Policy 10:   Allocation of Lungs

10.1 Priorities and Score Assignments for Lung Candidates

Lung candidates:

- Less than 12 years old are assigned a priority for lung allocation that is based on medical urgency.
- At least 12 years old use a Lung Allocation Score (LAS) to determine lung allocation, as well as geography and blood type.

10.1.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_2 greater than 50% in order to maintain oxygen saturation levels greater than 90%
   - Has an arterial or capillary PCO_2 greater than 50 mm Hg
   - Has a venous PCO_2 greater than 56 mm Hg

2. 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^2
     - Syncope
     - Hemoptysis
     - Suprasystemic PA pressure on cardiac catheterization or by echocardiogram estimate

The OPTN Contractor will maintain examples of accepted medical therapy for pulmonary hypertension. Transplant programs must indicate which of these medical therapies the candidate has received. If the candidate has not received any of the listed therapies, the transplant program must submit an exception request to the lung review board (LRB).

10.1.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 level 1, then the candidate is priority 2.

10.1.C   Priority and Clinical Data Update Schedule for Candidates Less than 12 Years Old

A transplant program may update the reported clinical data to justify a candidate's priority at any time. When a candidate meets the requirements for priority 1 the candidate will remain at priority 1 for six months from the date first registered as priority 1 on the lung transplant waiting list.

To remain as priority 1, the transplant program must then update the required clinical data, except data that requires a heart catheterization, every six months following the first six months as a priority 1 candidate. The updates must occur in each six month period following the initial six months at priority 1 to remain at priority 1. The transplant program may determine the frequency of performing the heart catheterization.

If the data used to justify the priority 1 criteria are more than 6 months old at the 6-month anniversary date, other than data requiring a heart catheterization, the candidate will automatically be assigned priority 2.

Lung candidates registered on the waiting list at inactive status are subject to these same requirements for updating clinical data.

10.1.D   Candidates at Least 12 Years Old - LAS

Candidates who are at least 12 years old or who have an approved adolescent classification exception receive offers for deceased donor lungs based on their calculated LAS. Candidates with a higher LAS receive higher waiting list priority within geography and blood type classifications.

10.1.E   LAS Values and Clinical Data Update Schedule for Candidates at Least 12 Years Old

When registering a candidate who is at least 12 years old for a lung transplant, or when registering a candidate with an approved adolescent classification exception according to *Policy 10.2.B: Lung Candidates with Exceptional Cases*, transplant programs must report to the OPTN Contractor clinical data corresponding with to the covariates shown in *Table 10-3: Waiting List Mortality Calculation: Covariates and Their Coefficients* and *Table 10-4: Post-Transplant Survival Calculation, Covariates, and Their Coefficients*.

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

Except as noted in *Policy 10.1.G: Reporting Additional Data for Candidates with an LAS of 50 or Higher*, transplant programs must report to the OPTN Contractor LAS covariate clinical data for every covariate in *Table 10-3* and *Table 10-4* for each candidate at least once in every six month period after the date of the candidate's initial registration or the LRB's approval of an adolescent classification exception. The first six-month period begins six months from the date of the candidate's initial registration, or, in the case of adolescent classification exceptions, six months from the date of LRB approval, with a new six-month period occurring every six months thereafter.

A covariate's value expires if the covariate's test date is six-months older than the most recent six-month anniversary date. The LAS system considers actual values and approved estimated values for pulmonary pressures to be valid until the transplant program updates them with new actual values or new approved estimated values as described in Policy *10.2.B.iii: Estimated Values Approved by the LRB*.

Transplant programs may report a medically reasonable estimated value if a test needed to obtain an actual value for a variable covariate cannot be performed due to the candidate's medical condition. Before entering estimated values, programs must receive approval from the LRB, which will determine whether the estimated values are appropriate according to *Policy 10.2.B.iii: Estimated Values Approved by the LRB.* Approved estimated values remain valid until an updated actual value is reported for the covariate, or until the transplant program reports a new, approved estimated value.

LAS covariate data obtained by heart catheterization does not need to be reported to the OPTN Contractor every six months. For LAS covariate data that requires a heart catheterization, the transplant program may determine the frequency of updating the data. However, if a transplant program performs a heart catheterization test on the candidate during the six month interval, then it must report the data to the OPTN Contractor.

If values for certain covariates are missing, expired, or below the threshold as defined by *Table 10-1*, then the LAS calculation will substitute normal or least beneficial values to calculate the candidate's LAS. A normal value is one that a healthy individual is likely to exhibit. A least beneficial value is one that will calculate the lowest LAS for a candidate. *Table 10-1* lists the normal and least beneficial values that will be substituted.

Table 10-1: Values Substituted for Missing or Expired Actual Values in Calculating the LAS

If this covariate's value:	Is:	Then the LAS calculation will use this substituted value:
Bilirubin	Missing, expired, or less than 0.7 mg/dL	0.7 mg/dL
Body mass index (BMI)	Missing or expired	100 kg/m^2
Cardiac index	Missing	3.0 L/min/m^2
Central venous pressure (CVP)	Missing or less than 5 mm Hg	5 mm Hg
Continuous mechanical ventilation	Missing or expired	No mechanical ventilation in the waiting list model Continuous mechanical ventilation while hospitalized in the post-transplant survival measure
Creatinine: serum	Missing or expired	0.1 mg/dL in the waiting list model 40 mg/dL in the post-transplant survival measure for candidates at least 18 years old 0 mg/dL in the post-transplant survival measure for candidates less than 18 years old
Diabetes	Missing or expired	No diabetes
Forced vital capacity (FVC)	Missing or expired	150% for Diagnosis Group D

If this covariate's value:	Is:	Then the LAS calculation will use this substituted value:
Functional status	Missing or expired	No assistance needed in the waiting list model

Some or total assistance needed in the post-transplant survival measure |
| Oxygen needed at rest | Missing or expired | No supplemental oxygen needed in the waiting list model

26.33 L/min in the post-transplant survival measure |
| PCO_2 | Missing, expired, or less than 40 mm Hg | 40 mm Hg |
| Pulmonary artery (PA) systolic pressure | Missing or less than 20 mm Hg | 20 mm Hg |
| Six-minute-walk distance | Missing or expired | 4,000 feet in the waiting list urgency measure

0 feet in the post-transplant survival measure |

10.1.F   The LAS Calculation

The LAS calculation uses *all* of the following measures:

- Waiting List Urgency Measure, which is the expected number of days a candidate will live without a transplant during an additional year on the waiting list.
- Post-transplant Survival Measure, which is the expected number of days a candidate will live during the first year post-transplant.
- Transplant Benefit Measure, which is the difference between the Post-transplant Survival Measure and the Waiting List Urgency Measure.
- Raw Allocation Score, which is the difference between Transplant Benefit Measure and Waiting List Urgency Measure.

To determine a candidate's LAS, the Raw Allocation Score is normalized to a continuous scale of zero to 100.

The equation for the LAS calculation is:

$$LAS = \frac{100 * [PTAUC - 2 * WLAUC + 730]}{1095}$$

Table 10-2: LAS Calculation Values

Where…	Includes…
$$PTAUC = \sum_{k=0}^{364} S_{TX}(k)$$	PTAUC = the area under the post-transplant survival probability curve during the first post-transplant year. β_I = the coefficient for characteristic i from the waiting list measure, according to *Table 10-3: Waiting List Mortality Calculation: Covariates and their Coefficients.*
$$S_{TX}(t) = S_{TX,0}(t)^{e^{\alpha_1 Y_1 + \alpha_2 Y_2 + \dots + \alpha_q Y_q}}$$	$S_{TX}(t)$ = the expected post-transplant survival probability at time t for an individual candidate. Y_i = the value of the jth characteristic for an individual candidate α_j = the coefficient for characteristic j from the post-transplant survival measure, according to *Table 10-4: Post-Transplant Survival Calculation, Covariates, and Their Coefficients*.
$$WLAUC = \sum_{k=0}^{364} S_{WL}(k)$$	WLAUC = the area under the waiting list survival probability curve during the next year.
$$S_{WL}(t) = S_{WL,0}(t)^{e^{\beta_1 X_1 + \beta_2 X_2 + \dots + \beta_p X_p}}$$	$S_{WL,0}(t)$ = the baseline waiting list survival probability at time t, according to *Table 10-8: Baseline Waiting List Survival (SWL(t)) Probability.* $S_{TX,0}(t)$ = the baseline post-transplant survival probability at time t, according to *Table 10-9: Baseline Post-Transplant Survival (S_TX(t)) Probability.* $S_{WL}(t)$ = the expected waiting list survival probability at time t for an individual candidate X_i = the value of the ith characteristic for an individual candidate.

Table 10-3 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 10-3: Waiting List Mortality Calculation: Covariates and their Coefficients

For this covariate:	The following coefficient is used in the LAS calculation:
1. Age (year)	0.0083990318885565*age
2. Bilirubin (mg/dL)	0.0431682188302477*(bilirubin – 1) if bilirubin is more than 1.0 mg/dL 0 when bilirubin is 1.0 mg/dL or less

For this covariate:	The following coefficient is used in the LAS calculation:
3. Bilirubin increase of at least 50%	1.4144058906830200 for Diagnosis Group B 0 for Diagnosis Groups A, C, and D
4. Body mass index (BMI) (kg/m^2)	0.1261444133358100*(20 – BMI) for BMI less than 20 kg/m^2 0 if BMI is at least 20 kg/m^2
5. Cardiac index prior to any exercise	0.5435368888028200 if the cardiac index is less than 2 L/min/m^2 0 if the cardiac index is at least 2 L/min/m^2
6. Central venous pressure (CVP) (mm Hg) at rest, prior to any exercise	0.0173841981251578*(CVP – 7) for CVP greater than 7 mm Hg (Diagnosis Group B only) 0 if less than or equal to 7 mm Hg for Diagnosis Group B 0 for candidates in Diagnosis Groups A, C, and D
7. Ventilation status if candidate is hospitalized	1.6771121096052300 if continuous mechanical ventilation needed 0 if no continuous mechanical ventilation needed
8. Creatinine (serum) (mg/dL)	0.5034346761960600* creatinine if candidate is at least 18 years old 0 if candidate is less than 18 years old
9. Diabetes	0.4680254026735700 if diabetic 0 if not diabetic
10. Diagnosis Group A	0
11. Diagnosis Group B	1.5774243292137200
12. Diagnosis Group C	1.2313926484343600
13. Diagnosis Group D	0.6259577164157700
14. Detailed diagnosis: Bronchiectasis (Diagnosis Group A only)	0.6680518055684700
15. Detailed diagnosis: Eisenmenger's syndrome (Diagnosis Group B only)	-0.6278657824830000
16. Detailed diagnosis: Lymphangioleiomyomatosis (Diagnosis Group A only)	-0.3162937838984600
17. Detailed Diagnosis: Obliterative bronchiolitis (not-retransplant) (Diagnosis Group D only)	0.4453284411081100

For this covariate:	The following coefficient is used in the LAS calculation:
18. Detailed Diagnosis: Pulmonary fibrosis, not idiopathic (Diagnosis Group D only)	-0.2091170018125500
19. Detailed Diagnosis: Sarcoidosis with PA mean pressure greater than 30 mm Hg (Diagnosis Group D only)	-0.4577749354638600
20. Detailed Diagnosis: Sarcoidosis with PA mean pressure of 30 mm Hg or less (Diagnosis Group A only)	0.9330846239906700
21. Forced vital capacity (FVC)	$0.1829476350587400*(80 - FVC)/10$ if FVC is less than 80% for Diagnosis Group D 0 if FVC is greater than or equal to 80% for Diagnosis Group D 0 for candidates in Diagnosis Groups A, B, and C
22. Functional Status	-0.4471034284458400 if no assistance needed with activities of daily living 0 if some or total assistance needed with activities of daily living
23. Oxygen needed to maintain adequate oxygen saturation (88% or greater) at rest (L/min)	$0.0213187586203456*O_2$ for Diagnosis Group B $0.1188479817592500*O_2$ for Diagnosis Groups A, C, and D
24. PCO_2 (mm Hg): current	$0.1104609835819100*PCO_2/10$ if PCO_2 is at least 40 mm Hg
25. PCO_2 increase of at least 15%	0.2331149280428300 if PCO_2 increase is at least 15% 0 if PCO_2 increase is less than 15%
26. Pulmonary artery (PA) systolic pressure (10 mm Hg) at rest, prior to any exercise	$0.4155116686114300*(PA\ systolic - 40)/10$ for Diagnosis Group A if the PA systolic pressure is greater than 40 mm Hg 0 for Diagnosis Group A if the PA systolic pressure is 40 mm Hg or less $0.0462410402627318*PA\ systolic/10$ for Diagnosis Groups B, C, and D

For this covariate:	The following coefficient is used in the LAS calculation:
27. 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.	-0.0844896372724000*Six-minute-walk distance/100

Table 10-4 lists the covariates and corresponding coefficients in the waiting list and post-transplant survival measures. See *Policy 10.1.F.i: Lung Disease Diagnosis Groups* for specific information on each diagnosis group.

Table 10-4: Post-Transplant Survival Calculation: Covariates and Their Coefficients

For this variable:	The following is used in the LAS calculation:
1. Age (years)	0.0246579831271869*(age–45) if candidate is greater than 45 years old 0 if candidate is 45 years old or younger
2. Creatinine (serum) at transplant (mg/dL)	0.0895569900508900*creatinine if candidate is at least 18 years old 0 if candidate is less than 18 years old
3. Creatinine increase of at least 150%	0.7708616024698100 if increase in creatinine is at least 150%, and the higher value determining this increase is at least 1 mg/dL 0 if increase in creatinine of 150% if the higher value determining this increase is less than 1 mg/dL 0 if increase in creatinine less than 150%
4. Cardiac index (L/min/m^2) at rest, prior to any exercise	0.3499381679822400 if less than 2 L/min/m^2 0 if at least 2 L/min/m^2
5. Ventilation status if candidate is hospitalized	0.6094478988424900 if continuous mechanical ventilation needed 0 if no continuous mechanical ventilation needed
6. Diagnosis Group A	0
7. Diagnosis Group B	0.6115547319209300
8. Diagnosis Group C	0.3627014422464200
9. Diagnosis Group D	0.4641392063023200
10. Detailed diagnosis: Bronchiectasis (Diagnosis Group A only)	0.1889100379099400

For this variable:	The following is used in the LAS calculation:
11. Detailed diagnosis: Eisenmenger's syndrome (Diagnosis Group B only)	0.9146727886744700
12. Detailed diagnosis: Lymphangioleiomyomatosis (Diagnosis Group A only)	-1.5194416206749400
13. Detailed diagnosis: Obliterative bronchiolitis (not-retransplant, Diagnosis Group D only)	-1.2050508750702600
14. Detailed diagnosis: Pulmonary fibrosis, not idiopathic (Diagnosis Group D only)	-0.0723596761367600
15. Detailed diagnosis: Sarcoidosis with PA mean pressure greater than 30 mm Hg (Diagnosis Group D only)	-0.0437880049066331
16. Detailed diagnosis: Sarcoidosis with PA mean pressure of 30 mm Hg or less (Diagnosis Group A only)	-0.1389363636019300
17. Oxygen needed to maintain adequate oxygen saturation (88% or greater) at rest (L/min)	$0.0747978926517300 * O_2$ for Diagnosis Group A $0.0164276945879309 * O_2$ for Diagnosis Groups B, C, and D
18. Functional Status	-0.1900086366785100 if no assistance needed with activities of daily living 0 if some or total assistance needed with activities of daily living
19. 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.	$0.0004594953809594 * (1200 - \text{Six-minute-walk distance})$ 0 if six-minute-distance-walked is at least 1,200 feet

See *Policy 10.5: Probability Data Used in the LAS Calculation* for *Tables 10-8* and *10-9* that provide data used in the LAS calculation.

10.1.F.i   Lung Disease Diagnosis Groups

The LAS calculation uses diagnosis Groups A, B, C, and D as listed below.

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
- Lymphangioleiomyomatosis
- Obstructive lung disease
- Primary ciliary dyskinesia;
- Sarcoidosis with mean pulmonary artery pressure of 30 mm Hg or less
- 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
- Primary 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
- CREST – Restrictive
- Eosinophilic granuloma
- Fibrosing Mediastinitis
- Graft versus host disease (GVHD)
- Hermansky Pudlak syndrome
- Hypersensitivity pneumonitis
- Idiopathic interstitial pneumonia, with at least one or more 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 mean pulmonary artery pressure higher than 30 mm Hg
- Scleroderma – restrictive
- Secondary pulmonary fibrosis: (specify cause)
- Silicosis
- Sjogren's syndrome
- Surfactant protein B mutation
- Surfactant protein C mutation
- Teratoma
- Wegener's granuloma – restrictive

10.1.F.ii   PCO$_2$ in the LAS

The LAS calculation uses two measures of PCO$_2$:

1. Current PCO$_2$
2. PCO$_2$ Threshold Change

Current PCO$_2$

Current PCO$_2$ is the PCO$_2$ value reported to the OPTN Contractor with the most recent test date and time. A program may report a PCO$_2$ 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$_2$ Threshold Change

There are two PCO$_2$ threshold change calculations:

- The PCO$_2$ Threshold Change Calculation
- The Threshold Change Maintenance Calculation

The PCO$_2$ Threshold Change Calculation

An increase in PCO$_2$ that is at least 15% will impact a candidate's LAS. If a value is less than 40 mmHg, the system will substitute the normal clinical value of 40 mmHg before calculating change. The PCO$_2$ threshold change calculation uses the highest and lowest values of PCO$_2$ as follows:

- The test date and time of the lowest value reported to the OPTN Contractor used in the PCO$_2$ threshold change calculation must be earlier than the test date and time of the highest value used in the PCO$_2$ threshold change calculation.
- Test dates of these highest and lowest values cannot be more than six months apart.
- The PCO$_2$ threshold change calculation can use an expired lowest value, but cannot use an expired highest value.

If a current PCO$_2$ value expires according *to Policy 10.1.E: LAS Values and Clinical Data Update Schedule for Candidates at Least 12 Years Old,* the candidate's LAS will lose the impact from the PCO$_2$ threshold change calculation. The equation for the PCO$_2$ 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$_2$ threshold change calculation impacts a candidate's LAS, the LAS threshold change maintenance calculation assesses whether to maintain that impact. To maintain the impact of the PCO$_2$ increase, the candidate's current PCO$_2$ value must be at least 15% higher than the lowest value used in the PCO$_2$ 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_2 value expires, according to *Policy 10.1.E: LAS Values and Clinical Data Update Schedule for Candidates at Least 12 Years Old*, or a new current PCO_2 value is entered. For this calculation, the lowest and highest values that were used in the PCO_2 threshold change calculation can be expired. The current PCO_2 value can be the highest one that was used in the PCO_2 threshold change calculation. If a current PCO_2 value expires, the candidate's LAS will no longer be affected by the PCO_2 threshold change.

If a transplant hospital reports a new current PCO_2 value for a candidate who has lost the impact from the PCO_2 threshold change calculation, the LAS will perform the threshold change maintenance calculation. If the new current PCO_2 value is at least 15% higher than the lowest value used in the PCO_2 threshold change calculation, the candidate's LAS will again be affected by the PCO_2 threshold change calculation.

Normal PCO_2 Value

The normal clinical PCO_2 value is 40mmHg. If a current PCO_2 value is below 40 mmHg, or if the current PCO_2 value is missing or expired, the LAS calculation will use the normal clinical PCO_2 value.

10.1.F.iii Bilirubin in the LAS

The LAS calculation uses two measures of total bilirubin:

- Current bilirubin (for all candidates)
- Bilirubin Threshold Change (for diagnosis Group B only)

Current Bilirubin

Current bilirubin is the total bilirubin value with the most recent test date and time reported to the OPTN Contractor. A current bilirubin value greater than 1.0 mg/dL will impact candidate's LAS.

Bilirubin Threshold Change (Diagnosis Group B Only)

There are two Bilirubin threshold change calculations:

- Bilirubin Threshold Change Calculation
- Threshold Change Maintenance Calculation

Bilirubin Threshold Change Calculation

For candidates in diagnosis Group B, an increase-in-bilirubin that is at least 50% impacts the candidate's LAS. The bilirubin threshold change calculation uses the highest and lowest values of bilirubin as follows:

- The test date and time of the lowest bilirubin value reported to the OPTN Contractor used in the bilirubin threshold change calculation must be earlier than the test date and time of the highest bilirubin value used in the bilirubin threshold change calculation.
- The highest value must be at least 1.0 mg/dL.
- Test dates of these highest and lowest values cannot be more than six months apart.

- The bilirubin threshold calculation can use an expired lowest value, but cannot use an expired highest value.
- If a value is less than 0.7 mg/dL, the bilirubin threshold change calculation will use the normal clinical value of 0.7 mg/dL.

The equation for this bilirubin threshold change calculation is:

$$\frac{\text{Highest Bilirubin-Lowest Bilirubin}}{\text{Lowest Bilirubin}}$$

Threshold Change Maintenance Calculation

When a 50% or greater increase in bilirubin impacts a candidate's LAS, the LAS threshold change maintenance calculation assesses whether to maintain that impact. To maintain the impact of the bilirubin increase, the candidate's current bilirubin value must be at least 1.0 mg/dL and at least 50% higher than the lowest value used in the bilirubin threshold change calculation. The equation for the threshold change maintenance calculation is:

$$\frac{\text{Current Bilirubin-Lowest Bilirubin}}{\text{Lowest Bilirubin}}$$

The threshold change maintenance calculation occurs either when the current bilirubin value expires, according to *Policy 10.1.E: LAS Values and Clinical Data Update Schedule for Candidates at Least 12 Years Old*, or a new current bilirubin value is entered. For this calculation, the lowest and highest values that were used in the bilirubin threshold change calculation can be expired. The current bilirubin value can be the highest one that was used in the bilirubin threshold change calculation. If a current bilirubin value expires, the candidate's LAS will no longer be affected by the bilirubin threshold change.

If a transplant hospital reports a new current bilirubin value for a candidate who has lost the impact from the bilirubin threshold change calculation, the LAS will perform the threshold change maintenance calculation. If the new current bilirubin value is at least 50% higher than the lowest value used in the bilirubin threshold change calculation, the candidate's LAS will again be affected by the bilirubin threshold change calculation.

Normal Bilirubin Value

The normal clinical current bilirubin value is 0.7 mg/dL. If a current bilirubin value is below 0.7 mg/dL, or if the current bilirubin value is missing or expired, the LAS calculation will use the normal clinical current bilirubin value.

10.1.F.iv Creatinine in the LAS

The LAS calculation uses two measures of creatinine:

1. Current creatinine (only for candidates who are at least 18 years old)
2. Creatinine Threshold Change (for all candidates)

Current Creatinine

Current creatinine is the serum creatinine value with the most recent test date and time reported to the OPTN Contractor for candidates who are at least 18 years old.

Creatinine Threshold Change Calculations

There are two creatinine threshold change calculations:

1. Creatinine Threshold Change Calculation
2. Threshold Change Maintenance Calculation

The Creatinine Threshold Change Calculation

An increase in creatinine that is at least 150% will impact a candidate's LAS. The creatinine threshold change calculation uses the highest and lowest values of creatinine as follows:

*   The test date and time of the lowest creatinine value reported to the OPTN Contractor used in the creatinine threshold change calculation must be earlier than the test date and time of the highest creatinine value used in the creatinine threshold change calculation.
*   The highest value must be at least 1.0 mg/dL.
*   Test dates of these highest and lowest values cannot be more than six months apart.
*   The creatinine threshold change calculation can use an expired lowest value, but cannot use an expired highest value.

The equation for this creatinine threshold change calculation is:

$$\frac{\text{Highest Creatinine-Lowest Creatinine}}{\text{Lowest Creatinine}}$$

The Threshold Change Maintenance Calculation

When a creatinine threshold change calculation impacts a candidate's LAS, the threshold change maintenance calculation assesses whether to maintain that impact. To maintain the impact of the increase in creatinine, the candidate's current creatinine value must be at least 1.0 mg/dL and at least 150% higher than the lowest value used in the creatinine threshold change calculation. The equation for the threshold change maintenance calculation is:

$$\frac{\text{Current Creatinine-Lowest Creatinine}}{\text{Lowest Creatinine}}$$

If the current creatinine value expires or a new creatinine value is entered, then the threshold change maintenance calculation will occur.

10.1.G   Reporting Additional Data for Candidates with an LAS of 50 or Higher

Within 14 days of the date a candidate's LAS becomes 50 or higher, the candidate's transplant program must assess and report to the OPTN Contractor the following variables:

1. Assisted ventilation
2. Supplemental oxygen
3. Current PCO_2

While the candidate's LAS remains 50 or higher, the transplant program must continue to assess and report assisted ventilation and supplemental oxygen data every 14 days. The transplant

program is only required to report updated PCO$_2$ data if the assessment was performed during the previous 14 day interval.

The transplant program must maintain documentation of each assessment in the candidate's medical chart.

10.2 Priority and Score Exceptions

10.2.A   Allocation Exception for Sensitized Patients

Lungs may be allocated to sensitized candidates within a DSA out of the sequence required by the match run if:

1. The candidate's transplant surgeon or physician determines that the candidate's antibodies would react adversely to certain human leukocyte antigens (HLA) antigens.
2. All lung transplant programs and the OPO within the DSA agree to allocate the lung from a compatible deceased donor to the sensitized candidate because the results of a crossmatch between the blood serum of that the candidate and cells of the lung donor are negative.
3. The candidate's transplant program, all lung transplant programs, and the OPO within a DSA agree upon the level of sensitization at which a candidate qualifies for the sensitization exception.

Sensitization alone does not qualify a candidate to qualify for an exception as described in *Policy 10.2.B*: *Lung Candidates with Exceptional Cases* below.

10.2.B   Lung Candidates with Exceptional Cases

The Thoracic Organ Transplantation Committee establishes guidelines for special case review by the LRB.

If a candidate's transplant program believes that a candidate's current priority or LAS does not appropriately reflect the candidate's medical urgency for transplant, the transplant program may request approval of a specific priority or LAS by the LRB. The transplant program can also ask the LRB to approve specific estimated values or diagnoses.

For lung candidates less than 12 years old, transplant programs may request classification as an adolescent candidate for the purposes of *Policy 10.4.C: Allocation of Lungs from Deceased Donors at Least 18 Years Old*, and *Policy 10.4.D: Allocation of Lungs from Deceased Donors 12 to Less Than 18 Years Old*. Candidates receiving this exception will also maintain their pediatric classification for the purposes of *Policy 10.4.E: Allocation of Lungs from Deceased Donors Less than 12 Years Old*.

10.2.B.i   LRB Review Process

Requests for approval of estimated values, diagnoses, specific LAS, or adolescent classification exceptions require prospective review by the LRB. The transplant hospital must submit requests for LRB review to the OPTN Contractor, and accompany each request for special review with a supporting narrative. The LRB will have seven days to reach a decision regarding the request, starting from the date that the OPTN Contractor sends the request to the LRB.

If the LRB denies a request upon initial review, then the transplant program may choose to appeal the decision and request reconsideration by the LRB. The transplant program has seven days from the date of the initial denial of the initial request to appeal. The LRB has seven days to reach a decision on the appeal, starting from the date that the OPTN Contractor sends the appealed request to the

LRB. If the LRB does not complete its review of an initial request or appeal within seven days of receiving it, then the candidate will not receive the requested LAS, diagnosis, estimated value, or adolescent classification, and the OPTN Contractor will send the request or appeal to the Thoracic Organ Transplantation Committee for further review.

Requests to register a candidate less than 12 years old as priority 1 require retrospective LRB review by the LRB.

10.2.B.ii LRB Decision Overrides

If the LRB denies a transplant hospital's initial request or appeal for an estimated value, adolescent classification, or specific LAS on appeal, the transplant hospital has the option to override the decision of the LRB. If the transplant hospital elects to override the decision of the LRB, then the OPTN Contractor will send the request or appeal to the Thoracic Organ Transplantation Committee for review. This review by the Thoracic Organ Transplantation Committee may result in further referral of the matter to the Membership and Professional Standards Committee (MPSC). If the MPSC agrees with the Thoracic Organ Transplantation Committee's decision, a member who has registered a candidate with an unapproved estimated value, adolescent classification, or LAS will be subject to action according to *Appendix L: Reviews, Actions, and Due Process* of the *OPTN Bylaws*.

10.2.B.iii Estimated Values Approved by the LRB

Approved estimated values approved by the LRB or Thoracic Committee will are valid until an actual value is reported to the OPTN Contractor or a new estimated value is reported to the OPTN Contractor.

10.2.B.iv LAS Diagnoses Approved by the LRB

A diagnosis that has been approved by the LRB or the Thoracic Organ Transplantation Committee is valid indefinitely, or until an adjustment is requested and, if necessary, approved by the LRB.

10.2.B.v LAS Approved by the LRB

An LAS approved by the LRB or the Thoracic Committee will remain valid for six months from the date the candidate's LAS is updated, (or from the candidate's twelfth birthday, whichever occurs later). If the candidate is still on the waiting list six months after the date the LAS is updated, then the candidate's LAS will be computed as described in Policy *10.1: Priorities and Score Assignments for Lung Candidates* unless a new LAS or priority request is submitted to the OPTN Contractor.

10.3 Waiting Time

Waiting time for lung candidates begins when the candidate is registered on the waiting list. Candidates at least 12 years old awaiting a lung transplant on the waiting list at inactive status will not accrue any waiting time while at inactive status. Lung candidates less than 12 years old accrue waiting time when registered at inactive status.

When waiting time is used for lung allocation, a candidate will receive a preference over other candidates who have accumulated less waiting time within the same priority or LAS.

10.3.A   Lung Candidates at Least 12 Years Old

If multiple candidates have identical computed LASs greater than zero, and have identical priority for a lung offer considering all other allocation factors, then priority among those candidates will be determined by the earliest date and time of each candidate's most recent data used in the calculation of the LAS reported to the OPTN Contractor.

If multiple candidates have identical assigned LASs due to an exceptional case request as defined by *Policy 10.2.B*, and have identical priority for a lung offer considering all other allocation factors, then priority among those candidates will be determined by the earliest date and time that each candidate's most recent LRB approval of that LAS was reported to the OPTN Contractor.

10.3.B   Lung Candidates Less than 12 Years Old

Allocation ranking for a priority 1 lung candidate is based on the candidate's most recent priority 1 waiting time, which only includes the candidate's current time as priority 1 and does not include any previous time spent as priority 1.

If there is ever a tie among priority 1 candidates within the same classification due to identical priority 1 waiting times, then the lung will be allocated to the priority 1 candidate with the most total waiting time. Total waiting time includes time spent waiting as priority 1, priority 2, and at inactive status. Allocation ranking will also consider this total waiting time.

Among priority 2 candidates, allocation ranking considers total waiting time for receiving deceased donor lung offers. Total waiting time includes the time a candidate spent waiting as priority 1, priority 2, and inactive. A priority 2 lung candidate's waiting time is the same as total waiting time.

10.4 Lung Allocation Classifications and Rankings

10.4.A   Sorting Within Each Classification

Lung candidates at least 12 years old are sorted in the following order:

1. LAS (highest to lowest)
2. Total active waiting time (longest to shortest)
3. LAS variable update date and time (earliest to most recent approval)
4. LAS exception date (earliest to most recent approval)

Lung candidates less than 12 years old are sorted in the following order:

1. Pediatric priority waiting time (longest to shortest)
2. Total waiting time (longest to shortest)

10.4.B   Allocation of Lungs by Blood Type

A candidate whose blood type is identical to the donor's will receive the single or double lung offer before a candidate whose blood type is compatible but not identical with the donor's.

10.4.C   Allocation of Lungs from Deceased Donors at Least 18 Years Old

Single and double lungs from deceased donors at least 18 years old are allocated according to *Table 10-5* below.

Table 10-5: Allocation of Lungs from Deceased Donors at Least 18 Years Old

Classification	Candidates that are included within the:	And are:
1	OPO's DSA	At least 12 years old, blood type identical to the donor
2	OPO's DSA	At least 12 years old, blood type compatible with the donor
3	OPO's DSA	Priority 1, blood type identical to the donor
4	OPO's DSA	Priority 1, blood type compatible with the donor
5	OPO's DSA	Priority 2, blood type identical to the donor
6	OPO's DSA	Priority 2, blood type compatible with the donor
7	Zone A	At least 12 years old, blood type identical to the donor
8	Zone A	At least 12 years old, blood type compatible with the donor
9	Zone A	Priority 1, blood type identical to the donor
10	Zone A	Priority 1, blood type compatible with the donor
11	Zone A	Priority 2, blood type identical to the donor
12	Zone A	Priority 2, blood type compatible with the donor
13	Zone B	At least 12 years old, blood type identical to the donor
14	Zone B	At least 12 years old, blood type compatible with the donor
15	Zone B	Priority 1, blood type identical to the donor
16	Zone B	Priority 1, blood type compatible with the donor
17	Zone B	Priority 2, blood type identical to the donor
18	Zone B	Priority 2, blood type compatible with the donor
19	Zone C	At least 12 years old, blood type identical to the donor
20	Zone C	At least 12 years old, blood type compatible with the donor
21	Zone C	Priority 1, blood type identical to the donor
22	Zone C	Priority 1, blood type compatible with the donor
23	Zone C	Priority 2, blood type identical to the donor
24	Zone C	Priority 2, blood type compatible with the donor

Classification	Candidates that are included within the:	And are:
25	Zone D	At least 12 years old, blood type identical to the donor
26	Zone D	At least 12 years old, blood type compatible with the donor
27	Zone D	Priority 1, blood type identical to the donor
28	Zone D	Priority 1, blood type compatible with the donor
29	Zone D	Priority 2, blood type identical to the donor
30	Zone D	Priority 2, blood type compatible with the donor
31	Zone E	At least 12 years old, blood type identical to the donor
32	Zone E	At least 12 years old, blood type compatible with the donor
33	Zone E	Priority 1, blood type identical to the donor
34	Zone E	Priority 1, blood type compatible with the donor
35	Zone E	Priority 2, blood type identical to the donor
36	Zone E	Priority 2, blood type compatible with the donor

10.4.D   Allocation of Lungs from Deceased Donors 12 to Less Than 18 Years Old

Single and double lungs from deceased donors at least 12 years old to less than 18 years old are allocated according to *Table 10-6* below.

Table 10-6: Allocation of Lungs from Deceased Donors 12 to Less Than 18 Years Old

Classification	Includes Candidates that are within the:	And are:
1	OPO's DSA	12 to less than 18 years old, blood type identical to the donor
2	OPO's DSA	12 to less than 18 years old, blood type compatible with the donor
3	OPO's DSA	Priority 1, blood type identical to the donor
4	OPO's DSA	Priority 1, blood type compatible with the donor
5	OPO's DSA	Priority 2, blood type identical to the donor
6	OPO's DSA	Priority 2, blood type compatible with the donor
7	OPO's DSA	At least 18 years old, blood type identical to the donor

Classification	Includes Candidates that are within the:	And are:
8	OPO's DSA	At least 18 years old, blood type compatible with the donor
9	Zone A	12 to less than 18 years old, blood type identical to the donor
10	Zone A	12 to less than 18 years old, blood type compatible with the donor
11	Zone A	Priority 1, blood type identical to the donor
12	Zone A	Priority 1, blood type compatible with the donor
13	Zone A	Priority 2, blood type identical to the donor
14	Zone A	Priority 2, blood type compatible with the donor
15	Zone A	At least 18 years old, blood type identical to the donor
16	Zone A	At least 18 years old, blood type compatible with the donor
17	Zone B	12 to less than 18 years old, blood type identical to the donor
18	Zone B	12 to less than 18 years old, blood type compatible with the donor
19	Zone B	Priority 1, blood type identical to the donor
20	Zone B	Priority 1, blood type compatible with the donor
21	Zone B	Priority 2, blood type identical to the donor
22	Zone B	Priority 2, blood type compatible with the donor
23	Zone B	At least 18 years old, blood type identical to the donor
24	Zone B	At least 18 years old, blood type compatible with the donor
25	Zone C	12 to less than 18 years old, blood type identical to the donor
26	Zone C	12 to less than 18 years old, blood type compatible with the donor
27	Zone C	Priority 1, blood type identical to the donor
28	Zone C	Priority 1, blood type compatible with the donor
29	Zone C	Priority 2, blood type identical to the donor
30	Zone C	Priority 2, blood type compatible with the donor
31	Zone C	At least 18 years old, blood type identical to the donor

Classification	Includes Candidates that are within the:	And are:
32	Zone C	At least 18 years old, compatible with the donor
33	Zone D	12 to less than 18 years old, blood type identical to the donor
34	Zone D	12 to less than 18 years old, blood type compatible with the donor
35	Zone D	Priority 1, blood type identical to the donor
36	Zone D	Priority 1, blood type compatible with the donor
37	Zone D	Priority 2, blood type identical to the donor
38	Zone D	Priority 2, blood type compatible with the donor
39	Zone D	At least 18 years old, blood type identical to the donor
40	Zone D	At least 18 years old, blood type compatible with the donor
41	Zone E	12 to less than 18 years old, blood type identical to the donor
42	Zone E	12 to less than 18 years old, blood type compatible with the donor
43	Zone E	Priority 1, blood type identical to the donor
44	Zone E	Priority 1, blood type compatible with the donor
45	Zone E	Priority 2, blood type identical to the donor
46	Zone E	Priority 2, blood type compatible with the donor
47	Zone E	At least 18 years old, blood type identical to the donor
48	Zone E	At least 18 years old, blood type compatible with the donor

10.4.E   Allocation of Lungs from Deceased Donors Less than 12 Years Old

Single and double lungs from deceased donors less than 12 years old are allocated according to *Table 10-7* below.

Table 10-7: Allocation of Lungs from Deceased Donors Less than 12 Years Old

Classification	Candidates that are included within the:	And are:
1	OPO's DSA, Zone A, or Zone B	Priority 1, blood type identical to the donor
2	OPO's DSA, Zone A, or Zone B	Priority 1, blood type compatible with the donor
3	OPO's DSA, Zone A, or Zone B	Priority 2, blood type identical to the donor
4	OPO's DSA, Zone A, or Zone B	Priority 2, blood type compatible with the donor
5	OPO's DSA or Zone A	12 to less than 18 years old, blood type identical to the donor
6	OPO's DSA or Zone A	12 to less than 18 years old, blood type compatible with the donor
7	OPO's DSA	At least 18 years, blood type identical to the donor
8	OPO's DSA	At least 18 years, blood type compatible with the donor
9	Zone A	At least 18 years old, blood type identical to the donor
10	Zone A	At least 18 years old, blood type compatible with the donor
11	Zone B	12 to less than 18 years old, blood type identical to the donor
12	Zone B	12 to less than 18 years old, blood type compatible with the donor
13	Zone B	At least 18 years old, blood type identical to the donor
14	Zone B	At least 18 years old, blood type compatible with the donor
15	Zone C	Priority 1, blood type identical to the donor
16	Zone C	Priority 1, blood type compatible with the donor
17	Zone C	Priority 2, blood type identical to the donor
18	Zone C	Priority 2, blood type compatible with the donor
19	Zone C	12 to less than 18 years old, blood type identical to the donor
20	Zone C	12 to less than 18 years old, blood type compatible with the donor
21	Zone C	At least 18 years old, blood type identical to the donor
22	Zone C	At least 18 years old, blood type compatible with the donor

Classification	Candidates that are included within the:	And are:
23	Zone D	Priority 1, blood type identical to the donor
24	Zone D	Priority 1, blood type compatible with the donor
25	Zone D	Priority 2, blood type identical to the donor
26	Zone D	Priority 2, blood type compatible with the donor
27	Zone D	12 to less than 18 years old, blood type identical to the donor
28	Zone D	12 to less than 18 years old, blood type compatible with the donor
29	Zone D	At least 18 years old, blood type identical to the donor
30	Zone D	At least 18 years old, blood type compatible with the donor
31	Zone E	Priority 1, blood type identical to the donor
32	Zone E	Priority 1, blood type compatible with the donor
33	Zone E	Priority 2, blood type identical to the donor
34	Zone E	Priority 2, blood type compatible with the donor
35	Zone E	12 to less than 18 years old, blood type identical to the donor
36	Zone E	12 to less than 18 years old, blood type compatible with the donor
37	Zone E	At least 18 years old, blood type identical to the donor
38	Zone E	At least 18 years old, blood type compatible with the donor

10.5 Probability Data Used in the LAS Calculation

Table 10-8: Baseline Waiting List Survival (SWL(t)) Probability Where t=Time in Days

t	$S_{WL}(t)$	t	$S_{WL}(t)$	t	$S_{WL}(t)$	t	$S_{WL}(t)$	t	$S_{WL}(t)$
0	1.0000000000	49	0.9966437334	98	0.9931596573	147	0.9905400510	196	0.9872991723
1	0.9999907157	50	0.9965433845	99	0.9930980163	148	0.9905400510	197	0.9872626749
2	0.9999254055	51	0.9965175429	100	0.9930607383	149	0.9905400510	198	0.9871552755
3	0.9998674170	52	0.9963972737	101	0.9930052489	150	0.9905400510	199	0.9871220338
4	0.9997455435	53	0.9963972737	102	0.9930052489	151	0.9905400510	200	0.9865302072
5	0.9995975343	54	0.9963631304	103	0.9929378277	152	0.9903840245	201	0.9865302072
6	0.9994989961	55	0.9963053385	104	0.9929378277	153	0.9903328361	202	0.9864801346
7	0.9993713802	56	0.9961914895	105	0.9928829296	154	0.9903328361	203	0.9859628001
8	0.9993046242	57	0.9961189511	106	0.9928829296	155	0.9903328361	204	0.9859256159
9	0.9992177050	58	0.9959421227	107	0.9928506946	156	0.9902446847	205	0.9859256159
10	0.9990851999	59	0.9959421227	108	0.9927619069	157	0.9902446847	206	0.9858198690
11	0.9989901794	60	0.9959092500	109	0.9927244496	158	0.9902446847	207	0.9858198690
12	0.9988873318	61	0.9959092500	110	0.9926433860	159	0.9901449203	208	0.9857415923
13	0.9988160788	62	0.9958731922	111	0.9926433860	160	0.9896887318	209	0.9857415923
14	0.9987295863	63	0.9958457969	112	0.9925624932	161	0.9896887318	210	0.9857415923
15	0.9986602768	64	0.9958457969	113	0.9920885646	162	0.9896520090	211	0.9857075131
16	0.9985875403	65	0.9956136053	114	0.9920640055	163	0.9895745634	212	0.9857075131
17	0.9984554393	66	0.9955529860	115	0.9920400127	164	0.9895745634	213	0.9855411680
18	0.9983616851	67	0.9955529860	116	0.9919966080	165	0.9889025189	214	0.9855411680
19	0.9982588046	68	0.9955529860	117	0.9919660469	166	0.9888730124	215	0.9855411680
20	0.9982200289	69	0.9955000986	118	0.9919399263	167	0.9888730124	216	0.9854501485
21	0.9980677506	70	0.9954789372	119	0.9919399263	168	0.9887838841	217	0.9854501485
22	0.9980357372	71	0.9953493820	120	0.9919399263	169	0.9887222824	218	0.9854501485
23	0.9979724590	72	0.9952934145	121	0.9915144847	170	0.9886945957	219	0.9853304718
24	0.9978684291	73	0.9951363273	122	0.9915144847	171	0.9886945957	220	0.9852652088
25	0.9977699910	74	0.9949654223	123	0.9915144847	172	0.9886945957	221	0.9852652088
26	0.9977420222	75	0.9948209678	124	0.9915144847	173	0.9886549235	222	0.9852652088
27	0.9976665328	76	0.9947736691	125	0.9914883902	174	0.9886549235	223	0.9852652088
28	0.9976255053	77	0.9947021905	126	0.9914618560	175	0.9886549235	224	0.9852652088
29	0.9975404117	78	0.9947021905	127	0.9913925084	176	0.9886246774	225	0.9846212073
30	0.9974725579	79	0.9946337898	128	0.9913069760	177	0.9885475245	226	0.9845486667
31	0.9973914097	80	0.9945649862	129	0.9913069760	178	0.9885475245	227	0.9845486667
32	0.9973268946	81	0.9945465023	130	0.9912697831	179	0.9885475245	228	0.9845486667
33	0.9972974521	82	0.9944645092	131	0.9912361687	180	0.9880619575	229	0.9845486667
34	0.9972743143	83	0.9944645092	132	0.9912361687	181	0.9880619575	230	0.9844886959
35	0.9972419197	84	0.9942969766	133	0.9910529687	182	0.9880619575	231	0.9844886959
36	0.9972419197	85	0.9942969766	134	0.9910121623	183	0.9880212199	232	0.9843962284
37	0.9971814314	86	0.9942969766	135	0.9910121623	184	0.9879335450	233	0.9843236173
38	0.9971367830	87	0.9942969766	136	0.9909776544	185	0.9878851712	234	0.9842799561
39	0.9971209292	88	0.9941805902	137	0.9909776544	186	0.9878851712	235	0.9840794709
40	0.9971209292	89	0.9940771789	138	0.9909776544	187	0.9878851712	236	0.9840794709
41	0.9970189115	90	0.9940345018	139	0.9909355857	188	0.9878851712	237	0.9840145629
42	0.9969461979	91	0.9940082090	140	0.9909011142	189	0.9878560942	238	0.9840145629
43	0.9969159237	92	0.9938663826	141	0.9909011142	190	0.9878560942	239	0.9840145629
44	0.9968488001	93	0.9938313146	142	0.9908111395	191	0.9878560942	240	0.9840145629
45	0.9968488001	94	0.9938070978	143	0.9907387924	192	0.9878560942	241	0.9838347625
46	0.9968199961	95	0.9937145919	144	0.9905945464	193	0.9878560942	242	0.9838347625
47	0.9967799694	96	0.9933077154	145	0.9905945464	194	0.9876077782	243	0.9837917116
48	0.9967313053	97	0.9932199214	146	0.9905400510	195	0.9873585581	244	0.9837534417

(Continued on next page)

Table 10-8: Baseline Waiting List Survival (SWL(t)) Probability Where t=Time in Days (Continued)

t	$S_{WL}(t)$	t	$S_{WL}(t)$	t	$S_{WL}(t)$	t	$S_{WL}(t)$	t	$S_{WL}(t)$
245	0.9837534417	269	0.9829597020	293	0.9818267812	317	0.9802178676	341	0.9785965606
246	0.9837534417	270	0.9829597020	294	0.9818267812	318	0.9801289145	342	0.9785965606
247	0.9836972199	271	0.9827972342	295	0.9815730256	319	0.9801289145	343	0.9783012252
248	0.9836363251	272	0.9827972342	296	0.9813194319	320	0.9800157994	344	0.9782502701
249	0.9836363251	273	0.9827972342	297	0.9807747475	321	0.9800157994	345	0.9782502701
250	0.9836363251	274	0.9827972342	298	0.9807747475	322	0.9800157994	346	0.9782502701
251	0.9836363251	275	0.9827004206	299	0.9805186284	323	0.9797725024	347	0.9781167565
252	0.9832432776	276	0.9826027019	300	0.9803970706	324	0.9797725024	348	0.9780370471
253	0.9832432776	277	0.9826027019	301	0.9803970706	325	0.9796706377	349	0.9780370471
254	0.9832432776	278	0.9825107450	302	0.9803970706	326	0.9796706377	350	0.9780370471
255	0.9830967678	279	0.9824570403	303	0.9803970706	327	0.9791639481	351	0.9780370471
256	0.9830967678	280	0.9824570403	304	0.9803970706	328	0.9791639481	352	0.9779370209
257	0.9830967678	281	0.9824570403	305	0.9803970706	329	0.9791639481	353	0.9779370209
258	0.9830967678	282	0.9824128485	306	0.9803970706	330	0.9791639481	354	0.9779370209
259	0.9830967678	283	0.9823232942	307	0.9803390799	331	0.9791001516	355	0.9778553245
260	0.9830967678	284	0.9823232942	308	0.9803390799	332	0.9791001516	356	0.9778553245
261	0.9830967678	285	0.9823232942	309	0.9803390799	333	0.9789346942	357	0.9778553245
262	0.9830516708	286	0.9823232942	310	0.9803390799	334	0.9789346942	358	0.9777099092
263	0.9830516708	287	0.9823232942	311	0.9803390799	335	0.9788174060	359	0.9777099092
264	0.9830516708	288	0.9823232942	312	0.9803390799	336	0.9788174060	360	0.9768812539
265	0.9830516708	289	0.9823232942	313	0.9803390799	337	0.9788174060	361	0.9768812539
266	0.9830516708	290	0.9823232942	314	0.9803390799	338	0.9788174060	362	0.9768812539
267	0.9830516708	291	0.9819156574	315	0.9802178676	339	0.9788174060	363	0.9767085255
268	0.9829597020	292	0.9818779459	316	0.9802178676	340	0.9788174060	364	0.9767085255

Table 10-9: Baseline Post-Transplant Survival ($S_{TX}(t)$) Probability Where t=Time in Days

t	$S_{TX}(t)$	t	$S_{TX}(t)$	t	$S_{TX}(t)$	t	$S_{TX}(t)$	t	$S_{TX}(t)$
0	1.0000000000	48	0.9818819454	97	0.9724145650	146	0.9651646731	195	0.9585852831
0	0.9989463518	49	0.9813940581	98	0.9724145650	147	0.9650179741	196	0.9585852831
1	0.9975582572	50	0.9811149797	99	0.9721278916	148	0.9650179741	197	0.9585106153
2	0.9968950221	51	0.9808357071	100	0.9719843820	149	0.9647244778	198	0.9583612369
3	0.9963635815	52	0.9804163818	101	0.9717688365	150	0.9646510762	199	0.9580621750
4	0.9954983869	53	0.9802065044	102	0.9716969486	151	0.9645042403	200	0.9580621750
5	0.9951651492	54	0.9801365116	103	0.9715531365	152	0.9643573707	201	0.9579873451
6	0.9945645668	55	0.9799264755	104	0.9713373330	153	0.9640634927	202	0.9579873451
7	0.9941636334	56	0.9796462096	105	0.9712653813	154	0.9638429283	203	0.9579125074
8	0.9939630137	57	0.9794358024	106	0.9711934225	155	0.9636958085	204	0.9577628083
9	0.9933601591	58	0.9790847785	107	0.9711214419	156	0.9634750547	205	0.9576130592
10	0.9931589002	59	0.9788739877	108	0.9710494372	157	0.9633278327	206	0.9575381540
11	0.9924871748	60	0.9787334069	109	0.9709774209	158	0.9631069028	207	0.9573882873
12	0.9923526429	61	0.9784520623	110	0.9707613132	159	0.9627384081	208	0.9573133332
13	0.9919487360	62	0.9783816832	111	0.9706892585	160	0.9625171483	209	0.9572383663
14	0.9916792045	63	0.9781704820	112	0.9706171946	161	0.9624433701	210	0.9571633895
15	0.9912068471	64	0.9781000588	113	0.9705451162	162	0.9622957853	211	0.9571633895
16	0.9905308509	65	0.9779591798	114	0.9704730247	163	0.9620743353	212	0.9569383725
17	0.9902600814	66	0.9778182436	115	0.9703288079	164	0.9619266457	213	0.9568633391
18	0.9899212765	67	0.9778182436	116	0.9699680182	165	0.9617049921	214	0.9567883006
19	0.9895819543	68	0.9775361418	117	0.9698236079	166	0.9616310727	215	0.9567132550
20	0.9895140131	69	0.9772537901	118	0.9696791597	167	0.9615571395	216	0.9566381918
21	0.9889017936	70	0.9770418835	119	0.9696069224	168	0.9614831983	217	0.9564880147
22	0.9882201168	71	0.9769712231	120	0.9693901236	169	0.9614831983	218	0.9562625865
23	0.9878104319	72	0.9769005466	121	0.9691008601	170	0.9614092449	219	0.9562625865
24	0.9874685977	73	0.9767590709	122	0.9689561390	171	0.9611132339	220	0.9561873965
25	0.9872633504	74	0.9765466782	123	0.9686665562	172	0.9611132339	221	0.9561121949
26	0.9870579950	75	0.9764758630	124	0.9685941382	173	0.9610391867	222	0.9560369867
27	0.9865784176	76	0.9761925132	125	0.9683767411	174	0.9609651281	223	0.9558865533
28	0.9863040866	77	0.9759089522	126	0.9681590825	175	0.9608910582	224	0.9557360679
29	0.9860295071	78	0.9757670435	127	0.9680864781	176	0.9607428635	225	0.9557360679
30	0.9859608276	79	0.9756250284	128	0.9678684348	177	0.9605945954	226	0.9557360679
31	0.9857547158	80	0.9754829371	129	0.9677956729	178	0.9604462255	227	0.9556608016
32	0.9854796626	81	0.9754829371	130	0.9675043666	179	0.9604462255	228	0.9556608016
33	0.9851355094	82	0.9754829371	131	0.9673585766	180	0.9603719931	229	0.9555102388
34	0.9849288641	83	0.9749850268	132	0.9671398110	181	0.9602977341	230	0.9555102388
35	0.9845152420	84	0.9749850268	133	0.9671398110	182	0.9601491697	231	0.9552089409
36	0.9844462708	85	0.9747001806	134	0.9669939177	183	0.9600748710	232	0.9552089409
37	0.9841701925	86	0.9747001806	135	0.9667019115	184	0.9598519074	233	0.9551335669
38	0.9838247337	87	0.9744152006	136	0.9664827327	185	0.9597775675	234	0.9549827718
39	0.9834789109	88	0.9739873157	137	0.9664827327	186	0.9597032090	235	0.9548319320
40	0.9832019349	89	0.9738445742	138	0.9664096522	187	0.9596288106	236	0.9546810412
41	0.9830633211	90	0.9736303735	139	0.9662634193	188	0.9595543795	237	0.9545300840
42	0.9828552725	91	0.9734160812	140	0.9661902639	189	0.9594799325	238	0.9544545732
43	0.9827164882	92	0.9734160812	141	0.9661902639	190	0.9592564778	239	0.9542279182
44	0.9825775890	93	0.9732016972	142	0.9659707159	191	0.9591074222	240	0.9542279182
45	0.9822995280	94	0.9730587142	143	0.9657510525	192	0.9590328768	241	0.9540767061
46	0.9821604041	95	0.9729156920	144	0.9656778054	193	0.9590328768	242	0.9540767061
47	0.9819515885	96	0.9726294362	145	0.9653113457	194	0.9587345577	243	0.9539254009

(Continued on next page)

Table 10-9: Baseline Post-Transplant Survival (S$_{TX}$(t)) Probability Where t=Time in Days (Continued)

t	S$_{TX}$(t)	t	S$_{TX}$(t)	t	S$_{TX}$(t)	t	S$_{TX}$(t)	t	S$_{TX}$(t)
244	0.9538497172	269	0.9511902217	293	0.9485888127	317	0.9463585089	341	0.9437285938
245	0.9538497172	270	0.9509612738	294	0.9483586281	318	0.9463585089	342	0.9436509982
246	0.9537740199	271	0.9506558210	295	0.9482818803	319	0.9462042511	343	0.9435733917
247	0.9537740199	272	0.9505794198	296	0.9481283428	320	0.9462042511	344	0.9434181618
248	0.9536983112	273	0.9504265693	297	0.9480515582	321	0.9461270863	345	0.9433405390
249	0.9536225901	274	0.9502736813	298	0.9479747621	322	0.9460499065	346	0.9431075841
250	0.9533952367	275	0.9501207590	299	0.9478210865	323	0.9460499065	347	0.9430298440
251	0.9533193886	276	0.9501207590	300	0.9476673351	324	0.9458955253	348	0.9430298440
252	0.9530158831	277	0.9498147874	301	0.9476673351	325	0.9458183199	349	0.9429520371
253	0.9530158831	278	0.9496617253	302	0.9473596856	326	0.9455866228	350	0.9427185272
254	0.9527122194	279	0.9496617253	303	0.9473596856	327	0.9454321012	351	0.9427185272
255	0.9527122194	280	0.9495851653	304	0.9473596856	328	0.9454321012	352	0.9427185272
256	0.9527122194	281	0.9495851653	305	0.9473596856	329	0.9453548209	353	0.9426406582
257	0.9524843651	282	0.9494319939	306	0.9472827362	330	0.9452775175	354	0.9424848995
258	0.9524083896	283	0.9493553886	307	0.9472827362	331	0.9451228653	355	0.9424848995
259	0.9523323977	284	0.9492787721	308	0.9472057776	332	0.9451228653	356	0.9421732641
260	0.9522563886	285	0.9492787721	309	0.9471288083	333	0.9449681796	357	0.9420173651
261	0.9521803676	286	0.9492021461	310	0.9469748345	334	0.9448908227	358	0.9417833903
262	0.9521043365	287	0.9492021461	311	0.9468208245	335	0.9447360580	359	0.9417053586
263	0.9518761834	288	0.9491255112	312	0.9468208245	336	0.9445812189	360	0.9416273052
264	0.9518000820	289	0.9490488687	313	0.9468208245	337	0.9445037758	361	0.9415492338
265	0.9516477499	290	0.9488955575	314	0.9467438071	338	0.9441938892	362	0.9415492338
266	0.9516477499	291	0.9488188902	315	0.9465897325	339	0.9440388525	363	0.9413148953
267	0.9515715365	292	0.9488188902	316	0.9464356005	340	0.9439613054	364	0.9413148953
268	0.9514952979								