SCIENTIFIC REGISTRY OF TRANSPLANT RECIPIENTS

KDPI and Small (<20kg) Kidney Donors

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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.

AND

My presentation does/does not include discussion of off-label or investigational use

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Introduction

- Supply of kidneys for transplant continues to exceed demand.
- Numerous efforts to expand the donor pool and decrease waiting times.
- Interest in use of small pediatric donors.

Use of small donor kidneys

- Concerns with small donor kidneys:
  - Vascular thrombosis
  - Ureteral complications
  - Hyperfiltration injury
- Early experiences with poor graft survival due to technical issues.
- Current era, similar or superior graft survival compared with adult living or deceased donors.

Metzger, AJT 2003; Dharnidharka, AJT 2005; Sureshkumar, Tx 2006; Sharma, Tx 2011; Butani AJT 2013; Maluf, AJT 2013; Bent AJT 2015.

KAS and KDRI of Small Kidneys

- New kidney allocation policy (KAS) uses the kidney donor risk index (KDRI).
- Two factors in the KDRI, age and height, are formulated to confer the highest risk on young, small donors.
- Concern that KDRI of small pediatric donor kidneys may not reflect actual risk.

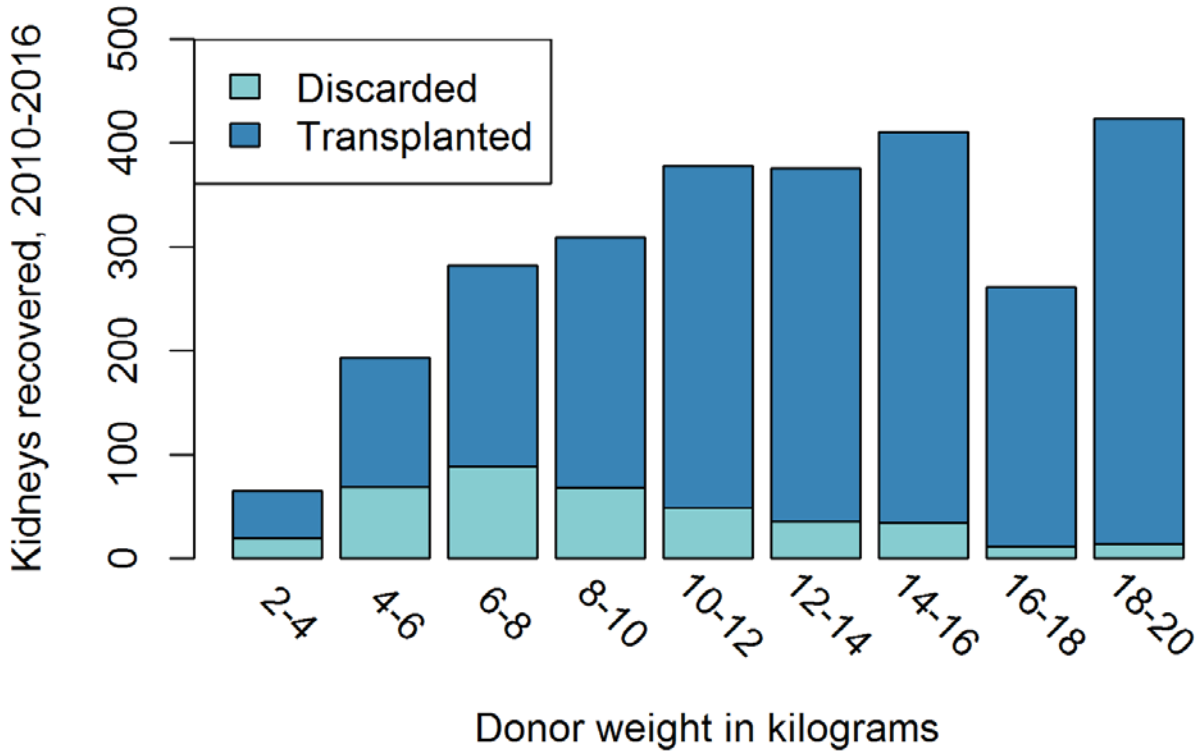
Study question

- How does the KDRI of small pediatric donor kidneys align with graft survival?
- How does this affect organ utilization?

Methods

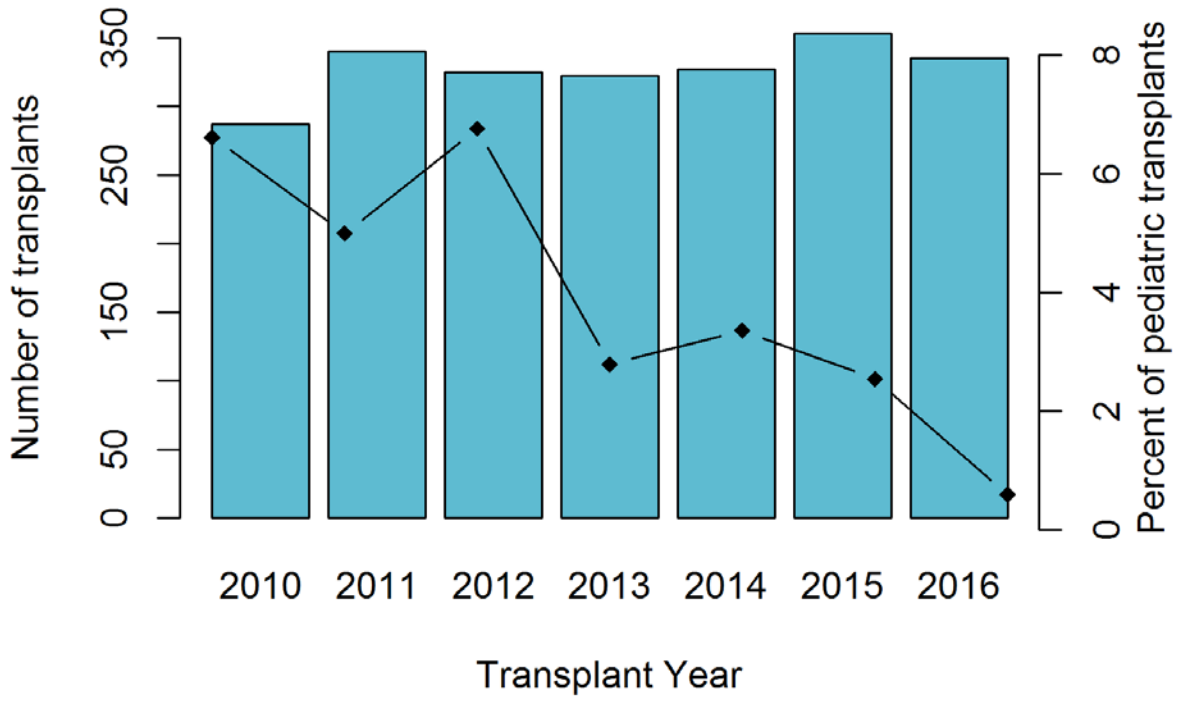
- Reviewed kidneys < 20 kg: recovery, use, and outcomes.
- SRTR standard analysis files.
- January 1, 2010, through December 31, 2016.
- Kidneys reported to OPTN as single left/right or en bloc.
- Stratified by KDPI group (35-85, ≥ 86) and donor size (≤ 20 kg, > 20 kg).

Results

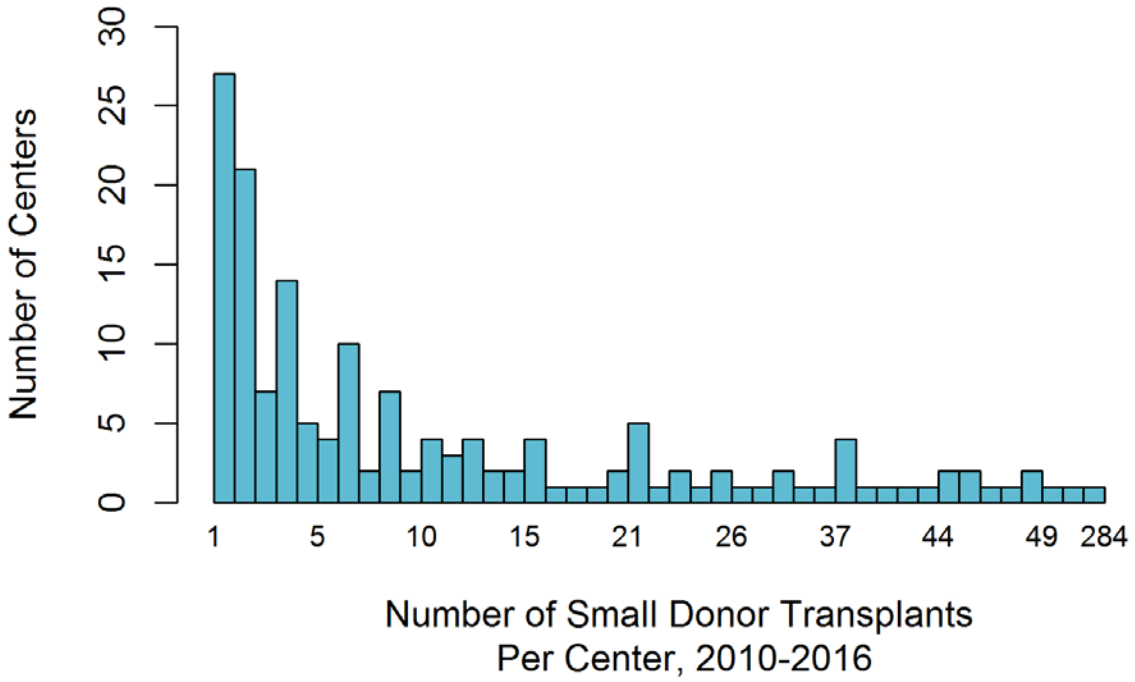

Kidneys recovered, 2010-2016
0
100
200
300
400
500
Discarded
Transplanted
2-4
4-6
6-8
8-10
10-12
12-14
14-16
16-18
18-20
Donor weight in kilograms

Number of transplants from small (≤ 20 kg) kidney donors

2289 small donor kidneys transplanted January 1, 2010-December 31, 2016

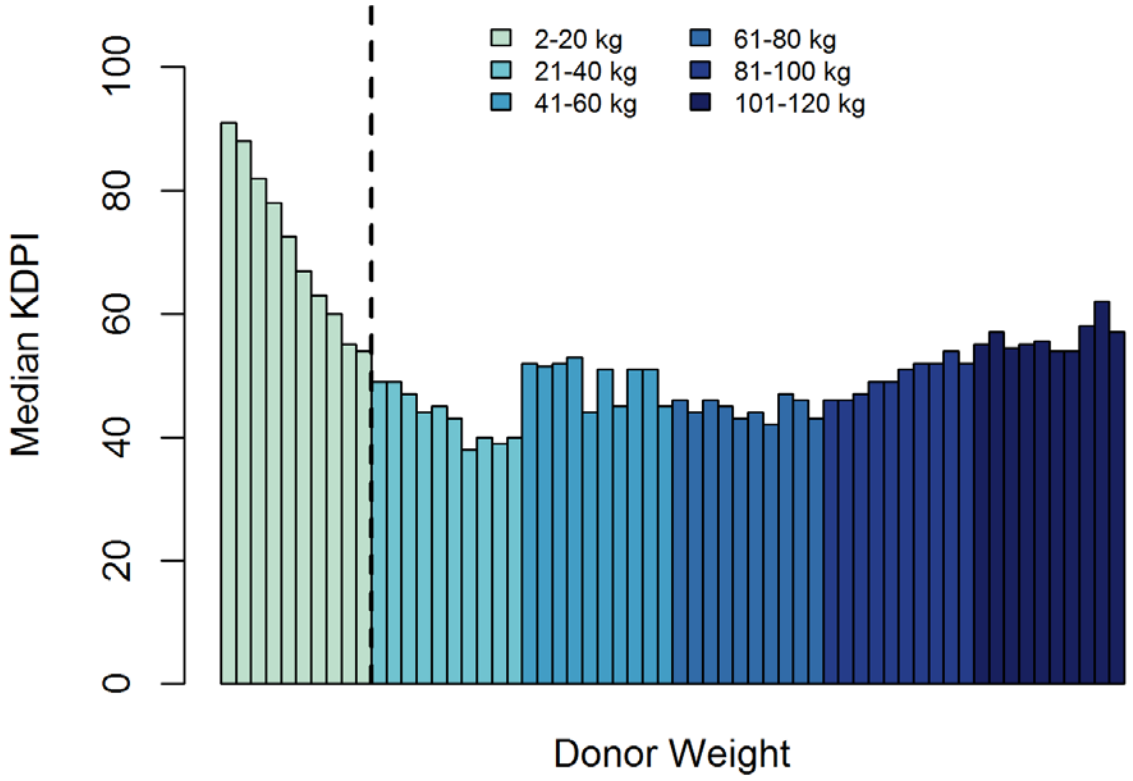


Centers performing small donor transplants



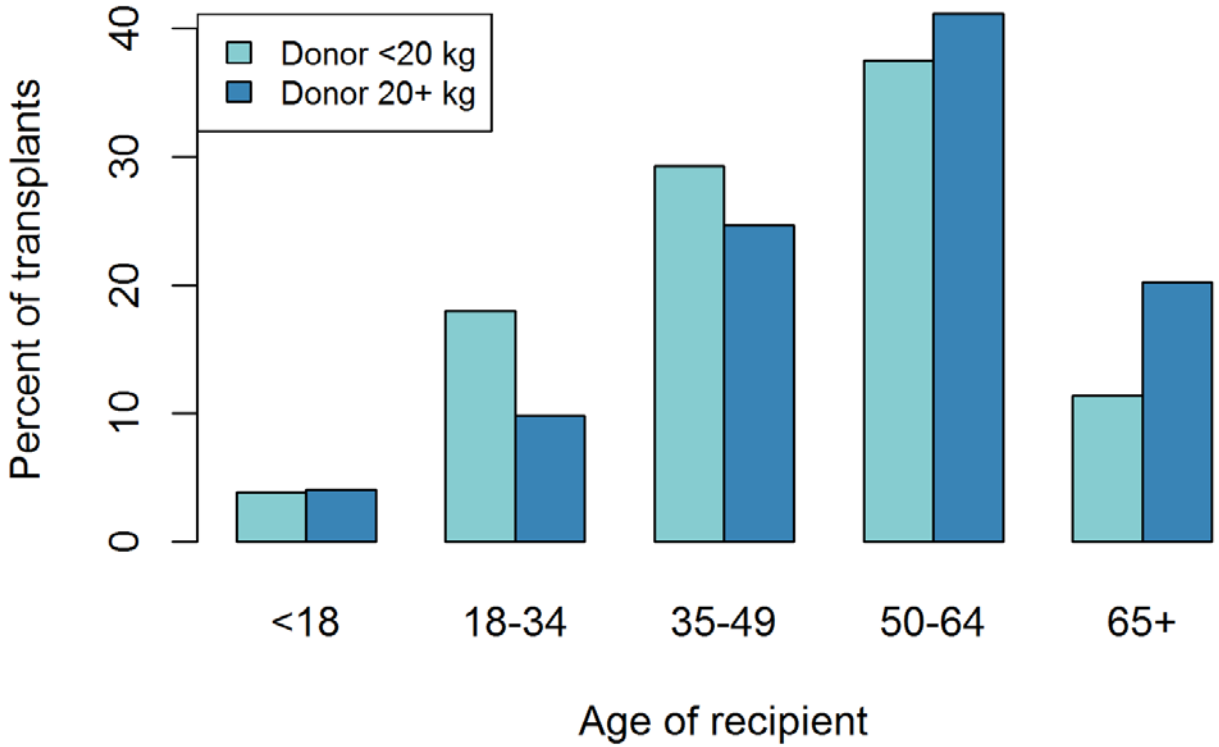
KDPI by donor weight

- Kidneys recovered for transplant, 2010-2016, weight ≤ 120 kg
- All small donors (≤ 20 kg) had KDPI > 35: 82% KDPI 35-85; 18% KDPI ≥ 86.

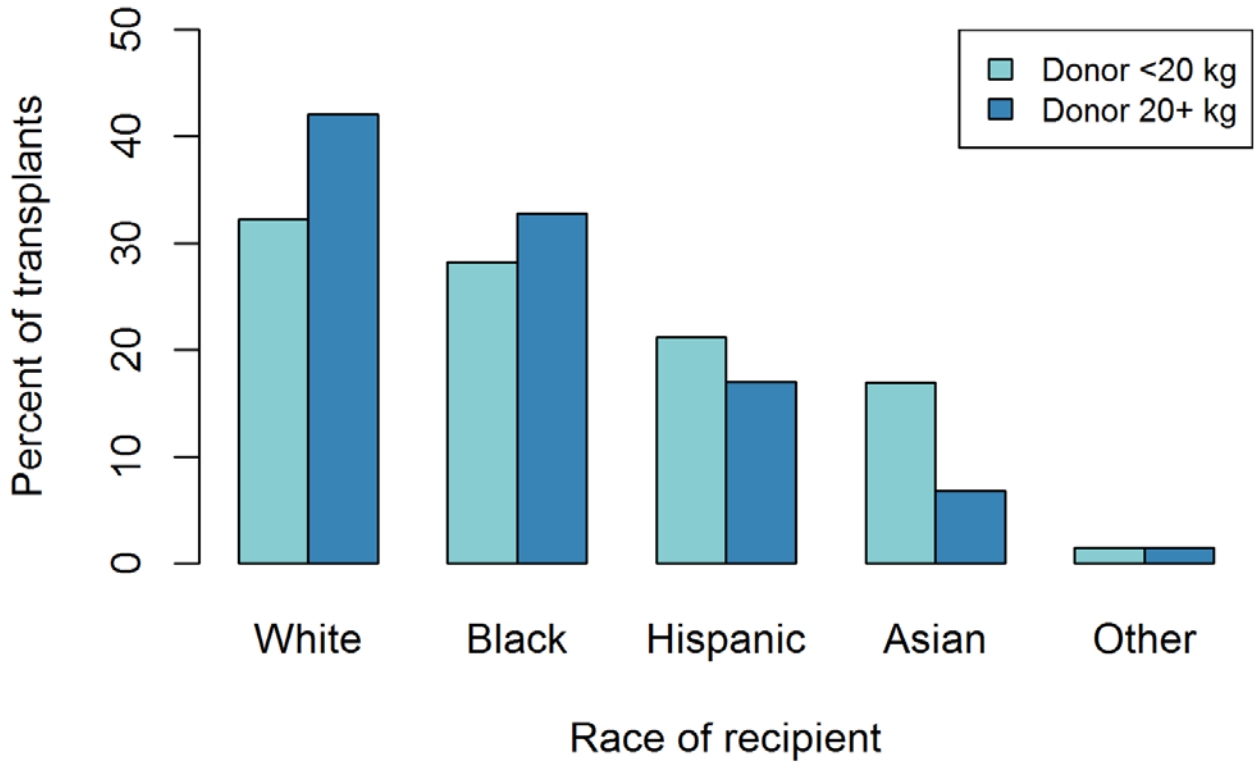


Recipient characteristics

- Who gets these kidneys?



Recipient characteristics



Recipient characteristics

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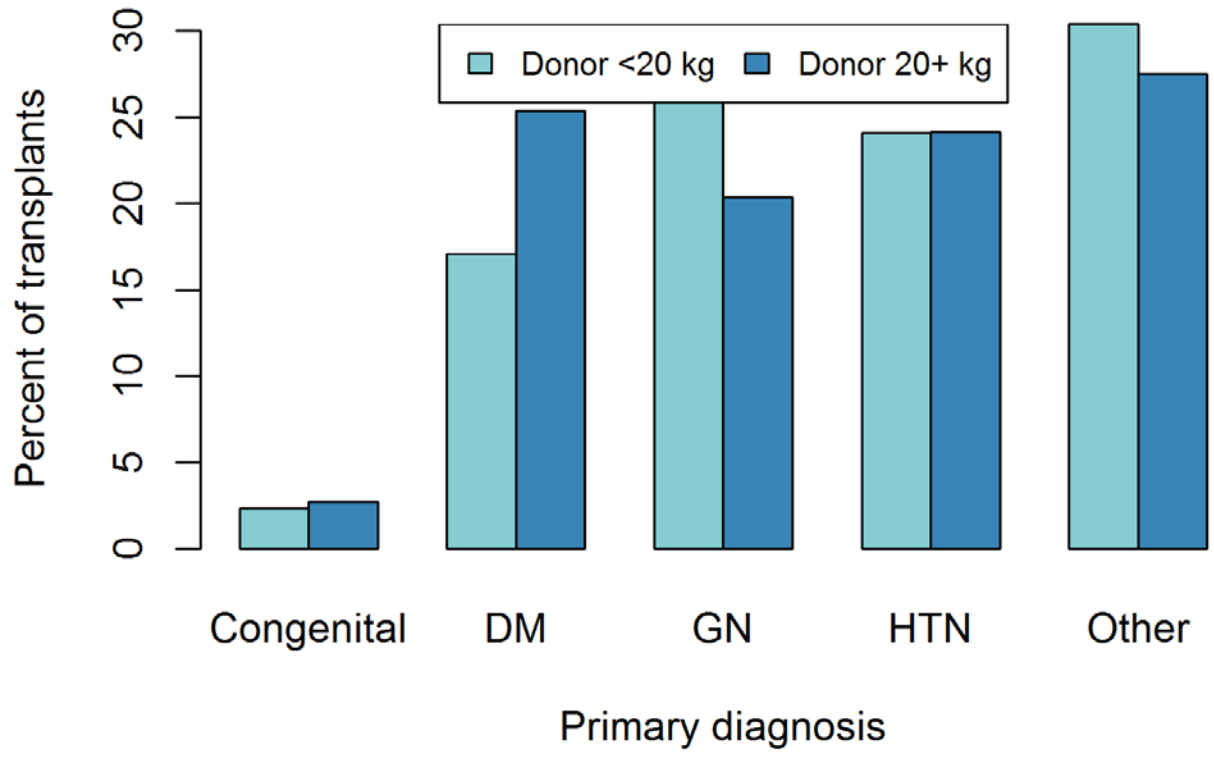
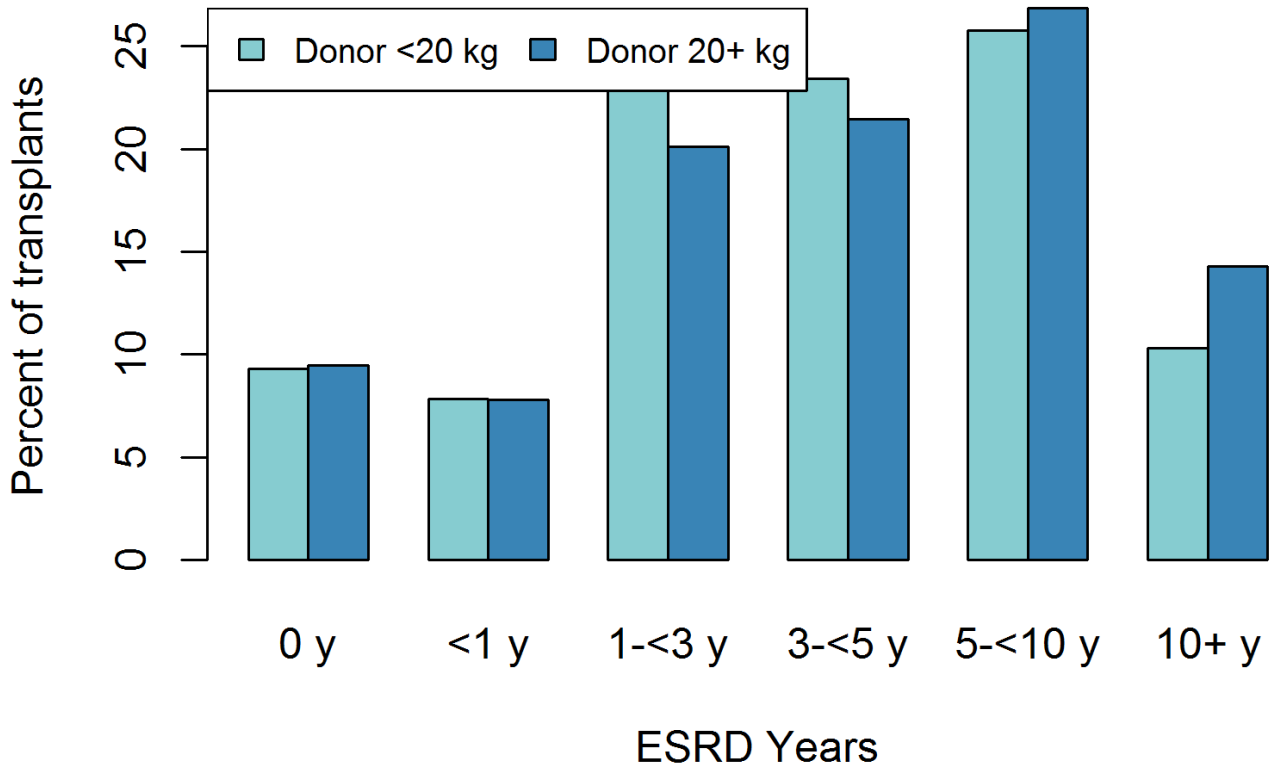
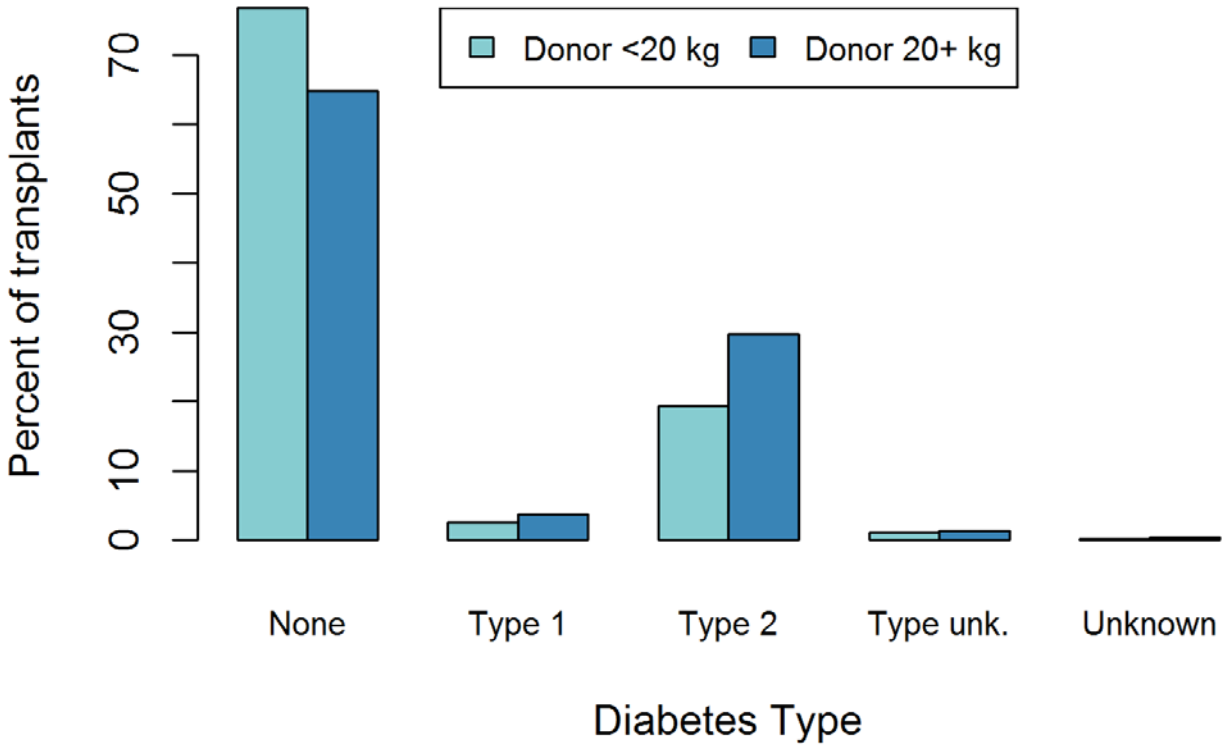


Recipient characteristics

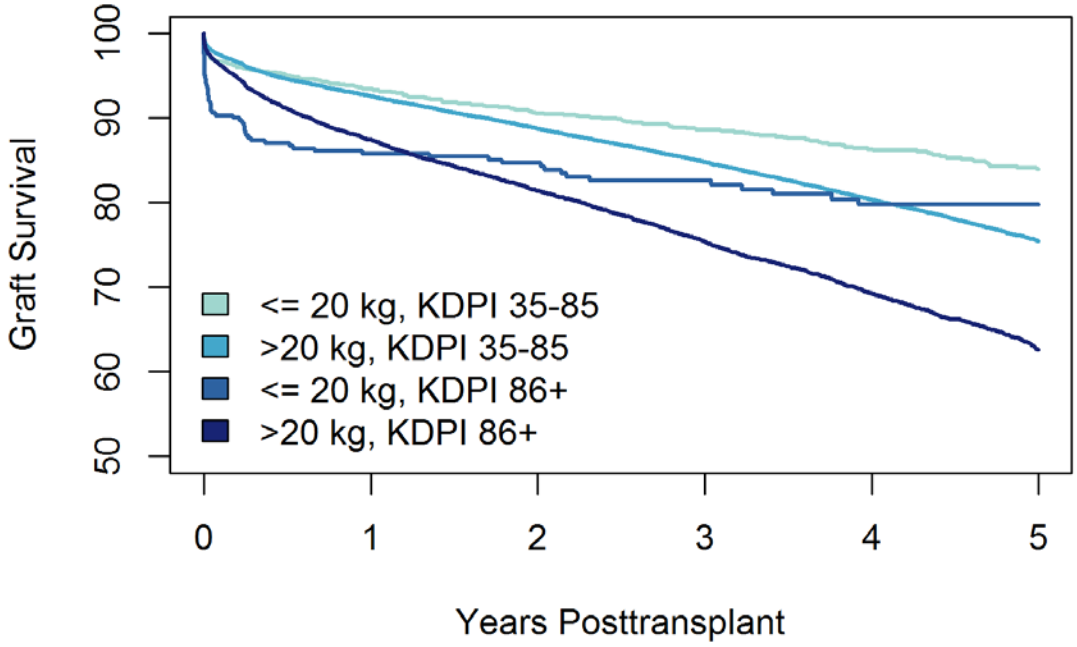


Recipient characteristics



Graft survival

- We compared the allograft survival of small versus large donor kidneys stratified by KDPI group, in donors with KDPI 35+.
- At 30 days posttransplant, graft survival was worse for small-donor recipients than for their larger-donor counterparts (within KDPI): 96.7% for small KDPI 35-85; 97.4% for large KDPI 35-85; 90.3% for small KDPI 86+; 96.5% for large KDPI 86+.
- For KDPI 35-85, small donors outperformed large by 30 days posttransplant. For KDPI 86+, small donors outperformed large by 15 months posttransplant.



KDRI in small donors

- To evaluate whether KDRI fully captures the risk associated with small donor kidneys, we fit a Cox Proportional Hazards model to all KDPI 35+ kidneys transplanted from 2010-2016.
    - Adjusted for recipient characteristics (age, race, sex, diagnosis, ESRD time, diabetes, ABO type, education level, BMI, insurance type)
    - Including a "small donor" factor, interacted with early failure (< 30 days)
    - KDRI as an offset (similar to adjusting for KDRI)
- After adjustment for KDRI, small donors had a significantly higher risk of early (< 30 days) failure, as well as a significantly reduced risk of late failure, versus large donors:
    - HR, 95% CI (small, early failure) = 3.2 (2.5, 4.2)
    - HR, 95% CI (small, late failure) = 0.59 (0.51, 0.68)
- These results support the assertion that KDRI does not measure the risk of kidney allograft failure well for small donors.

Conclusion

- Small donors likelier to have higher KDRI and KDPI, all else equal
- Small donor (≤20 kg) transplants in pediatrics down post-KAS, likely due to maximum acceptable KDPI screening criteria
- Evidence that KDRI may not accurately reflect the risk of small pediatric donor kidneys
    - Small donors outperform large donors when controlling for KDRI and recipient characteristics
- Further study is needed regarding how best to quantify the risk of these small donor kidneys.