sensitized and high dialysis time patients have been transplanted under KAS

- Transplants to these groups have tapered over 18 months

- Deceased donor transplant volume has increased 7%

- However, utilization of recovered kidneys has not improved

- Largest impact on pediatric transplants was observed in Region 5.

- DGF has increased but is slowly trending downward

- Post-KAS, 6-month graft (95.3%) and recipient (97.6%) survival are excellent, though slightly lower than pre-KAS.
For more detailed analyses of KAS’s impact after 1 year, other resources are available:

Incorrect KDPI Mapping Table
Background

- KDRI was incorrectly mapped to KDPI between April 20, 2016 – May 19, 2016
  - Problem fixed: 2016-05-19 11:31:34.640

- Source of problem: incorrect “mapping table” uploaded for converting KDRI to KDPI

- Impact:
  - All KDPI values* displayed in DonorNet and used for allocation were higher than they should have been.
  - On average, the displayed KDPI was 17 points higher than the correct value. The maximum deviation was 21 points.

* Except KDPI values of 100%, since KDPI cannot be higher than 100%.
Shift in KDPI values due to incorrect mapping for 930 affected transplants

Distribution of KDPI used for allocation shifted to higher values.

Actual KDPI's

Incorrectly mapped KDPI's

Mean=46.4

Mean=63.7
KAS sequences dependent upon KDPI

A: KDPI 0-20%
CPRA 98-100%
0 ABDR mismatch (EPTS 0-20%)
Local prior living donors
Local pediatrics
Local A2/A2B-->B (EPTS 0-20%)
Local EPTS 0-20%
0 ABDR mismatch (EPTS 21-100%)
Local A2/A2B-->B (EPTS 21-100%)
Local EPTS 21-100%
Regional pediatrics
Regional A2/A2B-->B (EPTS 0-20%)
Regional EPTS 0-20%
Regional A2/A2B-->B (EPTS 21-100%)
Regional EPTS 21-100%
National pediatrics
National A2/A2B-->B (EPTS Top 20%)
National EPTS 0-20%

B: KDPI 21-34%
CPRA 98-100%
0 ABDR mismatch
Local prior living donors
Local pediatrics
Local A2/A2B-->B
Local candidates
Regional pediatrics
Regional A2/A2B-->B
Regional candidates
National pediatrics
National A2/A2B-->B
National candidates

C: KDPI 35-85%
CPRA 98-100%
0 ABDR mismatch
Local prior living donors
Local A2/A2B-->B
Local candidates
Regional A2/A2B-->B
Regional candidates
National A2/A2B-->B
National candidates

D: KDPI 86-100%
CPRA 98-100%
0 ABDR mismatch
Local + regional A2/A2B-->B
Local + regional candidates
National A2/A2B-->B
National candidates
Differences in allocation sequence due to incorrect KDPI

149 fewer transplants were allocated per sequence A (KDPI 0-20).
121 more transplants were allocated per sequence D (KDPI 86-100).
Impact of incorrect KDPI mapping

EPTS 0-20% recipients

Transplants to EPTS 0-20% adults dropped and rebounded after the system was fixed.
Impact of incorrect KDPI mapping
EPTS 21-100% recipients

% of Solitary Adult DD kidney transplants to EPTS 21-100% recipients

Transplants to EPTS 21-100% adults increased then returned to previous levels after the fix.
Fixing the problem

- The correct table was uploaded on May 19th, 2016
- Tested by IT department and validated by Research department
- Working as expected since May 19th, 2016
- New processes put in place to prevent future problems of this nature
- All programs that performed a transplant during this period were informed of the correct (lower) KDPI value for each recipient.
Impact on distribution of deceased donor kidney transplants
% of transplants received by groups of recipients

The distribution of transplants shifted toward older recipients during this one month period but subsequently returned to previous levels.
Impact of KDPI mapping error: summary of findings

- Deceased donor kidney transplant volume remained on par with post-KAS average and was 9% above the pre-KAS average.
  - The kidney discard rate was slightly higher (22.9%, vs. 19.7% post-KAS average) but not outside normal, observed monthly variation.

- For this one month period, the distribution of transplants resembled pre-KAS with respect to longevity matching and recipient ages.

- Pediatric transplants declined slightly but rebounded sharply post-fix.

- Transplants to highly sensitized and African American patients were unaffected.
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