

## ***Notice of OPTN Policy, Guidance, and Guideline Changes***

# **Establish Continuous Distribution of Lungs**

<b>Sponsoring Committee:</b>	<b>OPTN Lung Transplantation Committee</b>
<b>Policies Affected:</b>	<b><i>1.2: Definitions 3.6.A: Waiting Time for Inactive Candidates 5.10.E: Other Multi-Organ Combinations 6.6.F: Allocation of Heart-Lungs 6.6.F.i: Allocation of Heart-Lungs from Deceased Donors at Least 18 Years Old 6.6.F.ii: Allocation of Heart-Lungs from Deceased Donors Less Than 18 Years Old 10: Lung Allocation (and all subsections) 21: Composite Allocation Score Reference (and all subsections)</i></b>
<b>Guidance Affected:</b>	<b><i>Lung Review Board Guidance</i></b>
<b>Guidelines Affected:</b>	<b><i>Lung Review Board Operational Guidelines</i></b>
<b>Public Comment:</b>	<b>August 3, 2021 - September 30, 2021 August 3, 2022 – September 28, 2022</b>
<b>Board Approved:</b>	<b>December 6, 2021 December 5, 2022</b>
<b>Clarification Approved:</b>	<b>October 26, 2022 January 9, 2023</b>
<b>Effective Date:</b>	<b>March 9, 2023</b>

*Note: The OPTN Executive Committee approved clarifications to these policy changes at its meetings on October 26, 2022, and January 9, 2023. For more information regarding the clarifications, please see the mini-briefs available at <https://optn.transplant.hrsa.gov/policies-bylaws/public-comment/establish-continuous-distribution-of-lungs>, or contact [member.questions@unos.org](mailto:member.questions@unos.org).*

### **Purpose of Policy Changes**

This change better aligns lung allocation policy regulatory requirements, community and ethical goals identified by the OPTN, and medical advancements, while considering each candidate holistically. It moves lung allocation into a continuous distribution framework, removes rigid boundaries in lung allocation, and introduces the composite allocation score for lung candidates.

## Proposal History

To educate the community about continuous distribution, a presence on the OPTN website was established to explain concepts and plans for development. Progress specific to the development of lung continuous distribution included:

2019

- Concept paper on the continuous distribution of lungs<sup>1</sup>

2020

- Request for feedback and update on work that had been completed to date<sup>2</sup>
- Results of community feedback on priorities that was provided through a prioritization exercise<sup>3</sup>
- Results of an analysis to reveal the preferences inherent in the current lung allocation system<sup>4</sup>
- An interactive tool for visualizing what a match would look like under continuous distribution<sup>5</sup>

2021

- Results from the first round of SRTR modeling<sup>6</sup>
- Results from modeling impact of 5-year post-transplant outcomes<sup>7</sup>
- Results from the second round of SRTR modeling<sup>8</sup>
- Continuous Distribution public comment proposal<sup>9</sup>
- Establish Continuous Distribution of Lungs briefing paper<sup>10</sup>

2022

- Public comment proposal to update multi-organ allocation for continuous distribution of lungs<sup>11</sup>
- Public comment proposal to revise Lung Review Board guidelines, guidance, and policy<sup>12</sup>

<sup>1</sup> Concept Paper, *Continuous Distribution of Lungs*, OPTN Thoracic Organ Transplantation Committee. Public Comment Period August 2, 2019-October 2, 2019. [https://optn.transplant.hrsa.gov/media/3111/thoracic\\_publiccomment\\_201908.pdf](https://optn.transplant.hrsa.gov/media/3111/thoracic_publiccomment_201908.pdf).

<sup>2</sup> OPTN Request for Feedback, Update on the Continuous Distribution of Organs Project, OPTN Lung Transplantation Committee. Public Comment Period August 4, 2020-October 1, 2020.

[https://optn.transplant.hrsa.gov/media/3932/continuous\\_distribution\\_lungs\\_concept\\_paper\\_pc.pdf](https://optn.transplant.hrsa.gov/media/3932/continuous_distribution_lungs_concept_paper_pc.pdf).

<sup>3</sup> Continuous Distribution of Lungs, Summer 2020 Prioritization Exercise – Community Results, October 12, 2020.

[https://optn.transplant.hrsa.gov/media/4157/2020-10\\_report\\_community\\_ahp\\_prioritization.pdf](https://optn.transplant.hrsa.gov/media/4157/2020-10_report_community_ahp_prioritization.pdf).

<sup>4</sup> Darren E. Stewart, Dallas W. Wood, James B. Alcorn, Erika D. Lease, Michael Hayes, Brett Hauber and Rebecca E. Goff, A revealed preference analysis to develop composite scores approximating lung allocation policy in the U.S., January 6, 2021.

<https://optn.transplant.hrsa.gov/media/4317/2021-revealed-preference-analysis.pdf>.

<sup>5</sup> <https://public.tableau.com/profile/optn.committees#!/vizhome/ContinuousDistributionofLungs/Home>.

<sup>6</sup> SRTR, Continuous Distribution Simulations for Lung Transplant, Data Request ID# LU2020\_05, February 12, 2021.

[https://optn.transplant.hrsa.gov/media/4450/lu2020\\_05\\_cont\\_distn\\_srtr\\_1.pdf](https://optn.transplant.hrsa.gov/media/4450/lu2020_05_cont_distn_srtr_1.pdf).

<sup>7</sup> SRTR The impact of extending follow-up for the PTAUC model from 1 year to 5 years after transplant, February 17, 2021. (Accessed June 18, 2021) [https://optn.transplant.hrsa.gov/media/4675/lu\\_posttx\\_5y\\_2\\_2021.pdf](https://optn.transplant.hrsa.gov/media/4675/lu_posttx_5y_2_2021.pdf).

<sup>8</sup> SRTR, Continuous distribution simulations for lung transplant: Round 2, Data Request ID#: LU2021\_01, May 28, 2021.

[https://optn.transplant.hrsa.gov/media/4646/lu2021\\_01\\_cont\\_distn\\_report\\_final.pdf](https://optn.transplant.hrsa.gov/media/4646/lu2021_01_cont_distn_report_final.pdf).

<sup>9</sup> Public Comment Proposal, Establish Continuous Distribution of Lungs, OPTN Lung Transplantation Committee. Public Comment Period August 3, 2021- September 30, 2021. [https://optn.transplant.hrsa.gov/media/4772/continuous\\_distribution\\_of\\_lungs-public\\_comment.pdf](https://optn.transplant.hrsa.gov/media/4772/continuous_distribution_of_lungs-public_comment.pdf).

<sup>10</sup> Briefing Paper, Establish Continuous Distribution of Lungs, OPTN Lung Transplantation Committee, December 2021.

<https://optn.transplant.hrsa.gov/media/esjb4ztn/20211206-bp-lung-establish-cont-dist-lungs.pdf>.

<sup>11</sup> Public Comment Proposal, Update Multi-Organ Allocation for Continuous Distribution of Lungs, OPTN Lung Transplantation Committee. Public Comment Period August 3, 2022 – September 28, 2022. [https://optn.transplant.hrsa.gov/media/ss1h253a/update-multi-organ-allocation-for-continuous-distribution-of-lungs\\_lung\\_pc-summer-2022.pdf](https://optn.transplant.hrsa.gov/media/ss1h253a/update-multi-organ-allocation-for-continuous-distribution-of-lungs_lung_pc-summer-2022.pdf).

<sup>12</sup> Public Comment Proposal, Revise Lung Review Board Guidelines, Guidance, and Policy for Continuous Distribution, OPTN Lung Transplantation Committee. Public Comment Period August 3, 2022 – September 28, 2022.

[https://optn.transplant.hrsa.gov/media/hzdkvbm/revise-lung-review-board-guidelines-guidance-and-policy-for-continuous-distribution\\_lung\\_pc-summer-2022.pdf](https://optn.transplant.hrsa.gov/media/hzdkvbm/revise-lung-review-board-guidelines-guidance-and-policy-for-continuous-distribution_lung_pc-summer-2022.pdf).

- Policy clarification<sup>13</sup>
- Briefing paper to update multi-organ allocation for continuous distribution of lungs<sup>14</sup>
- Briefing paper to revise Lung Review Board guidelines, guidance, and policy<sup>15</sup>

2023

- Policy clarification<sup>16</sup>

## Summary of Changes

This change removes the current classification system and replaces it with a lung composite allocation score (CAS) which is comprised of the following attributes:

- Medical Urgency, or how long a patient is expected to live without receiving a transplant
- Post-Transplant Outcomes, or a patient’s life expectancy within the first five years following a transplant
- Biological Disadvantages, for patients who are medically harder to match which includes candidate blood type, sensitization, and height
- Patient Access, for patients under the age of 18 and patients who are prior living donors
- Placement efficiency, or the resources required to match, transport, and transplant an organ which includes both travel efficiency and proximity efficiency

Each attribute has a rating scale, which will determine how many points a candidate receives for each, and each attribute has a relative weight. The total weights add up to 100. These points combine into a total score for the candidate. With every organ offer, a candidate receives a new Composite Allocation Score (CAS), which is used to rank the candidates for that organ offer. The lung composite allocation score will be awarded in the proportions of:

Attribute	Percentage
<b>Waitlist Survival</b>	<b>25%</b>
<b>Post-transplant Outcomes</b>	<b>25%</b>
<b>Biological Disadvantages</b>	<b>15%</b>
Blood Type	5%
CPRA	5%
Height	5%
<b>Patient Access</b>	<b>25%</b>
Pediatric	20%
Prior living donor	5%
<b>Placement Efficiency</b>	<b>10%</b>
Travel Efficiency	5%
Proximity Efficiency	5%

<sup>13</sup> Mini-Brief, Clarifications to the Continuous Distribution of Lungs, OPTN Lung Transplantation Committee, October 2022, <https://optn.transplant.hrsa.gov/policies-bylaws/public-comment/establish-continuous-distribution-of-lungs/>.

<sup>14</sup> Briefing Paper, Update Multi-Organ Allocation for Continuous Distribution of Lungs, OPTN Lung Transplantation Committee, December 2022. [https://optn.transplant.hrsa.gov/media/jtcizwok/bp\\_update-mot-for-cd-of-lung.pdf](https://optn.transplant.hrsa.gov/media/jtcizwok/bp_update-mot-for-cd-of-lung.pdf).

<sup>15</sup> Briefing Paper, Revise Lung Review Board Guidelines, Guidance, and Policy for Continuous Distribution, OPTN Lung Transplantation Committee, December 2022. [https://optn.transplant.hrsa.gov/media/hbilgzlf/bp\\_revise-lung-review-board-guidelines-guidance-and-policy-for-cd\\_dec-2022.pdf](https://optn.transplant.hrsa.gov/media/hbilgzlf/bp_revise-lung-review-board-guidelines-guidance-and-policy-for-cd_dec-2022.pdf).

<sup>16</sup> Mini-Brief, Clarification to Continuous Distribution of Lungs Value Tables, OPTN Lung Transplantation Committee, January 2023, <https://optn.transplant.hrsa.gov/policies-bylaws/public-comment/establish-continuous-distribution-of-lungs/>.

Each candidate will be awarded a portion of the score for each attribute based on their individual characteristics relative to the rating scale for that attribute.

Data collection related to supplemental oxygen, assisted ventilation, and prior living donation will be changed, and the update schedule for the most urgent candidates will change. There are also changes to multi-organ allocation and to lung score exceptions designed to align these with the CAS system.

These changes reflect two amendments adopted by the Board of Directors in December 2021 that:

- Replaced outdated references to the lung allocation score (LAS) with references to the CAS
- Limited the changes to the policy language, removing proposed changes to the Lung Review Board Operational Guidelines

Operational guidelines and clinical guidance for the Lung Review Board went through public comment in August – September 2022 and were approved by the Board of Directors in December 2022.<sup>17</sup> These changes also reflect clarifications approved by the Executive Committee in October 2022 and January 2023 that addressed questions raised during implementation and corrected value tables.

## Implementation

Transplant hospitals will need to educate staff and patients about the changes to the allocation system, and the impact it will have on scoring, offers, exceptions, and updates to certain testing. There will be limited changes to data collection related to supplemental oxygen, assisted ventilation, and prior living donation.

OPOs may need to train staff on the new match run and revised multi-organ allocation rules. This change is also likely to alter offer patterns, and OPOs may develop new relationships with transplant hospitals they did not work with frequently in the past.

This change includes candidate CPRA as a factor in the composite allocation score. Histocompatibility laboratories may need to work with the lung transplant hospitals they serve to update candidate testing policies, and may be asked to test lung candidates more frequently.

This change will require extensive system changes and member education. There will be limited changes to data collection related to supplemental oxygen, assisted ventilation, and prior living donation.

Prior to implementation, information will be provided to members to assist them in determining the impact of the new allocation system on their candidate, and members will be able to request exception scores so that candidates can use an exception score on the day the new system is implemented. The OPTN plans to distribute educational materials related to the new system, including specific educational offerings related to the changes to the lung review board such as clinical exception guidance. It will also publish a new online CAS calculator and patient's guide to understanding the new composite allocation score.

The first phase of continuous distribution of lungs was implemented on November 8, 2022. This included implementation of two new fields:

- Prior living donor

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<sup>17</sup> OPTN, Revise Lung Review Board Guidelines, Guidance, and Policy for Continuous Distribution, OPTN Lung Transplantation Committee, Public Comment Period August 3, 2022 – September 28, 2022. [https://optn.transplant.hrsa.gov/media/hzdkvbm/revise-lung-review-board-guidelines-guidance-and-policy-for-continuous-distribution\\_lung\\_pc-summer-2022.pdf](https://optn.transplant.hrsa.gov/media/hzdkvbm/revise-lung-review-board-guidelines-guidance-and-policy-for-continuous-distribution_lung_pc-summer-2022.pdf).

- Requires documentation to be submitted to the Organ Center for lung candidates who previously donated an organ in order for those candidates to receive prior living donor points
- On high flow nasal cannula
  - Displays when the candidate requires supplemental oxygen at rest, at night or with exercise
  - This field will become required for all lung candidates receiving supplemental oxygen at rest, at night or with exercise when lung continuous distribution is implemented

Additional information regarding implementation is posted on the lung continuous distribution policy toolkit: <https://optn.transplant.hrsa.gov/professionals/by-organ/heart-lung/lung-continuous-distribution-policy/>.

## Affected Policy Language

New language is underlined (example) and language that is deleted is struck through (example).

### 1.2 Definitions

#### **Composite allocation score (CAS)**

The scoring system used to prioritize candidates on the match run. It ranges from 0-100 and is an aggregate of separate goal level scores.

#### **Lung allocation score (LAS)**

The scoring system used to measure illness severity in the allocation of lungs to candidates 12 years and older.

### 3.6.A Waiting Time for Inactive Candidates

Candidates accrue waiting time while inactive according to *Table 3-3* below. Inactive candidates do not receive organ offers.

**Table 3-3: Waiting Time for Inactive Candidates**

If the candidate is registered for the following organ...	Then the candidate accrues waiting time while inactive as follows...
Heart	No time
Intestine	Up to 30 cumulative days
Kidney	Unlimited time
Kidney-pancreas	Unlimited time
Liver	No time
Lung and is at least 12 years old	No time
Lung and is less than 12 years old	Unlimited time
Pancreas	Unlimited time
Pancreas islet	Unlimited time
Any covered VCA	Unlimited time
All other organs	Up to 30 days

## 5.10.E Other Multi-Organ Combinations

When an OPO is offering a heart or lung, and a liver or kidney is also available from the same deceased donor, PTRs who meet the criteria in *Table 5-4* must be offered the second organ.

**Table 5-4 Second Organ for Heart or Lung PTRs**

<b>If the OPO is offering the following organ:</b>	<b>And a PTR is also registered for one of the following organs:</b>	<b>The OPO must offer the second organ if the PTR is registered at a transplant hospital at or within 500 NM of the donor hospital and meets the following criteria:</b>
Heart	Liver or Kidney	Heart Adult Status 1, 2, 3 or any active pediatric status
Lung	Liver or Kidney	Lung allocation score of greater than or equal to 35 or candidates less than 12 years old

<b><u>If the OPO is offering the following organ:</u></b>	<b><u>And a PTR is also registered for one of the following organs:</u></b>	<b><u>The OPO must offer the second organ if the PTR meets <i>all</i> of the following criteria:</u></b>
<u>Heart</u>	<u>Liver or Kidney</u>	<ul style="list-style-type: none"> <li>• <u>Registered at a transplant hospital at or within 500 NM of the donor hospital</u></li> <li>• <u>Heart Adult Status 1, 2, 3 or any active pediatric status</u></li> </ul>
<u>Lung</u>	<u>Liver or Kidney</u>	<u>Has a Lung Composite Allocation Score of 25 or greater</u>

When the OPO is offering a heart or lung and two PTRs meet the criteria in *Table 5-4*, the OPO has the discretion to offer the second organ to either PTR.

It is permissible for the OPO to offer the second organ to other multi-organ PTRs that do not meet the criteria above.

## 6.6.F Allocation of Heart-Lungs

If a host OPO is offering a heart and a lung from the same deceased donor, then the host OPO must offer the heart and the lung according to *Policy 6.6.F.i: Allocation of Heart-Lungs from Deceased Donors at Least 18 Years Old* or *Policy 6.6.F.ii: Allocation of Heart-Lungs from Deceased Donors Less Than 18 Years Old*.

The blood type matching requirements described in *Policy 6.6.A: Allocation of Hearts by Blood Type* apply to heart-lung candidates when the candidates appear on the heart match run. The blood type matching requirements in *Policy 10.4.B: Allocation of Lungs by Blood Type* apply to heart-lung candidates when the candidates appear on the lung match run.

### **6.6.F.i Allocation of Heart-Lungs from Deceased Donors at Least 18 Years Old**

If a heart or heart-lung potential transplant recipient (PTR) requires a lung, the OPO must offer the lungs from the same deceased donor to the heart or heart-lung PTR according to *Policy 6.6.D: Allocation of Hearts from Donors at Least 18 Years Old*.

If a lung or heart-lung PTR in allocation classifications 1 through 12 according to *Policy 10.4.C: Allocation of Lungs From Deceased Donors at Least 18 Years Old* requires a heart, the OPO cannot allocate the heart from the same deceased donor to the lung or heart-lung PTR until after the heart has been offered to all heart and heart-lung PTRs in allocation classifications 1 through 4 according to *Policy 6.6.D: Allocation of Hearts from Donors at Least 18 Years Old*.

If a host OPO is offering a heart and lung from the same deceased donor, then the host OPO must offer the heart and lung in the following order:

1. To all heart and heart-lung PTRs in allocation classifications 1 through 4 according to *Policy 6.6.D: Allocation of Hearts from Donors at Least 18 Years Old*
2. To all lung and heart-lung PTRs according to *Policy 10.1 Lung Composite Allocation Score* until offers have been made to all heart-lung PTRs with a lung composite allocation score of 25 or higher
3. To heart and heart-lung PTRs in classifications 5 or later according to *Policy 6.6.D: Allocation of Hearts from Donors at Least 18 Years Old*.

The host OPO must follow the order on each match run, including heart-lung, heart, and lung candidates.

### **6.6.F.ii Allocation of Heart-Lungs from Deceased Donors Less Than 18 Years Old**

If a heart or heart-lung potential transplant recipient (PTR) requires a lung, the OPO must offer the lungs from the same deceased donor to the heart or heart-lung PTR according to *Policy 6.6.E: Allocation of Hearts from Donors Less Than 18 Years Old*.

If a lung or heart-lung PTR in allocation classifications 1 through 10 according to *Policy 10.4.D: Allocation of Lungs From Deceased Donors Less Than 18 Years Old* requires a heart, the OPO cannot allocate the heart from the same deceased donor to the lung or heart-lung PTR until after the heart has been offered to all heart and heart-lung PTRs in allocation classifications 1 through 12 according to *Policy 6.6.E: Allocation of Hearts from Donors Less Than 18 Years Old*.

If a host OPO is offering a heart and lung from the same deceased donor, then the host OPO must offer:

1. To all heart and heart-lung PTRs in allocation classifications 1 through 12 according to *Policy 6.6.E: Allocation of Hearts from Donors Less Than 18 Years Old*
2. To all lung and heart-lung PTRs according to *Policy 10.1 Lung Composite Allocation Score* until offers have been made to all heart-lung PTRs with a lung composite allocation score of 25 or higher

3. To heart and heart-lung PTRs in classifications 13 or later according to *Policy 6.6.E: Allocation of Hearts from Donors Less Than 18 Years Old*

The host OPO must follow the order on each match run, including heart-lung, heart, and lung candidates.



## Policy 10: Allocation of Lungs

Repealed.

## Policy 10: Allocation of Lungs

### 10.1 Lung Composite Allocation Score

The lung composite allocation score is the combined total of the candidate's lung medical urgency score, lung post-transplant outcomes score, lung biological disadvantages score, lung patient access score and lung placement efficiency score. The lung composite allocation score is awarded on a scale from 0 to 100.

Candidates will be rank-ordered by lung composite allocation score. If two or more candidates have the same lung composite allocation score, the tied candidates will be ranked by order of their registration date (oldest to newest).

#### 10.1.A Prioritizing Medically Urgent Candidates

The lung medical urgency score is equal to the candidate's lung waitlist survival points.

##### 10.1.A.1. Waitlist Survival Points for Candidates at least 12 Years Old

For candidates at least 12 years old at the time of the match run lung waitlist survival points are awarded based on the candidate's waiting list survival probability, based on the following factors:

- Age at the time of the match run (fractional calendar years)
- Bilirubin (mg/dL) value with the most recent test date and time
- Body mass index (BMI) (kg/m<sup>2</sup>)
- Assisted ventilation
- Creatinine (serum) (mg/dL) with the most recent test date and time
- Diagnosis Group (A, B, C, or D), as defined in Policy 10.1.F Lung Disease *Diagnosis Groups*
- Whether the candidate has one of the following specific diagnoses within Diagnosis Group A:
  - Bronchiectasis
  - Sarcoidosis with pulmonary artery (PA) mean pressure of 30 mm Hg or less
  - Sarcoidosis with PA mean pressure missing
- Whether the candidate has one of the following specific diagnoses within Diagnosis Group D:
  - COVID-19: pulmonary fibrosis
  - Pulmonary fibrosis, other specify cause
  - Sarcoidosis with PA mean pressure greater than 30 mm Hg
- Functional Status

- Amount of supplemental oxygen required to maintain adequate oxygen saturation (88% or greater) at rest (L/min)
- PCO<sub>2</sub> (mm Hg): current
- PCO<sub>2</sub> increase of at least 15%
- PA systolic pressure (mm Hg) at rest, prior to any exercise
- Six-minute-walk distance (feet) obtained while the candidate is receiving supplemental oxygen required to maintain an oxygen saturation of 88% or greater at rest. Increase in supplemental oxygen during this test is at the discretion of the center performing the test.

Lung waitlist survival points are awarded on a scale of 0-25. Policy 21.1.A: Waiting List Survival Formulas details the calculation of lung waitlist survival points.

### **10.1.A.2 Waitlist Survival Points for Candidates Less than 12 Years Old**

Lung candidates assigned pediatric priority 1 receive 1.9073 waitlist survival points based on the candidate's waitlist survival probability.

Lung candidates assigned pediatric priority 2 receive 0.4406 waitlist survival points based on the candidate's waitlist survival probability.

#### **10.1.A.2.a Candidates Less than 12 Years Old - Priority 1**

A lung candidate less than 12 years old may be assigned priority 1 if at least *one* of the following requirements is met:

1. Candidate has respiratory failure, evidenced by at least *one* of the following:
  - Requires continuous mechanical ventilation
  - Requires supplemental oxygen delivered by any means to achieve FiO<sub>2</sub> greater than 50% in order to maintain oxygen saturation levels greater than 90%
  - Has an arterial or capillary PCO<sub>2</sub> greater than 50 mm Hg
  - Has a venous PCO<sub>2</sub> greater than 56 mm Hg
  
2. Candidate has pulmonary hypertension, evidenced by at least *one* of the following:
  - Has pulmonary vein stenosis involving 3 or more vessels
  - Exhibits *any* of the following, in spite of medical therapy:
    - Cardiac index less than 2 L/min/M<sup>2</sup>
    - Syncope
    - Hemoptysis
    - Suprasystemic PA pressure on cardiac catheterization or by echocardiogram estimate

#### **10.1.A.2.b Candidates Less than 12 Years Old - Priority 2**

If a lung candidate less than 12 years old does not meet any of the above criteria to qualify for priority 1, then the candidate is assigned priority 2.

## **10.1.B Improving Post-Transplant Outcomes**

Each lung candidate is assigned a lung post-transplant outcomes score. The lung post-transplant outcomes score is equal to the candidate's lung post-transplant outcomes points.

### **10.1.B.1 Post-Transplant Outcomes Points for Candidates at Least 12 Years Old**

For candidates at least 12 years old at the time of the match run, lung post-transplant outcomes points are awarded based on the candidate's post-transplant survival probability, based on the following factors:

- Age at the time of the match run (fractional calendar years)
- Creatinine (serum) (mg/dL) with the most recent test date and time
- Cardiac index (L/min/m<sup>2</sup>) at rest, prior to any exercise
- Assisted ventilation
- Diagnosis Group (A, B, C, or D), as defined in 10.1.F: Lung Disease Diagnosis Groups
- Whether the candidate has one of the following specific diagnoses within Diagnosis Group A:
  - Bronchiectasis
  - Lymphangiomyomatosis
  - Sarcoidosis with PA mean pressure of 30 mm Hg or less
  - Sarcoidosis with PA mean pressure missing
- Whether the candidate has one of the following specific diagnoses within Diagnosis Group D:
  - COVID-19: pulmonary fibrosis
  - Obliterative bronchiolitis (non-retransplant)
  - Constrictive bronchiolitis
  - Sarcoidosis with PA mean pressure greater than 30 mm Hg
  - Pulmonary fibrosis, other specify cause
- Functional Status
- Six-minute-walk-distance (feet) obtained while candidate is receiving supplemental oxygen required to maintain an oxygen saturation of 88% or greater at rest. Increase in supplemental oxygen during this test is at the discretion of the center performing the test

Lung post-transplant outcomes points are awarded on a scale of 0-25. Policy 21.1.B: Post-Transplant Outcomes Formulas details the calculation of lung post-transplant outcomes points.

### **10.1.B.2 Post-Transplant Outcomes Points for Candidates Less than 12 years Old**

Lung candidates who are less than 12 years old are assigned 18.6336 post-transplant outcomes points based on the candidate's post-transplant survival probability.

## **10.1.C Reducing Biological Disadvantages**

Each lung candidate is assigned a lung biological disadvantages score. The lung biological disadvantages score is equal to the total of the candidate’s lung blood type points, lung CPRA points, and lung height points.

### **10.1.C.1 Blood Type**

Each lung candidate is assigned lung blood type points determined based on the proportion of donors the candidate could accept based on blood type compatibility, according to *Table 10-1: Points by Blood Type*. Candidates who are eligible to accept blood group incompatible donors according to *Policy 10.4.A Eligibility for Intended Blood Group Incompatible Offers for Deceased Donor Lungs* receive the same blood type points as other candidates in their blood group.

**Table 10-1: Points by Blood Type**

<u>A candidate with a blood type of</u>	<u>Will receive this many lung blood type points</u>
<u>AB</u>	<u>0</u>
<u>A</u>	<u>.0455</u>
<u>B</u>	<u>.2439</u>
<u>O</u>	<u>.4550</u>

### **10.1.C.2 CPRA**

Each lung candidate is assigned lung CPRA points based on the proportion of donors the candidate could accept based on antigen acceptability. Lung CPRA points are awarded on a scale of 0-5. *Policy 21.1.C.1: Lung CPRA Points* details the calculation of lung CPRA points.

### **10.1.C.3 Height**

Each lung candidate is assigned lung height points based on the proportion of donors the candidate could accept based on height compatibility. Lung height points are awarded on a scale of 0-5. *Policy 21.1.C.2: Lung Height Points* details the calculation of lung height points.

## **10.1.D Promoting Patient Access**

The lung patient access score is equal to the total of the candidate’s lung pediatric points and lung living donor points.

### **10.1.D.1 Pediatric Candidates**

A candidate who was less than 18 years old at the time of registration on the lung waiting list will receive 20 lung pediatric points.

**10.1.D.2 Prior Living Donors**

A candidate who is a prior living organ donor will receive 5 lung living donor points.

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 and the candidate's physician reports all of the following information to the OPTN:

- a. The name of the recipient or intended recipient of the donated organ or organ segment
- b. The recipient's or intended recipient's transplant hospital
- c. The date the donated organ was procured

**10.1.E Promoting the Efficient Management of the Organ Placement System**

The lung placement efficiency score is the total of the candidate's lung travel efficiency and lung proximity efficiency points.

**10.1.E.1 Travel Efficiency**

A candidate's lung travel efficiency points are determined based on the straight-line distance between the donor hospital and the transplant hospital where the candidate is listed. Lung travel efficiency points are awarded on a scale of 0-5. *Policy 21.1.D.1: Lung Travel Efficiency Points* details the calculation of lung travel efficiency points.

**10.1.E.2 Proximity Efficiency**

A candidate's lung proximity efficiency points are determined based on the straight-line distance between the donor hospital and the transplant hospitals where the candidate is listed. Lung proximity efficiency points are awarded on a scale of 0-5. *Policy 21.1.D.2: Lung Proximity Efficiency Points* details the calculation of lung proximity efficiency points.

**10.1.F Lung Disease Diagnosis Groups**

Each candidate is assigned a diagnosis group, based on their lung disease diagnosis, which is used in the calculation of their medical urgency score and their post-transplant survival score.

**Group A**

A candidate is in Group A if the candidate has *any* of the following diagnoses:

- Allergic bronchopulmonary aspergillosis
- Alpha-1 antitrypsin deficiency
- Bronchiectasis
- Bronchopulmonary dysplasia

- Chronic obstructive pulmonary disease/emphysema
- Ehlers-Danlos syndrome
- Granulomatous lung disease
- Inhalation burns/trauma
- Kartagener's syndrome
- Lymphangiomyomatosis
- Obstructive lung disease
- Primary ciliary dyskinesia;
- Sarcoidosis with either:
  - Pulmonary artery (PA) mean pressure of 30 mm Hg or less
  - PA mean pressure missing
- Tuberous sclerosis
- Wegener's granuloma – bronchiectasis

### **Group B**

A candidate is in Group B if the candidate has *any* of the following diagnoses:

- Congenital malformation
- CREST – pulmonary hypertension
- Eisenmenger's syndrome: atrial septal defect (ASD)
- Eisenmenger's syndrome: multi-congenital anomalies
- Eisenmenger's syndrome: other specify
- Eisenmenger's syndrome: patent ductus arteriosus (PDA)
- Eisenmenger's syndrome: ventricular septal defect (VSD)
- Portopulmonary hypertension
- Pulmonary hypertension/pulmonary arterial hypertension
- Pulmonary capillary hemangiomatosis
- Pulmonary telangiectasia – pulmonary hypertension
- Pulmonary thromboembolic disease
- Pulmonary vascular disease
- Pulmonary veno-occlusive disease
- Pulmonic stenosis
- Right hypoplastic lung
- Scleroderma – pulmonary hypertension
- Secondary pulmonary hypertension
- Thromboembolic pulmonary hypertension

### **Group C**

A candidate is in Group C if the candidate has *any* of the following diagnoses:

- Common variable immune deficiency
- Cystic fibrosis
- Fibrocavitary lung disease
- Hypogammaglobulinemia
- Schwachman-Diamond syndrome

**Group D**

A candidate is in Group D if the candidate has *any* of the following diagnoses:

- ABCA3 transporter mutation
- Alveolar proteinosis
- Amyloidosis
- Acute respiratory distress syndrome or pneumonia
- Bronchioloalveolar carcinoma (BAC)
- Carcinoid tumorlets
- Chronic pneumonitis of infancy
- Constrictive bronchiolitis
- COVID-19: acute respiratory distress syndrome
- COVID-19: pulmonary fibrosis
- CREST – Restrictive
- Eosinophilic granuloma
- Fibrosing Mediastinitis
- Graft versus host disease (GVHD)
- Hermansky Pudlak syndrome
- Hypersensitivity pneumonitis
- Idiopathic interstitial pneumonia, with at least one of the following disease entities:
  - Acute interstitial pneumonia
  - Cryptogenic organizing pneumonia/Bronchiolitis obliterans with organizing pneumonia (BOOP)
  - Desquamative interstitial pneumonia
  - Idiopathic pulmonary fibrosis (IPF)
  - Nonspecific interstitial pneumonia
  - Lymphocytic interstitial pneumonia (LIP)
  - Respiratory bronchiolitis-associated interstitial lung disease
- Idiopathic pulmonary hemosiderosis
- Lung retransplant or graft failure: acute rejection
- Lung retransplant or graft failure: non-specific
- Lung retransplant or graft failure: obliterative bronchiolitis-obstructive
- Lung retransplant or graft failure: obliterative bronchiolitis-restrictive
- Lung retransplant or graft failure: obstructive
- Lung retransplant or graft failure: other specify
- Lung retransplant or graft failure: primary graft failure
- Lung retransplant or graft failure: restrictive
- Lupus
- Mixed connective tissue disease
- Obliterative bronchiolitis: non-retransplant
- Occupational lung disease: other specify
- Paraneoplastic pemphigus associated Castleman’s disease
- Polymyositis
- Pulmonary fibrosis: other specify cause

- Pulmonary hyalinizing granuloma
- Pulmonary lymphangiectasia (PL)
- Pulmonary telangiectasia – restrictive
- Rheumatoid disease
- Sarcoidosis with PA mean pressure greater than 30 mm Hg
- Scleroderma – restrictive
- Silicosis
- Sjogren’s syndrome
- Surfactant protein B deficiency
- Surfactant protein C deficiency
- Teratoma
- Wegener’s granuloma – restrictive

## **10.2 Lung Composite Score Exceptions**

If a candidate’s current lung composite allocation score does not appropriately prioritize the candidate for transplant, the candidate’s transplant program may submit an exception request to the Lung Review Board. A candidate’s lung composite allocation score cannot exceed 100, inclusive of score exceptions.

### **10.2.A Lung Review Board Composition**

For lung exceptions, there is a Lung Review Board.

The Lung Review Board reviews lung medical urgency score, lung post-transplant outcomes score, lung biological disadvantages score, and lung patient access score exceptions.

The Lung Transplantation Committee will develop and approve operational guidelines that detail the administrative details of the Lung Review Board operations. The Lung Transplantation Committee may develop clinical guidance documents for specific clinical scenarios. These guidelines may include appropriate documentation for the Lung Review Board to consider, appropriate clinical values, and suggested (but not automatically accepted) exception requests.

### **10.2.B Exception Requests**

An exception request must include all of the following:

1. Indication of the applicable goal in the composite allocation score
2. A request for a specific score
3. A justification of how the medical criteria supports the higher score for the candidate
4. An explanation of how the candidate’s current condition is comparable to that of other candidates with the requested score

Approved exception scores are valid until the candidate is transplanted, is removed from the lung waiting list, or withdraws the exception.

### **10.2.C Review of Exceptions**

The Lung Review Board must review exception requests within five days of the date the request is submitted to the Lung Review Board.



### **10.2.D Appeals to Lung Review Board**

If the Lung Review Board denies an exception request, the candidate's transplant program may appeal to the Lung Review Board within seven days of receiving the denial. The Lung Review Board must review appeals within five days of the date the appeal is submitted to the Lung Review Board.

### **10.2.E Appeals to Lung Transplantation Committee**

If the Lung Review Board denies an exception request on appeal, the candidate's transplant program may appeal to the Lung Transplantation Committee within seven days of receiving the denial. The Lung Transplantation Committee must review the appeal no later than fourteen days following the request to the Committee.

## **10.3 Clinical Values and Update Schedule**

Transplant programs must report to the OPTN clinical data corresponding with the factors outlined in *Policy 10.1.A.1: Waitlist Survival Points for Candidates at least 12 Years Old* and *10.1.B.1: Post-Transplant Outcomes Points for Candidates at Least 12 Years Old*. The data reported at the time of the candidate's registration on the lung transplant waiting list must be six months old or less from the date of the candidate's registration date, with the exception of the following values:

- Cardiac index (L/min/m<sup>2</sup>) at rest, prior to any exercise
- PA mean pressure
- Pulmonary artery (PA) systolic pressure (mm Hg) at rest, prior to any exercise

The transplant program must maintain source documentation for all clinical values reported in the candidate's medical chart.

### **10.3.A Lung Clinical Values That Must Be Updated Every 28 Days**

When a transplant program reports that a candidate on the lung waiting list is on continuous mechanical ventilation or ECMO, or requires supplemental oxygen provided via a high flow nasal cannula, the program must report the following values, assessed within the 28 days preceding the report:

- Amount of supplemental oxygen required to maintain adequate oxygen saturation (88% or greater) (L/min)
- Assisted ventilation status

The transplant program must continue to assess and report the amount of supplemental oxygen required to maintain adequate oxygen saturation (88% or greater) and assisted ventilation status every 28 days following the most recent assessment while the candidate remains on continuous mechanical ventilation or ECMO, or continues to require supplemental oxygen provided via a high flow nasal cannula.

### **10.3.B Lung Clinical Values That Must Be Updated Every Six Months**

Transplant hospitals must update all of the following clinical values at least once in every six month period following registration for each candidate on the lung waiting list:

- Bilirubin (mg/dL) value with the most recent test date and time
- Weight to determine body mass index (BMI) (kg/m<sup>2</sup>)
- Creatinine (serum) (mg/dL) value with the most recent test date and time
- Functional Status
- Amount of supplemental oxygen required to maintain adequate oxygen saturation (88% or greater) (L/min)
- PCO<sub>2</sub> (mm Hg)
- Six-minute-walk distance (feet) obtained while the candidate is receiving supplemental oxygen required to maintain an oxygen saturation of 88% or greater at rest. Increase in supplemental oxygen during this test is at the discretion of the center performing the test.
- Assisted ventilation status

The transplant program must maintain source documentation for all clinical values reported in the candidate's medical chart.

Candidates who are less than 12 years old and are assigned priority 1 based on evidence of respiratory failure in accordance with *Policy 10.1.A.2.a Candidates Less than 12 Years Old - Priority 1* will be assigned to priority 2 if the clinical values that qualify the candidates for priority 1 are more than six months old on the six-month anniversary of the candidate's listing date.

### **10.3.C Lung Clinical Values That Must Be Updated When Performed**

Transplant hospitals must report updated values for the following clinical values if they were obtained within any six month period following registration for each candidate at an active or inactive status.

- Cardiac index (L/min/m<sup>2</sup>) at rest, prior to any exercise
- PA mean pressure, if candidate's diagnosis is Sarcoidosis
- Pulmonary artery (PA) systolic pressure (mm Hg) at rest, prior to any exercise

The transplant program must maintain source documentation for all clinical values reported in the candidate's medical chart.

## **10.4 Eligibility Criteria**

### **10.4.A Eligibility for Intended Blood Group Incompatible Offers for Deceased Donor Lungs**

Incompatible blood types are defined in *Table 10-2: Incompatible Blood Groups for Deceased Donor Lungs*.

**Table 10-2: Incompatible Offers Blood Groups for Deceased Donor Lungs**

<u>Deceased Donor’s Blood Type</u>	<u>Candidate’s Blood Type</u>
<u>A</u>	<u>O and B</u>
<u>B</u>	<u>O and A</u>
<u>AB</u>	<u>O, A, and B</u>

Candidates with incompatible blood types will be screened from lung match runs unless the candidate meets the criteria for eligibility in Table 10-3: Eligibility for Intended Blood Group Incompatible Offers for Deceased Donor Lungs below.

**Table 10-3: Eligibility for Intended Blood Group Incompatible Offers for Deceased Donor Lungs**

<u>If the candidate is:</u>	<u>And meets <i>all</i> of the following:</u>
<u>Less than one year old at the time of the match run</u>	<ol style="list-style-type: none"> <li><u>Has a waiting list survival score of at least 1.9073</u></li> <li><u>Has reported isohemagglutinin titer information for A or B blood type antigens to the OPTN within the last 30 days</u></li> </ol>
<u>At least one year old at the time of the match run</u>	<ol style="list-style-type: none"> <li><u>Is registered prior to turning two years old</u></li> <li><u>Has a waiting list survival score of at least 1.9073</u></li> <li><u>Has reported to the OPTN isohemagglutinin titers less than or equal to 1:16 for A or B blood type antigens from a blood sample collected within the last 30 days. The candidate must not have received treatments that may have reduced isohemagglutinin titers to 1:16 or less within 30 days of when this blood sample was collected</u></li> </ol>

### **10.4.B Isohemagglutinin Titer Reporting Requirements for a Candidate Willing to Receive an Intended Blood Group Incompatible Lung**

If a laboratory provides more than one isohemagglutinin titer value for a tested blood sample, the transplant program must report the highest titer value to the OPTN.

Accurate isohemagglutinin titers must be reported for candidates eligible for an intended blood type incompatible lung, according to Table 10-4 below, at all of the following times:

1. Upon initially reporting that a candidate is willing to accept an intended blood type incompatible lung.
2. Every 30 days after initially reporting that a candidate is willing to accept an intended blood type incompatible lung.

**Table 10-4: Isohemagglutinin Titer Reporting Requirements for a Candidate Willing to Receive an Intended Blood Type Incompatible Lung**

<u>If the candidate's blood type is:</u>	<u>Then the transplant program must report the following isohemagglutinin titers to the OPTN:</u>
<u>A</u>	<u>Anti-B</u>
<u>B</u>	<u>Anti-A</u>
<u>O</u>	<u>Anti-A and Anti-B</u>

Accurate isohemagglutinin titers must be reported for recipients of an intended blood type incompatible lung, according to Table 10-5, as follows:

1. At transplant, from a blood sample taken within 24 hours prior to transplant.
2. If graft loss occurs within one year after transplant from the most recent sample, if available.
3. If recipient death occurs within one year after transplant from the most recent blood sample, if available.

**Table 10-5: Isohemagglutinin Titer Reporting Requirements for a Recipient of an Intended Blood Type Incompatible Lung**

<u>If the deceased donor's blood type is:</u>	<u>And the recipient's blood type is:</u>	<u>Then the transplant program must report the following isohemagglutinin titers to the OPTN:</u>
<u>A</u>	<u>B or O</u>	<u>Anti-A</u>
<u>B</u>	<u>A or O</u>	<u>Anti-B</u>
<u>AB</u>	<u>A</u>	<u>Anti-B</u>
<u>AB</u>	<u>B</u>	<u>Anti-A</u>
<u>AB</u>	<u>O</u>	<u>Anti-A and Anti-B</u>

## Policy 21: Composite Allocation Score Reference

### 21.1 Formulas

#### 21.1.A Waiting List Survival Formulas

##### 21.1.A.1 Lung Waitlist Area Under the Curve (WLAUC)

The area under the lung waiting list survival probability curve within one year (WLAUC) is calculated using the formula

$$WL_i = \sum_{k=1}^{365} S_{WL,i}(k-1)$$

The calculation for  $S_{WL,i}$  is in *Policy 21.1.A.2 Expected Lung Waiting List Survival Probability Within One Year*.

##### 21.1.A.2 Expected Lung Waiting List Survival Probability Within One Year

The formula used to calculate expected lung waiting list survival probability within one year is

$$S_{WL,i}(t) = S_{WL,0}(t) e^{\beta_1 X_{1i} + \beta_2 X_{2i} + \dots + \beta_p X_{pi}}$$

*Table 21-1: Expected Lung Waiting List Survival Probability Within One Year Variables* lists what each variable in the formula represents.

**Table 21-1 Expected Lung Waiting List Survival Probability Within One Year Variables**

<u>The variable</u>	<u>Represents</u>
$S_{WL,i}(t)$	the expected waiting list survival probability at time t for candidate i
$S_{WL,0}(t)$	the baseline waiting list survival probability at time t
$\beta_1, \beta_2, \dots, \beta_p$	the parameter estimates from the waiting list model (Table 21-5)
$X_{ji}$	the value of characteristic j for candidate i
i	1, 2, ..., N is the candidate identifier

##### 21.1.A.3 Converting Lung WLAUC to Lung Waiting List Survival Points

Waiting list Survival Points are equal to

$$\frac{(25^{(1-WLAUC/365)} - 1)}{24} * 25$$

## 21.1.B Post-Transplant Outcomes Formulas

### 21.1.B.1 Expected Lung Five years Post-Transplant Area Under the Curve (PTAUC)

The area under the post-transplant survival probability curve during the first five years post-transplant (PTAUC) is calculated using the formula

$$PT_i = \sum_{k=1}^{1826} S_{TX,i}(k)$$

### 21.1.B.2 Expected Lung Post-Transplant Survival Probability Within Five Years

The formula used to calculate expected lung post-transplant survival probability within five years is

$$S_{TX,i}(t) = S_{TX,0}(t) e^{\alpha_1 Y_1 + \alpha_2 Y_2 + \dots + \alpha_q Y_q}$$

*Table 21-2: Expected Lung Post-Transplant Survival Probability Within Five Years Variables* lists what each variable in the formula represents.

**Table 21-2 Expected Lung Post-Transplant Survival Probability Within Five Years Variables**

The variable	Represents
$S_{TX,i}(t)$	expected post-transplant survival probability at time t for candidate i
$S_{TX,0}(t)$	the baseline post-transplant survival probability at time t
$\alpha_1, \alpha_2, \dots, \alpha_q$	the parameter estimates from the post-transplant model (Table 21-8)
$Y_{ij}$	the value of characteristic j for candidate i
i	1, 2, ..., N is the candidate identifier

### 21.1.B.3 Converting Lung PTAUC to Lung Post-Transplant Outcomes Points

Post-Transplant Outcomes Points are equal to

$$(PTAUC/1826)*25$$

## 21.1.C Biological Disadvantages Formulas

### 21.1.C.1 Lung CPRA Points

The Lung CPRA points are equal to

$$((100^{CPRA}-1)/99)*5$$

The variable CPRA represents the probability of incompatibility based on the candidate's CPRA.

## **21.1.C.2 Lung Height Points**

The Lung Height points are equal to

$$\frac{((100^{HTIN}-1)/99)*5}{1}$$

The variable HTIN represents the probability of incompatibility based on the candidate’s height found in *Policy 21.2.C.1: Probability of Incompatible Lung Donors Based on Height*.

## **21.1.D Efficient Management Formulas**

### **21.1.D.1 Lung Travel Efficiency Points**

The Lung travel efficiency points are equal to

$$\frac{(1 - [6.3 * NM + 247.63 * (NM - 43.44) * I\{NM > 43.44\} - 104.44 * (NM - 67.17) * I\{NM > 67.17\} - 128.34 * (NM - 86.9) * I\{NM > 86.9\}] / 116989.1) * 5}{1}$$

The variable NM represents straight-line distance between donor hospital and candidate hospital in nautical miles.

### **21.1.D.2 Lung Proximity Efficiency Points**

The Lung proximity efficiency points are equal to

$$\frac{(I\{NM \leq 45\} + I\{NM \in (45,90)\}) * (1 - 0.15 / 45 * (NM - 45)) + I\{NM \geq 90\} * 0.875 / [1 + \exp(0.0025 * (NM - 1500))]}{1} * 5$$

The variable NM represents straight-line distance between donor hospital and candidate hospital in nautical miles.

## **21.2 Reference Values**

### **21.2.A Values Used in the Calculation of Lung Waiting List Survival**

*Table 21-3* provides the covariates and their coefficients for the waiting list mortality calculation. See *Policy 10.1.F.i: Lung Disease Diagnosis Groups* for specific information on each diagnosis group.

**Table 21-3: Waiting List Survival Calculation: Covariates and their Coefficients**

<u>For this covariate:</u>	<u>When</u>	<u>The following coefficient is used in the lung waiting list survival calculation:</u>
<u>Age at the time of the match run (fractional calendar year)</u>	<u>All candidates</u>	<u>0.0281444188123287*age</u>

<u>For this covariate:</u>	<u>When</u>	<u>The following coefficient is used in the lung waiting list survival calculation:</u>
<u>Bilirubin (mg/dL) value with the most recent test date and time</u>	<u>Bilirubin is more than 1.0 mg/dL</u>	<u>0.15572123729572*(bilirubin – 1)</u>
	<u>1.0 mg/dL or less</u>	<u>0</u>
<u>Body mass index (BMI) (kg/m<sup>2</sup>)</u>	<u>BMI less than 20 kg/m<sup>2</sup></u>	<u>0.10744133677215*(20 – BMI)</u>
	<u>BMI is at least 20 kg/m<sup>2</sup></u>	<u>0</u>
<u>Assisted ventilation</u>	<u>ECMO or continuous mechanical-hospitalized</u>	<u>1.57618530736936</u>
	<u>Not ECMO or continuous mechanical-hospitalized</u>	<u>0</u>
<u>Creatinine (serum) (mg/dL) with the most recent test date and time</u>	<u>Candidate is at least 18 years old</u>	<u>0.0996197163645* creatinine</u>
	<u>Candidate is less than 18 years old</u>	<u>0</u>
<u>Diagnosis Group</u>	<u>A</u>	<u>0</u>
<u>Diagnosis Group</u>	<u>B</u>	<u>1.26319338239175</u>
<u>Diagnosis Group</u>	<u>C</u>	<u>1.78024171092307</u>
<u>Diagnosis Group</u>	<u>D</u>	<u>1.51440083414275</u>
<u>Detailed diagnosis within group A</u>	<u>Bronchiectasis</u>	<u>0.40107198445555</u>
	<u>Sarcoidosis with PA mean pressure of 30 mm Hg or less</u>	<u>1.39885489102977</u>
	<u>Sarcoidosis with PA mean pressure missing</u>	<u>1.39885489102977</u>
<u>Detailed Diagnosis within group D</u>	<u>COVID-19: pulmonary fibrosis</u>	<u>0.2088684500011</u>



<u>For this covariate:</u>	<u>When</u>	<u>The following coefficient is used in the lung waiting list survival calculation:</u>
	<u>Pulmonary fibrosis, other</u>	<u>0.2088684500011</u>
	<u>Sarcoidosis with PA mean pressure greater than 30 mm Hg</u>	<u>-0.64590852776042</u>
<u>Functional Status</u>	<u>No assistance needed with activities of daily living</u>	<u>-0.59790409246653</u>
	<u>Some or total assistance needed with activities of daily living</u>	<u>0</u>
<u>Amount of supplemental oxygen required to maintain adequate oxygen saturation (88% or greater) (L/min)</u>	<u>At rest, Diagnosis Group B</u>	<u>0.0340531822566417*O<sub>2</sub></u>
	<u>At rest, Diagnosis Groups A, C, and D</u>	<u>0.08232292818591*O<sub>2</sub></u>
	<u>Not needed at rest</u>	<u>0</u>
<u>PCO<sub>2</sub> (mm Hg): current</u>	<u>PCO<sub>2</sub> is at least 40 mm Hg</u>	<u>0.12639905519026*PCO<sub>2</sub>/10</u>
<u>PCO<sub>2</sub> threshold change</u>	<u>PCO<sub>2</sub> increase is at least 15%</u>	<u>0.15556911866376</u>
	<u>PCO<sub>2</sub> increase is less than 15%</u>	<u>0</u>
<u>Pulmonary artery (PA) systolic pressure (mm Hg) at rest, prior to any exercise</u>	<u>Diagnosis Group A and the PA systolic pressure is greater than 40 mm Hg</u>	<u>0.55767046368853*(PA systolic – 40)/10</u>

<u>For this covariate:</u>	<u>When</u>	<u>The following coefficient is used in the lung waiting list survival calculation:</u>
	<u>Diagnosis Group A and the PA systolic pressure is 40 mm Hg or less</u>	<u>0</u>
	<u>Diagnosis Groups B, C, and D</u>	<u>0.1230478043299*PA systolic/10</u>
<u>Six-minute-walk distance (feet)</u>	<u>Obtained while the candidate is receiving supplemental oxygen required to maintain an oxygen saturation of 88% or greater at rest.</u>	<u>-0.09937981549564*Six-minute-walk distance/100</u>

If values for certain covariates are missing, expired, or below the threshold as defined by *Table 21-4*, then the composite allocation score calculation will substitute normal or least beneficial values to calculate the candidate's waiting list survival score. *Table 21-4* lists the normal and least beneficial values that will be substituted.

**Table 21-4: Values Substituted for Missing or Expired Actual Values in Calculating Waiting List Survival Score**

<u>If this covariate's value:</u>	<u>Is:</u>	<u>Then the waiting list survival calculation will use this substituted value:</u>
<u>Bilirubin</u>	<u>Missing, expired, or less than 0.7 mg/dL</u>	<u>0.7 mg/dL</u>
<u>Height or weight to determine body mass index (BMI)</u>	<u>Missing</u>	<u>100 kg/m<sup>2</sup></u>
<u>Weight to determine BMI</u>	<u>Expired</u>	<u>100 kg/m<sup>2</sup></u>
<u>Assisted ventilation</u>	<u>Missing or expired</u>	<u>No mechanical ventilation</u>
<u>Creatinine (serum) (mg/dL)</u>	<u>Missing or expired</u>	<u>0.1 mg/dL</u>
<u>Functional status</u>	<u>Missing or expired</u>	<u>No assistance needed</u>

<u>If this covariate's value:</u>	<u>Is:</u>	<u>Then the waiting list survival calculation will use this substituted value:</u>
<u>Amount of supplemental oxygen required to maintain adequate oxygen saturation (88% or greater) (L/min)</u>	<u>Missing or expired</u>	<u>No supplemental oxygen needed at rest</u>
<u>PCO<sub>2</sub></u>	<u>Missing, expired, or less than 40 mm Hg</u>	<u>40 mm Hg</u>
<u>Pulmonary artery (PA) systolic pressure</u>	<u>Missing or less than 20 mm Hg</u>	<u>20 mm Hg</u>
<u>Six-minute-walk distance</u>	<u>Missing or expired</u>	<u>4,000 feet</u>

### **21.2.A.1 PCO<sub>2</sub> Threshold Change in the Waiting List Survival Calculation**

The CAS calculation uses two measures of PCO<sub>2</sub>:

1. Current PCO<sub>2</sub>
2. PCO<sub>2</sub> Threshold Change

#### **Current PCO<sub>2</sub>**

Current PCO<sub>2</sub> is the PCO<sub>2</sub> value reported to the OPTN with the most recent test date and time. A program may report a PCO<sub>2</sub> value from an arterial, venous, or capillary blood gas test. All blood gas values will be converted to an arterial value as follows:

- A capillary value will equal an arterial value.
- A venous value minus 6 mmHg equals an arterial value.

#### **PCO<sub>2</sub> Threshold Change**

There are two PCO<sub>2</sub> threshold change calculations:

- The PCO<sub>2</sub> Threshold Change Calculation
- The Threshold Change Maintenance Calculation

#### **The PCO<sub>2</sub> Threshold Change Calculation**

An increase in PCO<sub>2</sub> that is at least 15% will impact a candidate's CAS. If a value is less than 40 mmHg, the system will substitute the normal clinical value of 40 mmHg before calculating change. The PCO<sub>2</sub> threshold change calculation uses the highest and lowest values of PCO<sub>2</sub> as follows:

- The test date and time of the lowest value reported to the OPTN used in the PCO<sub>2</sub> threshold change calculation must be earlier than the test date and time of the highest value used in the PCO<sub>2</sub> threshold change calculation.
- Test dates of these highest and lowest values cannot be more than six months apart.

- The PCO<sub>2</sub> threshold change calculation can use an expired lowest value, but cannot use an expired highest value.

If a current PCO<sub>2</sub> value expires according to Policy 10.3 Clinical Update Schedule, the candidate’s CAS will lose the impact from the PCO<sub>2</sub> threshold change calculation. The equation for the PCO<sub>2</sub> threshold change calculation is:

$$\frac{\text{Highest PCO}_2 - \text{Lowest PCO}_2}{\text{Lowest PCO}_2}$$

**The Threshold Change Maintenance Calculation**

When a 15% or greater PCO<sub>2</sub> threshold change calculation impacts a candidate’s CAS, the CAS threshold change maintenance calculation assesses whether to maintain that impact. To maintain the impact of the PCO<sub>2</sub> increase, the candidate’s current PCO<sub>2</sub> value must be at least 15% higher than the lowest value used in the PCO<sub>2</sub> threshold change calculation. The equation for this threshold change maintenance calculation is:

$$\frac{\text{Current PCO}_2 - \text{Lowest PCO}_2}{\text{Lowest PCO}_2}$$

The threshold change maintenance calculation occurs either when the current PCO<sub>2</sub> value expires, according to Policy 10.3 Clinical Update Schedule, or a new current PCO<sub>2</sub> value is entered. For this calculation, the lowest and highest values that were used in the PCO<sub>2</sub> threshold change calculation can be expired. The current PCO<sub>2</sub> value can be the highest one that was used in the PCO<sub>2</sub> threshold change calculation. If a current PCO<sub>2</sub> value expires, the candidate’s CAS will no longer be affected by the PCO<sub>2</sub> threshold change.

If a transplant hospital reports a new current PCO<sub>2</sub> value for a candidate who has lost the impact from the PCO<sub>2</sub> threshold change calculation, the CAS will perform the threshold change maintenance calculation. If the new current PCO<sub>2</sub> value is at least 15% higher than the lowest value used in the PCO<sub>2</sub> threshold change calculation, the candidate’s CAS will again be affected by the PCO<sub>2</sub> threshold change calculation.

**Normal PCO<sub>2</sub> Value**

The normal clinical PCO<sub>2</sub> value is 40mmHg. If a current PCO<sub>2</sub> value is below 40 mmHg, or if the current PCO<sub>2</sub> value is missing or expired, the CAS calculation will use the normal clinical PCO<sub>2</sub> value.

**21.2.A.2 Probabilities Used in Calculating Lung Waiting List Survival**

**Table 21-5: Baseline Waiting List Survival (SWL(t)) Probability Where t=Time in Days**

<u>T</u>	<u>S<sub>TX</sub>(t)</u>	<u>T</u>	<u>S<sub>TX</sub>(t)</u>	<u>T</u>	<u>S<sub>TX</sub>(t)</u>	<u>T</u>	<u>S<sub>TX</sub>(t)</u>
<u>0</u>	<u>1.000000</u>	<u>1</u>	<u>0.999998</u>	<u>2</u>	<u>0.999983</u>	<u>3</u>	<u>0.999956</u>

<u>T</u>	<u>S<sub>TX</sub>(t)</u>	<u>T</u>	<u>S<sub>TX</sub>(t)</u>	<u>T</u>	<u>S<sub>TX</sub>(t)</u>	<u>T</u>	<u>S<sub>TX</sub>(t)</u>
<u>4</u>	<u>0.999928</u>	<u>46</u>	<u>0.999002</u>	<u>88</u>	<u>0.998244</u>	<u>130</u>	<u>0.997610</u>
<u>5</u>	<u>0.999902</u>	<u>47</u>	<u>0.998978</u>	<u>89</u>	<u>0.998244</u>	<u>131</u>	<u>0.997599</u>
<u>6</u>	<u>0.999878</u>	<u>48</u>	<u>0.998967</u>	<u>90</u>	<u>0.998226</u>	<u>132</u>	<u>0.997584</u>
<u>7</u>	<u>0.999856</u>	<u>49</u>	<u>0.998949</u>	<u>91</u>	<u>0.998179</u>	<u>133</u>	<u>0.997577</u>
<u>8</u>	<u>0.999814</u>	<u>50</u>	<u>0.998922</u>	<u>92</u>	<u>0.998179</u>	<u>134</u>	<u>0.997570</u>
<u>9</u>	<u>0.999786</u>	<u>51</u>	<u>0.998886</u>	<u>93</u>	<u>0.998171</u>	<u>135</u>	<u>0.997570</u>
<u>10</u>	<u>0.999770</u>	<u>52</u>	<u>0.998852</u>	<u>94</u>	<u>0.998144</u>	<u>136</u>	<u>0.997561</u>
<u>11</u>	<u>0.999740</u>	<u>53</u>	<u>0.998843</u>	<u>95</u>	<u>0.998131</u>	<u>137</u>	<u>0.997552</u>
<u>12</u>	<u>0.999705</u>	<u>54</u>	<u>0.998843</u>	<u>96</u>	<u>0.998115</u>	<u>138</u>	<u>0.997540</u>
<u>13</u>	<u>0.999682</u>	<u>55</u>	<u>0.998821</u>	<u>97</u>	<u>0.998115</u>	<u>139</u>	<u>0.997540</u>
<u>14</u>	<u>0.999650</u>	<u>56</u>	<u>0.998815</u>	<u>98</u>	<u>0.998076</u>	<u>140</u>	<u>0.997540</u>
<u>15</u>	<u>0.999635</u>	<u>57</u>	<u>0.998772</u>	<u>99</u>	<u>0.998046</u>	<u>141</u>	<u>0.997540</u>
<u>16</u>	<u>0.999629</u>	<u>58</u>	<u>0.998734</u>	<u>100</u>	<u>0.998046</u>	<u>142</u>	<u>0.997540</u>
<u>17</u>	<u>0.999615</u>	<u>59</u>	<u>0.998725</u>	<u>101</u>	<u>0.998036</u>	<u>143</u>	<u>0.997534</u>
<u>18</u>	<u>0.999597</u>	<u>60</u>	<u>0.998703</u>	<u>102</u>	<u>0.998036</u>	<u>144</u>	<u>0.997534</u>
<u>19</u>	<u>0.999565</u>	<u>61</u>	<u>0.998703</u>	<u>103</u>	<u>0.998026</u>	<u>145</u>	<u>0.997534</u>
<u>20</u>	<u>0.999527</u>	<u>62</u>	<u>0.998665</u>	<u>104</u>	<u>0.997991</u>	<u>146</u>	<u>0.997530</u>
<u>21</u>	<u>0.999508</u>	<u>63</u>	<u>0.998665</u>	<u>105</u>	<u>0.997980</u>	<u>147</u>	<u>0.997515</u>
<u>22</u>	<u>0.999493</u>	<u>64</u>	<u>0.998660</u>	<u>106</u>	<u>0.997980</u>	<u>148</u>	<u>0.997504</u>
<u>23</u>	<u>0.999460</u>	<u>65</u>	<u>0.998630</u>	<u>107</u>	<u>0.997976</u>	<u>149</u>	<u>0.997499</u>
<u>24</u>	<u>0.999430</u>	<u>66</u>	<u>0.998617</u>	<u>108</u>	<u>0.997965</u>	<u>150</u>	<u>0.997492</u>
<u>25</u>	<u>0.999406</u>	<u>67</u>	<u>0.998575</u>	<u>109</u>	<u>0.997944</u>	<u>151</u>	<u>0.997477</u>
<u>26</u>	<u>0.999382</u>	<u>68</u>	<u>0.998570</u>	<u>110</u>	<u>0.997877</u>	<u>152</u>	<u>0.997477</u>
<u>27</u>	<u>0.999361</u>	<u>69</u>	<u>0.998567</u>	<u>111</u>	<u>0.997872</u>	<u>153</u>	<u>0.997455</u>
<u>28</u>	<u>0.999335</u>	<u>70</u>	<u>0.998556</u>	<u>112</u>	<u>0.997828</u>	<u>154</u>	<u>0.997410</u>
<u>29</u>	<u>0.999302</u>	<u>71</u>	<u>0.998510</u>	<u>113</u>	<u>0.997824</u>	<u>155</u>	<u>0.997335</u>
<u>30</u>	<u>0.999294</u>	<u>72</u>	<u>0.998494</u>	<u>114</u>	<u>0.997824</u>	<u>156</u>	<u>0.997335</u>
<u>31</u>	<u>0.999272</u>	<u>73</u>	<u>0.998490</u>	<u>115</u>	<u>0.997824</u>	<u>157</u>	<u>0.997327</u>
<u>32</u>	<u>0.999262</u>	<u>74</u>	<u>0.998431</u>	<u>116</u>	<u>0.997824</u>	<u>158</u>	<u>0.997321</u>
<u>33</u>	<u>0.999243</u>	<u>75</u>	<u>0.998413</u>	<u>117</u>	<u>0.997824</u>	<u>159</u>	<u>0.997315</u>
<u>34</u>	<u>0.999201</u>	<u>76</u>	<u>0.998403</u>	<u>118</u>	<u>0.997824</u>	<u>160</u>	<u>0.997294</u>
<u>35</u>	<u>0.999178</u>	<u>77</u>	<u>0.998391</u>	<u>119</u>	<u>0.997783</u>	<u>161</u>	<u>0.997294</u>
<u>36</u>	<u>0.999155</u>	<u>78</u>	<u>0.998391</u>	<u>120</u>	<u>0.997777</u>	<u>162</u>	<u>0.997294</u>
<u>37</u>	<u>0.999130</u>	<u>79</u>	<u>0.998379</u>	<u>121</u>	<u>0.997767</u>	<u>163</u>	<u>0.997273</u>
<u>38</u>	<u>0.999128</u>	<u>80</u>	<u>0.998370</u>	<u>122</u>	<u>0.997761</u>	<u>164</u>	<u>0.997273</u>
<u>39</u>	<u>0.999103</u>	<u>81</u>	<u>0.998363</u>	<u>123</u>	<u>0.997734</u>	<u>165</u>	<u>0.997273</u>
<u>40</u>	<u>0.999080</u>	<u>82</u>	<u>0.998347</u>	<u>124</u>	<u>0.997656</u>	<u>166</u>	<u>0.997269</u>
<u>41</u>	<u>0.999060</u>	<u>83</u>	<u>0.998314</u>	<u>125</u>	<u>0.997656</u>	<u>167</u>	<u>0.997223</u>
<u>42</u>	<u>0.999048</u>	<u>84</u>	<u>0.998306</u>	<u>126</u>	<u>0.997650</u>	<u>168</u>	<u>0.997223</u>
<u>43</u>	<u>0.999048</u>	<u>85</u>	<u>0.998295</u>	<u>127</u>	<u>0.997637</u>	<u>169</u>	<u>0.997218</u>
<u>44</u>	<u>0.999036</u>	<u>86</u>	<u>0.998257</u>	<u>128</u>	<u>0.997610</u>	<u>170</u>	<u>0.997209</u>
<u>45</u>	<u>0.999036</u>	<u>87</u>	<u>0.998244</u>	<u>129</u>	<u>0.997610</u>	<u>171</u>	<u>0.997209</u>

<u>T</u>	<u>S<sub>TX</sub>(t)</u>	<u>T</u>	<u>S<sub>TX</sub>(t)</u>	<u>T</u>	<u>S<sub>TX</sub>(t)</u>	<u>T</u>	<u>S<sub>TX</sub>(t)</u>
<u>172</u>	<u>0.997209</u>	<u>214</u>	<u>0.996621</u>	<u>256</u>	<u>0.995938</u>	<u>298</u>	<u>0.995439</u>
<u>173</u>	<u>0.997209</u>	<u>215</u>	<u>0.996621</u>	<u>257</u>	<u>0.995938</u>	<u>299</u>	<u>0.995439</u>
<u>174</u>	<u>0.997209</u>	<u>216</u>	<u>0.996614</u>	<u>258</u>	<u>0.995927</u>	<u>300</u>	<u>0.995414</u>
<u>175</u>	<u>0.997183</u>	<u>217</u>	<u>0.996602</u>	<u>259</u>	<u>0.995927</u>	<u>301</u>	<u>0.995414</u>
<u>176</u>	<u>0.997169</u>	<u>218</u>	<u>0.996579</u>	<u>260</u>	<u>0.995923</u>	<u>302</u>	<u>0.995385</u>
<u>177</u>	<u>0.997169</u>	<u>219</u>	<u>0.996579</u>	<u>261</u>	<u>0.995923</u>	<u>303</u>	<u>0.995358</u>
<u>178</u>	<u>0.997169</u>	<u>220</u>	<u>0.996574</u>	<u>262</u>	<u>0.995923</u>	<u>304</u>	<u>0.995345</u>
<u>179</u>	<u>0.997169</u>	<u>221</u>	<u>0.996524</u>	<u>263</u>	<u>0.995923</u>	<u>305</u>	<u>0.995345</u>
<u>180</u>	<u>0.997160</u>	<u>222</u>	<u>0.996511</u>	<u>264</u>	<u>0.995923</u>	<u>306</u>	<u>0.995345</u>
<u>181</u>	<u>0.997160</u>	<u>223</u>	<u>0.996439</u>	<u>265</u>	<u>0.995923</u>	<u>307</u>	<u>0.995309</u>
<u>182</u>	<u>0.997132</u>	<u>224</u>	<u>0.996439</u>	<u>266</u>	<u>0.995895</u>	<u>308</u>	<u>0.995296</u>
<u>183</u>	<u>0.997113</u>	<u>225</u>	<u>0.996423</u>	<u>267</u>	<u>0.995794</u>	<u>309</u>	<u>0.995296</u>
<u>184</u>	<u>0.997113</u>	<u>226</u>	<u>0.996423</u>	<u>268</u>	<u>0.995794</u>	<u>310</u>	<u>0.995274</u>
<u>185</u>	<u>0.997109</u>	<u>227</u>	<u>0.996412</u>	<u>269</u>	<u>0.995778</u>	<u>311</u>	<u>0.995274</u>
<u>186</u>	<u>0.997099</u>	<u>228</u>	<u>0.996388</u>	<u>270</u>	<u>0.995778</u>	<u>312</u>	<u>0.995251</u>
<u>187</u>	<u>0.997099</u>	<u>229</u>	<u>0.996388</u>	<u>271</u>	<u>0.995778</u>	<u>313</u>	<u>0.995251</u>
<u>188</u>	<u>0.997099</u>	<u>230</u>	<u>0.996368</u>	<u>272</u>	<u>0.995778</u>	<u>314</u>	<u>0.995251</u>
<u>189</u>	<u>0.997099</u>	<u>231</u>	<u>0.996368</u>	<u>273</u>	<u>0.995778</u>	<u>315</u>	<u>0.995228</u>
<u>190</u>	<u>0.997099</u>	<u>232</u>	<u>0.996368</u>	<u>274</u>	<u>0.995770</u>	<u>316</u>	<u>0.995228</u>
<u>191</u>	<u>0.997099</u>	<u>233</u>	<u>0.996368</u>	<u>275</u>	<u>0.995764</u>	<u>317</u>	<u>0.995228</u>
<u>192</u>	<u>0.997099</u>	<u>234</u>	<u>0.996368</u>	<u>276</u>	<u>0.995741</u>	<u>318</u>	<u>0.995167</u>
<u>193</u>	<u>0.997099</u>	<u>235</u>	<u>0.996368</u>	<u>277</u>	<u>0.995726</u>	<u>319</u>	<u>0.995131</u>
<u>194</u>	<u>0.997091</u>	<u>236</u>	<u>0.996368</u>	<u>278</u>	<u>0.995726</u>	<u>320</u>	<u>0.995131</u>
<u>195</u>	<u>0.997067</u>	<u>237</u>	<u>0.996368</u>	<u>279</u>	<u>0.995726</u>	<u>321</u>	<u>0.995131</u>
<u>196</u>	<u>0.996968</u>	<u>238</u>	<u>0.996368</u>	<u>280</u>	<u>0.995726</u>	<u>322</u>	<u>0.995131</u>
<u>197</u>	<u>0.996968</u>	<u>239</u>	<u>0.996368</u>	<u>281</u>	<u>0.995691</u>	<u>323</u>	<u>0.995131</u>
<u>198</u>	<u>0.996968</u>	<u>240</u>	<u>0.996368</u>	<u>282</u>	<u>0.995691</u>	<u>324</u>	<u>0.995080</u>
<u>199</u>	<u>0.996959</u>	<u>241</u>	<u>0.996258</u>	<u>283</u>	<u>0.995691</u>	<u>325</u>	<u>0.995080</u>
<u>200</u>	<u>0.996959</u>	<u>242</u>	<u>0.996258</u>	<u>284</u>	<u>0.995691</u>	<u>326</u>	<u>0.995080</u>
<u>201</u>	<u>0.996945</u>	<u>243</u>	<u>0.996195</u>	<u>285</u>	<u>0.995680</u>	<u>327</u>	<u>0.995080</u>
<u>202</u>	<u>0.996861</u>	<u>244</u>	<u>0.996195</u>	<u>286</u>	<u>0.995680</u>	<u>328</u>	<u>0.995080</u>
<u>203</u>	<u>0.996838</u>	<u>245</u>	<u>0.996195</u>	<u>287</u>	<u>0.995680</u>	<u>329</u>	<u>0.995080</u>
<u>204</u>	<u>0.996838</u>	<u>246</u>	<u>0.996096</u>	<u>288</u>	<u>0.995661</u>	<u>330</u>	<u>0.995080</u>
<u>205</u>	<u>0.996825</u>	<u>247</u>	<u>0.996044</u>	<u>289</u>	<u>0.995661</u>	<u>331</u>	<u>0.995080</u>
<u>206</u>	<u>0.996819</u>	<u>248</u>	<u>0.996025</u>	<u>290</u>	<u>0.995639</u>	<u>332</u>	<u>0.995067</u>
<u>207</u>	<u>0.996819</u>	<u>249</u>	<u>0.995988</u>	<u>291</u>	<u>0.995639</u>	<u>333</u>	<u>0.994986</u>
<u>208</u>	<u>0.996819</u>	<u>250</u>	<u>0.995974</u>	<u>292</u>	<u>0.995548</u>	<u>334</u>	<u>0.994951</u>
<u>209</u>	<u>0.996819</u>	<u>251</u>	<u>0.995974</u>	<u>293</u>	<u>0.995548</u>	<u>335</u>	<u>0.994951</u>
<u>210</u>	<u>0.996810</u>	<u>252</u>	<u>0.995955</u>	<u>294</u>	<u>0.995505</u>	<u>336</u>	<u>0.994951</u>
<u>211</u>	<u>0.996796</u>	<u>253</u>	<u>0.995955</u>	<u>295</u>	<u>0.995498</u>	<u>337</u>	<u>0.994937</u>
<u>212</u>	<u>0.996717</u>	<u>254</u>	<u>0.995938</u>	<u>296</u>	<u>0.995479</u>	<u>338</u>	<u>0.994937</u>
<u>213</u>	<u>0.996636</u>	<u>255</u>	<u>0.995938</u>	<u>297</u>	<u>0.995464</u>	<u>339</u>	<u>0.994937</u>

<b>340</b>	<u>0.994937</u>	<b>347</b>	<u>0.994738</u>	<b>354</b>	<u>0.994585</u>	<b>361</b>	<u>0.994477</u>
<b>341</b>	<u>0.994937</u>	<b>348</b>	<u>0.994695</u>	<b>355</b>	<u>0.994585</u>	<b>362</b>	<u>0.994477</u>
<b>342</b>	<u>0.994937</u>	<b>349</b>	<u>0.994685</u>	<b>356</b>	<u>0.994572</u>	<b>363</b>	<u>0.994477</u>
<b>343</b>	<u>0.994937</u>	<b>350</b>	<u>0.994685</u>	<b>357</b>	<u>0.994527</u>	<b>364</b>	<u>0.994390</u>
<b>344</b>	<u>0.994842</u>	<b>351</b>	<u>0.994685</u>	<b>358</b>	<u>0.994527</u>		
<b>345</b>	<u>0.994842</u>	<b>352</b>	<u>0.994685</u>	<b>359</b>	<u>0.994527</u>		
<b>346</b>	<u>0.994842</u>	<b>353</b>	<u>0.994685</u>	<b>360</b>	<u>0.994477</u>		

## 21.2.B Values Used in the Calculation of Post-Transplant Outcomes

### 21.2.B.1 Coefficients Used in Calculating Lung Post-Transplant Outcomes

*Table 21-6: Post-Transplant Outcomes Calculation: Covariates and Their Coefficients* lists the covariates and corresponding coefficients in the waiting list and post-transplant survival measures. See *Policy 10.1.F: Lung Disease Diagnosis Groups* for specific information on each diagnosis group.

**Table 21-6: Post-Transplant Outcomes Calculation: Covariates and Their Coefficients**

<u>For this covariate</u>	<u>When</u>	<u>The following coefficient is used in the lung post-transplant outcomes score calculation</u>
<u>Age at the time of the match run (fractional calendar year)</u>	<u>age is less than 20</u>	<u><math>0.0676308559079852 \times (20 - \text{age}) + 0.78241832</math></u>
	<u>age is at least 20 and less than 30</u>	<u><math>-0.0782418319259552 \times (\text{age} - 20) + 0.78241832</math></u>
	<u>age is at least 30 and less than 40</u>	<u>0</u>
	<u>age is at least 40 and less than 50</u>	<u><math>0.0025908121347866 \times (\text{age} - 40)</math></u>
	<u>age is at least 50 and less than 60</u>	<u><math>0.0167463361760962 \times (\text{age} - 50) + 0.02590812</math></u>
	<u>age is at least 60 and less than 70</u>	<u><math>0.0227144625797883 \times (\text{age} - 60) + 0.19337148</math></u>
	<u>age is at least 70</u>	<u><math>0.0612288624399672 \times (\text{age} - 70) + 0.42051611</math></u>
<u>Creatinine (serum) (mg/dL) with the most recent test date and time</u>	<u>creatinine is less than 0.4 and candidate is at least 18 years old</u>	<u><math>-7.4016726145812200 \times (0.4 - \text{creatinine}) + 0.41872820</math></u>
	<u>creatinine is at least 0.4 and less than 0.6 and candidate is at least 18 years old</u>	<u><math>-1.2584103289549000 \times (\text{creatinine} - 0.4) + 0.41872820</math></u>

<u>For this covariate</u>	<u>When</u>	<u>The following coefficient is used in the lung post-transplant outcomes score calculation</u>
	<u>creatinine is at least 0.6 and less than 0.8 and candidate is at least 18 years old</u>	<u>0.3712348866558860 x (creatinine - 0.6) + 0.16704614</u>
	<u>creatinine is at least 0.8 and less than 1.4 and candidate is at least 18 years old</u>	<u>0.6844301806854400 x (creatinine - 0.8) + 0.24129311</u>
	<u>creatinine is at least 1.4 and candidate is at least 18 years old</u>	<u>0.6881894154264970 x (creatinine - 1.4) + 0.65195122</u>
	<u>Candidate is less than 18 years old</u>	<u>0</u>
<u>Cardiac index (L/min/m<sup>2</sup>) at rest, prior to any exercise</u>	<u>Less than 2 L/min/m<sup>2</sup></u>	<u>-0.4837491139906200 x (2 - cardiac index) + 0.04030226</u>
	<u>At least 2 and less than 2.5 L/min/m<sup>2</sup></u>	<u>-0.0806045255202868 x (cardiac index - 2) + 0.04030226</u>
	<u>At least 2.5 and less than 3.5 L/min/m<sup>2</sup></u>	<u>0.0136169358319050 x (cardiac index - 2.5)</u>
	<u>At least 3.5 and less than 4.5 L/min/m<sup>2</sup></u>	<u>0.0808432592591954 x (cardiac index - 3.5) + 0.01361694</u>
	<u>At least 4.5 and less than 5 L/min/m<sup>2</sup></u>	<u>0.0696938839239190 x (cardiac index - 4.5) + 0.09446020</u>
	<u>At least 5 L/min/m<sup>2</sup></u>	<u>-0.0023264599609358 x (cardiac index - 5) + 0.12930714</u>
<u>Assisted ventilation</u>	<u>ECMO or continuous mechanical-hospitalized</u>	<u>0.267537018672253</u>
	<u>not ECMO or continuous mechanical-hospitalized</u>	<u>0</u>
<u>Diagnosis Group</u>	<u>A</u>	<u>-0.098901796</u>
	<u>B</u>	<u>0</u>
	<u>C</u>	<u>-0.167126401</u>
	<u>D</u>	<u>0</u>
<u>Detailed diagnosis within Group A</u>	<u>Bronchiectasis</u>	<u>-0.026706663</u>
	<u>Lymphangiomyomatosis</u>	<u>-0.271420386</u>
	<u>Sarcoidosis with PA mean pressure of 30 mm Hg or less</u>	<u>0.501743373724746</u>



<u>For this covariate</u>	<u>When</u>	<u>The following coefficient is used in the lung post-transplant outcomes score calculation</u>
	<u>Sarcoidosis with PA mean pressure missing</u>	<u>0.501743373724746</u>
<u>Detailed diagnosis within Group D</u>	<u>COVID-19: pulmonary fibrosis</u>	<u>0.046504644</u>
	<u>Obliterative bronchiolitis (non-retransplant)</u>	<u>-0.132634978</u>
	<u>Constrictive bronchiolitis</u>	<u>-0.132634978</u>
	<u>Sarcoidosis with PA mean pressure greater than 30 mm Hg</u>	<u>0.0561853179859775</u>
	<u>Pulmonary fibrosis, other</u>	<u>0.046504644</u>
<u>Functional Status</u>	<u>No assistance needed with activities of daily living</u>	<u>-0.005304128</u>
	<u>Some assistance needed with activities of daily living</u>	<u>0</u>
	<u>Total assistance needed with activities of daily living</u>	<u>0.074378407</u>
<u>Six-minute-walk distance (feet) obtained while candidate is receiving supplemental oxygen required to maintain an oxygen saturation of 88% or greater at rest. Increase in supplemental oxygen during this test is at the discretion of the center performing the test.</u>	<u>Less than 200 feet</u>	<u>-0.0002535116049789 x (200 - Six-minute-walk distance) + 0.11168755</u>
	<u>At least 200 feet and less than 600 feet</u>	<u>-0.0002841805913329 x (Six-minute-walk distance - 200) + 0.11168755</u>
	<u>At least 600 feet and less than 800 feet</u>	<u>-0.0000049617083362 x (Six-minute-walk distance - 600) - 0.00198468</u>
	<u>At least 800 feet and less than 1,200 feet</u>	<u>-0.0001950464256370 x (Six-minute-walk distance - 800) - 0.00297703</u>
	<u>At least 1,200 feet and less than 1,600 feet</u>	<u>-0.0007428583659073 x (Six-minute-walk distance - 1200) - 0.08099560</u>
	<u>At least 1,600 feet</u>	<u>0.0035374143842919 x (Six-minute-walk distance - 1600) - 0.37813894</u>

If values for certain covariates are missing, expired, or below the threshold as defined by *Table 10-4*, then the composite allocation score calculation will substitute normal or least beneficial values to calculate the candidate's post-transplant outcomes score. *Table 21-7: Values Substituted for Missing or Expired Actual Values in Calculating Post-Transplant Outcomes Score* lists the normal and least beneficial values that will be substituted.

**Table 21-7: Values Substituted for Missing or Expired Actual Values in Calculating Post-Transplant Outcomes Score**

<u>If this covariate's value:</u>	<u>Is:</u>	<u>Then the post-transplant outcomes score calculation will use this substituted value:</u>
<u>Cardiac index</u>	<u>Missing, or greater than 5</u>	<u>5.0 L/min/m<sup>2</sup></u>
<u>Assisted ventilation</u>	<u>Missing or expired</u>	<u>Continuous mechanical ventilation while hospitalized</u>
<u>Creatinine (serum) (mg/dL)</u>	<u>Missing, expired or greater than 1.6</u>	<u>1.6 mg/dL</u>
<u>Functional status</u>	<u>Missing or expired</u>	<u>Total assistance needed</u>
<u>Six-minute-walk distance</u>	<u>Missing or expired</u>	<u>200 feet</u>
	<u>Greater than 1,600</u>	<u>1,600 feet</u>

### **21.2.B.2 Probabilities Used in Calculating Lung Post-Transplant Survival**

**Table 21-8: Baseline Post-Transplant Survival ( $S_{TX}(t)$ ) Probability Where t=Time in Days**

<u>t</u>	<u><math>S_{TX}(t)</math></u>	<u>t</u>	<u><math>S_{TX}(t)</math></u>	<u>t</u>	<u><math>S_{TX}(t)</math></u>	<u>t</u>	<u><math>S_{TX}(t)</math></u>
<u>0</u>	<u>1</u>	<u>16</u>	<u>0.989747</u>	<u>32</u>	<u>0.984048</u>	<u>48</u>	<u>0.979687</u>
<u>1</u>	<u>0.999154</u>	<u>17</u>	<u>0.989294</u>	<u>33</u>	<u>0.983592</u>	<u>49</u>	<u>0.979484</u>
<u>2</u>	<u>0.998058</u>	<u>18</u>	<u>0.988942</u>	<u>34</u>	<u>0.98344</u>	<u>50</u>	<u>0.979484</u>
<u>3</u>	<u>0.997111</u>	<u>19</u>	<u>0.98864</u>	<u>35</u>	<u>0.983238</u>	<u>51</u>	<u>0.979179</u>
<u>4</u>	<u>0.996312</u>	<u>20</u>	<u>0.988287</u>	<u>36</u>	<u>0.982731</u>	<u>52</u>	<u>0.978772</u>
<u>5</u>	<u>0.995562</u>	<u>21</u>	<u>0.988086</u>	<u>37</u>	<u>0.982478</u>	<u>53</u>	<u>0.978772</u>
<u>6</u>	<u>0.995162</u>	<u>22</u>	<u>0.987633</u>	<u>38</u>	<u>0.982225</u>	<u>54</u>	<u>0.978467</u>
<u>7</u>	<u>0.994562</u>	<u>23</u>	<u>0.98738</u>	<u>39</u>	<u>0.981616</u>	<u>55</u>	<u>0.978162</u>
<u>8</u>	<u>0.994011</u>	<u>24</u>	<u>0.986977</u>	<u>40</u>	<u>0.981363</u>	<u>56</u>	<u>0.977857</u>
<u>9</u>	<u>0.99336</u>	<u>25</u>	<u>0.986574</u>	<u>41</u>	<u>0.981007</u>	<u>57</u>	<u>0.977653</u>
<u>10</u>	<u>0.992859</u>	<u>26</u>	<u>0.986473</u>	<u>42</u>	<u>0.980957</u>	<u>58</u>	<u>0.977347</u>
<u>11</u>	<u>0.992107</u>	<u>27</u>	<u>0.986069</u>	<u>43</u>	<u>0.980652</u>	<u>59</u>	<u>0.977195</u>
<u>12</u>	<u>0.991806</u>	<u>28</u>	<u>0.985917</u>	<u>44</u>	<u>0.980297</u>	<u>60</u>	<u>0.977042</u>
<u>13</u>	<u>0.991154</u>	<u>29</u>	<u>0.985463</u>	<u>45</u>	<u>0.980144</u>	<u>61</u>	<u>0.976634</u>
<u>14</u>	<u>0.990802</u>	<u>30</u>	<u>0.984907</u>	<u>46</u>	<u>0.980043</u>	<u>62</u>	<u>0.976431</u>
<u>15</u>	<u>0.99025</u>	<u>31</u>	<u>0.984705</u>	<u>47</u>	<u>0.97989</u>	<u>63</u>	<u>0.976125</u>

$t$	$S_{TX}(t)$	$t$	$S_{TX}(t)$	$t$	$S_{TX}(t)$	$t$	$S_{TX}(t)$
64	0.976074	105	0.970398	146	0.96479	187	0.958994
65	0.975921	106	0.970346	147	0.964481	188	0.958943
66	0.975717	107	0.970193	148	0.964377	189	0.958839
67	0.975666	108	0.969987	149	0.964223	190	0.958579
68	0.975513	109	0.969885	150	0.964068	191	0.958475
69	0.975411	110	0.969731	151	0.963913	192	0.958164
70	0.975156	111	0.969474	152	0.963913	193	0.958008
71	0.974748	112	0.969423	153	0.963655	194	0.957852
72	0.974645	113	0.969269	154	0.963345	195	0.9578
73	0.974441	114	0.969115	155	0.963241	196	0.9578
74	0.974339	115	0.968755	156	0.963138	197	0.957644
75	0.974339	116	0.968652	157	0.963035	198	0.957384
76	0.974339	117	0.968395	158	0.96288	199	0.957176
77	0.974288	118	0.968292	159	0.962724	200	0.957072
78	0.974186	119	0.967984	160	0.962621	201	0.956864
79	0.974083	120	0.967932	161	0.962518	202	0.956604
80	0.973981	121	0.967675	162	0.962414	203	0.956396
81	0.973879	122	0.967572	163	0.962311	204	0.95624
82	0.973828	123	0.967469	164	0.962207	205	0.955928
83	0.973726	124	0.967315	165	0.962052	206	0.955824
84	0.973675	125	0.967161	166	0.961845	207	0.955772
85	0.973572	126	0.967161	167	0.961741	208	0.955511
86	0.97347	127	0.966955	168	0.961638	209	0.955303
87	0.973214	128	0.966903	169	0.961586	210	0.955147
88	0.972908	129	0.966852	170	0.961483	211	0.954886
89	0.972703	130	0.966749	171	0.961275	212	0.95473
90	0.972549	131	0.966697	172	0.961224	213	0.954678
91	0.972549	132	0.966646	173	0.961017	214	0.954469
92	0.972396	133	0.966543	174	0.960913	215	0.954313
93	0.972396	134	0.966543	175	0.960706	216	0.954156
94	0.972242	135	0.96644	176	0.96055	217	0.954052
95	0.971884	136	0.966388	177	0.960447	218	0.954
96	0.971884	137	0.966131	178	0.960239	219	0.953843
97	0.971782	138	0.965925	179	0.960187	220	0.953739
98	0.971474	139	0.965925	180	0.960032	221	0.953634
99	0.971423	140	0.965615	181	0.959928	222	0.953478
100	0.971064	141	0.965461	182	0.959876	223	0.953269
101	0.970808	142	0.965358	183	0.959565	224	0.95306
102	0.970757	143	0.965254	184	0.959513	225	0.952956
103	0.970552	144	0.965151	185	0.959358	226	0.952799
104	0.970398	145	0.964842	186	0.95915	227	0.952642

<u>t</u>	<u>S<sub>TX</sub>(t)</u>	<u>t</u>	<u>S<sub>TX</sub>(t)</u>	<u>t</u>	<u>S<sub>TX</sub>(t)</u>	<u>t</u>	<u>S<sub>TX</sub>(t)</u>
<u>228</u>	<u>0.952329</u>	<u>269</u>	<u>0.946461</u>	<u>310</u>	<u>0.940876</u>	<u>351</u>	<u>0.935259</u>
<u>229</u>	<u>0.952277</u>	<u>270</u>	<u>0.946198</u>	<u>311</u>	<u>0.940771</u>	<u>352</u>	<u>0.935047</u>
<u>230</u>	<u>0.952016</u>	<u>271</u>	<u>0.945935</u>	<u>312</u>	<u>0.940559</u>	<u>353</u>	<u>0.934887</u>
<u>231</u>	<u>0.951963</u>	<u>272</u>	<u>0.945935</u>	<u>313</u>	<u>0.9404</u>	<u>354</u>	<u>0.934728</u>
<u>232</u>	<u>0.951702</u>	<u>273</u>	<u>0.94583</u>	<u>314</u>	<u>0.940295</u>	<u>355</u>	<u>0.934728</u>
<u>233</u>	<u>0.95165</u>	<u>274</u>	<u>0.945778</u>	<u>315</u>	<u>0.940189</u>	<u>356</u>	<u>0.934675</u>
<u>234</u>	<u>0.95144</u>	<u>275</u>	<u>0.945567</u>	<u>316</u>	<u>0.94003</u>	<u>357</u>	<u>0.934462</u>
<u>235</u>	<u>0.951074</u>	<u>276</u>	<u>0.945462</u>	<u>317</u>	<u>0.939925</u>	<u>358</u>	<u>0.934196</u>
<u>236</u>	<u>0.950813</u>	<u>277</u>	<u>0.94541</u>	<u>318</u>	<u>0.939766</u>	<u>359</u>	<u>0.934037</u>
<u>237</u>	<u>0.950603</u>	<u>278</u>	<u>0.945199</u>	<u>319</u>	<u>0.939713</u>	<u>360</u>	<u>0.933877</u>
<u>238</u>	<u>0.950446</u>	<u>279</u>	<u>0.945147</u>	<u>320</u>	<u>0.93966</u>	<u>361</u>	<u>0.933664</u>
<u>239</u>	<u>0.950342</u>	<u>280</u>	<u>0.944989</u>	<u>321</u>	<u>0.939607</u>	<u>362</u>	<u>0.933664</u>
<u>240</u>	<u>0.950342</u>	<u>281</u>	<u>0.944936</u>	<u>322</u>	<u>0.939501</u>	<u>363</u>	<u>0.933664</u>
<u>241</u>	<u>0.950289</u>	<u>282</u>	<u>0.944831</u>	<u>323</u>	<u>0.939342</u>	<u>364</u>	<u>0.933664</u>
<u>242</u>	<u>0.950185</u>	<u>283</u>	<u>0.94462</u>	<u>324</u>	<u>0.939342</u>	<u>365</u>	<u>0.933664</u>
<u>243</u>	<u>0.950028</u>	<u>284</u>	<u>0.94462</u>	<u>325</u>	<u>0.939078</u>	<u>366</u>	<u>0.933505</u>
<u>244</u>	<u>0.949923</u>	<u>285</u>	<u>0.944515</u>	<u>326</u>	<u>0.938972</u>	<u>367</u>	<u>0.933239</u>
<u>245</u>	<u>0.949713</u>	<u>286</u>	<u>0.944357</u>	<u>327</u>	<u>0.938919</u>	<u>368</u>	<u>0.932866</u>
<u>246</u>	<u>0.949713</u>	<u>287</u>	<u>0.944094</u>	<u>328</u>	<u>0.938707</u>	<u>369</u>	<u>0.932653</u>
<u>247</u>	<u>0.949556</u>	<u>288</u>	<u>0.943936</u>	<u>329</u>	<u>0.938495</u>	<u>370</u>	<u>0.932546</u>
<u>248</u>	<u>0.949556</u>	<u>289</u>	<u>0.943831</u>	<u>330</u>	<u>0.938389</u>	<u>371</u>	<u>0.93228</u>
<u>249</u>	<u>0.949399</u>	<u>290</u>	<u>0.943673</u>	<u>331</u>	<u>0.938177</u>	<u>372</u>	<u>0.931854</u>
<u>250</u>	<u>0.949137</u>	<u>291</u>	<u>0.943356</u>	<u>332</u>	<u>0.938124</u>	<u>373</u>	<u>0.931801</u>
<u>251</u>	<u>0.949085</u>	<u>292</u>	<u>0.943198</u>	<u>333</u>	<u>0.937913</u>	<u>374</u>	<u>0.931747</u>
<u>252</u>	<u>0.949032</u>	<u>293</u>	<u>0.942987</u>	<u>334</u>	<u>0.937701</u>	<u>375</u>	<u>0.931641</u>
<u>253</u>	<u>0.94898</u>	<u>294</u>	<u>0.942882</u>	<u>335</u>	<u>0.937435</u>	<u>376</u>	<u>0.931481</u>
<u>254</u>	<u>0.94877</u>	<u>295</u>	<u>0.942777</u>	<u>336</u>	<u>0.93717</u>	<u>377</u>	<u>0.931374</u>
<u>255</u>	<u>0.948613</u>	<u>296</u>	<u>0.942777</u>	<u>337</u>	<u>0.936905</u>	<u>378</u>	<u>0.931267</u>
<u>256</u>	<u>0.948193</u>	<u>297</u>	<u>0.942513</u>	<u>338</u>	<u>0.93664</u>	<u>379</u>	<u>0.930947</u>
<u>257</u>	<u>0.947931</u>	<u>298</u>	<u>0.94246</u>	<u>339</u>	<u>0.936534</u>	<u>380</u>	<u>0.930947</u>
<u>258</u>	<u>0.947826</u>	<u>299</u>	<u>0.942302</u>	<u>340</u>	<u>0.936428</u>	<u>381</u>	<u>0.930787</u>
<u>259</u>	<u>0.947774</u>	<u>300</u>	<u>0.942196</u>	<u>341</u>	<u>0.936162</u>	<u>382</u>	<u>0.930627</u>
<u>260</u>	<u>0.947616</u>	<u>301</u>	<u>0.941985</u>	<u>342</u>	<u>0.936056</u>	<u>383</u>	<u>0.930147</u>
<u>261</u>	<u>0.947459</u>	<u>302</u>	<u>0.941985</u>	<u>343</u>	<u>0.936003</u>	<u>384</u>	<u>0.929987</u>
<u>262</u>	<u>0.947406</u>	<u>303</u>	<u>0.941827</u>	<u>344</u>	<u>0.93595</u>	<u>385</u>	<u>0.929666</u>
<u>263</u>	<u>0.947301</u>	<u>304</u>	<u>0.941774</u>	<u>345</u>	<u>0.935897</u>	<u>386</u>	<u>0.929506</u>
<u>264</u>	<u>0.947196</u>	<u>305</u>	<u>0.94151</u>	<u>346</u>	<u>0.935737</u>	<u>387</u>	<u>0.929453</u>
<u>265</u>	<u>0.946986</u>	<u>306</u>	<u>0.941405</u>	<u>347</u>	<u>0.935631</u>	<u>388</u>	<u>0.929292</u>
<u>266</u>	<u>0.946881</u>	<u>307</u>	<u>0.941352</u>	<u>348</u>	<u>0.935578</u>	<u>389</u>	<u>0.929079</u>
<u>267</u>	<u>0.946724</u>	<u>308</u>	<u>0.941193</u>	<u>349</u>	<u>0.935472</u>	<u>390</u>	<u>0.928865</u>
<u>268</u>	<u>0.946566</u>	<u>309</u>	<u>0.940982</u>	<u>350</u>	<u>0.935259</u>	<u>391</u>	<u>0.928811</u>

$t$	$S_{TX}(t)$	$t$	$S_{TX}(t)$	$t$	$S_{TX}(t)$	$t$	$S_{TX}(t)$
392	0.928704	433	0.922915	474	0.916659	515	0.911613
393	0.928277	434	0.922646	475	0.916442	516	0.911232
394	0.92817	435	0.922485	476	0.916442	517	0.911069
395	0.927956	436	0.922377	477	0.916388	518	0.910797
396	0.927849	437	0.922108	478	0.91628	519	0.910688
397	0.927421	438	0.922001	479	0.916172	520	0.910525
398	0.927368	439	0.921839	480	0.916117	521	0.910525
399	0.927207	440	0.92157	481	0.916009	522	0.910471
400	0.926993	441	0.921409	482	0.915955	523	0.910362
401	0.926886	442	0.921355	483	0.915793	524	0.910253
402	0.926725	443	0.921301	484	0.915522	525	0.910144
403	0.926725	444	0.921247	485	0.915413	526	0.909926
404	0.926618	445	0.921193	486	0.915413	527	0.909872
405	0.926457	446	0.921139	487	0.915142	528	0.909817
406	0.926189	447	0.920816	488	0.915088	529	0.909817
407	0.926136	448	0.920708	489	0.91498	530	0.909599
408	0.925975	449	0.920493	490	0.91498	531	0.90949
409	0.925921	450	0.920277	491	0.91498	532	0.909436
410	0.925868	451	0.920223	492	0.91498	533	0.909381
411	0.925707	452	0.920062	493	0.914926	534	0.909381
412	0.925439	453	0.9199	494	0.914709	535	0.909272
413	0.925439	454	0.919846	495	0.914655	536	0.909163
414	0.925332	455	0.919576	496	0.914492	537	0.908945
415	0.925332	456	0.919361	497	0.914221	538	0.908836
416	0.925117	457	0.919199	498	0.914112	539	0.908618
417	0.925063	458	0.919091	499	0.914058	540	0.908618
418	0.924956	459	0.918983	500	0.913949	541	0.908455
419	0.924634	460	0.918821	501	0.913841	542	0.908291
420	0.924634	461	0.918821	502	0.913732	543	0.908073
421	0.924581	462	0.918659	503	0.913461	544	0.908018
422	0.92442	463	0.918389	504	0.913352	545	0.9078
423	0.924312	464	0.918173	505	0.913243	546	0.907745
424	0.924205	465	0.918119	506	0.913026	547	0.907636
425	0.923829	466	0.917795	507	0.912972	548	0.907527
426	0.92356	467	0.917632	508	0.912809	549	0.907472
427	0.923507	468	0.917416	509	0.912592	550	0.907254
428	0.923292	469	0.917308	510	0.912429	551	0.907144
429	0.923184	470	0.917254	511	0.912265	552	0.906926
430	0.923184	471	0.917092	512	0.912157	553	0.906871
431	0.92313	472	0.916875	513	0.911939	554	0.906817
432	0.922969	473	0.916821	514	0.911776	555	0.906598

$t$	$S_{TX}(t)$	$t$	$S_{TX}(t)$	$t$	$S_{TX}(t)$	$t$	$S_{TX}(t)$
556	0.90627	597	0.901496	638	0.896878	679	0.891874
557	0.906161	598	0.90133	639	0.89682	680	0.891756
558	0.906161	599	0.90133	640	0.89682	681	0.891519
559	0.906051	600	0.901274	641	0.896591	682	0.89146
560	0.905723	601	0.901274	642	0.896534	683	0.89146
561	0.905559	602	0.901051	643	0.896477	684	0.891341
562	0.90534	603	0.900829	644	0.896247	685	0.891162
563	0.905231	604	0.900773	645	0.896075	686	0.890805
564	0.905121	605	0.900662	646	0.895845	687	0.890567
565	0.905121	606	0.90055	647	0.895729	688	0.890507
566	0.905121	607	0.900438	648	0.895556	689	0.890448
567	0.904902	608	0.900326	649	0.895441	690	0.890448
568	0.904738	609	0.90027	650	0.895268	691	0.890328
569	0.904574	610	0.900103	651	0.89521	692	0.890268
570	0.90441	611	0.900103	652	0.895152	693	0.890149
571	0.904355	612	0.899934	653	0.895152	694	0.890089
572	0.904245	613	0.89971	654	0.894978	695	0.890089
573	0.904136	614	0.899654	655	0.894746	696	0.889669
574	0.903971	615	0.899485	656	0.894688	697	0.889548
575	0.903862	616	0.899317	657	0.894688	698	0.889368
576	0.903643	617	0.899204	658	0.894572	699	0.889187
577	0.903533	618	0.899148	659	0.894514	700	0.889067
578	0.903259	619	0.899035	660	0.894455	701	0.888946
579	0.903149	620	0.898979	661	0.894222	702	0.888946
580	0.903094	621	0.898866	662	0.893988	703	0.888825
581	0.902875	622	0.898866	663	0.893872	704	0.888705
582	0.902875	623	0.89864	664	0.893638	705	0.888584
583	0.902765	624	0.898527	665	0.893579	706	0.888341
584	0.902655	625	0.898414	666	0.893404	707	0.88816
585	0.90249	626	0.898414	667	0.893345	708	0.888038
586	0.902269	627	0.898187	668	0.893287	709	0.887856
587	0.902159	628	0.898017	669	0.893228	710	0.887735
588	0.902104	629	0.897903	670	0.893052	711	0.887613
589	0.902049	630	0.89779	671	0.892935	712	0.887309
590	0.901938	631	0.897562	672	0.892641	713	0.887188
591	0.901883	632	0.897505	673	0.892641	714	0.887188
592	0.901773	633	0.897448	674	0.892523	715	0.887005
593	0.901662	634	0.897277	675	0.892405	716	0.886883
594	0.901607	635	0.897163	676	0.892346	717	0.886883
595	0.901551	636	0.896992	677	0.89211	718	0.886883
596	0.901496	637	0.896935	678	0.892051	719	0.886821

<u>t</u>	<u>S<sub>TX</sub>(t)</u>	<u>t</u>	<u>S<sub>TX</sub>(t)</u>	<u>t</u>	<u>S<sub>TX</sub>(t)</u>	<u>t</u>	<u>S<sub>TX</sub>(t)</u>
720	0.886821	761	0.881142	802	0.876246	843	0.869619
721	0.886821	762	0.881015	803	0.876115	844	0.869482
722	0.886637	763	0.880888	804	0.876049	845	0.869414
723	0.886515	764	0.880825	805	0.875918	846	0.869209
724	0.886453	765	0.880761	806	0.875786	847	0.869141
725	0.886207	766	0.880634	807	0.875654	848	0.868936
726	0.886146	767	0.880315	808	0.875522	849	0.868799
727	0.886084	768	0.880187	809	0.87539	850	0.868593
728	0.886084	769	0.880187	810	0.875192	851	0.868456
729	0.886022	770	0.88006	811	0.874795	852	0.868319
730	0.885961	771	0.879932	812	0.87453	853	0.86825
731	0.885899	772	0.879676	813	0.874398	854	0.868112
732	0.885775	773	0.87942	814	0.874332	855	0.868112
733	0.885528	774	0.879356	815	0.874265	856	0.867768
734	0.885528	775	0.879292	816	0.874265	857	0.867768
735	0.885404	776	0.8791	817	0.874133	858	0.867768
736	0.885404	777	0.878971	818	0.873933	859	0.867561
737	0.885032	778	0.878779	819	0.873866	860	0.867422
738	0.884845	779	0.878586	820	0.8736	861	0.867353
739	0.884721	780	0.878457	821	0.8734	862	0.867215
740	0.884597	781	0.878264	822	0.8734	863	0.867215
741	0.884597	782	0.878199	823	0.873199	864	0.867215
742	0.884285	783	0.878199	824	0.873066	865	0.867006
743	0.884035	784	0.87807	825	0.872865	866	0.866937
744	0.88366	785	0.87794	826	0.872664	867	0.866867
745	0.883472	786	0.877811	827	0.872462	868	0.866797
746	0.88316	787	0.877811	828	0.872395	869	0.866728
747	0.883097	788	0.877681	829	0.872261	870	0.866588
748	0.882721	789	0.877616	830	0.872193	871	0.866518
749	0.882532	790	0.877551	831	0.872059	872	0.866518
750	0.88247	791	0.877551	832	0.871856	873	0.866379
751	0.882407	792	0.877291	833	0.871519	874	0.866169
752	0.882344	793	0.877226	834	0.871384	875	0.865889
753	0.882092	794	0.877161	835	0.871249	876	0.865748
754	0.882029	795	0.877031	836	0.871046	877	0.865608
755	0.881902	796	0.876835	837	0.870775	878	0.865467
756	0.881839	797	0.876639	838	0.870707	879	0.865397
757	0.881713	798	0.876443	839	0.870435	880	0.865397
758	0.88165	799	0.876443	840	0.870367	881	0.865186
759	0.881586	800	0.876312	841	0.870231	882	0.865044
760	0.881333	801	0.876312	842	0.869755	883	0.865044

$t$	$S_{TX}(t)$	$t$	$S_{TX}(t)$	$t$	$S_{TX}(t)$	$t$	$S_{TX}(t)$
884	0.864974	925	0.860345	966	0.855543	1007	0.851257
885	0.864903	926	0.860197	967	0.855313	1008	0.851098
886	0.864832	927	0.860124	968	0.855313	1009	0.851018
887	0.86469	928	0.859976	969	0.85516	1010	0.851018
888	0.864619	929	0.859828	970	0.855083	1011	0.851018
889	0.864619	930	0.859828	971	0.85493	1012	0.850858
890	0.864477	931	0.85968	972	0.854699	1013	0.850778
891	0.864335	932	0.859606	973	0.854622	1014	0.850778
892	0.864335	933	0.859458	974	0.854622	1015	0.850778
893	0.864192	934	0.859384	975	0.854545	1016	0.850618
894	0.864121	935	0.859384	976	0.854468	1017	0.850538
895	0.864049	936	0.859235	977	0.854237	1018	0.850217
896	0.863978	937	0.859012	978	0.854159	1019	0.849895
897	0.863978	938	0.859012	979	0.854159	1020	0.849895
898	0.863978	939	0.858863	980	0.854082	1021	0.849895
899	0.863978	940	0.858863	981	0.854005	1022	0.849815
900	0.863691	941	0.858714	982	0.853927	1023	0.849492
901	0.863691	942	0.85849	983	0.853694	1024	0.849492
902	0.863691	943	0.85849	984	0.853616	1025	0.849492
903	0.863619	944	0.858266	985	0.853539	1026	0.849492
904	0.863474	945	0.858191	986	0.853539	1027	0.84933
905	0.863402	946	0.857966	987	0.853383	1028	0.84933
906	0.86333	947	0.857891	988	0.853305	1029	0.84933
907	0.863186	948	0.857665	989	0.853149	1030	0.849249
908	0.862896	949	0.85759	990	0.853071	1031	0.849086
909	0.862607	950	0.85759	991	0.852914	1032	0.848842
910	0.862317	951	0.85744	992	0.852836	1033	0.848679
911	0.8621	952	0.85744	993	0.852836	1034	0.848598
912	0.862027	953	0.857364	994	0.852758	1035	0.848353
913	0.862027	954	0.857063	995	0.852679	1036	0.848109
914	0.861881	955	0.856987	996	0.852601	1037	0.848109
915	0.861809	956	0.85676	997	0.852601	1038	0.847782
916	0.86159	957	0.856685	998	0.852286	1039	0.847619
917	0.861517	958	0.856305	999	0.852049	1040	0.847619
918	0.861444	959	0.856229	1000	0.852049	1041	0.847455
919	0.861078	960	0.856229	1001	0.852049	1042	0.847373
920	0.861078	961	0.856153	1002	0.851812	1043	0.84729
921	0.860785	962	0.856077	1003	0.851495	1044	0.847126
922	0.860712	963	0.855772	1004	0.851336	1045	0.846961
923	0.860712	964	0.855619	1005	0.851336	1046	0.846879
924	0.860492	965	0.855619	1006	0.851257	1047	0.846714



<u>t</u>	<u>S<sub>TX</sub>(t)</u>	<u>t</u>	<u>S<sub>TX</sub>(t)</u>	<u>t</u>	<u>S<sub>TX</sub>(t)</u>	<u>t</u>	<u>S<sub>TX</sub>(t)</u>
<u>1048</u>	<u>0.846549</u>	<u>1089</u>	<u>0.841907</u>	<u>1130</u>	<u>0.836987</u>	<u>1171</u>	<u>0.830997</u>
<u>1049</u>	<u>0.846301</u>	<u>1090</u>	<u>0.841907</u>	<u>1131</u>	<u>0.836896</u>	<u>1172</u>	<u>0.830997</u>
<u>1050</u>	<u>0.84597</u>	<u>1091</u>	<u>0.841821</u>	<u>1132</u>	<u>0.836806</u>	<u>1173</u>	<u>0.830997</u>
<u>1051</u>	<u>0.845804</u>	<u>1092</u>	<u>0.841734</u>	<u>1133</u>	<u>0.836806</u>	<u>1174</u>	<u>0.830997</u>
<u>1052</u>	<u>0.845638</u>	<u>1093</u>	<u>0.841561</u>	<u>1134</u>	<u>0.836535</u>	<u>1175</u>	<u>0.830808</u>
<u>1053</u>	<u>0.845389</u>	<u>1094</u>	<u>0.841389</u>	<u>1135</u>	<u>0.836263</u>	<u>1176</u>	<u>0.830524</u>
<u>1054</u>	<u>0.845389</u>	<u>1095</u>	<u>0.841129</u>	<u>1136</u>	<u>0.835901</u>	<u>1177</u>	<u>0.830524</u>
<u>1055</u>	<u>0.845389</u>	<u>1096</u>	<u>0.841042</u>	<u>1137</u>	<u>0.835719</u>	<u>1178</u>	<u>0.830429</u>
<u>1056</u>	<u>0.845222</u>	<u>1097</u>	<u>0.840956</u>	<u>1138</u>	<u>0.835719</u>	<u>1179</u>	<u>0.830144</u>
<u>1057</u>	<u>0.845138</u>	<u>1098</u>	<u>0.840869</u>	<u>1139</u>	<u>0.835628</u>	<u>1180</u>	<u>0.830049</u>
<u>1058</u>	<u>0.845138</u>	<u>1099</u>	<u>0.840695</u>	<u>1140</u>	<u>0.835537</u>	<u>1181</u>	<u>0.830049</u>
<u>1059</u>	<u>0.845138</u>	<u>1100</u>	<u>0.840695</u>	<u>1141</u>	<u>0.835446</u>	<u>1182</u>	<u>0.829858</u>
<u>1060</u>	<u>0.844971</u>	<u>1101</u>	<u>0.840608</u>	<u>1142</u>	<u>0.835082</u>	<u>1183</u>	<u>0.829763</u>
<u>1061</u>	<u>0.844971</u>	<u>1102</u>	<u>0.840434</u>	<u>1143</u>	<u>0.835082</u>	<u>1184</u>	<u>0.829763</u>
<u>1062</u>	<u>0.844887</u>	<u>1103</u>	<u>0.840259</u>	<u>1144</u>	<u>0.834899</u>	<u>1185</u>	<u>0.829667</u>
<u>1063</u>	<u>0.844887</u>	<u>1104</u>	<u>0.839735</u>	<u>1145</u>	<u>0.834899</u>	<u>1186</u>	<u>0.829571</u>
<u>1064</u>	<u>0.844719</u>	<u>1105</u>	<u>0.839648</u>	<u>1146</u>	<u>0.834532</u>	<u>1187</u>	<u>0.829379</u>
<u>1065</u>	<u>0.844635</u>	<u>1106</u>	<u>0.839473</u>	<u>1147</u>	<u>0.834532</u>	<u>1188</u>	<u>0.829187</u>
<u>1066</u>	<u>0.844635</u>	<u>1107</u>	<u>0.839385</u>	<u>1148</u>	<u>0.834256</u>	<u>1189</u>	<u>0.82861</u>
<u>1067</u>	<u>0.84455</u>	<u>1108</u>	<u>0.839122</u>	<u>1149</u>	<u>0.834256</u>	<u>1190</u>	<u>0.82861</u>
<u>1068</u>	<u>0.844466</u>	<u>1109</u>	<u>0.839034</u>	<u>1150</u>	<u>0.834072</u>	<u>1191</u>	<u>0.828417</u>
<u>1069</u>	<u>0.844466</u>	<u>1110</u>	<u>0.838946</u>	<u>1151</u>	<u>0.834072</u>	<u>1192</u>	<u>0.828224</u>
<u>1070</u>	<u>0.844128</u>	<u>1111</u>	<u>0.838946</u>	<u>1152</u>	<u>0.834072</u>	<u>1193</u>	<u>0.827837</u>
<u>1071</u>	<u>0.844044</u>	<u>1112</u>	<u>0.838858</u>	<u>1153</u>	<u>0.833795</u>	<u>1194</u>	<u>0.827643</u>
<u>1072</u>	<u>0.844044</u>	<u>1113</u>	<u>0.838858</u>	<u>1154</u>	<u>0.83361</u>	<u>1195</u>	<u>0.827546</u>
<u>1073</u>	<u>0.843959</u>	<u>1114</u>	<u>0.838682</u>	<u>1155</u>	<u>0.833518</u>	<u>1196</u>	<u>0.827546</u>
<u>1074</u>	<u>0.843959</u>	<u>1115</u>	<u>0.838505</u>	<u>1156</u>	<u>0.833147</u>	<u>1197</u>	<u>0.827449</u>
<u>1075</u>	<u>0.843789</u>	<u>1116</u>	<u>0.838417</u>	<u>1157</u>	<u>0.833147</u>	<u>1198</u>	<u>0.827449</u>
<u>1076</u>	<u>0.84362</u>	<u>1117</u>	<u>0.838328</u>	<u>1158</u>	<u>0.833055</u>	<u>1199</u>	<u>0.827254</u>
<u>1077</u>	<u>0.84362</u>	<u>1118</u>	<u>0.838151</u>	<u>1159</u>	<u>0.832869</u>	<u>1200</u>	<u>0.827059</u>
<u>1078</u>	<u>0.843535</u>	<u>1119</u>	<u>0.838151</u>	<u>1160</u>	<u>0.832683</u>	<u>1201</u>	<u>0.826961</u>
<u>1079</u>	<u>0.843364</u>	<u>1120</u>	<u>0.837973</u>	<u>1161</u>	<u>0.832683</u>	<u>1202</u>	<u>0.826863</u>
<u>1080</u>	<u>0.843194</u>	<u>1121</u>	<u>0.837795</u>	<u>1162</u>	<u>0.83231</u>	<u>1203</u>	<u>0.826765</u>
<u>1081</u>	<u>0.843023</u>	<u>1122</u>	<u>0.837795</u>	<u>1163</u>	<u>0.832217</u>	<u>1204</u>	<u>0.826569</u>
<u>1082</u>	<u>0.843023</u>	<u>1123</u>	<u>0.837706</u>	<u>1164</u>	<u>0.832124</u>	<u>1205</u>	<u>0.826373</u>
<u>1083</u>	<u>0.843023</u>	<u>1124</u>	<u>0.837706</u>	<u>1165</u>	<u>0.832124</u>	<u>1206</u>	<u>0.826373</u>
<u>1084</u>	<u>0.842851</u>	<u>1125</u>	<u>0.837706</u>	<u>1166</u>	<u>0.831843</u>	<u>1207</u>	<u>0.826373</u>
<u>1085</u>	<u>0.842508</u>	<u>1126</u>	<u>0.837527</u>	<u>1167</u>	<u>0.831655</u>	<u>1208</u>	<u>0.826373</u>
<u>1086</u>	<u>0.842337</u>	<u>1127</u>	<u>0.837437</u>	<u>1168</u>	<u>0.831561</u>	<u>1209</u>	<u>0.826373</u>
<u>1087</u>	<u>0.842251</u>	<u>1128</u>	<u>0.837437</u>	<u>1169</u>	<u>0.831186</u>	<u>1210</u>	<u>0.826275</u>
<u>1088</u>	<u>0.841993</u>	<u>1129</u>	<u>0.837257</u>	<u>1170</u>	<u>0.831092</u>	<u>1211</u>	<u>0.826078</u>

<u>t</u>	<u>S<sub>TX</sub>(t)</u>	<u>t</u>	<u>S<sub>TX</sub>(t)</u>	<u>t</u>	<u>S<sub>TX</sub>(t)</u>	<u>t</u>	<u>S<sub>TX</sub>(t)</u>
<u>1212</u>	<u>0.825782</u>	<u>1253</u>	<u>0.82084</u>	<u>1294</u>	<u>0.81567</u>	<u>1335</u>	<u>0.812243</u>
<u>1213</u>	<u>0.825585</u>	<u>1254</u>	<u>0.820634</u>	<u>1295</u>	<u>0.815562</u>	<u>1336</u>	<u>0.81213</u>
<u>1214</u>	<u>0.825487</u>	<u>1255</u>	<u>0.82053</u>	<u>1296</u>	<u>0.815562</u>	<u>1337</u>	<u>0.811903</u>
<u>1215</u>	<u>0.825487</u>	<u>1256</u>	<u>0.82022</u>	<u>1297</u>	<u>0.815562</u>	<u>1338</u>	<u>0.811903</u>
<u>1216</u>	<u>0.825487</u>	<u>1257</u>	<u>0.82022</u>	<u>1298</u>	<u>0.815453</u>	<u>1339</u>	<u>0.811561</u>
<u>1217</u>	<u>0.825487</u>	<u>1258</u>	<u>0.82022</u>	<u>1299</u>	<u>0.815236</u>	<u>1340</u>	<u>0.811446</u>
<u>1218</u>	<u>0.825387</u>	<u>1259</u>	<u>0.820116</u>	<u>1300</u>	<u>0.815236</u>	<u>1341</u>	<u>0.811332</u>
<u>1219</u>	<u>0.825288</u>	<u>1260</u>	<u>0.819804</u>	<u>1301</u>	<u>0.815236</u>	<u>1342</u>	<u>0.811217</u>
<u>1220</u>	<u>0.824991</u>	<u>1261</u>	<u>0.819804</u>	<u>1302</u>	<u>0.815236</u>	<u>1343</u>	<u>0.810988</u>
<u>1221</u>	<u>0.824891</u>	<u>1262</u>	<u>0.8197</u>	<u>1303</u>	<u>0.815236</u>	<u>1344</u>	<u>0.810873</u>
<u>1222</u>	<u>0.824891</u>	<u>1263</u>	<u>0.819595</u>	<u>1304</u>	<u>0.815236</u>	<u>1345</u>	<u>0.810528</u>
<u>1223</u>	<u>0.824891</u>	<u>1264</u>	<u>0.819387</u>	<u>1305</u>	<u>0.814798</u>	<u>1346</u>	<u>0.810298</u>
<u>1224</u>	<u>0.824692</u>	<u>1265</u>	<u>0.819387</u>	<u>1306</u>	<u>0.814798</u>	<u>1347</u>	<u>0.810183</u>
<u>1225</u>	<u>0.824392</u>	<u>1266</u>	<u>0.819177</u>	<u>1307</u>	<u>0.814579</u>	<u>1348</u>	<u>0.810068</u>
<u>1226</u>	<u>0.824392</u>	<u>1267</u>	<u>0.818968</u>	<u>1308</u>	<u>0.814359</u>	<u>1349</u>	<u>0.809953</u>
<u>1227</u>	<u>0.824292</u>	<u>1268</u>	<u>0.818863</u>	<u>1309</u>	<u>0.814359</u>	<u>1350</u>	<u>0.809722</u>
<u>1228</u>	<u>0.823992</u>	<u>1269</u>	<u>0.818653</u>	<u>1310</u>	<u>0.814029</u>	<u>1351</u>	<u>0.809722</u>
<u>1229</u>	<u>0.823791</u>	<u>1270</u>	<u>0.818548</u>	<u>1311</u>	<u>0.814029</u>	<u>1352</u>	<u>0.809722</u>
<u>1230</u>	<u>0.823791</u>	<u>1271</u>	<u>0.818442</u>	<u>1312</u>	<u>0.813809</u>	<u>1353</u>	<u>0.809374</u>
<u>1231</u>	<u>0.823791</u>	<u>1272</u>	<u>0.818126</u>	<u>1313</u>	<u>0.813809</u>	<u>1354</u>	<u>0.809258</u>
<u>1232</u>	<u>0.823791</u>	<u>1273</u>	<u>0.818126</u>	<u>1314</u>	<u>0.813809</u>	<u>1355</u>	<u>0.809142</u>
<u>1233</u>	<u>0.82369</u>	<u>1274</u>	<u>0.818021</u>	<u>1315</u>	<u>0.813809</u>	<u>1356</u>	<u>0.809025</u>
<u>1234</u>	<u>0.823489</u>	<u>1275</u>	<u>0.817809</u>	<u>1316</u>	<u>0.813698</u>	<u>1357</u>	<u>0.808909</u>
<u>1235</u>	<u>0.823187</u>	<u>1276</u>	<u>0.817598</u>	<u>1317</u>	<u>0.813587</u>	<u>1358</u>	<u>0.808793</u>
<u>1236</u>	<u>0.822884</u>	<u>1277</u>	<u>0.817492</u>	<u>1318</u>	<u>0.813365</u>	<u>1359</u>	<u>0.808676</u>
<u>1237</u>	<u>0.822884</u>	<u>1278</u>	<u>0.817386</u>	<u>1319</u>	<u>0.813365</u>	<u>1360</u>	<u>0.808676</u>
<u>1238</u>	<u>0.822884</u>	<u>1279</u>	<u>0.817173</u>	<u>1320</u>	<u>0.813142</u>	<u>1361</u>	<u>0.808676</u>
<u>1239</u>	<u>0.822884</u>	<u>1280</u>	<u>0.817067</u>	<u>1321</u>	<u>0.813142</u>	<u>1362</u>	<u>0.808442</u>
<u>1240</u>	<u>0.822681</u>	<u>1281</u>	<u>0.817067</u>	<u>1322</u>	<u>0.813142</u>	<u>1363</u>	<u>0.80809</u>
<u>1241</u>	<u>0.822579</u>	<u>1282</u>	<u>0.817067</u>	<u>1323</u>	<u>0.813142</u>	<u>1364</u>	<u>0.80809</u>
<u>1242</u>	<u>0.822274</u>	<u>1283</u>	<u>0.817067</u>	<u>1324</u>	<u>0.812918</u>	<u>1365</u>	<u>0.807972</u>
<u>1243</u>	<u>0.822172</u>	<u>1284</u>	<u>0.816854</u>	<u>1325</u>	<u>0.812918</u>	<u>1366</u>	<u>0.807855</u>
<u>1244</u>	<u>0.82207</u>	<u>1285</u>	<u>0.81664</u>	<u>1326</u>	<u>0.812806</u>	<u>1367</u>	<u>0.807855</u>
<u>1245</u>	<u>0.82207</u>	<u>1286</u>	<u>0.81664</u>	<u>1327</u>	<u>0.812806</u>	<u>1368</u>	<u>0.807737</u>
<u>1246</u>	<u>0.821968</u>	<u>1287</u>	<u>0.81664</u>	<u>1328</u>	<u>0.812581</u>	<u>1369</u>	<u>0.807737</u>
<u>1247</u>	<u>0.821968</u>	<u>1288</u>	<u>0.816426</u>	<u>1329</u>	<u>0.812468</u>	<u>1370</u>	<u>0.807737</u>
<u>1248</u>	<u>0.821456</u>	<u>1289</u>	<u>0.816426</u>	<u>1330</u>	<u>0.812468</u>	<u>1371</u>	<u>0.807618</u>
<u>1249</u>	<u>0.821149</u>	<u>1290</u>	<u>0.816211</u>	<u>1331</u>	<u>0.812356</u>	<u>1372</u>	<u>0.807618</u>
<u>1250</u>	<u>0.821149</u>	<u>1291</u>	<u>0.816103</u>	<u>1332</u>	<u>0.812356</u>	<u>1373</u>	<u>0.807618</u>
<u>1251</u>	<u>0.821149</u>	<u>1292</u>	<u>0.816103</u>	<u>1333</u>	<u>0.812356</u>	<u>1374</u>	<u>0.8075</u>
<u>1252</u>	<u>0.821149</u>	<u>1293</u>	<u>0.815887</u>	<u>1334</u>	<u>0.812243</u>	<u>1375</u>	<u>0.807143</u>

<u>t</u>	<u>S<sub>TX</sub>(t)</u>	<u>t</u>	<u>S<sub>TX</sub>(t)</u>	<u>t</u>	<u>S<sub>TX</sub>(t)</u>	<u>t</u>	<u>S<sub>TX</sub>(t)</u>
<u>1376</u>	<u>0.807024</u>	<u>1417</u>	<u>0.802145</u>	<u>1458</u>	<u>0.796634</u>	<u>1499</u>	<u>0.791084</u>
<u>1377</u>	<u>0.806905</u>	<u>1418</u>	<u>0.801895</u>	<u>1459</u>	<u>0.796502</u>	<u>1500</u>	<u>0.791084</u>
<u>1378</u>	<u>0.806905</u>	<u>1419</u>	<u>0.801895</u>	<u>1460</u>	<u>0.796502</u>	<u>1501</u>	<u>0.790945</u>
<u>1379</u>	<u>0.806905</u>	<u>1420</u>	<u>0.801895</u>	<u>1461</u>	<u>0.796238</u>	<u>1502</u>	<u>0.790805</u>
<u>1380</u>	<u>0.806905</u>	<u>1421</u>	<u>0.801644</u>	<u>1462</u>	<u>0.796238</u>	<u>1503</u>	<u>0.790665</u>
<u>1381</u>	<u>0.806786</u>	<u>1422</u>	<u>0.801519</u>	<u>1463</u>	<u>0.796105</u>	<u>1504</u>	<u>0.790665</u>
<u>1382</u>	<u>0.806786</u>	<u>1423</u>	<u>0.801141</u>	<u>1464</u>	<u>0.795708</u>	<u>1505</u>	<u>0.790524</u>
<u>1383</u>	<u>0.806546</u>	<u>1424</u>	<u>0.801141</u>	<u>1465</u>	<u>0.795708</u>	<u>1506</u>	<u>0.790524</u>
<u>1384</u>	<u>0.806427</u>	<u>1425</u>	<u>0.801141</u>	<u>1466</u>	<u>0.795441</u>	<u>1507</u>	<u>0.790524</u>
<u>1385</u>	<u>0.806187</u>	<u>1426</u>	<u>0.801015</u>	<u>1467</u>	<u>0.795174</u>	<u>1508</u>	<u>0.790524</u>
<u>1386</u>	<u>0.806067</u>	<u>1427</u>	<u>0.800636</u>	<u>1468</u>	<u>0.795174</u>	<u>1509</u>	<u>0.790524</u>
<u>1387</u>	<u>0.805826</u>	<u>1428</u>	<u>0.800256</u>	<u>1469</u>	<u>0.795174</u>	<u>1510</u>	<u>0.790383</u>
<u>1388</u>	<u>0.805586</u>	<u>1429</u>	<u>0.800003</u>	<u>1470</u>	<u>0.79504</u>	<u>1511</u>	<u>0.790241</u>
<u>1389</u>	<u>0.805586</u>	<u>1430</u>	<u>0.800003</u>	<u>1471</u>	<u>0.794638</u>	<u>1512</u>	<u>0.790241</u>
<u>1390</u>	<u>0.805344</u>	<u>1431</u>	<u>0.800003</u>	<u>1472</u>	<u>0.794503</u>	<u>1513</u>	<u>0.790098</u>
<u>1391</u>	<u>0.805223</u>	<u>1432</u>	<u>0.800003</u>	<u>1473</u>	<u>0.794503</u>	<u>1514</u>	<u>0.790098</u>
<u>1392</u>	<u>0.805223</u>	<u>1433</u>	<u>0.800003</u>	<u>1474</u>	<u>0.794368</u>	<u>1515</u>	<u>0.790098</u>
<u>1393</u>	<u>0.805102</u>	<u>1434</u>	<u>0.799875</u>	<u>1475</u>	<u>0.794368</u>	<u>1516</u>	<u>0.789813</u>
<u>1394</u>	<u>0.805102</u>	<u>1435</u>	<u>0.79962</u>	<u>1476</u>	<u>0.794233</u>	<u>1517</u>	<u>0.789813</u>
<u>1395</u>	<u>0.805102</u>	<u>1436</u>	<u>0.799493</u>	<u>1477</u>	<u>0.793827</u>	<u>1518</u>	<u>0.789813</u>
<u>1396</u>	<u>0.804981</u>	<u>1437</u>	<u>0.799365</u>	<u>1478</u>	<u>0.793691</u>	<u>1519</u>	<u>0.789813</u>
<u>1397</u>	<u>0.804737</u>	<u>1438</u>	<u>0.799365</u>	<u>1479</u>	<u>0.793419</u>	<u>1520</u>	<u>0.789669</u>
<u>1398</u>	<u>0.804615</u>	<u>1439</u>	<u>0.799365</u>	<u>1480</u>	<u>0.793419</u>	<u>1521</u>	<u>0.789525</u>
<u>1399</u>	<u>0.804494</u>	<u>1440</u>	<u>0.799365</u>	<u>1481</u>	<u>0.793147</u>	<u>1522</u>	<u>0.789237</u>
<u>1400</u>	<u>0.804494</u>	<u>1441</u>	<u>0.799365</u>	<u>1482</u>	<u>0.79301</u>	<u>1523</u>	<u>0.789237</u>
<u>1401</u>	<u>0.804371</u>	<u>1442</u>	<u>0.799108</u>	<u>1483</u>	<u>0.792737</u>	<u>1524</u>	<u>0.789237</u>
<u>1402</u>	<u>0.804249</u>	<u>1443</u>	<u>0.799108</u>	<u>1484</u>	<u>0.792737</u>	<u>1525</u>	<u>0.789092</u>
<u>1403</u>	<u>0.804249</u>	<u>1444</u>	<u>0.799108</u>	<u>1485</u>	<u>0.792737</u>	<u>1526</u>	<u>0.788947</u>
<u>1404</u>	<u>0.804126</u>	<u>1445</u>	<u>0.798849</u>	<u>1486</u>	<u>0.792737</u>	<u>1527</u>	<u>0.788947</u>
<u>1405</u>	<u>0.803635</u>	<u>1446</u>	<u>0.79872</u>	<u>1487</u>	<u>0.792464</u>	<u>1528</u>	<u>0.788947</u>
<u>1406</u>	<u>0.803635</u>	<u>1447</u>	<u>0.79872</u>	<u>1488</u>	<u>0.792464</u>	<u>1529</u>	<u>0.788654</u>
<u>1407</u>	<u>0.803635</u>	<u>1448</u>	<u>0.798332</u>	<u>1489</u>	<u>0.792464</u>	<u>1530</u>	<u>0.788654</u>
<u>1408</u>	<u>0.803512</u>	<u>1449</u>	<u>0.798332</u>	<u>1490</u>	<u>0.792189</u>	<u>1531</u>	<u>0.788361</u>
<u>1409</u>	<u>0.803265</u>	<u>1450</u>	<u>0.798072</u>	<u>1491</u>	<u>0.792052</u>	<u>1532</u>	<u>0.788215</u>
<u>1410</u>	<u>0.803265</u>	<u>1451</u>	<u>0.797942</u>	<u>1492</u>	<u>0.791776</u>	<u>1533</u>	<u>0.787921</u>
<u>1411</u>	<u>0.803141</u>	<u>1452</u>	<u>0.797682</u>	<u>1493</u>	<u>0.791776</u>	<u>1534</u>	<u>0.787921</u>
<u>1412</u>	<u>0.803141</u>	<u>1453</u>	<u>0.797682</u>	<u>1494</u>	<u>0.791362</u>	<u>1535</u>	<u>0.787627</u>
<u>1413</u>	<u>0.803017</u>	<u>1454</u>	<u>0.79729</u>	<u>1495</u>	<u>0.791223</u>	<u>1536</u>	<u>0.787479</u>
<u>1414</u>	<u>0.802893</u>	<u>1455</u>	<u>0.79729</u>	<u>1496</u>	<u>0.791223</u>	<u>1537</u>	<u>0.787479</u>
<u>1415</u>	<u>0.802395</u>	<u>1456</u>	<u>0.796897</u>	<u>1497</u>	<u>0.791084</u>	<u>1538</u>	<u>0.787479</u>
<u>1416</u>	<u>0.802395</u>	<u>1457</u>	<u>0.796765</u>	<u>1498</u>	<u>0.791084</u>	<u>1539</u>	<u>0.787479</u>

<u>t</u>	<u>S<sub>TX</sub>(t)</u>	<u>t</u>	<u>S<sub>TX</sub>(t)</u>	<u>t</u>	<u>S<sub>TX</sub>(t)</u>	<u>t</u>	<u>S<sub>TX</sub>(t)</u>
<u>1540</u>	<u>0.787035</u>	<u>1581</u>	<u>0.783366</u>	<u>1622</u>	<u>0.781726</u>	<u>1663</u>	<u>0.777765</u>
<u>1541</u>	<u>0.787035</u>	<u>1582</u>	<u>0.783366</u>	<u>1623</u>	<u>0.781726</u>	<u>1664</u>	<u>0.777765</u>
<u>1542</u>	<u>0.787035</u>	<u>1583</u>	<u>0.783207</u>	<u>1624</u>	<u>0.781558</u>	<u>1665</u>	<u>0.777584</u>
<u>1543</u>	<u>0.787035</u>	<u>1584</u>	<u>0.783207</u>	<u>1625</u>	<u>0.781221</u>	<u>1666</u>	<u>0.777584</u>
<u>1544</u>	<u>0.787035</u>	<u>1585</u>	<u>0.783047</u>	<u>1626</u>	<u>0.781052</u>	<u>1667</u>	<u>0.777584</u>
<u>1545</u>	<u>0.786736</u>	<u>1586</u>	<u>0.783047</u>	<u>1627</u>	<u>0.781052</u>	<u>1668</u>	<u>0.777584</u>
<u>1546</u>	<u>0.786287</u>	<u>1587</u>	<u>0.783047</u>	<u>1628</u>	<u>0.780544</u>	<u>1669</u>	<u>0.777584</u>
<u>1547</u>	<u>0.786137</u>	<u>1588</u>	<u>0.783047</u>	<u>1629</u>	<u>0.780205</u>	<u>1670</u>	<u>0.777402</u>
<u>1548</u>	<u>0.786137</u>	<u>1589</u>	<u>0.782887</u>	<u>1630</u>	<u>0.780035</u>	<u>1671</u>	<u>0.777402</u>
<u>1549</u>	<u>0.785986</u>	<u>1590</u>	<u>0.782887</u>	<u>1631</u>	<u>0.780035</u>	<u>1672</u>	<u>0.777402</u>
<u>1550</u>	<u>0.785835</u>	<u>1591</u>	<u>0.782887</u>	<u>1632</u>	<u>0.780035</u>	<u>1673</u>	<u>0.777219</u>
<u>1551</u>	<u>0.785684</u>	<u>1592</u>	<u>0.782887</u>	<u>1633</u>	<u>0.780035</u>	<u>1674</u>	<u>0.777219</u>
<u>1552</u>	<u>0.785533</u>	<u>1593</u>	<u>0.782887</u>	<u>1634</u>	<u>0.780035</u>	<u>1675</u>	<u>0.776668</u>
<u>1553</u>	<u>0.785533</u>	<u>1594</u>	<u>0.782887</u>	<u>1635</u>	<u>0.780035</u>	<u>1676</u>	<u>0.776668</u>
<u>1554</u>	<u>0.785381</u>	<u>1595</u>	<u>0.782887</u>	<u>1636</u>	<u>0.780035</u>	<u>1677</u>	<u>0.776301</u>
<u>1555</u>	<u>0.785381</u>	<u>1596</u>	<u>0.782887</u>	<u>1637</u>	<u>0.779691</u>	<u>1678</u>	<u>0.776116</u>
<u>1556</u>	<u>0.785076</u>	<u>1597</u>	<u>0.782887</u>	<u>1638</u>	<u>0.779691</u>	<u>1679</u>	<u>0.776116</u>
<u>1557</u>	<u>0.785076</u>	<u>1598</u>	<u>0.782887</u>	<u>1639</u>	<u>0.779691</u>	<u>1680</u>	<u>0.775931</u>
<u>1558</u>	<u>0.784923</u>	<u>1599</u>	<u>0.782887</u>	<u>1640</u>	<u>0.779345</u>	<u>1681</u>	<u>0.775931</u>
<u>1559</u>	<u>0.784769</u>	<u>1600</u>	<u>0.782887</u>	<u>1641</u>	<u>0.779172</u>	<u>1682</u>	<u>0.77556</u>
<u>1560</u>	<u>0.784769</u>	<u>1601</u>	<u>0.782887</u>	<u>1642</u>	<u>0.778825</u>	<u>1683</u>	<u>0.77556</u>
<u>1561</u>	<u>0.784769</u>	<u>1602</u>	<u>0.782887</u>	<u>1643</u>	<u>0.778825</u>	<u>1684</u>	<u>0.77556</u>
<u>1562</u>	<u>0.784462</u>	<u>1603</u>	<u>0.782723</u>	<u>1644</u>	<u>0.778652</u>	<u>1685</u>	<u>0.775373</u>
<u>1563</u>	<u>0.784308</u>	<u>1604</u>	<u>0.782723</u>	<u>1645</u>	<u>0.778652</u>	<u>1686</u>	<u>0.774998</u>
<u>1564</u>	<u>0.784308</u>	<u>1605</u>	<u>0.782723</u>	<u>1646</u>	<u>0.778652</u>	<u>1687</u>	<u>0.774998</u>
<u>1565</u>	<u>0.784153</u>	<u>1606</u>	<u>0.782559</u>	<u>1647</u>	<u>0.778652</u>	<u>1688</u>	<u>0.774809</u>
<u>1566</u>	<u>0.784153</u>	<u>1607</u>	<u>0.782559</u>	<u>1648</u>	<u>0.778652</u>	<u>1689</u>	<u>0.774809</u>
<u>1567</u>	<u>0.784153</u>	<u>1608</u>	<u>0.782559</u>	<u>1649</u>	<u>0.778652</u>	<u>1690</u>	<u>0.77462</u>
<u>1568</u>	<u>0.784153</u>	<u>1609</u>	<u>0.782559</u>	<u>1650</u>	<u>0.778652</u>	<u>1691</u>	<u>0.77462</u>
<u>1569</u>	<u>0.784153</u>	<u>1610</u>	<u>0.782559</u>	<u>1651</u>	<u>0.778475</u>	<u>1692</u>	<u>0.77462</u>
<u>1570</u>	<u>0.784153</u>	<u>1611</u>	<u>0.782228</u>	<u>1652</u>	<u>0.778475</u>	<u>1693</u>	<u>0.77462</u>
<u>1571</u>	<u>0.784153</u>	<u>1612</u>	<u>0.782228</u>	<u>1653</u>	<u>0.778298</u>	<u>1694</u>	<u>0.77443</u>
<u>1572</u>	<u>0.783997</u>	<u>1613</u>	<u>0.782228</u>	<u>1654</u>	<u>0.777943</u>	<u>1695</u>	<u>0.774048</u>
<u>1573</u>	<u>0.783997</u>	<u>1614</u>	<u>0.782228</u>	<u>1655</u>	<u>0.777943</u>	<u>1696</u>	<u>0.774048</u>
<u>1574</u>	<u>0.783997</u>	<u>1615</u>	<u>0.781895</u>	<u>1656</u>	<u>0.777943</u>	<u>1697</u>	<u>0.773856</u>
<u>1575</u>	<u>0.783997</u>	<u>1616</u>	<u>0.781895</u>	<u>1657</u>	<u>0.777943</u>	<u>1698</u>	<u>0.773664</u>
<u>1576</u>	<u>0.783839</u>	<u>1617</u>	<u>0.781895</u>	<u>1658</u>	<u>0.777765</u>	<u>1699</u>	<u>0.773471</u>
<u>1577</u>	<u>0.783682</u>	<u>1618</u>	<u>0.781895</u>	<u>1659</u>	<u>0.777765</u>	<u>1700</u>	<u>0.773471</u>
<u>1578</u>	<u>0.783524</u>	<u>1619</u>	<u>0.781895</u>	<u>1660</u>	<u>0.777765</u>	<u>1701</u>	<u>0.773471</u>
<u>1579</u>	<u>0.783524</u>	<u>1620</u>	<u>0.781895</u>	<u>1661</u>	<u>0.777765</u>	<u>1702</u>	<u>0.773471</u>
<u>1580</u>	<u>0.783366</u>	<u>1621</u>	<u>0.781895</u>	<u>1662</u>	<u>0.777765</u>	<u>1703</u>	<u>0.773277</u>

$t$	$S_{TX}(t)$	$t$	$S_{TX}(t)$	$t$	$S_{TX}(t)$
<u>1704</u>	<u>0.773277</u>	<u>1745</u>	<u>0.76785</u>	<u>1786</u>	<u>0.760337</u>
<u>1705</u>	<u>0.773083</u>	<u>1746</u>	<u>0.767434</u>	<u>1787</u>	<u>0.760337</u>
<u>1706</u>	<u>0.773083</u>	<u>1747</u>	<u>0.766599</u>	<u>1788</u>	<u>0.759442</u>
<u>1707</u>	<u>0.772692</u>	<u>1748</u>	<u>0.766599</u>	<u>1789</u>	<u>0.759217</u>
<u>1708</u>	<u>0.772497</u>	<u>1749</u>	<u>0.766389</u>	<u>1790</u>	<u>0.759217</u>
<u>1709</u>	<u>0.772497</u>	<u>1750</u>	<u>0.765758</u>	<u>1791</u>	<u>0.759217</u>
<u>1710</u>	<u>0.772497</u>	<u>1751</u>	<u>0.765758</u>	<u>1792</u>	<u>0.759217</u>
<u>1711</u>	<u>0.772497</u>	<u>1752</u>	<u>0.765547</u>	<u>1793</u>	<u>0.759217</u>
<u>1712</u>	<u>0.772497</u>	<u>1753</u>	<u>0.765125</u>	<u>1794</u>	<u>0.759217</u>
<u>1713</u>	<u>0.772497</u>	<u>1754</u>	<u>0.764913</u>	<u>1795</u>	<u>0.758991</u>
<u>1714</u>	<u>0.7723</u>	<u>1755</u>	<u>0.764913</u>	<u>1796</u>	<u>0.758991</u>
<u>1715</u>	<u>0.7723</u>	<u>1756</u>	<u>0.764701</u>	<u>1797</u>	<u>0.758991</u>
<u>1716</u>	<u>0.7723</u>	<u>1757</u>	<u>0.764701</u>	<u>1798</u>	<u>0.758991</u>
<u>1717</u>	<u>0.772101</u>	<u>1758</u>	<u>0.764701</u>	<u>1799</u>	<u>0.758762</u>
<u>1718</u>	<u>0.771505</u>	<u>1759</u>	<u>0.764701</u>	<u>1800</u>	<u>0.758533</u>
<u>1719</u>	<u>0.771505</u>	<u>1760</u>	<u>0.764487</u>	<u>1801</u>	<u>0.758533</u>
<u>1720</u>	<u>0.770906</u>	<u>1761</u>	<u>0.764487</u>	<u>1802</u>	<u>0.758303</u>
<u>1721</u>	<u>0.770906</u>	<u>1762</u>	<u>0.764487</u>	<u>1803</u>	<u>0.758303</u>
<u>1722</u>	<u>0.770505</u>	<u>1763</u>	<u>0.764487</u>	<u>1804</u>	<u>0.758303</u>
<u>1723</u>	<u>0.770304</u>	<u>1764</u>	<u>0.764057</u>	<u>1805</u>	<u>0.758303</u>
<u>1724</u>	<u>0.770103</u>	<u>1765</u>	<u>0.763412</u>	<u>1806</u>	<u>0.758303</u>
<u>1725</u>	<u>0.769699</u>	<u>1766</u>	<u>0.763196</u>	<u>1807</u>	<u>0.758303</u>
<u>1726</u>	<u>0.769699</u>	<u>1767</u>	<u>0.763196</u>	<u>1808</u>	<u>0.75807</u>
<u>1727</u>	<u>0.769699</u>	<u>1768</u>	<u>0.763196</u>	<u>1809</u>	<u>0.757837</u>
<u>1728</u>	<u>0.769699</u>	<u>1769</u>	<u>0.763196</u>	<u>1810</u>	<u>0.757837</u>
<u>1729</u>	<u>0.769699</u>	<u>1770</u>	<u>0.763196</u>	<u>1811</u>	<u>0.757837</u>
<u>1730</u>	<u>0.769496</u>	<u>1771</u>	<u>0.763196</u>	<u>1812</u>	<u>0.757602</u>
<u>1731</u>	<u>0.769293</u>	<u>1772</u>	<u>0.76276</u>	<u>1813</u>	<u>0.757602</u>
<u>1732</u>	<u>0.769293</u>	<u>1773</u>	<u>0.762542</u>	<u>1814</u>	<u>0.757602</u>
<u>1733</u>	<u>0.769293</u>	<u>1774</u>	<u>0.762542</u>	<u>1815</u>	<u>0.757602</u>
<u>1734</u>	<u>0.769293</u>	<u>1775</u>	<u>0.762323</u>	<u>1816</u>	<u>0.757602</u>
<u>1735</u>	<u>0.769088</u>	<u>1776</u>	<u>0.761884</u>	<u>1817</u>	<u>0.757602</u>
<u>1736</u>	<u>0.768883</u>	<u>1777</u>	<u>0.761664</u>	<u>1818</u>	<u>0.757365</u>
<u>1737</u>	<u>0.768883</u>	<u>1778</u>	<u>0.761224</u>	<u>1819</u>	<u>0.757365</u>
<u>1738</u>	<u>0.768678</u>	<u>1779</u>	<u>0.761003</u>	<u>1820</u>	<u>0.757365</u>
<u>1739</u>	<u>0.768472</u>	<u>1780</u>	<u>0.760782</u>	<u>1821</u>	<u>0.756888</u>
<u>1740</u>	<u>0.768472</u>	<u>1781</u>	<u>0.760782</u>	<u>1822</u>	<u>0.756888</u>
<u>1741</u>	<u>0.768472</u>	<u>1782</u>	<u>0.760782</u>	<u>1823</u>	<u>0.756888</u>
<u>1742</u>	<u>0.768265</u>	<u>1783</u>	<u>0.760337</u>	<u>1824</u>	<u>0.756409</u>
<u>1743</u>	<u>0.768265</u>	<u>1784</u>	<u>0.760337</u>	<u>1825</u>	<u>0.756169</u>
<u>1744</u>	<u>0.76785</u>	<u>1785</u>	<u>0.760337</u>		

## 21.2.C Values Used in the Calculation of Biological Disadvantages

### 21.2.C.1 Probability of Incompatible Lung Donors Based on Height

Table 21-9 lists the proportion of incompatible donors based on the candidate’s height and diagnosis group.

**Table 21-9 Proportion of Incompatible Donors Based on Lung Height**

<u>Candidate height (cm)</u>	<u>Proportion for Candidates in Diagnosis Groups A and C</u>	<u>Proportion for Candidates in Diagnosis Group B</u>	<u>Proportion for Candidates in Diagnosis Group D</u>
63 or less	<u>0.9989</u>	<u>0.9989</u>	<u>0.9989</u>
64	<u>0.9982</u>	<u>0.9989</u>	<u>0.9989</u>
65	<u>0.9982</u>	<u>0.9989</u>	<u>0.9989</u>
66	<u>0.9978</u>	<u>0.9989</u>	<u>0.9989</u>
67	<u>0.9975</u>	<u>0.9989</u>	<u>0.9989</u>
68	<u>0.9975</u>	<u>0.9989</u>	<u>0.9989</u>
69	<u>0.9975</u>	<u>0.9982</u>	<u>0.9989</u>
70	<u>0.9975</u>	<u>0.9982</u>	<u>0.9989</u>
71	<u>0.9971</u>	<u>0.9975</u>	<u>0.9982</u>
72	<u>0.9971</u>	<u>0.9975</u>	<u>0.9982</u>
73	<u>0.9967</u>	<u>0.9975</u>	<u>0.9978</u>
74	<u>0.9967</u>	<u>0.9975</u>	<u>0.9975</u>
75	<u>0.9967</u>	<u>0.9975</u>	<u>0.9975</u>
76	<u>0.9971</u>	<u>0.9971</u>	<u>0.9975</u>
77	<u>0.9967</u>	<u>0.9971</u>	<u>0.9975</u>
78	<u>0.9967</u>	<u>0.9967</u>	<u>0.9971</u>
79	<u>0.9967</u>	<u>0.9967</u>	<u>0.9971</u>
80	<u>0.9967</u>	<u>0.9971</u>	<u>0.9967</u>
81	<u>0.9967</u>	<u>0.9971</u>	<u>0.9967</u>
82	<u>0.9971</u>	<u>0.9967</u>	<u>0.9967</u>
83	<u>0.9971</u>	<u>0.9967</u>	<u>0.9967</u>
84	<u>0.9975</u>	<u>0.9967</u>	<u>0.9964</u>
85	<u>0.9975</u>	<u>0.9967</u>	<u>0.9967</u>
86	<u>0.9975</u>	<u>0.9971</u>	<u>0.9967</u>
87	<u>0.9967</u>	<u>0.9971</u>	<u>0.9967</u>
88	<u>0.9967</u>	<u>0.9975</u>	<u>0.9967</u>
89	<u>0.9967</u>	<u>0.9975</u>	<u>0.9967</u>
90	<u>0.9967</u>	<u>0.9975</u>	<u>0.9967</u>
91	<u>0.9967</u>	<u>0.9975</u>	<u>0.9971</u>
92	<u>0.9964</u>	<u>0.9967</u>	<u>0.9971</u>
93	<u>0.9964</u>	<u>0.9967</u>	<u>0.9975</u>
94	<u>0.9960</u>	<u>0.9967</u>	<u>0.9967</u>
95	<u>0.9960</u>	<u>0.9967</u>	<u>0.9967</u>

<u>Candidate height (cm)</u>	<u>Proportion for Candidates in Diagnosis Groups A and C</u>	<u>Proportion for Candidates in Diagnosis Group B</u>	<u>Proportion for Candidates in Diagnosis Group D</u>
<u>96</u>	<u>0.9960</u>	<u>0.9967</u>	<u>0.9967</u>
<u>97</u>	<u>0.9960</u>	<u>0.9964</u>	<u>0.9967</u>
<u>98</u>	<u>0.9960</u>	<u>0.9964</u>	<u>0.9967</u>
<u>99</u>	<u>0.9956</u>	<u>0.9960</u>	<u>0.9964</u>
<u>100</u>	<u>0.9964</u>	<u>0.9960</u>	<u>0.9964</u>
<u>101</u>	<u>0.9964</u>	<u>0.9960</u>	<u>0.9960</u>
<u>102</u>	<u>0.9971</u>	<u>0.9960</u>	<u>0.9960</u>
<u>103</u>	<u>0.9971</u>	<u>0.9960</u>	<u>0.9960</u>
<u>104</u>	<u>0.9971</u>	<u>0.9964</u>	<u>0.9960</u>
<u>105</u>	<u>0.9971</u>	<u>0.9964</u>	<u>0.9960</u>
<u>106</u>	<u>0.9971</u>	<u>0.9967</u>	<u>0.9956</u>
<u>107</u>	<u>0.9971</u>	<u>0.9971</u>	<u>0.9956</u>
<u>108</u>	<u>0.9975</u>	<u>0.9971</u>	<u>0.9956</u>
<u>109</u>	<u>0.9975</u>	<u>0.9971</u>	<u>0.9964</u>
<u>110</u>	<u>0.9967</u>	<u>0.9971</u>	<u>0.9964</u>
<u>111</u>	<u>0.9967</u>	<u>0.9975</u>	<u>0.9967</u>
<u>112</u>	<u>0.9964</u>	<u>0.9971</u>	<u>0.9971</u>
<u>113</u>	<u>0.9964</u>	<u>0.9975</u>	<u>0.9971</u>
<u>114</u>	<u>0.9964</u>	<u>0.9975</u>	<u>0.9967</u>
<u>115</u>	<u>0.9956</u>	<u>0.9967</u>	<u>0.9967</u>
<u>116</u>	<u>0.9949</u>	<u>0.9967</u>	<u>0.9971</u>
<u>117</u>	<u>0.9935</u>	<u>0.9964</u>	<u>0.9964</u>
<u>118</u>	<u>0.9917</u>	<u>0.9964</u>	<u>0.9967</u>
<u>119</u>	<u>0.9913</u>	<u>0.9964</u>	<u>0.9964</u>
<u>120</u>	<u>0.9877</u>	<u>0.9956</u>	<u>0.9960</u>
<u>121</u>	<u>0.9866</u>	<u>0.9949</u>	<u>0.9960</u>
<u>122</u>	<u>0.9837</u>	<u>0.9924</u>	<u>0.9956</u>
<u>123</u>	<u>0.9822</u>	<u>0.9913</u>	<u>0.9949</u>
<u>124</u>	<u>0.9815</u>	<u>0.9913</u>	<u>0.9935</u>
<u>125</u>	<u>0.9731</u>	<u>0.9877</u>	<u>0.9917</u>
<u>126</u>	<u>0.9728</u>	<u>0.9866</u>	<u>0.9913</u>
<u>127</u>	<u>0.9586</u>	<u>0.9822</u>	<u>0.9877</u>
<u>128</u>	<u>0.9503</u>	<u>0.9822</u>	<u>0.9866</u>
<u>129</u>	<u>0.9488</u>	<u>0.9815</u>	<u>0.9837</u>
<u>130</u>	<u>0.9274</u>	<u>0.9731</u>	<u>0.9815</u>
<u>131</u>	<u>0.9270</u>	<u>0.9728</u>	<u>0.9808</u>
<u>132</u>	<u>0.8987</u>	<u>0.9517</u>	<u>0.9731</u>
<u>133</u>	<u>0.8824</u>	<u>0.9503</u>	<u>0.9728</u>
<u>134</u>	<u>0.8795</u>	<u>0.9492</u>	<u>0.9586</u>
<u>135</u>	<u>0.8410</u>	<u>0.9274</u>	<u>0.9499</u>
<u>136</u>	<u>0.8225</u>	<u>0.9267</u>	<u>0.9485</u>
<u>137</u>	<u>0.8156</u>	<u>0.8987</u>	<u>0.9270</u>

<u>Candidate height (cm)</u>	<u>Proportion for Candidates in Diagnosis Groups A and C</u>	<u>Proportion for Candidates in Diagnosis Group B</u>	<u>Proportion for Candidates in Diagnosis Group D</u>
<u>138</u>	<u>0.7586</u>	<u>0.8824</u>	<u>0.9267</u>
<u>139</u>	<u>0.7525</u>	<u>0.8799</u>	<u>0.8987</u>
<u>140</u>	<u>0.6947</u>	<u>0.8261</u>	<u>0.8824</u>
<u>141</u>	<u>0.6697</u>	<u>0.8218</u>	<u>0.8795</u>
<u>142</u>	<u>0.6639</u>	<u>0.8156</u>	<u>0.8407</u>
<u>143</u>	<u>0.5800</u>	<u>0.7586</u>	<u>0.8221</u>
<u>144</u>	<u>0.5735</u>	<u>0.7525</u>	<u>0.8156</u>
<u>145</u>	<u>0.5183</u>	<u>0.6762</u>	<u>0.7586</u>
<u>146</u>	<u>0.4973</u>	<u>0.6682</u>	<u>0.7525</u>
<u>147</u>	<u>0.4904</u>	<u>0.6642</u>	<u>0.6947</u>
<u>148</u>	<u>0.4174</u>	<u>0.5800</u>	<u>0.6697</u>
<u>149</u>	<u>0.4131</u>	<u>0.5735</u>	<u>0.6639</u>
<u>150</u>	<u>0.3673</u>	<u>0.5002</u>	<u>0.5797</u>
<u>151</u>	<u>0.3426</u>	<u>0.4973</u>	<u>0.5731</u>
<u>152</u>	<u>0.3372</u>	<u>0.4911</u>	<u>0.5183</u>
<u>153</u>	<u>0.2548</u>	<u>0.4174</u>	<u>0.4966</u>
<u>154</u>	<u>0.2526</u>	<u>0.4131</u>	<u>0.4897</u>
<u>155</u>	<u>0.2069</u>	<u>0.3481</u>	<u>0.4167</u>
<u>156</u>	<u>0.1902</u>	<u>0.3434</u>	<u>0.4123</u>
<u>157</u>	<u>0.1837</u>	<u>0.3387</u>	<u>0.3673</u>
<u>158</u>	<u>0.1165</u>	<u>0.2555</u>	<u>0.3419</u>
<u>159</u>	<u>0.1143</u>	<u>0.2519</u>	<u>0.3358</u>
<u>160</u>	<u>0.0947</u>	<u>0.1917</u>	<u>0.2515</u>
<u>161</u>	<u>0.0889</u>	<u>0.1909</u>	<u>0.2490</u>
<u>162</u>	<u>0.0857</u>	<u>0.1866</u>	<u>0.2040</u>
<u>163</u>	<u>0.0806</u>	<u>0.1165</u>	<u>0.1858</u>
<u>164</u>	<u>0.0820</u>	<u>0.1140</u>	<u>0.1789</u>
<u>165</u>	<u>0.0809</u>	<u>0.1027</u>	<u>0.1103</u>
<u>166</u>	<u>0.0897</u>	<u>0.0893</u>	<u>0.1089</u>
<u>167</u>	<u>0.0904</u>	<u>0.0998</u>	<u>0.0918</u>
<u>168</u>	<u>0.1267</u>	<u>0.0820</u>	<u>0.0799</u>
<u>169</u>	<u>0.1285</u>	<u>0.0824</u>	<u>0.0770</u>
<u>170</u>	<u>0.1310</u>	<u>0.1027</u>	<u>0.0588</u>
<u>171</u>	<u>0.1822</u>	<u>0.0900</u>	<u>0.0584</u>
<u>172</u>	<u>0.1862</u>	<u>0.1183</u>	<u>0.0708</u>
<u>173</u>	<u>0.2083</u>	<u>0.1296</u>	<u>0.0664</u>
<u>174</u>	<u>0.2479</u>	<u>0.1310</u>	<u>0.0679</u>
<u>175</u>	<u>0.2541</u>	<u>0.1848</u>	<u>0.0857</u>
<u>176</u>	<u>0.3307</u>	<u>0.1855</u>	<u>0.0838</u>
<u>177</u>	<u>0.3379</u>	<u>0.1924</u>	<u>0.1118</u>
<u>178</u>	<u>0.3637</u>	<u>0.2479</u>	<u>0.1252</u>
<u>179</u>	<u>0.4258</u>	<u>0.2541</u>	<u>0.1281</u>



<u>Candidate height (cm)</u>	<u>Proportion for Candidates in Diagnosis Groups A and C</u>	<u>Proportion for Candidates in Diagnosis Group B</u>	<u>Proportion for Candidates in Diagnosis Group D</u>
<u>180</u>	<u>0.4327</u>	<u>0.3303</u>	<u>0.1815</u>
<u>181</u>	<u>0.5064</u>	<u>0.3368</u>	<u>0.1840</u>
<u>182</u>	<u>0.5096</u>	<u>0.3423</u>	<u>0.1909</u>
<u>183</u>	<u>0.5358</u>	<u>0.4258</u>	<u>0.2479</u>
<u>184</u>	<u>0.5898</u>	<u>0.4323</u>	<u>0.2537</u>
<u>185</u>	<u>0.5942</u>	<u>0.5064</u>	<u>0.3292</u>
<u>186</u>	<u>0.6599</u>	<u>0.5093</u>	<u>0.3358</u>
<u>187</u>	<u>0.6675</u>	<u>0.5162</u>	<u>0.3416</u>
<u>188</u>	<u>0.6719</u>	<u>0.5898</u>	<u>0.4258</u>
<u>189</u>	<u>0.7564</u>	<u>0.5942</u>	<u>0.4323</u>
<u>190</u>	<u>0.7608</u>	<u>0.6399</u>	<u>0.5064</u>
<u>191</u>	<u>0.8243</u>	<u>0.6653</u>	<u>0.5093</u>
<u>192</u>	<u>0.8279</u>	<u>0.6715</u>	<u>0.5162</u>
<u>193</u>	<u>0.8334</u>	<u>0.7564</u>	<u>0.5898</u>
<u>194</u>	<u>0.9056</u>	<u>0.7604</u>	<u>0.5942</u>
<u>195</u>	<u>0.9089</u>	<u>0.8062</u>	<u>0.6399</u>
<u>196</u>	<u>0.9408</u>	<u>0.8261</u>	<u>0.6653</u>
<u>197</u>	<u>0.9430</u>	<u>0.8334</u>	<u>0.6715</u>
<u>198</u>	<u>0.9459</u>	<u>0.9056</u>	<u>0.7564</u>
<u>199</u>	<u>0.9724</u>	<u>0.9089</u>	<u>0.7604</u>
<u>200</u>	<u>0.9735</u>	<u>0.9281</u>	<u>0.8062</u>
<u>201</u>	<u>0.9779</u>	<u>0.9423</u>	<u>0.8261</u>
<u>202</u>	<u>0.9880</u>	<u>0.9459</u>	<u>0.8334</u>
<u>203</u>	<u>0.9880</u>	<u>0.9724</u>	<u>0.9056</u>
<u>204</u>	<u>0.9931</u>	<u>0.9731</u>	<u>0.9089</u>
<u>205</u>	<u>0.9946</u>	<u>0.9750</u>	<u>0.9281</u>
<u>206</u>	<u>0.9953</u>	<u>0.9880</u>	<u>0.9423</u>
<u>207</u>	<u>0.9975</u>	<u>0.9880</u>	<u>0.9459</u>
<u>208</u>	<u>0.9975</u>	<u>0.9931</u>	<u>0.9724</u>
<u>209</u>	<u>0.9989</u>	<u>0.9942</u>	<u>0.9731</u>
<u>210</u>	<u>0.9989</u>	<u>0.9946</u>	<u>0.9750</u>
<u>211</u>	<u>0.9989</u>	<u>0.9975</u>	<u>0.9880</u>
<u>212</u>	<u>0.9989</u>	<u>0.9975</u>	<u>0.9880</u>
<u>213</u>	<u>0.9993</u>	<u>0.9989</u>	<u>0.9931</u>
<u>214</u>	<u>1.0000</u>	<u>0.9989</u>	<u>0.9942</u>
<u>215</u>	<u>1.0000</u>	<u>0.9989</u>	<u>0.9946</u>
<u>216</u>	<u>1.0000</u>	<u>0.9989</u>	<u>0.9975</u>
<u>217</u>	<u>1.0000</u>	<u>0.9993</u>	<u>0.9975</u>
<u>218</u>	<u>1.0000</u>	<u>1.0000</u>	<u>0.9989</u>
<u>219</u>	<u>1.0000</u>	<u>1.0000</u>	<u>0.9989</u>
<u>220</u>	<u>1.0000</u>	<u>1.0000</u>	<u>0.9989</u>
<u>221</u>	<u>1.0000</u>	<u>1.0000</u>	<u>0.9989</u>

<u>Candidate height (cm)</u>	<u>Proportion for Candidates in Diagnosis Groups A and C</u>	<u>Proportion for Candidates in Diagnosis Group B</u>	<u>Proportion for Candidates in Diagnosis Group D</u>
<u>222</u>	<u>1.0000</u>	<u>1.0000</u>	<u>0.9993</u>
<u>223 or more</u>	<u>1.0000</u>	<u>1.0000</u>	<u>1.0000</u>

#

## Affected Guidance

### Lung Review Board Guidance

#### Summary and Goals

Policy 10.2 allows a transplant program to submit exception requests for Medical Urgency, Post-Transplant Outcomes, Biological Disadvantages, and/or Patient Access Scores. The Lung Review Board (Review Board) provides prompt peer review of candidate score exceptions on the lung transplant waiting list. These guidelines are intended to promote consistent review of these scores.

When submitting an exception request, transplant programs must provide a clinical justification for the exception. Please refer to *Policy 10.2 Lung Composite Score Exceptions* for additional information about the exception review process.

This resource is not OPTN Policy, so it does not carry the monitoring or enforcement implications of policy. It is not an official guideline for clinical practice, nor is it intended to be clinically prescriptive or to define a standard of care. This resource is intended to provide guidance to transplant programs and the Review Board.

#### Recommendations

##### Exception Requests

In addition to the requirements listed in *OPTN Policy 10.2.B Exception Requests*, requesting transplant programs are encouraged to include citations to supporting literature where available. Transplant programs are encouraged to consult the CAS calculator, and the national score distribution information when considering what score to request, and may wish to include information in the request about how these were used in the choice of a requested score.

##### *Pulmonary Hypertension*

Lung transplant candidates diagnosed with pulmonary hypertension (PH) and who meet the following criteria may qualify for an increase in their Waitlist Survival and/or Post-Transplant Outcomes Scores:

1. Patient is deteriorating on optimal therapy, and
2. Patient has a right atrial pressure greater than 15 mm Hg or a cardiac index less than 1.8 L/min/m<sup>2</sup>.

To request an increase in a PH candidate's scores, transplant programs must submit an exception request to the Review Board; this request should include sufficient clinical detail to support that the patient meets the above criteria.

If the transplant program believes that its patient has similar waiting list mortality and potential transplant benefit as a PH patient meeting the criteria listed above, then it should provide a detailed narrative on that assertion, referencing literature supporting the request for a higher score.

Transplant programs may wish to submit to the Review Board exception requests for the candidate's Waitlist Survival Score and Post-Transplant Outcomes Score to be at the national 90<sup>th</sup> percentile for each goal. This information is provided by the OPTN on a rolling basis.

## Pediatric Priority 1

To request a pediatric priority 1 exception for a candidate currently assigned to priority 2, transplant programs should request an exception for 7.6292% of the waitlist survival score to get the 1.9073 waitlist points assigned to pediatric priority 1 candidates. It is not necessary to request an exception for post-transplant outcomes since pediatric priority 1 and 2 candidates are assigned the same number of post-transplant outcomes points.

## Affected Guidelines

### Lung Review Board Operational Guidelines<sup>18</sup>

Repealed.

### Lung Review Board Operational Guidelines

#### Overview

The purpose of the Lung Review Board (Review Board) is to provide fair, equitable, and prompt peer review of exception requests. The Review Board will review these exception requests and determine if the request is comparable to other candidates with the same score.

#### Representation

Policy 10.2 Lung Composite Score Exceptions sets the structure and composition of the Review Board.

The membership of the Review Board is comprised of representatives from active lung transplant programs. Review Board members serve a term of 2 years. Service terms will be staggered among the Review Board members with a portion of active lung transplant programs permitted to appoint representatives each term. The Review Board membership is rotated to ensure each transplant program has equal opportunity to participate. Each participating lung transplant program may appoint a primary and an alternate representative. At least 4 of the active lung transplant programs must have performed at least one transplant for a candidate under the age of 12 within the last five years. The Review Board members from lung transplant programs that have performed at least one transplant for a candidate under the age of 12 within the last five years will be given priority for assignment to pediatric cases if they are available.

The immediate past Chair of the Lung Transplantation Committee will serve as the Review Board Chair for a 2-year term. In the event of a Review Board Chair vacancy, the Lung Transplantation Committee Chair will appoint a Review Board Chair.

Qualifications to serve on the Review Board include:

- The Review Board representative must be employed at an active lung transplant program.
  - If a transplant hospital inactivates or withdraws its lung program, the Review Board representative from that hospital may not participate in the Review Board.
  - If a transplant hospital inactivates or withdraws its pediatric lung component, the Review Board representative from that hospital may not participate in the Review Board.
  - The term of the transplant program or component's representative on the Review Board ends upon program or component's inactivation or withdrawal from the OPTN. Should a transplant program reactivate, it may again have the opportunity to be represented on the Review Board during future rotations.
  - It is the responsibility of each transplant program to provide the OPTN Contractor with the contact information for the both the primary Review Board representative and the alternate from their program. Should a representative leave his transplant program,

<sup>18</sup> "Lung Review Board Information," OPTN, January 2015, accessed June 23, 2022, [https://optn.transplant.hrsa.gov/media/2701/review\\_board\\_guidelines\\_lung.pdf](https://optn.transplant.hrsa.gov/media/2701/review_board_guidelines_lung.pdf).

then the program's alternate representative will become the primary Review Board member. The departing member will be removed from the Review Board.

- Complete a conflict of interest and confidentiality statement and orientation training prior to each term of service.
- The primary representative must have at least five years of post-training transplant experience.
- The alternate representative must have at least three years of post-training transplant experience.
- Transplant programs must ensure that Review Board volunteers from their programs meet these requirements.

## **Chair Responsibilities**

The Review Board Chair:

- A. Serves as a liaison between the Review Board and the Lung Transplantation Committee.
- B. May remove members of the Review Board who the Chair identifies as non-responsive to Review Board cases.

## **Representatives Responsibilities**

Review Board representatives must:

- A. Vote on all exception requests and appeals according to the timelines set by policy.
- B. When voting to deny an exception, provide constructive comments that are relevant to the candidate's clinical information and based on policy or guidance documents. These comments will be provided to the candidate's lung program.
- C. Notify the OPTN of any planned absences. Requests will not be assigned to representatives who indicate they are out of the office.

The alternate representative will only be assigned cases if the primary representative indicates they are out of the office.

## **Voting Procedure**

The OPTN Contractor will send the exception request or appeal to nine of the Review Board members. If there are fewer than nine reviewers available, the OPTN Contractor will send the case to all available reviewers.

If the assigned Review Board member has not voted within three days of when the OPTN Contractor sends the application or appeal to the Review Board, then the request will be reassigned to another representative.

The Review Board will review all exception requests prospectively. The candidate will not receive the exception score unless or until it is approved.

Voting will close at the earliest of when:

- A majority of all assigned voters have voted to approve an exception request
- A majority of all assigned voters have voted to deny an exception request
- The timeline lapses for the Review Board members to vote on the exception request.

The Review Board will have five days to vote and exception requests will be decided as follows:

<u>Of the votes submitted, if...</u>	<u>The request is...</u>
<u>The majority vote to approve</u>	<u>Approved</u>
<u>The majority vote to deny</u>	<u>Denied</u>
<u>There is a tie</u>	<u>Approved</u>
<u>No votes are submitted</u>	<u>Approved</u>

A majority is more than half of the votes submitted.

## **Appeal Process**

A candidate’s lung program may appeal the Review Board’s decision to deny an exception request within seven days of receiving the appeal denial notification. All representative comments of denied requests are provided to the lung program. The program must submit additional written information justifying or amending the requested exception and may include responses to the comments of dissenting Review Board representatives. This additional information will be provided to the Review Board representatives for further consideration. To the extent possible, the appeal will be considered by the same reviewers who considered the initial exception application. Exception requests appealed to the Review Board are adjudicated as described in Voting Procedure, above.

Following a denial on an appeal to the Review Board, the candidate’s lung program can appeal to the Committee. The lung program must appeal within 7 days of notification. The program can provide additional written information justifying or amending the requested exception to be sent to the Committee. The Committee will approve or deny each appeal no later than fourteen days following the request to the Committee. Exception requests appealed to the Committee are adjudicated as follows:

<u>Of the votes submitted, if...</u>	<u>The request is...</u>
<u>The majority vote to approve</u>	<u>Approved</u>
<u>The majority vote to deny</u>	<u>Denied</u>
<u>There is a tie</u>	<u>Approved</u>

Any member of the Committee who reviewed the case as a Review Board representative must abstain from voting on the appeal to the Committee.

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