



Simulation of DSA-free lung allocation

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Introduction

- On November 24, 2017, the OPTN Executive Committee enacted an emergency policy change removing donation service area (DSA) as the first unit of allocation for adult deceased donor lungs.
- DSA was replaced by a circle of radius 250 nautical miles (NM) from the donor hospital.
- Since the new rules were based on limited data, the OPTN Thoracic Committee requested simulations of the new rules compared with former rules.
- SRTR used thoracic simulated allocation model (TSAM) software to predict waitlist outcomes using former DSA-first rules compared with 250NM and 500NM, respectively, as the first units of allocation.

Methods

- The study used SRTR data.
- The TSAM cohort included candidates and recipients and all donors, July 1, 2009-June 30, 2011.

Methods (cont'd)

- TSAM simulated match runs according to DSA-first lung policy and according to 250NM and 500NM rules.
- For each set of allocation rules, we performed 10 simulation runs, introducing variability into the system by altering the order of available donors.
- We computed predicted transplant and waitlist mortality (WLM) rates, overall and by primary diagnosis and lung allocation score (LAS).
- We show data as average, minimum and maximum rates observed across 10 simulation runs.

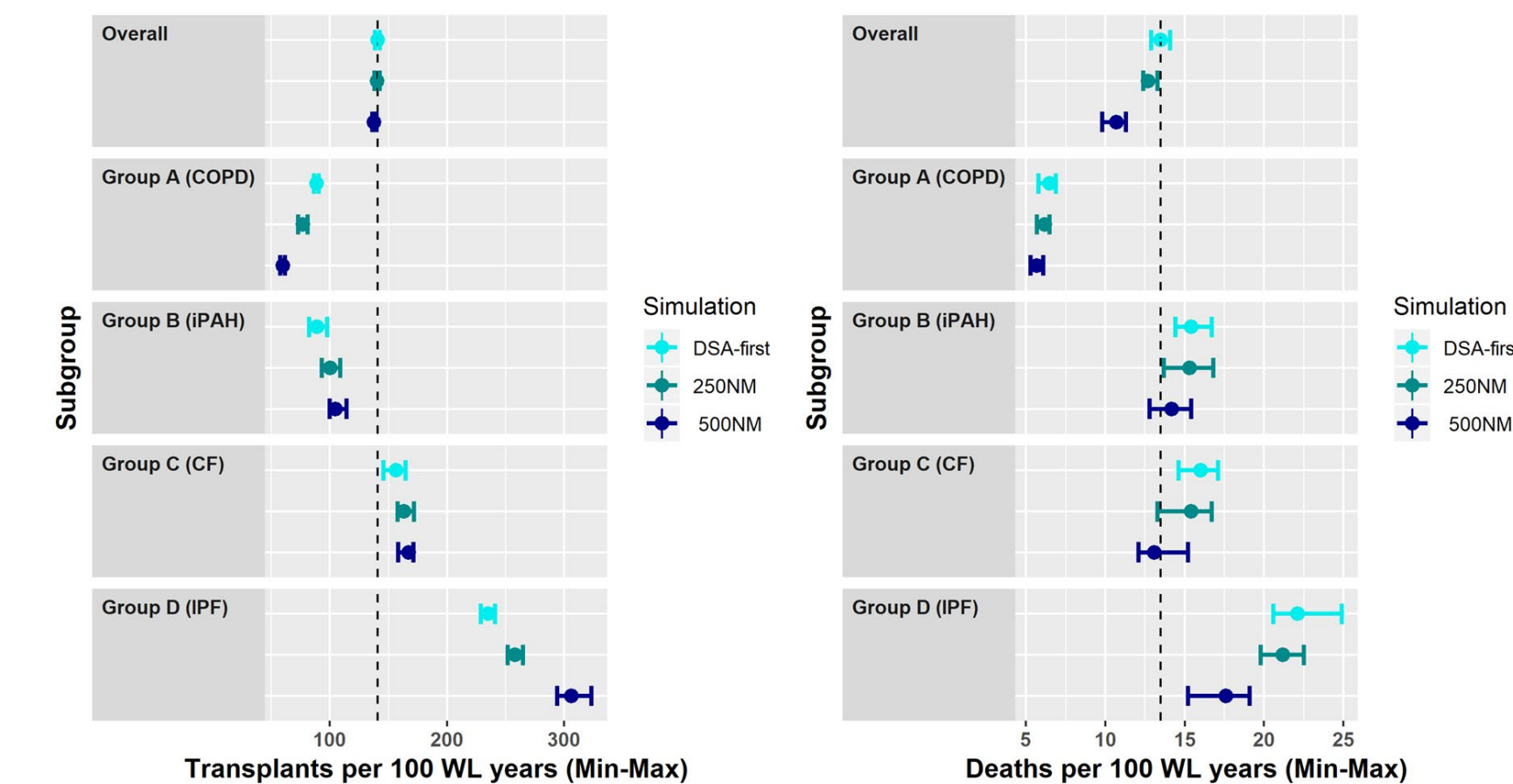
Results

- Overall transplant rates (Fig 1) and counts (Table 1) were similar in the DSA-first and 250NM simulations.
- Overall WLM rates and counts declined slightly from DSA-first to 250NM simulations, although the ranges of the simulations overlapped.
- Transplant counts and rates declined for diagnosis group A and increased for diagnosis group D at 250NM compared with DSA-first.

Results (cont'd)

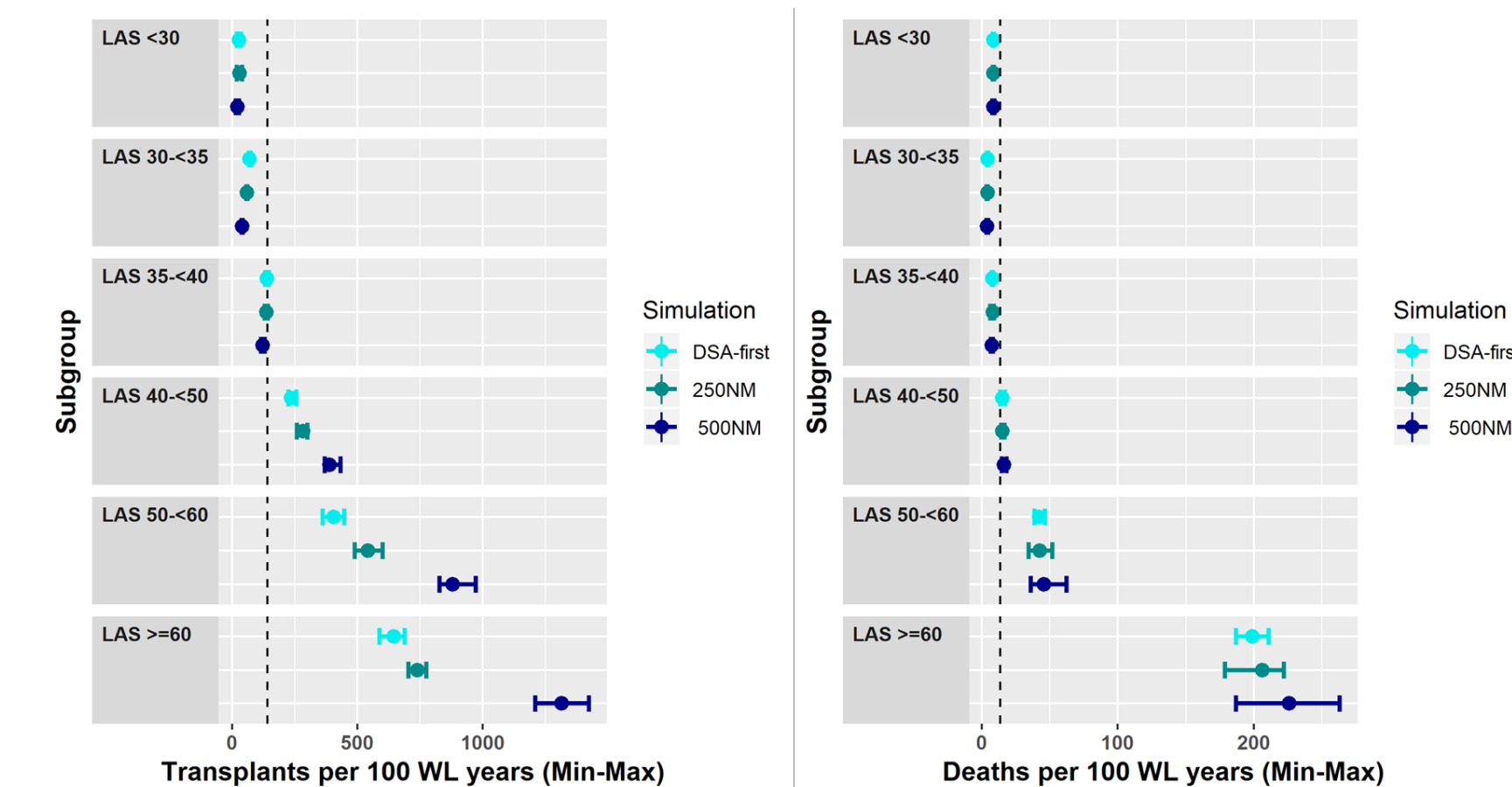
- WLM counts and rates by diagnosis group were similar in the DSA-first and 250NM simulations.
- Removing local DSA priority resulted in transplant rate declines (Fig 2) for candidates with LAS 30 <-35, and increases for those with LAS ≥40, compared with DSA-first allocation.
- The 500NM simulation resulted in more transplants (3504 vs. 3486), but similar overall transplant rates and lower WLM counts and rates compared with DSA-first.
- Transplant count and rate declines for diagnosis group A and further increases for diagnosis group D were clearer at 500NM compared with DSA-first.
- At 500NM, WLM counts and rates in diagnosis group D declined compared with DSA-first.
- At 500NM, transplant rates and counts increased considerably for candidates with LAS ≥40, while WLM rates remained similar.
- WLM counts for candidates with LAS ≥60 declined considerably at 500NM.
- Posttransplant outcomes (not shown) were similar in all simulations and subgroups.

Figure 1: TSAM transplant and WLM rates by primary diagnosis group



Diagnosis group A: obstructive lung disease, i.e., COPD; group B: pulmonary vascular disease, i.e., iPAH; group C: cystic fibrosis and immunodeficiency disorders; group D, restrictive lung disease, i.e., IPF. Vertical dashed line is the average overall rate in the DSA-first simulation.

Figure 2: TSAM transplant and WLM rates by LAS group



Vertical dashed line is the average overall rate in the DSA-first simulation, which does not appear in this figure.

Table 1: TSAM waitlist outcomes by primary diagnosis

Subgroup	Transplant counts			Waitlist mortality counts		
	DSA	250NM	500NM	DSA	250NM	500NM
All	3486	3497	3504	487	464	397
Group A (COPD)	1063	978	830	105	105	105
Group B (iPAH)	213	228	235	75	73	67
Group C (CF)	468	479	495	72	69	58
Group D (IPF)	1743	1812	1944	236	218	167
LAS <30	17	18	13	66	65	65
LAS 30-<35	896	791	593	62	63	65
LAS 35-<40	818	798	741	50	52	50
LAS 40-<50	829	914	1050	58	53	48
LAS 50-<60	329	371	420	38	32	24
LAS ≥60	530	539	619	201	185	130

Conclusions

- The 250NM waitlist and posttransplant outcomes were similar to those under the former DSA-first policy overall and for most subgroups, although transplant rates increased for diagnosis group D and LAS ≥40, and decreased for diagnosis group A.
- With broader sharing out to 500NM, predicted transplant counts increased and waitlist deaths decreased overall, and especially in groups with high WLM.