waitlist mortalities they observed after conversion to the new system all occurred in patients with very high LAS scores, the very patients the new system was designed to help.

The results of the authors' findings are difficult to generalize among other transplant centers. The authors argue that they are disadvantaged by the relatively small size of their transplant program, its rural location, and service of the socioeconomically disadvantaged. They also cite the challenges of competing with other larger transplant centers within a 250-mile radius.

However, it seems that every transplant center, not just their own, struggles to deal with its own unique set of challenges presented by the new system. This observational study cannot control for the multitude of variables related to organ distribution and transplantation. These include program reputation, quality of local organ procurement agencies, cultural donation patterns, patient referral patterns, competing transplant programs, and local population size to name just a few.

The 1-year report published by the Organ Procurement and Transplantation Network Thoracic Transplantation Committee looked at the early national results after removal of DSA as a unit of a lung allocation.² Although there were some statistically significant differences between pre- and post-era metrics, the jury is still out on the overall impact of the change. More data, including 1-year post-transplant survival, will need to be analyzed. What is certain is that changes in national donation policy clearly impact each of our transplant programs individually and differently.

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Commentary: The cost of drawing the line: Lung transplant programs in the post-donor service area era

Ramiro Fernandez, MD, Jesse Rappaport, MD, and Usman Ahmad, MD

Almost 3 years have passed since the emergency change in lung allocation policy in November 2017 that replaced the donor service area (DSA) with a 250 nautical mile radius as the first unit of lung allocation. The Organ Procurement and Transplantation Network Thoracic Transplantation

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Broader sharing has increased travel distance and cost. National waitlist mortality has remained stable in the early period. Innovative strategies are needed to overcome the shortcomings of this model.

Committee has monitored outcomes very closely, most recently reporting on 2-year outcomes since the change.¹ Meanwhile, individual transplant centers have begun reporting their experiences. While the overarching goal is

From the Department of Cardiothoracic Surgery, Heart and Vascular Institute, Cleveland Clinic, Cleveland, Ohio.

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Address for reprints: Usman Ahmad, MD, Department of Cardiothoracic Surgery, Heart and Vascular Institute, Cleveland Clinic, Cleveland, OH 44195 (E-mail: ahmadu@ccf.org).

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improvement in patient outcomes, the effects may not be identical across all programs in the United States. While we wait for longer term outcomes to mature, early effects can be seen in changes in cost of doing a transplant and potentially waitlist mortality.

Haywood and colleagues² have shared the University of Virginia experience, presenting it as a low- to medium-volume transplant center. Not unexpectedly, they found a significant decrease in local donors (6% vs 68%) and corresponding increase in procurement travel distance (145 vs 235 miles). This was associated with a significant increase in procurement costs per transplant (\$60,852 vs \$69,052). The findings of decreased local donors and escalating costs under the new allocation policy are consistent with the report by Puri and colleagues³ describing the Washington University in St Louis experience. Remarkably, the Washington University in St Louis group reported a doubling of cost per procurement (\$34,000 to \$70,203) associated with a rise in distant procurements. This phenomenon is reflected nationally as well, with decreased local donors reflected in longer travel distances.¹

Despite increased travel distance and greater recipient lung allocation scores, the University of Virginia group found no differences in short-term mortality or primary graft dysfunction incidence. Interestingly, the authors reported an increase in waitlist mortality (31.6 vs 6.9 per 100 patient-years) that has not been reported previously.^{1,3} Closer examination of the data reveals one waitlist death under the former allocation policy compared with 5 deaths under the new policy. Two of the 5 deaths under the new policy were in delisted patients, making their inclusion in the final sum debatable. Furthermore, when comparing small absolute figures, minor differences can have a large relative effect. It is important to note that the national data at the 2-year time point after the elimination of the DSA showed no difference in waitlist mortality.¹ Broader sharing through the new allocation policy was intended to help the sickest patients and decrease waitlist mortality. While some high lung allocation score groups trended toward decreased waitlist mortality in the 2-year Organ Procurement and Transplantation Network report,¹ whether and when the new policy lowers waitlist mortality overall remains to be seen.

Broader geographic distribution of organs as part of the Final Rule is here to stay.⁴ For programs to remain aggressive about donor evaluation and organ procurement over longer distances, centers need greater financial flexibility. A dry run over a longer distance is going to cost more and increase the financial strain on the system. This may eventually decrease a center's propensity to evaluate marginal donors and thus defeat the main purpose of abrogation of the DSA. Therefore, cost-containment measures such as resource sharing may be necessary for transplant programs. Puri and colleagues³ suggested the use of local procurement teams to mitigate travel costs. This strategy might have been

difficult to implement during normal times. The coronavirus disease 2019 pandemic, with its limitations on interstate travel, has put it effectively in action. In combination with wider use of ex vivo perfusion (EVLP) to allow evaluation of organs, programs could potentially save the cost of a dry run. Another key factor in increasing adoption of this paradigm is the mutual understanding between the transplant program and the Organ Procurement Organization to waive part or all of the cost if the organ does not end up being transplanted. Programs that do not have in-house EVLP facilities should strongly consider joining the national clinical trials.

Geographic inequity in lung allocation has existed since lung transplantation became an established therapy for end-stage lung disease.^{5,6} In addition to broader sharing of a scarce resource, increasing the supply can also effectively mitigate some of the competing risk. Expanding the use of donation after circulatory death lungs and EVLP to rehabilitate marginal lungs are well-established ways to increase the donor pool.^{7,8} The International Society of Heart and Lung Transplant 5-year report on donation after circulatory death lung transplants found similar 30-day, 1-year, and 5-year survival compared with brain dead donors, supporting the effectiveness of this underused donor pool.⁹ Similarly, the use of EVLP on high risk lungs that otherwise would have been discarded has shown favorable outcomes, with similar survival and rejection rates compared to standard criteria lungs over the long term.^{8,10}

As we move forward in this new era of lung allocation, it is imperative we continually seek ways to improve outcomes in the current environment since any change to lung allocation policy takes time. Increasing the donor pool and developing cost containment measures are actionable steps to continually expand lung transplantation while keeping it financially sustainable in the post-DSA era.

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