

Disclosures

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I have no financial relationships to disclose within the past 12 months relevant to my presentation. The ACCME defines 'relevant' financial relationships as financial relationships in any amount occurring within the past 12 months that create a conflict of interest.

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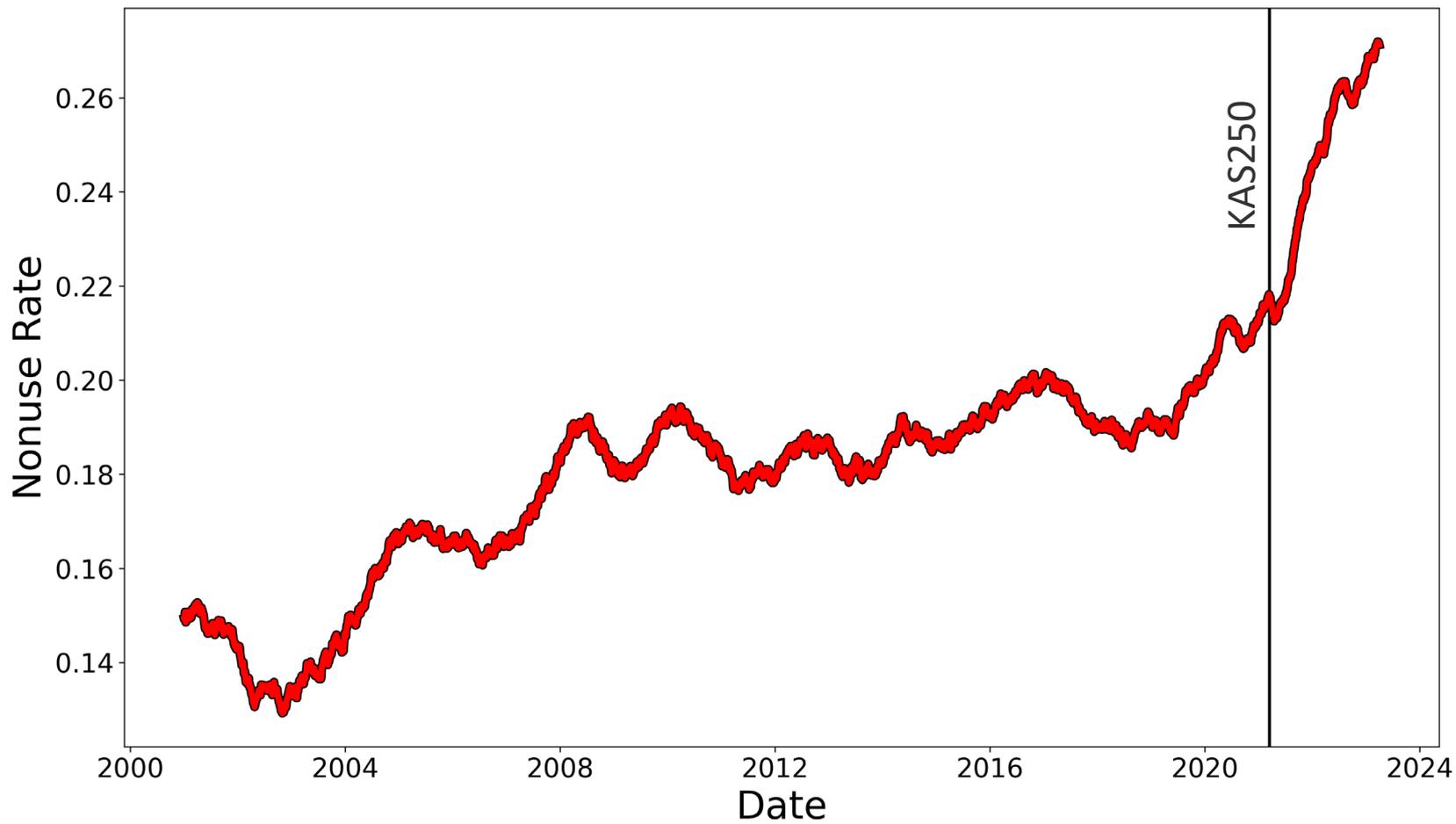
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Why Has The Kidney Nonuse Rate Sharply Increased Since 2021?

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Increased Logistical Complexity

- KAS250 replaced the geographic unit of allocation from the donation service area (DSA) to a 250-NM circle.
- This grants greater access to kidney transplants at the cost of increased complexity.
- After KAS250:
 - Median offer number at acceptance increased from 6 to 11.
 - Median center number at acceptance increased from 3 to 6.

PERSONAL VIEWPOINT

AJT

Greater complexity and monitoring of the new Kidney Allocation System: Implications and unintended consequences of concentric circle kidney allocation on network complexity

Joel T. Adler^{1,2} | Syed A. Husain^{3,4} | Kristen L. King^{3,4} | Sumit Mohan^{3,4,5}

Around the World

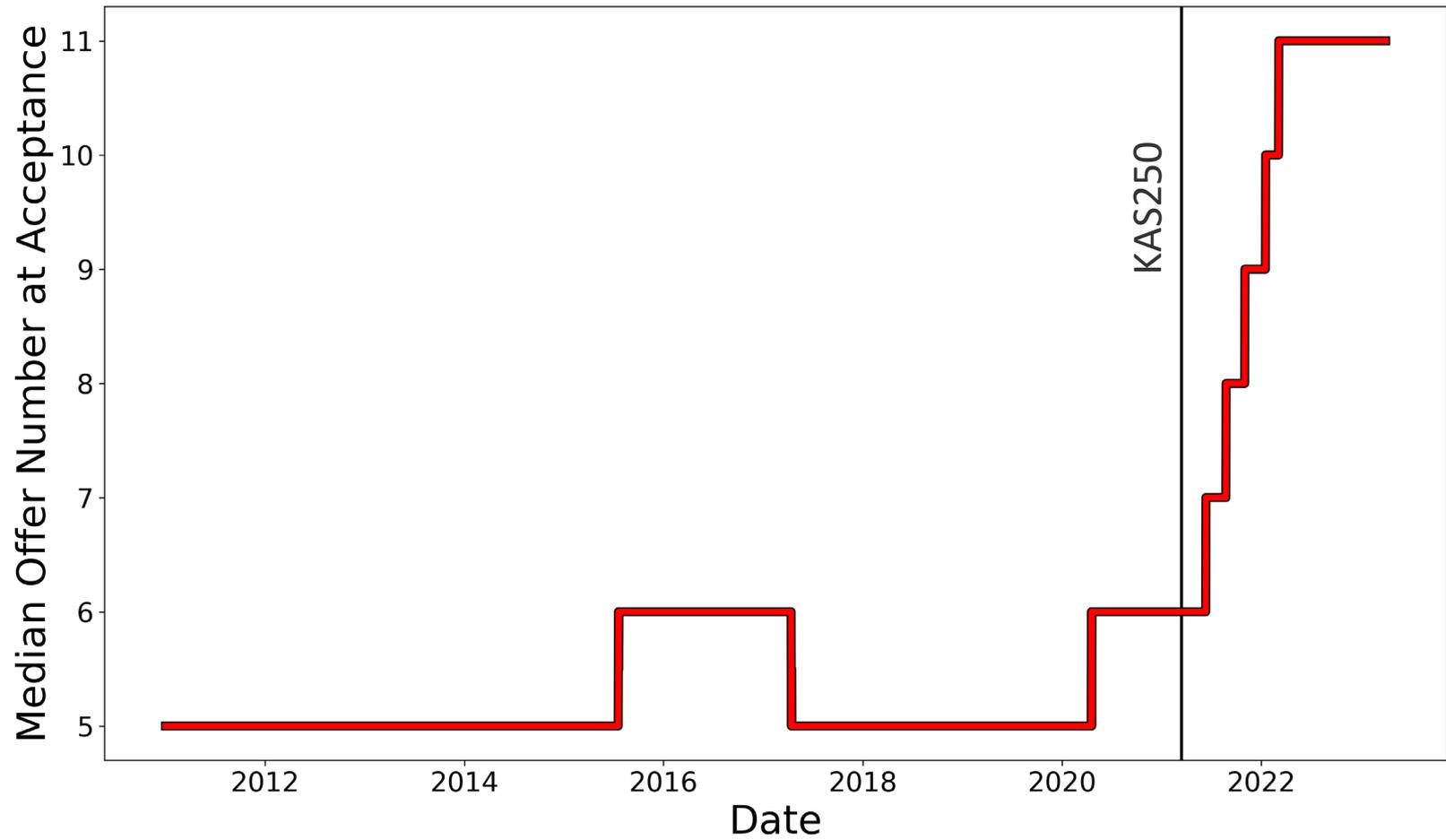


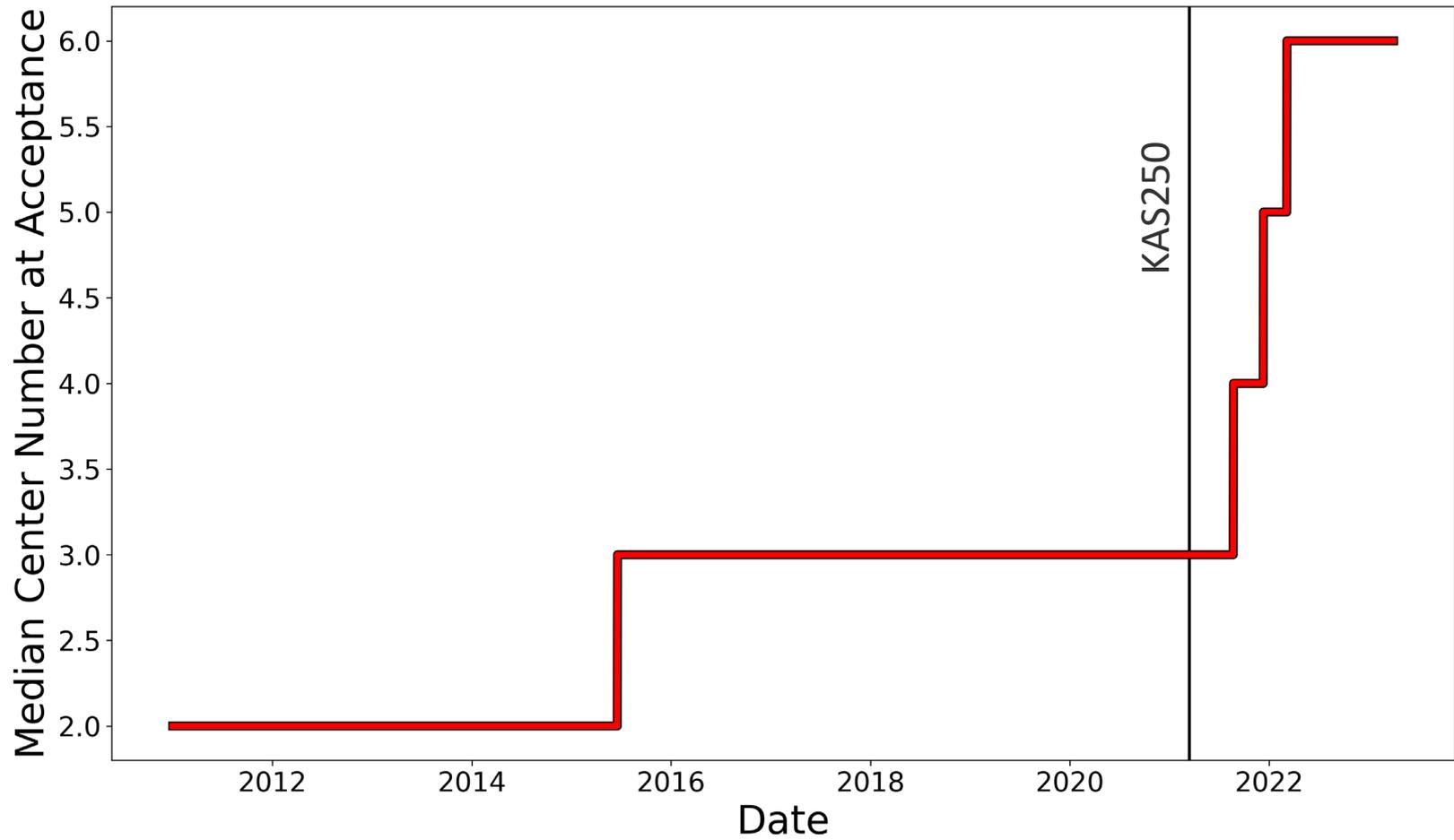
Increased Logistical Burden in Circle-based Kidney Allocation

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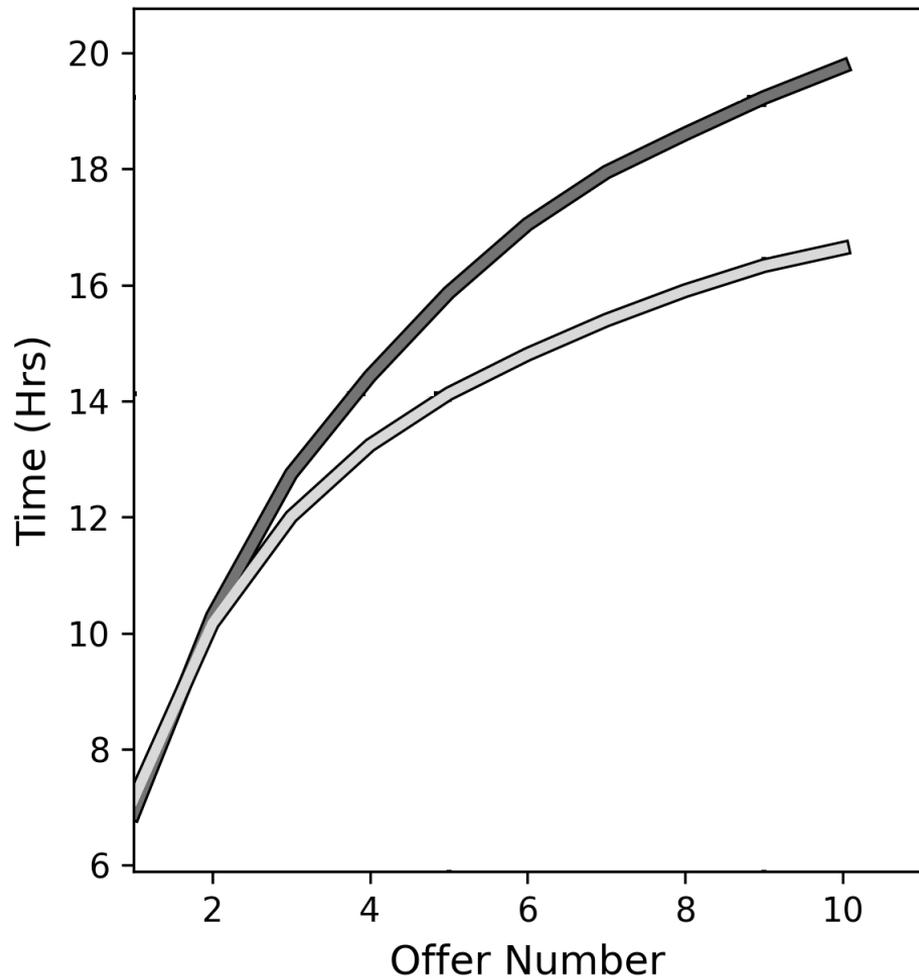




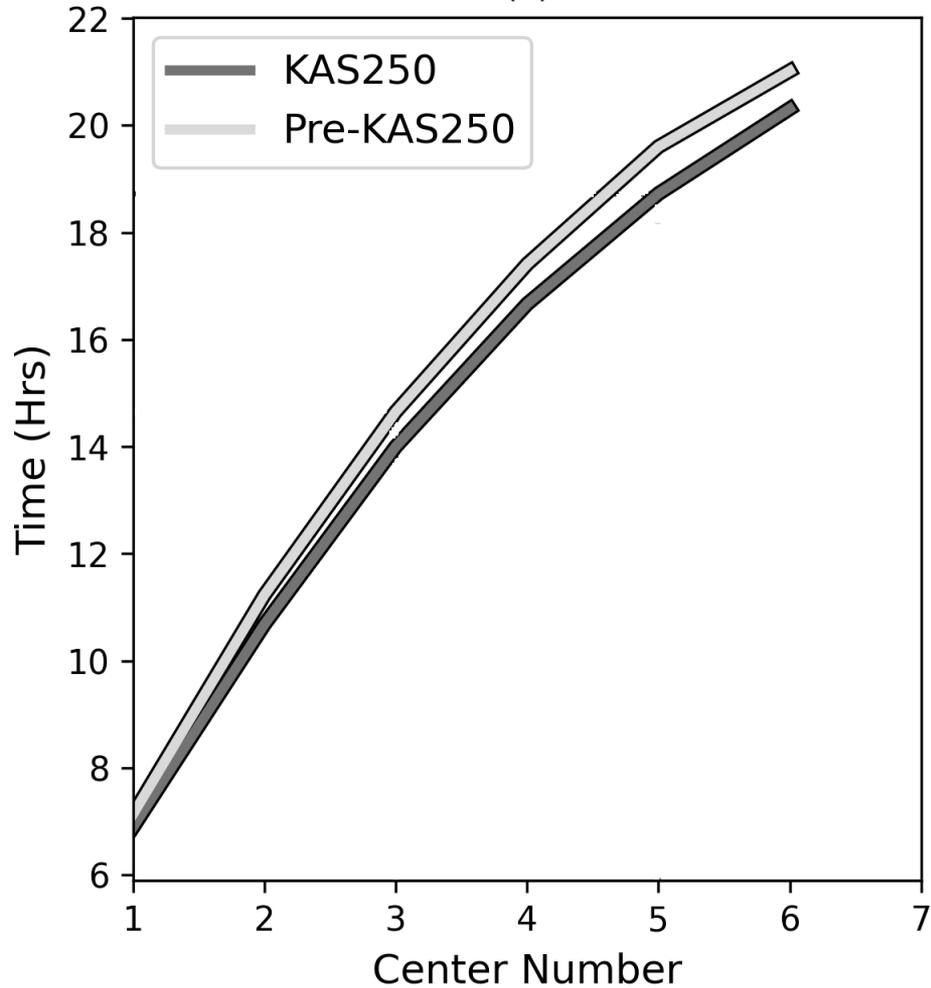
Complexity → Delays

- We hypothesized that the increased complexity of KAS250 caused placement delays.
- Using match run data from March 15, 2020, through December 31, 2021, we quantified the average time it took for the match run to progress in the pre-KAS250 and KAS250 allocation eras.
- We hypothesized that the increased complexity caused by KAS250 would make match runs progress more slowly.

(a)



(b)



Match Run Progression Time

- Compared with the pre-KAS250 era, it took longer (on average) for the match run to progress through offer numbers 3-10.
- However, it took approximately the same amount of time (on average) for the match run to progress through the first 6 transplant centers.
- This suggest that (on average) there is a fixed time cost associated with a transplant center evaluating a particular donor, but once that evaluation is done there is a very low time cost to applying that evaluation to any number of candidates.
- Therefore, the inclusion of more centers early in the match run is slowing down allocation.

Complexity → Delays → Nonuse

- We further hypothesized that these delays have led to increased kidney nonuse.
- Non-allocation-related factors may also be increasing nonuse:
 - COVID-19 effects
 - CMS metric pressuring OPOs to pursue more complex donors
- Can we disentangle the impact of the policy from impacts from other factors?

Modeling Kidney Nonuse

- We used regression to model the probability that a recovered kidney would not be used.
- Adjusted for many donor characteristics, COVID-19 effects, allocation era, and an underlying time trend.
- All kidneys recovered for transplant from March 15, 2019, through January 31, 2023.
- Model was used to estimate the number of kidneys recovered for transplant but not transplanted due to changes in these covariates.

Possible Causes

- KAS250
- Disruptions due to COVID-19
- Donor characteristics
 - Many donor characteristics were similar across allocation era.
 - Under KAS250, donors were older, had higher peak serum creatinine (SCr), and were more likely to be donation after circulatory death (DCD) and COVID+.
- Underlying time trend

	Pre-KAS250	KAS250
N	44,612	50,849
Nonuse rate	21.15%	25.79%
Age	41.0	42.2
DCD (%)	26.2	32.6
Peak SCr	1.97	2.06
COVID+ (%)	0.3	9.1

Estimated Impact

- If the nonuse rate had remained at 21.15%, then **2,334** more kidneys would have been used under KAS250.

Cause	Estimated Impact
KAS250	769 (33%)
Age	582 (25%)
Time trend	542 (23%)
DCD	274 (12%)
Peak SCr	138 (6%)
Other	42 (<2%)
COVID-19 effects	-14 (~0%)
Total	2,334

Estimated Impact

- If the nonuse rate had remained at 21.15%, then 2,334 more kidneys would have been used under KAS250.
- Largest single effect was KAS250, associated with **769 (33%)** kidneys not used.

Cause	Estimated Impact
KAS250	769 (33%)
Age	582 (25%)
Time trend	542 (23%)
DCD	274 (12%)
Peak SCr	138 (6%)
Other	42 (<2%)
COVID-19 effects	-14 (~0%)
Total	2,334

Estimated Impact

- If the nonuse rate had remained at 21.15%, then 2,334 more kidneys would have been used under KAS250.
- Increased donor age (**582**), DCD status (**274**), and peak serum creatinine (**138**) combined are associated with **994 (43%)** additional kidneys not used.

Cause	Estimated Impact
KAS250	769 (33%)
Age	582 (25%)
Time trend	542 (23%)
DCD	274 (12%)
Peak SCr	138 (6%)
Other	42 (<2%)
COVID-19 effects	-14 (~0%)
Total	2,334

Estimated Impact

- If the nonuse rate had remained at 21.15%, then 2,334 more kidneys would have been used under KAS250.
- COVID-19 effects had essentially no **net** impact on differences in nonuse across allocation eras.
 - Early COVID-19 affected pre-KAS250
 - More COVID+ donors under KAS250
 - Increasing willingness to transplant COVID+ kidneys over time

Cause	Estimated Impact
KAS250	769 (33%)
Age	582 (25%)
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Total	2,334

Estimated Impact

- If the nonuse rate had remained at 21.15%, then 2,334 more kidneys would have been used under KAS250.
- An otherwise unexplained trend of increasing nonuse is associated with **542 (23%)** additional kidneys not used.

Cause	Estimated Impact
KAS250	769 (33%)
Age	582 (25%)
Time trend	542 (23%)
DCD	274 (12%)
Peak SCr	138 (6%)
Other	42 (<2%)
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Total	2,334

Conclusions

- Kidney nonuse began increasing around 2019, then more rapidly in 2021 with the implementation of KAS250.
- KAS250 has made allocation more complex, and thereby has caused delays in placement and an increase in nonuse.
- Approximately 33% of the increase in nonuse is attributable to KAS250.
- Other sources of increased nonuse:
 - Decreasing donor quality – Net positive if this results in more overall transplants
 - Secular trend – Unexplained, requires further investigation



Transplantation

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