



allocation policies

Kidney allocation

Organ Procurement and Transplantation Network (OPTN) kidney allocation policy attempts to balance justice and medical utility by focusing on antigen matching/mismatching, blood type, sensitization, and waiting time. With exceptions for the best-matched organs, kidneys are offered initially to patients on the local list, then regionally, and then nationally. The rank order of patients on the local, regional, or national lists is determined primarily by assigning points based on the candidate's waiting time, degree of sensitization, and degree of biological match with the donor. Waiting time for kidney allocation is defined as the duration of time that the candidate has been listed on the kidney transplant waiting list while meeting certain medical criteria.

Candidates who have received blood transfusions, been pregnant, or undergone a previous organ transplant may be sensitized to the antigens of others (i.e., these candidates are less likely to have an acceptable biological match with some or most of the donated kidneys). For this reason, sensitized candidates receive additional priority for the kidneys with which they match. Since the degree of biological match between the donor and the recipient is important to survival (i.e., better matching tends to equate to longer graft and patient survival), points are also awarded for matching at certain biological markers.

Donated kidneys are classified as being from a standard criteria donor (SCD) or an expanded criteria donor (ECD) based on the donor's age and previous medical history (Table 1). Kidneys from ECD donors are allocated only to candidates who have previously agreed to accept these organs, and the ECD allocation system is designed to expedite placement.

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 liver allocation 139
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I am constantly reminded of how blessed I am, how fragile life is and how the generosity and compassion of others is so precious and necessary in this world.

Jasmine, mother of liver recipient

Additionally, kidneys from donors aged younger than 35 years are allocated preferentially to pediatric candidates (after perfectly matched candidates) in recognition of the unique problems associated with dialysis and of the disruption to expected growth and development processes in children who experience renal failure.

The description below provides a detailed, yet incomplete, description of how the deceased donor kidney allocation system works. The allocation system is more complex than depicted and is also subject to change. For more details and the most recent allocation policy, see the OPTN allocation policy, available on the internet: http://optn.transplant.hrsa.gov/PoliciesandBylaws2/policies/pdfs/policy_7.pdf.

A SHORT SYNOPSIS OF OPTN KIDNEY ALLOCATION POLICY

**Table 1. Expanded Criteria Donor (ECD)
and Standard Criteria Donor (SCD)**

A kidney is an ECD kidney if the deceased donor is

- Aged ≥ 60 years, or
- Aged 50–59 years with at least two of:
 - 1) Cerebrovascular accident (CVA) as cause of death,
 - 2) History of hypertension at any time,
 - 3) Serum creatinine > 1.5 mg/dL.

All other kidneys are SCD kidneys.

ABO blood type O kidneys must be transplanted into blood type O recipients, and ABO blood type B kidneys must be transplanted into type B recipients except for zero antigen mismatches.

For a pediatric candidate or a non-local adult candidate with calculated panel reactive antibodies (CPRA) $> 20\%$ and a zero antigen mismatch

(except kidneys procured for simultaneous non-renal organ transplant or DCD kidneys), the kidney goes first to identical blood type zero antigen mismatched candidates in descending point sequence in the case of SCD kidneys, and by waiting time in the case of ECD kidneys, in Usual Allocation Sequence (Table 2):

Table 2. Usual Allocation Sequence

Zero-antigen mismatches

- 1) local candidates;
- 2) $\geq 80\%$ CPRA candidates on the list of organ procurement organizations (OPOs) that are owed a payback kidney;
- 3) $\geq 80\%$ CPRA candidates on the regional waiting list;
- 4) $\geq 80\%$ CPRA candidates on the national waiting list;
- 5) $< 80\%$ CPRA candidates aged < 18 years on the list of OPOs that are owed a payback kidney;
- 6) $< 80\%$ CPRA candidates aged < 18 years on the regional waiting list;
- 7) $< 80\%$ CPRA candidates aged < 18 years on the national waiting list;
- 8) 21%–79% CPRA candidates on the list of OPOs that are owed a payback kidney;
- 9) 21%–79% CPRA candidates on the regional waiting list;
- 10) 21%–79% CPRA candidates on the national waiting list.

Then

(1) For blood type O donor kidneys, to blood type B zero antigen mismatched candidates, first, by Rank Order Point System (Table 3) in the case of SCD kidneys, and by waiting time in the case of ECD kidneys, as in the Usual Allocation Sequence

(Table 2), and, then, to blood type A and AB zero antigen mismatched candidates, also by Rank Order Point System (Table 3) in the case of SCD kidneys, and by waiting time in the case of ECD kidneys, as in the Usual Allocation Sequence (Table 2), and

(2) For blood type A, B, and AB donor kidneys, to all pediatric and sensitized adult candidates (CPRA > 20%) who are blood type compatible zero antigen mismatched candidates by Rank Order Point System (Table 3) in the case of SCD kidneys, and by waiting time in the case of ECD kidneys, as in the Usual Allocation Sequence (Table 2).

After being offered to candidates who have a zero antigen mismatch with the donor, the kidney is offered first to local prior living organ donors, then to local pediatric candidates. The kidney is then offered to candidates at OPOS that are owed a payback debt before being offered to local adult candidates. The kidney is then offered to regional pediatric candidates, regional adult candidates, national pediatric candidates, and national adult candidates.

Kidneys from ECD donors must be offered to candidates who have agreed to receive ECD organs in accordance with the Geographic Sequence (Table 4) of deceased kidney allocation and pursuant to the Rank Order Point System (Table 3).

Table 3. Rank Order Point System

Candidates with ABO blood type compatible with that of the donor are assigned points as follows:

- 1 point for waiting the longest period, with fractions of points assigned proportionately to all other candidates, according to their relative time of waiting.
 - 2 points if there are no DR mismatches, or
 - 1 point if there is 1 DR mismatch.
 - 4 points for a CPRA \geq 80%.
 - 1 point if aged <11 and donor <35 and not a o mismatch kidney.
 - 4 points if aged < 11 years for zero antigen mismatch kidneys.
 - 3 points if aged \geq 11 years but < 18 years for zero antigen mismatch kidneys.
 - 4 points for prior donation for transplant within the US.
-

Kidneys from donors aged < 35 years that are not shared for o human leukocyte antigen (HLA) mismatches are offered first for transplant candidates aged < 18 years, except for candidates assigned 4 points for PRA \geq 80%.

Table 4. Geographic Sequence of Deceased Kidney Allocation

In general, kidneys are to be allocated locally first, then regionally, and then nationally.

Locally: With the exception of kidneys that are 1) shared as a result of a zero antigen mismatch, 2) offered as payback, or 3) allocated according to a voluntary organ sharing arrangement, kidneys are allocated first to local candidates.

Regionally: If an SCD kidney is not accepted by any of the local transplant centers for local candidates, the kidney is to be allocated next via the regional list consisting of all candidates on the waiting lists of other members within the same region (Table 5) according to the Rank Order Point System (Table 3).

Nationally: If an SCD kidney is not accepted by any transplant center in the region in which the member that procured the kidney is located, the kidney is to be allocated to members for specific candidates in the other regions (Table 5) nationally according to the Rank Order Point System (Table 3).

Table 5. OPTN Regions

- Region 1: Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont
- Region 2: Delaware, District of Columbia, Maryland, New Jersey, Pennsylvania, Northern Virginia, West Virginia
- Region 3: Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, Puerto Rico
- Region 4: Oklahoma, Texas
- Region 5: Arizona, California, Nevada, New Mexico, Utah
- Region 6: Alaska, Hawaii, Idaho, Montana, Oregon, Washington
- Region 7: Illinois, Minnesota, North Dakota, South Dakota, Wisconsin
- Region 8: Colorado, Iowa, Kansas, Missouri, Nebraska, Wyoming
- Region 9: New York
- Region 10: Indiana, Michigan, Ohio
- Region 11: Kentucky, North Carolina, South Carolina, Tennessee, Virginia
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pancreas allocation

Pancreas candidates are categorized depending on their antibody sensitivity, HLA match with the donor, and geographic proximity to the donor.

Pancreata are first offered locally, then regionally (Table 5), and then nationally. Highly sensitized potential transplant recipients who have zero

HLA mismatches with the donor are offered the pancreas before any potential transplant recipient who is not highly sensitized. Within each respective geographic area, highly sensitized candidates are categorized ahead of other candidates. Multiple potential transplant recipients within each respective classification are stratified by the length of time they have been waiting.

The candidate's transplant center may ask not to be offered pancreata if the donor meets criteria that make the organ unsuitable for that candidate (HLA mismatches, age, body mass index, serologies, lab values, etc.).

Pancreata may also be allocated for islet transplant. The decision is based in part on donor age (50 years and younger, or not) and donor body mass index (BMI; 30 kg/m² and less, or not). Similar to the process of allocating the whole pancreas, islet offers follow the local, regional, national allocation order, and potential recipients are stratified by waiting time.

Table 6 provides a detailed, yet incomplete, description of how the deceased donor pancreas allocation system currently works. The allocation system is also subject to change. For more details and the most recent allocation policy, see the OPTN allocation policy, available on the internet: http://optn.transplant.hrsa.gov/PoliciesandBylaws2/policies/pdfs/policy_10.pdf.

In November 2010, OPTN approved a restructuring of pancreas allocation policy that is designed to provide greater equity in access to transplants and waiting time across the country, standardize kidney-pancreas allocation practices nationally, maximize use of available pancreata, and improve the efficiency and cost-effectiveness of the organ allocation system. A description of how this new allocation system will work under the restructured pancreas allocation policy is provided in Table 7.

A SHORT SYNOPSIS OF OPTN PANCREAS ALLOCATION POLICY

Table 6. Current Pancreas and Islet Allocation

For local pancreas allocation, recipients may be selected from candidates awaiting an isolated pancreas, kidney-pancreas combination, or combined solid organ-islet transplant from the same donor.

ORDER OF ALLOCATION TO PANCREAS, KIDNEY-PANCREAS, AND KIDNEY CANDIDATES

Organs must be offered first to zero mismatch kidney-pancreas candidates with a CPRA \geq 80% before kidneys can be offered to isolated kidney candidates. Kidneys must be offered to zero mismatch

pediatric kidney candidates and zero mismatch adult kidney candidates with a CPRA \geq 80% before they are offered to non-zero mismatch kidney-pancreas candidates. If an OPO has 6 or more payback debts for a particular blood group, kidneys must be offered through the payback debt classification before they are offered to non-zero mismatch kidney-pancreas candidates. Other than these requirements, the OPO may choose whether to offer the kidneys to kidney-pancreas or isolated kidney candidates.

BLOOD TYPE O KIDNEY-PANCREAS ALLOCATION

For combined kidney-pancreas candidates, blood type O kidneys must be transplanted into blood type O recipients as specified in Policy 3.5.1, unless there is a zero HLA antigen mismatch and the candidate has a CPRA \geq 80%.

ALLOCATION SEQUENCE FOR PANCREAS CANDIDATES

Pancreata and pancreas islets from donors aged \leq 50 years and BMI \leq 30 kg/m² are allocated in the following sequence:

- 1) Local zero mismatch pancreas candidates with a CPRA \geq 80%;
- 2) Local pancreas candidates with a CPRA \geq 80%;
- 3) Regional zero mismatch pancreas candidates with a CPRA \geq 80%;
- 4) National zero mismatch pancreas candidates with a CPRA \geq 80%;
- 5) Local pancreas candidates;
- 6) Regional pancreas candidates with a CPRA \geq 80%;
- 7) Regional pancreas candidates;
- 8) National pancreas candidates with a CPRA \geq 80%;
- 9) National pancreas candidates;
- 10) Local pancreas islet candidates;
- 11) Regional pancreas islet candidates;
- 12) National pancreas islet candidates.

Pancreata and pancreas islets from donors aged $>$ 50 years or BMI $>$ 30 kg/m² are allocated in the following sequence:

- 1) Local zero mismatch pancreas candidates with a CPRA \geq 80%;
- 2) Local pancreas candidates with a CPRA \geq 80%;
- 3) Regional zero mismatch pancreas candidates with a CPRA \geq 80%;
- 4) National zero mismatch pancreas candidates with a CPRA \geq 80%;
- 5) Local pancreas candidates;
- 6) Local pancreas islet candidates;

- 7) Regional pancreas islet candidates;
- 8) National pancreas islet candidates;
- 9) Regional pancreas candidates with a CPRA $\geq 80\%$;
- 10) Regional pancreas candidates;
- 11) National pancreas candidates with a CPRA $\geq 80\%$;
- 12) National pancreas candidates.

ALLOCATION SEQUENCE FOR KIDNEY-PANCREAS CANDIDATES

- 1) Local zero mismatch kidney-pancreas candidates with a CPRA $\geq 80\%$;
- 2) Regional zero mismatch pancreas and kidney-pancreas candidates with a CPRA $\geq 80\%$;
- 3) National zero mismatch pancreas and kidney-pancreas candidates with a CPRA $\geq 80\%$;
- 4) Local kidney-pancreas candidates with a CPRA $\geq 80\%$;
- 5) Local kidney-pancreas candidates;
- 6) Regional kidney-pancreas candidates with a CPRA $\geq 80\%$;
- 7) Regional kidney-pancreas candidates;
- 8) National kidney-pancreas candidates with a CPRA $\geq 80\%$;
- 9) National kidney-pancreas candidates.

Table 7. Proposed Pancreas and Islet Allocation ORDER OF ALLOCATION TO PANCREAS, KIDNEY-PANCREAS, AND KIDNEY CANDIDATES

Organs from the combined pancreas/kidney-pancreas match run must be offered first to the local pancreas and kidney-pancreas candidates before being offered to isolated kidney candidates.

BLOOD TYPE O KIDNEY-PANCREAS ALLOCATION

For combined kidney-pancreas candidates, blood type O kidneys must be transplanted into blood type O recipients (ABO "O" Kidneys into ABO "O" Recipients), unless there is a zero HLA antigen mismatch and the candidate has a CPRA $\geq 80\%$.

ALLOCATION SEQUENCE

Pancreata, kidney-pancreas combinations, and pancreas islets from donors aged ≤ 50 years and BMI ≤ 30 kg/m² are allocated in the following sequence:

- 1) Local zero mismatch pancreas and kidney-pancreas candidates with a CPRA $\geq 80\%$;
- 2) Local pancreas and kidney-pancreas candidates with a CPRA $\geq 80\%$;

- 3) Regional zero mismatch pancreas and kidney-pancreas candidates with a CPRA $\geq 80\%$;
- 4) National zero mismatch pancreas and kidney-pancreas candidates with a CPRA $\geq 80\%$;
- 5) Local pancreas and kidney-pancreas candidates;
- 6) Regional pancreas candidates and kidney-pancreas candidates with a CPRA $\geq 80\%^*$;
- 7) Regional pancreas candidates and kidney-pancreas candidates*;
- 8) National pancreas candidates and kidney-pancreas candidates with a CPRA $\geq 80%^*$;
- 9) National pancreas candidates and kidney-pancreas candidates*;
- 10) Local pancreas islet candidates;
- 11) Regional pancreas islet candidates;
- 12) National pancreas islet candidates.

Pancreata, kidney-pancreas combinations, and pancreas islets from donors aged > 50 years or BMI > 30 kg/m² are allocated in the following sequence:

- 1) Local zero mismatch pancreas and kidney-pancreas candidates with a CPRA $\geq 80\%$;
- 2) Local pancreas and kidney-pancreas candidates with a CPRA $\geq 80\%$;
- 3) Regional zero mismatch pancreas and kidney-pancreas candidates with a CPRA $\geq 80\%$;
- 4) National zero mismatch pancreas and kidney-pancreas candidates with a CPRA $\geq 80\%$;
- 5) Local pancreas and kidney-pancreas candidates;
- 6) Local pancreas islet candidates;
- 7) Regional pancreas islet candidates;
- 8) National pancreas islet candidates;
- 9) Regional pancreas candidates and kidney-pancreas candidates with a CPRA $\geq 80%^*$;
- 10) Regional pancreas candidates and kidney-pancreas candidates*;
- 11) National pancreas candidates and kidney-pancreas candidates with a CPRA $\geq 80%^*$;
- 12) National pancreas candidates and kidney-pancreas candidates.*

If a kidney is not available, the OPO may offer the pancreas to pancreas-alone candidates.

*If the Host OPO chooses. _____

liver allocation

Candidates are listed on the liver waiting list with their model for end-stage liver disease (MELD) score or pediatric end-stage liver disease (PELD)

score, or in status 1A or 1B. The MELD and PELD scores represent a candidate's risk of death while on the waiting list, with higher scores equating to higher risk.

- Candidates aged ≥ 12 years receive a MELD score based on laboratory tests of organ function (serum creatinine, bilirubin, and international normalized ratio [INR]), and based on whether the patient is currently on dialysis. The MELD score ranges from 6 to 40.
- Candidates aged < 12 years receive a PELD score based on laboratory tests of organ function (serum albumin, bilirubin, and INR), and on whether the patient was listed at age < 1 year, and/or has experienced growth failure. The PELD score can be a negative value, and can be as high as 99.
- Status 1A is reserved for very urgent adult and pediatric candidates who have a life expectancy of less than 7 days and have sudden liver failure or are in need of an immediate re-transplant.
- Status 1B is reserved for sick, chronically ill pediatric candidates with a MELD or PELD score ≥ 25 who require mechanical ventilation, or have significant gastrointestinal bleeding, renal failure/insufficiency, or impaired consciousness.
- Candidates whose MELD or PELD scores do not reflect their immediate need for a transplant, such as those with liver cancer, may be assigned a higher score if they meet specific criteria outlined in policy, or if their physician makes an application for a higher score that is approved by their Regional Review Board.

Priority is given to the most urgent patients (status 1A and 1B) and those with the highest MELD or PELD scores, as these patients tend to benefit more from a transplant than patients with lower scores. Within status 1A or 1B, candidates are ranked based on points assigned for blood type compatibility with the donor and waiting time in each status. Within each MELD or PELD score, candidates are ranked by their blood type compatibility with the donor. Within each category, candidates are then ranked based on the waiting time at that score. In general, pediatric donors are directed toward pediatric patients, who are in need of smaller-sized livers.

Table 8 provides a detailed, yet incomplete, description of how adult deceased donor liver allocation works. The allocation system is also subject to change. For more details and the most recent allocation policy, and for pediatric allocation policy, see the OPTN allocation policy on the internet: [\[optn.transplant.hrsa.gov/PoliciesandBylaws2/policies/pdfs/policy_8.pdf\]\(http://optn.transplant.hrsa.gov/PoliciesandBylaws2/policies/pdfs/policy_8.pdf\).](http://</p>
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A SHORT SYNOPSIS OF OPTN LIVER ALLOCATION POLICY

Table 8. Adult Liver Allocation

At each level of distribution, adult livers (ages ≥ 18 years) are allocated in the following sequence:

LOCAL AND REGIONAL

- 1) Status 1A candidates in descending point order.
- 2) Status 1B candidates in descending point order.

LOCAL

- 3) Candidates with MELD/PELD scores ≥ 15 in descending order of mortality risk scores.

REGIONAL

- 4) Candidates with MELD/PELD scores ≥ 15 in descending order of mortality risk scores.

LOCAL

- 5) Candidates with MELD/PELD scores < 15 in descending order of mortality risk scores.

REGIONAL

- 6) Candidates with MELD/PELD scores < 15 in descending order of mortality risk scores.

NATIONAL

- 7) Status 1A candidates in descending point order.
- 8) Status 1B candidates in descending point order.
- 9) All other candidates in descending order of mortality risk.

$$\text{MELD score} = 0.957 \times \text{Ln}(\text{creatinine mg/dL}) + 0.378 \times \text{Ln}(\text{bilirubin mg/dL}) + 1.120 \times \text{Ln}(\text{INR}) + 0.643$$

Laboratory values less than 1.0 are set to 1.0.

The MELD score for each liver transplant candidate is rounded to the tenth decimal place and then multiplied by 10. The MELD score will be limited to a total of 40 points maximum.

heart allocation

The primary components of heart allocation include medical urgency status, geography, candidate age, donor age, and blood group compatibility. All heart candidates are given a medical urgency status. The active statuses, in descending order of urgency, are status 1A, status 1B, and status 2. An adult or pediatric candidate may qualify for listing as status 1A or 1B by meeting specific policy definitions; or, if the treating physician believes that the candidate should receive a more urgent classification, the

physician may apply to a regional review board for an adjustment in status.

The first unit of organ distribution is the local donation service area (DSA). The distribution units beyond local are based on concentric circles with 500 nautical mile increments centered at the donor hospital. Within each status and geographic zone, candidates are prioritized based on blood group compatibility and waiting time within the status or higher urgency status.

Pediatric candidates receive priority over adult candidates for offers of pediatric donor hearts. There is no distinction in candidate age for prioritization of offers of adult donor hearts. The prioritization of status and geographic zone combinations differs for adult (aged 18 years or older) and pediatric donors.

lung allocation

Since 2005, prioritization of candidates for deceased donor lung offers has used the Lung Allocation Score (LAS) for candidates aged ≥ 12 years, and waiting list urgency status for candidates aged < 12 years.

The LAS is a statistical computation that predicts a candidate's medical urgency for a transplant and survival after transplant. The LAS, in combination with other medical characteristics, prioritizes a candidate for a lung offer. Candidates aged younger than 12 years receive a medical urgency classification: priority 1 or priority 2. Priority 1 candidates have higher urgency for transplant.

For candidates aged > 12 years, transplant clinicians may request a higher LAS, a diagnosis group not provided in UNetsM, or an estimated value, by submitting an exception request to the national Lung Review Board (LRB). For candidates aged < 12 years, transplant clinicians may request priority 1 by submitting an exception request to the LRB.

Waiting time breaks a tie between 2 or more candidates with identical scores in the LAS system, and prioritizes candidates aged younger than 12 years for a lung offer in the priority system.

A lung from a deceased donor aged 11 years or younger is offered, by priority and blood group compatibility, first to candidates of the same age who reside in the combined local, zone A, and zone B geographic area. If no such candidates exist or if their physicians do not accept the organ, then it is offered to adolescents (aged 12 to 17 years, inclusive), by LAS and blood group compatibility, who reside in the combined local and zone A geographic area by LAS. If the lung remains available, then it is offered to adults by LAS, geography (DSA and then

zone A, B, C, and D), blood group compatibility, and other medical characteristics.

A lung from an adult deceased donor is offered, by LAS and blood group compatibility, first to candidates aged 12 years or older and in the donor's local geographic area. If the lung remains available, then it is offered to candidates aged younger than 12 years by priority and blood group compatibility. This organ distribution system process repeats itself through each geographic zone (A, B, C, D, and E) until the lung is accepted or discarded due to its medical unsuitability for transplant.

The description below provides a detailed, yet incomplete, description of how the deceased donor thoracic allocation system works. The allocation system is also subject to change. For more details and the most recent allocation policy, see the OPTN allocation policy, available on the internet: http://optn.transplant.hrsa.gov/PoliciesandBylaws2/policies/pdfs/policy_9.pdf.

Patients first listed prior to implementation of the LAS system may remain on the waiting list with no LAS or with an LAS of zero, depending on which data elements are missing.

heart and lung allocation

A SHORT SYNOPSIS OF OPTN HEART AND LUNG ALLOCATION POLICY

Geographic Sequence of Thoracic Organ Allocation

Thoracic organs (hearts, heart-lung combinations, single and double lungs) are generally allocated locally first, then within the following zones in the sequence. Five zones are delineated by concentric circles of 500, 1,000, and 1,500 and 2,500 nautical mile radii with the donor hospital at the center:

- Zone A extends to all transplant centers that are within 500 miles of the donor hospital, but not in the local area of the donor hospital.
- Zone B extends to all transplant centers that are at least 500 miles from the donor hospital, but not more than 1,000 miles from the donor hospital.
- Zone C extends to all transplant centers that are at least 1,000 miles from the donor hospital, but not more than 1,500 miles from the donor hospital.
- Zone D extends to all transplant centers that are beyond 1,500 miles from the donor hospital, but not more than 2,500 miles from the donor hospital.
- Zone E extends to all transplant centers that are beyond 2,500 miles from the donor hospital.

HEART CANDIDATE STATUS

Each candidate awaiting heart transplant is assigned a status code that corresponds to how medically urgent it is that the candidate undergo transplant. Medical urgency is assigned to a heart transplant candidate at the time of listing, and can be updated at any time. Urgency is classified (by detailed criteria) as: status 1A, status 1B, status 2, and status 7 (inactive on the waiting list for medical reasons).

LAS System

Candidates aged ≥ 12 years are assigned priority for lung offers based upon the Lung Allocation Score, which is calculated using the following measures:

- 1) Wait-list urgency measure (expected number of days lived without a transplant during an additional year on the waiting list),
- 2) post-transplant survival measure (expected number of days lived during the first year post-transplant), and
- 3) transplant benefit measure (post-transplant survival measure minus wait-list urgency measure).

Candidate groupings are shown in Table 9. The wait-list urgency measure and post-transplant survival measure (used in the calculation of the transplant benefit measure) are developed using Cox proportional hazards models. Factors determined to be important predictors of wait-list mortality and post-transplant survival are listed below in Tables 8.10 and 8.11. It is expected that these factors will change over time as new data are available and added to the models. The OPTN Thoracic Organ Transplantation Committee reviews these data periodically and proposes changes to Tables 10 and 11 as appropriate.

Table 9. Candidate Groupings

Group A Includes candidates with obstructive lung disease, including without limitation chronic obstructive pulmonary disease (COPD), alpha-1-antitrypsin deficiency, emphysema, lymphangioleiomyomatosis, bronchiectasis, and sarcoidosis with mean pulmonary artery (PA) pressure ≤ 30 mmHg.

Group B Includes candidates with pulmonary vascular disease, including primary pulmonary hypertension (PPH), Eisenmenger syndrome, and other uncommon pulmonary vascular diseases.

Group C Includes candidates with cystic fibrosis (CF) and immunodeficiency disorders such as hypogammaglobulinemia.

Group D Includes candidates with restrictive lung diseases, including without limitation, idiopathic pulmonary fibrosis (IPF), pulmonary fibrosis

(other causes), sarcoidosis with mean PA pressure > 30 mmHg, and obliterative bronchiolitis (nonre-transplant).

The OPTN Contractor provides a complete list of diagnoses in UNETSM.

Table 10. Factors Used to Predict Risk of Death on the Lung Transplant Waiting List

- 1) Forced vital capacity (FVC)
- 2) Pulmonary artery (PA) systolic pressure (Groups A, C, and D)
- 3) O₂ required at rest
- 4) Age
- 5) Body mass index (BMI)
- 6) Diabetes
- 7) Functional status
- 8) Six-minute walk distance
- 9) Continuous mechanical ventilation
- 10) Diagnosis
- 11) PCO₂
- 12) Bilirubin: current bilirubin, all groups; change in bilirubin, group B (bilirubin has been board-approved, but implementation is pending)

Table 11. Factors That Predict Survival After Lung Transplant

- 1) FVC (groups B and D)
- 2) Pulmonary capillary wedge (PCW) pressure ≥ 20 mmHg (Group D)
- 3) Continuous mechanical ventilation
- 4) Age
- 5) Serum creatinine
- 6) Functional status
- 7) Diagnosis

The calculations define the difference between transplant benefit and wait-list urgency: Raw Allocation Score = Transplant Benefit Measure – Waiting List Urgency Measure.

Raw allocation scores range from -730 days up to $+365$ days, and are normalized to a continuous scale from 0–100 to determine Lung Allocation Scores. The higher the score, the higher the priority for receiving lung offers. Lung Allocation Scores are calculated to sufficient decimal places to avoid assigning the same score to multiple candidates.