Relationship Between Transport Time and Cold Ischemia Time in Liver Transplantation

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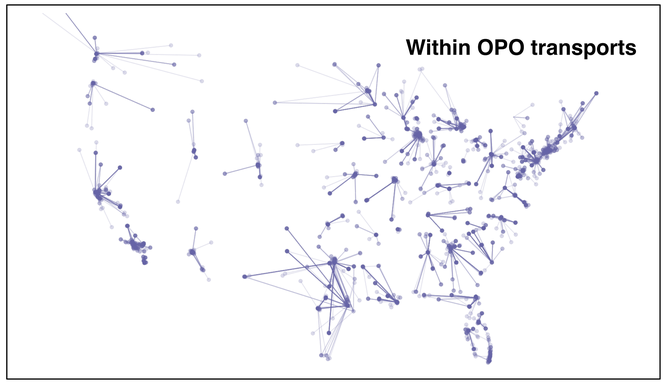
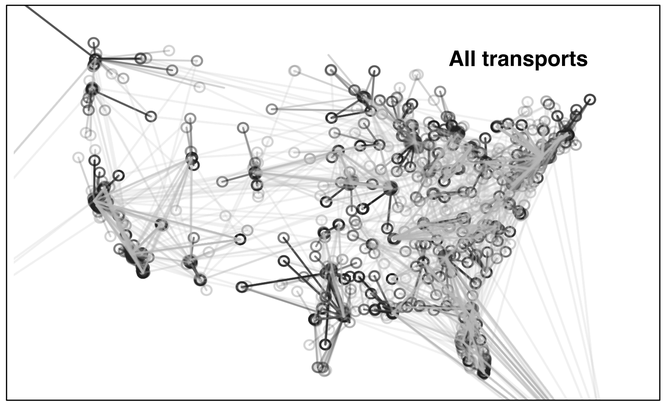
Background

Recent policy changes have broadened geographic sharing of deceased donor livers. With broader sharing, estimated transport time (TT) will increase, but it remains unclear if cold ischemia time (CIT) will also increase.

Figure 1: Liver Transports in 2010





Conclusion

- 20% of CIT is spent in transportation
- TT explains <15% of variation in CIT
- Median transport time is 1.3 hours longer in organs shared regionally versus locally
- CIT continues to be dominated by non-transport factors

Results

Figure 2: Median TT as a proportion of CIT

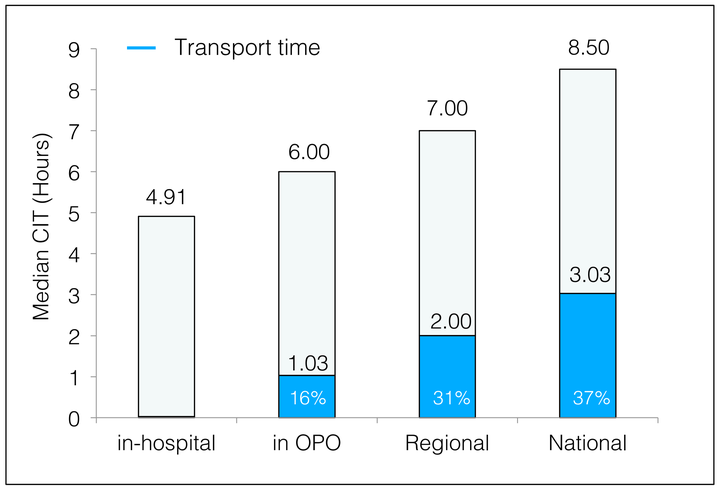


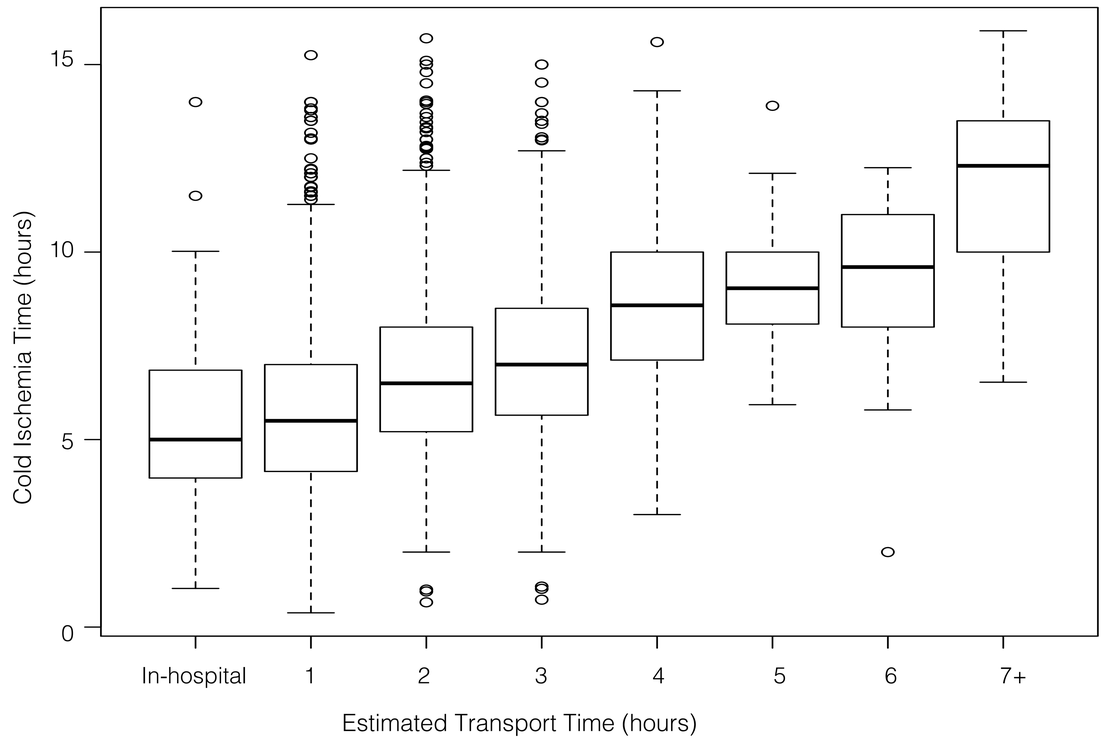
Table 1: Transport Mode by Disposition

	In-hospital	In OPO	Regionally shared	Nationally shared
No Transport	606	n/a	n/a	n/a
Drive	0	2379	128	2
Airplane	0	811	1085	269
Helicopter	0	18	1	0

Table 2: Linear Model of Cold Ischemia Time

	Additional hours of CIT	p-value
Intercept	$_{4.98}$5.15$_{5.32}$	p < 0.001
transport time	$_{0.65}$0.74$_{0.82}$	p < 0.001
recipient BMI	$_{0.006}$0.02$_{0.03}$	p = 0.003
procedure type		
Whole Liver	REF	
Partial Liver	$_{0.18}$0.86$_{1.54}$	p = 0.01
Split Liver	$_{0.10}$0.56$_{1.02}$	p = 0.02
pediatric transplant	$_{-0.78}$-0.48$_{-0.19}$	p=0.001
disposition		
in-hospital	REF	
local	$_{0.18}$0.39$_{0.59}$	p < 0.001
regional	$_{0.17}$0.45$_{0.73}$	p = 0.002
national	$_{0.66}$1.07$_{1.48}$	p < 0.001

Figure 3: Cold Ischemia Time versus Transport Time



- 1315 hospitals and 130 transplant centers performed 5299 adult and 314 pediatric LT.
- Median CIT was $_{5.0}$6.2$_{8.0}$ hours for all LT. CIT for pediatric recipients was 29 minutes shorter on average (p=0.001, R^2 = 0.15).
- Median estimated TT was $_{0.22}$0.70$_{1.70}$ hours for locally allocated organs and $_{1.79}$2.00$_{2.39}$ hours for regionally shared organs (p<0.001).

Methods

Estimated Transport Time
- Driving time from Google Maps for hospitals no more than 2 hours apart
- Helicopter if the distance < 150 miles
- Flight time + driving between the nearest airports (from the NPAIS database)

Modeling CIT and TT:
- linear model of CIT ~ TT, adjusting for BMI, procedure type (whole, split, partial), pediatric, and disposition (same-hospital, local, regional, national)

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