In summary, Gerull and colleagues⁵ offer compelling evidence to motivate ongoing scrutiny of lung allocation policy to optimize transplant efficiency, without sacrificing post-transplant outcomes. Although distant LTx may be the current reality, ultimately, new lungs may be right around the corner.

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See Article page 1284.

Commentary: Long-distance relationships work well in lung transplantation

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A considerable number of long-distance donor organs are still rejected based on a fear that post-transplant outcomes might be impaired by the prolonged cold ischemic time (CIT). In this issue of the *Journal*, Gerull and colleagues¹ analyzed a cohort of patients transplanted at the Washington University and compared recipients of local donors with recipients receiving a distant donor organ. Early- and long-term outcomes of both groups were identical, despite the fact that recipients with distant donors had a greater lung allocation score and were more likely to be intubated or

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CENTRAL MESSAGE

Long-distance organ sharing should not be hindered by a fear of prolonged cold ischemic times.

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on extracorporeal life support before the transplant. Of note, 63% of the distant organs had an ischemic time of >300 minutes as compared with only 12% in the local donor group.

These findings are in line with other publications, which question the importance of CIT for early organ function. Traditionally, 6 hours is considered the acceptable CIT threshold for a donor lung.² However, Hayes and colleagues³ found, in a diligent analysis of United Network for Organ Sharing data, that this threshold is not relevant for high-volume centers, where a CIT of up to 10 hours

does not lead to worse post-transplant outcomes. The reason for this lies in the expertise that comes with a high case load as well as improvements in handling the graft during transplantation and in the early postoperative period.⁴⁻⁶

Recent developments in organ preservation might further extend acceptable preservation times. There is convincing preclinical data showing that static cold storage on ice ($\sim 4^{\circ}\text{C}$) is not optimal and a temperature of 10°C results in less parenchymal damage.^{7,8} Storing donor lungs at 10°C would, however, require portable refrigerators, which are not yet available for clinical use. In contrast, portable ex vivo lung perfusion machines facilitate normothermic organ preservation in near physiological conditions. Their capacity to prolong preservation times has been recently published.⁹

As transplant centers become more confident in accepting lungs with CIT >6 hours, long-distance organ sharing will increase. A good example is the successful transborder exchange strategy of Eurotransplant, which allows organ sharing between Austria, Belgium, Croatia, Germany, Hungary, Luxembourg, The Netherlands, and Slovenia. In 2019, as much as 24% of all donor lungs within Eurotransplant have been allocated transborder, mostly to high-lung allocation score recipients.¹⁰

Let us assume that by the aforementioned developments, preservation times of >24 hours can be achieved in the near future. This would not only boost long-distance organ sharing but also allow to expand matching parameters. Presensitized patients could be matched according to their unacceptable antigens instead of treating them with complicated desensitization protocols, cytomegalovirus or Epstein–Barr virus status could be

considered or even human leukocyte antigen matching could be discussed.

In conclusion, Gerull and colleagues provide a strong argument that the distance between donor and recipient hospitals should not drive the allocation process. Instead, it should only concentrate on medical factors, with the aim of maximizing post-transplant outcomes.

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