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Elimination of the Donor Service Area (DSA) from Lung Allocation; No Turning Back

Following the issuance of the Final Rule governing the Organ Procurement and Transplantation Network (OPTN) in 1998, the then Chair of the OPTN Thoracic Transplantation Committee (hereafter referred to as the Committee) cited and supported the American Society of Transplant Surgeons (ASTS) testimony before congress stating “giving priority to the sickest patients first over broad geographic areas would be wasteful and dangerous, resulting in fewer patients transplanted, increased death rates, increased re-transplantation due to poor organ function and increased overall cost of transplantation(1)”. Despite early opposition, the OPTN Final Rule went into effect in 2000 requiring that organs be distributed over as broad a geographic area as feasible in order of decreasing medical urgency. The Committee immediately focused on creating a lung allocation score (LAS) to prioritize waitlisted patients based on severity of illness and transplant benefit. LAS implementation in 2005 led to a reduction in waitlist mortality, change in transplant distribution diagnoses to recipients more likely to die on the waitlist, and improved post-transplant 1 year survival(2). In November 2017, the OPTN Executive Committee made an emergency policy change to align lung allocation with the geographic aspects of the OPTN Final Rule. This eliminated the donation service area (DSA) as the first unit of distribution, replacing it by a circle with a 250 nautical mile (NM) radius, centered on the donor hospital. The OPTN has been closely monitoring and reporting on these changes, intended to allow broader distribution to the most medically urgent candidates based on the LAS.

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In this issue of *AJT*, Puri and colleagues offer important interpretations of the OPTN 6- month monitoring report along with additional insights into the impact on costs and travel for their institutions (3). They conclude that while there was an expected fall in the use of local (within DSA) lungs (56% decline), increased total ischemic time (5.33 to 5.53 hours), and increase in the mean LAS at transplant (47.85 vs. 49.96); there was no decline in waitlist mortality, no change in the type of patients receiving a lung transplant, an increase in the number of lungs discarded, and a substantial increase in median local organ procurement cost (\$34,000 to \$70,203) when compared to data prior to policy change (3).

The data referenced by Puri et al. has been updated in a one-year post-policy monitoring report (https://optn.transplant.hrsa.gov/media/2815/20190116_thoracic_committee_report_lung.pdf)(4).

Under the new system the median distance lungs are travelling has increased from 114NM to 166NM with a mean ischemic time increase of approximately 13 minutes (5.32 to 5.55 hours). The data highlight a statistically significant increase in the mean LAS (47.25 vs. 49.61, $p < 0.0001$) for transplant recipients. While Puri et al. imply that this change might not be clinically meaningful, an acute change in the LAS of patients with an LAS > 40 is associated with a significantly greater risk of waitlist death and an increase in relative transplant survival benefit is conferred by a higher LAS at time of transplantation(5, 6). Under the new policy, there have been 59 more transplants for candidates with an LAS 70+, 77 with LAS 60-70, and 55 with LAS 50-60 compared to the same time period pre-policy. The OPTN report shows a statistically significant decrease in the waiting listing mortality rate for 60-70 LAS candidates (Relative Risk=0.37, 95% CI:0.16, 0.85). Therefore, one-year monitoring data shows that under the new policy, lungs are travelling further with a subsequent increase in high LAS transplants and a decrease in waitlist mortality for some high LAS groups.

When examining lung utilization, the utilization rate (percentage of donors with at least one lung transplanted) may be a more appropriate metric than discard rate (percentage of lungs discarded out of those recovered for transplant) since lungs are rarely recovered and not transplanted. Since the national utilization rate did not change (22.59% vs 22.49%), the Committee discussed the geographic variation in utilization rate which was identified prior to the alteration in allocation. The most recent monitoring report shows that the utilization rate by OPTN region ranges between 14-28%.

With lungs often traveling farther, the total cost for organ allocation inevitably will increase primarily due to transportation fees. The authors suggest a potential doubling of the median cost of organ procurement (\$34,000 to \$70,203). Such increases have been cited in models of broader geographic

sharing for other organs, but may be offset by reduced costs for pre-transplant care, transplant episode and/or post-transplant care(7, 8).

Potential solutions to the current policy suggested by the authors include the use of regional procurement teams, offering broader sharing only to sicker individuals based on LAS (LAS \geq 50) and/or to patients based on multidimensional parameters that are traditional barriers to transplantation (e.g. short stature, allosensitization).

The Committee adopted the November 2017 change with the understanding that an optimized lung allocation model would be the next Committee project. In 2018, the OPTN formed an Ad Hoc Geography Committee to define guiding principles for the use of geographic constraints in allocation. For eventual application in all organ allocation policies, the Geography Committee suggested a continuous distribution framework, which, the OPTN Board approved in December 2018. In February 2019, the Thoracic Committee began the task of refining the current system to align with such a framework (9). Some of the suggestions made by Puri and colleagues to optimize lung allocation can be incorporated into this model.

The intent of the OPTN Final Rule was to ensure equity of U.S. organ allocation and thankfully, earlier concerns (1) did not portend the future. Having successfully tackled the provision requiring the allocation of lungs in order of decreasing medical urgency; we as a community, are now obligated to remove the impediment of geographic boundaries that were not established for the purpose of effective or equitable organ distribution.

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Disclosure

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