

## Frequently Asked Questions: Continuous Distribution of Lungs

### Calculation of the Lung Composite Allocation Score

- Is there any direct comparison of a lung allocation score (LAS) to a lung composite allocation score (CAS)?
  - No. Because of differences in how the scores are calculated, it is not possible to directly compare LAS to CAS.
- How is the lung CAS different from the former LAS?
  - LAS is a score from 0-100 comprised of two components:
    - (1) estimated 1-year waiting list survival
    - (2) estimated 1-year post-transplant survival.
  - The lung CAS is a score from 0-100 comprised of five components:
    - (1) estimated 1-year waiting list survival
    - (2) estimated 5-year post-transplant survival
    - (3) candidate biology (blood type, height, and sensitization)
    - (4) patient access (pediatric or prior living donor status)
    - (5) placement efficiency (travel and proximity efficiency)
  - Under LAS a candidate could receive a score of up to 100 based on their estimated waiting list survival and post-transplant survival. By contrast, in the lung CAS, a candidate can only receive a maximum of 50 points for their waiting list survival and post-transplant survival. The points allotted for each part of the score are shown below:

Waiting list Survival	25
Post-Transplant Survival	25
Candidate Biology	15
Blood Type	5
CPRA	5
Height	5
Patient Access	25
Pediatric	20
Prior Living Donor	5
Placement Efficiency	10
Travel Efficiency	5
Proximity Efficiency	5

- Additionally, with the implementation of continuous distribution, there are some changes to how points are assigned for waitlist survival and post-transplant survival compared to LAS.
  - First, with LAS, twice as much weight was placed on the waiting list survival score compared to the post-transplant survival score (a 2:1 ratio). With the lung

CAS, the waiting list survival score and post-transplant survival score each carry equal weight (a 1:1 ratio – up to 25 points can be assigned for each of them).

- Second, the waiting list survival component of the lung CAS uses a curved rating scale instead of the linear relationship used in LAS. Under the LAS, each day of survival carries the same weight in the calculation. In the lung CAS, candidates are assigned more points as their expected days of waiting list survival decrease. Doing so provides additional priority in allocation as their need for transplant becomes more urgent.
  - Finally, the post-transplant survival score in LAS is based on one-year expected post-transplant survival and the post-transplant survival score in the lung CAS is based on five-year post-transplant survival. For more information on the impact of extending the model to account for five-year post-transplant survival, please refer to this [SRTR report](#).
- How is the lung CAS calculated for patients?
    - OPTN *Policy 10: Lung Allocation* and *Policy 21: Composite Allocation Score Reference* list the factors and formulas for calculating the lung CAS.
  - How are pediatric priority 1 and 2 used in the lung CAS?
    - Lung candidates younger than 12 years old are still assigned to either priority 1 or priority 2 based on clinical criteria indicating their medical urgency. Candidates assigned to pediatric priority 1 receive 1.9073 waitlist survival points. Candidates assigned to pediatric priority 2 receive 0.4406 waitlist survival points based on their waitlist survival probability.
    - All lung candidates younger than 12 years old (both priority 1 and priority 2) are assigned 18.6336 post-transplant outcomes points based on their post-transplant survival probability.
    - Separately, all candidates registered before the age of 18, including those younger than age 12, receive an additional 20 points under the patient access goal for pediatric status.
  - How is candidate sensitization used in lung allocation?
    - Candidate sensitization will be included into lung allocation with continuous distribution to reduce the disadvantage that comes with being sensitized to various donor antigens. Transplant programs may enter unacceptable antigens for their candidates and the system will calculate the patient's Calculated Panel Reactive Antibodies (CPRA) based on the entered unacceptable antigens. Candidates with higher CPRA will receive more points for the sensitization component of the lung CAS. Points are assigned based on a steep nonlinear curve, as depicted in the [sensitivity analysis interactive dashboard tool](#) under the "Rating Scales" tab, so that a candidate with a CPRA of 99% would receive far more points than a candidate with a CPRA of 80%. Additional information can be found in *Unacceptable Antigens & CPRA in Lung Continuous Distribution*, an educational module on the OPTN learning management system.
  - How does prior living donor status factor into lung allocation?

- Candidates who are prior living organ donors will receive 5 additional points in their lung CAS. A lung candidate will be classified as a prior living donor if the candidate donated for transplantation, within the United States or its territories, at least one organ.
- How are points assigned to candidates for placement efficiency?
  - Up to 10 points are assigned to each candidate in the lung CAS for placement efficiency based on the distance between the donor hospital and the transplant hospital where the candidate is listed. Of these 10 points, up to 5 points are assigned for travel efficiency and up to 5 points are assigned for proximity efficiency. Travel efficiency measures the efficiency of traveling shorter distances and the associated reduction in travel costs. Proximity efficiency accounts for other gains in efficiency when transporting lungs shorter distances, including shorter time in transit for transplant teams, reduced effort to coordinate shorter travel, and reduced changes of logistical issues.
- Can you provide examples of how changing candidate conditions will impact their lung CAS?
  - Examples are available in *Basic Principles of Lung CD*, an educational module on the OPTN learning management system.

### Updating Clinical Values

- How frequently do various clinical values need to be updated for lung candidates?
  - There are three categories of clinical values that must be updated at different frequencies:
    - Values updated every 6 months for all lung candidates
    - Values updated every 28 days, only for candidates on continuous mechanical ventilation or extracorporeal membrane oxygenation (ECMO), and for candidates who require supplemental oxygen provided via a high flow oxygen device
    - Values that must be updated when performed for all lung candidates
  - The clinical values that fall into each of these categories are outlined in *Policy 10: Lung Allocation*

### Pediatric Candidates

- What happens to a candidate's lung CAS when they turn 12 years old?
  - Once a candidate turns 12, they will receive calculated waiting list survival and post-transplant survival scores in their lung CAS, based on clinical values entered in OPTN Waiting List, instead of the points assigned for pediatric candidates younger than 12 years old at priority 1 and priority 2. They will still receive an additional 20 points under the patient access goal for pediatric status.
- What happens to my candidate's lung CAS when they turn 18 years old?
  - Candidates registered on the lung waiting list prior to age 18 will continue to receive the 20 points for pediatric status after they turn 18.

### Tiebreakers

- What happens if two candidates have the exact same lung CAS? How is one of these candidates chosen to come before the other candidate on the match run?
  - If two or more candidates have the same lung CAS, they will be ranked by order of their registration date (oldest to newest). In other words, the candidates will be ranked in order by how long they have been waiting for a lung transplant, so that candidates that have been waiting longer will be prioritized.

### **Exception Requests**

- What exceptions can be requested for lung candidates?
  - If a candidate's current lung CAS does not appropriately prioritize the candidate for transplant, the candidate's transplant program may submit an exception request to the Lung Review Board. Exceptions may be requested for any goals that are determined before the match run: waiting list survival, post-transplant outcomes, candidate biology, and patient access.
  - Exceptions will not be available for placement efficiency, since those points are calculated at the time the match run is executed, based on the location of the donor.
- Do exceptions expire?
  - No. Approved exceptions are valid until the candidate is transplanted, is removed from the lung waiting list, or withdraws the exception. If a candidate's condition changes so that the exception is no longer warranted, then the transplant program should withdraw the candidate's exception.

### **Multiple Listings**

- Is multiple listing possible under continuous distribution of lungs?
  - Yes. Lung candidates may still be registered at multiple transplant programs.

### **Multi-Organ Allocation**

- How has lung multi-organ allocation changed?
  - Policies for heart-lung, lung-liver, and lung-kidney allocation were updated to maintain similar access to transplant for these candidates in the continuous distribution system relative to the former system. To accomplish this, the requirements for when the OPO must offer the other organ along with a lung were updated to replace the former requirements based on classifications and LAS with a lung CAS threshold. If a heart-lung, lung-liver, or lung-kidney candidate has a lung CAS that is equal to or greater than the threshold for multi-organ transplantation including the lung, the OPO must offer both organs to that candidate.