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A Guide to Calculating the Lung Allocation Score

U.S. lung allocation policy prioritizes lung transplant candidates for lung offers by assigning them a lung allocation score.

What is the Lung Allocation Score?

The lung allocation score (LAS) is used to prioritize waiting list candidates based on a combination of waitlist urgency and post-transplant survival. In this context, *waitlist urgency* is defined as what is expected to happen to a candidate, given his or her characteristics, in the next year if he or she doesn't receive a transplant. *Post-transplant survival* is defined as what is expected to happen to a candidate, given his or her characteristics, in the first year after a transplant if he or she does receive the transplant.

What is involved in the LAS calculation?

The LAS involves the following steps:

1. ***Calculate the waiting list survival probability during the next year***
2. ***Calculate the waitlist urgency measure***
3. ***Calculate the post-transplant survival probability during the first post-transplant year***
4. ***Calculate the post-transplant survival measure***
5. ***Calculate the raw allocation score***
6. ***Normalize the raw allocation score to obtain the LAS.***

A detailed explanation for each of the steps follows.

How is the LAS actually calculated?

We've computed the LAS for a hypothetical candidate to help you understand the process.

The following description of the calculation of the LAS in this document assumes that all characteristics are known. With the exception of a few characteristics (e.g., age and diagnosis), the LAS can also be computed when characteristics are missing. If a characteristic is missing, such as creatinine level or BMI, a default value is used. For some characteristics the default value is a normal value for that characteristic; for other characteristics the default is the least beneficial value for that characteristic. A normal value is a value that a person healthy for the given characteristic would exhibit. The least beneficial value is the value for that characteristic that will yield the lowest LAS. In general the least beneficial value is either the minimum or maximum possible value for the characteristic.

CAUTIONARY NOTES:

- ***We rounded the parameter estimates and survival rates to 6 places after the decimal. These rounded values are used for <u>explanatory purposes only</u>. The parameter estimates and survival rates used in the actual calculation of the LAS will contain up to 16 positions after the decimal. The estimated LAS computed using the method in this document will be close to, but not identical to, that using the actual allocation algorithm. For candidates currently on the lung or heart-lung waiting list, please contact your transplant center to obtain your precise LAS.***
- ***The parameter estimates and baseline survival rates shown in this document are current as of January 7, 2009. Though the characteristics or estimates used in the computation may be modified in the future, the basic method for computing the LAS will not change.***

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Calculating the LAS Step by Step

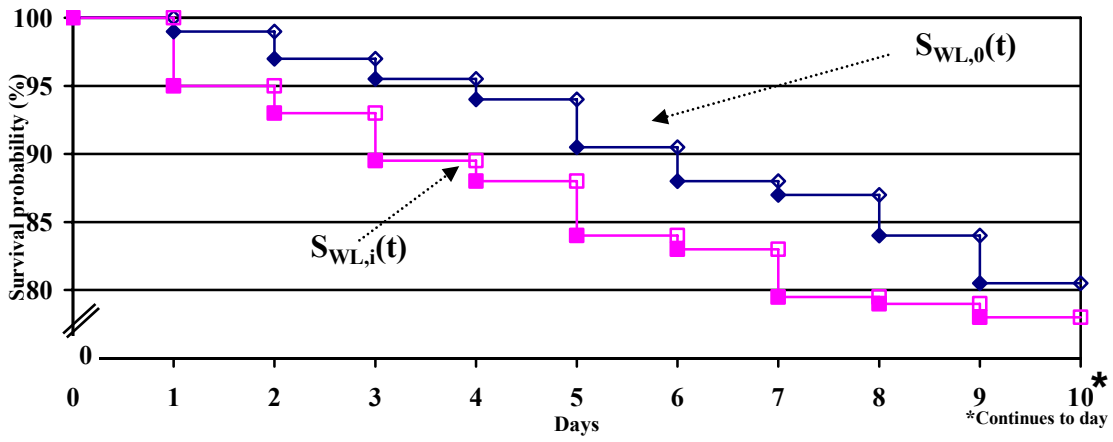
Step 1. Calculate the expected waiting list survival probability during the next year:

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

where

$S_{WL,i}(t)$ is the expected waiting list survival probability at time t for candidate i
$S_{WL,0}(t)$ is the baseline waiting list survival probability at time t
i.e., the survival probability for a candidate with all characteristics at baseline values (Appendix 1)
$\beta_1, \beta_2, \ldots \beta_p$ are the parameter estimates from the waiting list model (Table 1)
X_{ji} is the value of characteristic j for candidate i (j = 1, 2, …, p)
i = 1, 2, …, N is the candidate identifier

This step adjusts the baseline survival at each time point ($S_{WL,0}(t)$) by the candidate's characteristics to yield the expected waiting list survival probability for the candidate, $S_{WL,i}(t)$. The resulting survival may be either higher or lower than the baseline survival. A hypothetical example, in which the expected survival for candidate i is lower than the baseline survival, follows:



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Computing a candidate's expected waiting list survival probability during the next year involves three calculations:

(i) Sum the product of parameter estimates and characteristic values for candidate i: $\beta_1 X_{1i} + \beta_2 X_{2i} + \ldots + \beta_p X_{pi}$ (For β values see Table 1.)

(ii) Exponentiate this sum: $e^{\beta_1 x_{1i} + \beta_2 x_{2i} + \ldots + \beta_p x_{pi}}$

(iii) Apply the exponent to the baseline survival at all time points during the next year: $S_{WL,0}(t)^{e^{\beta_1 X_{1i} + \beta_2 X_{2i} + \ldots + \beta_p X_{pi}}}$ (For baseline survival values see Appendix 1.)

Table 1. Parameter estimates for waiting list model

CHARACTERISTIC (X)		BASELINE VALUE	β
Age at offer for Diagnosis Groups A,B,C (years)		0 years	0.015097
Age at offer for Diagnosis Group D (years)		0 years	0.021223
Body mass index (BMI) (kg/m^2)		0 kg/m^2	-0.051781
Diabetes (regardless of insulin dependency)		No diabetes	0.158821
Functional status	Requires some assistance to perform activities of daily living	No assistance required to perform activities of daily living	0.182250
	Requires total assistance to perform activities of daily living	No assistance required to perform activities of daily living	0.115024
FVC (% predicted)		0%	-0.019675
PA systolic for Diagnosis Groups A, C, and D (mm Hg)		0 mm Hg	0.015889
O_2 requirement at rest for Diagnosis Groups A and D (L/min)		0 L/min	0.187599
O_2 requirement at rest for Diagnosis Group B (L/min)		0 L/min	0.040766
O_2 requirement at rest for Diagnosis Group C (L/min)		0 L/min	0.125568
Six-minute walk distance < 150 feet		Distance ≥ 150 ft	0.330752
Continuous mechanical ventilation		Not on continuous mechanical ventilation	1.213804
PCO_2* (obtained from arterial or capillary) – 40 mm Hg		40 mm Hg	0.005448
Increase in PCO_2 of 15% or greater within a 6-month period		No change or change of less than 15%	0.076370
Diagnosis group**	Group B	Group A	2.376700
	Group C	Group A	0.943377
	Group D	Group A	0.996936
Diagnosis detailed	Bronchiectasis	Group A	0.157212
	Eisenmenger's syndrome	Group A	-0.627866
	Lymphangioleiomyomatosis	Group A	-0.197434
	Obliterative bronchiolitis (non-retransplant)	Group A	-0.256480
	Pulmonary Fibrosis other	Group A	-0.265233
	Sarcoidosis and PA mean > 30 mm Hg	Group A	-0.707346
	Sarcoidosis and PA mean ≤ 30 mm Hg	Group A	0.455348

* If PCO2 was obtained from venous blood, subtract 6 to estimate an arterial value.

** Diagnosis groups are defined as:
Group A = Obstructive lung disease (e.g., emphysema)
Group B = Pulmonary vascular disease (e.g., primary pulmonary hypertension)
Group C = Cystic fibrosis or immunodeficiency disorder
Group D = Restrictive lung disease (e.g., idiopathic pulmonary fibrosis)

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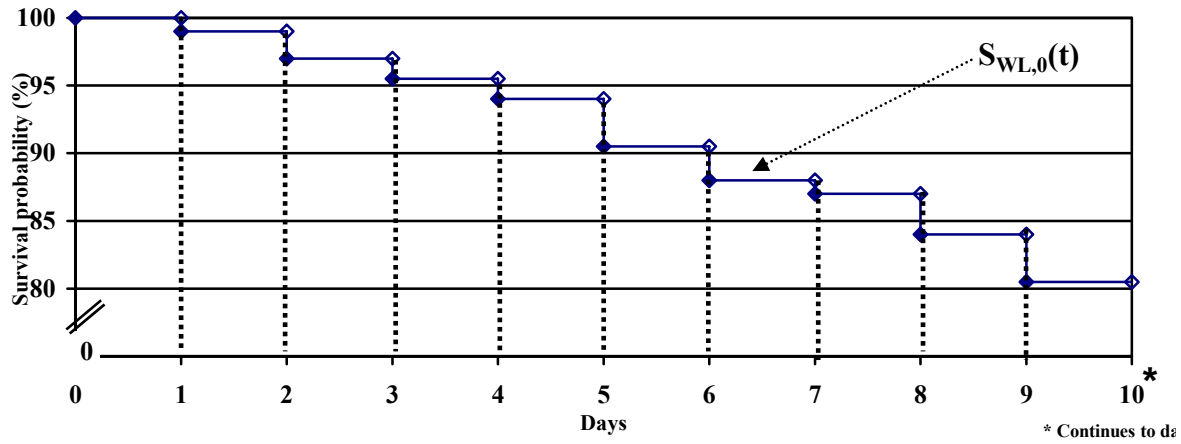
Calculate the waitlist urgency measure:

The ***waitlist urgency measure*** (WL_i) is defined as the area under the waiting list survival probability curve during the next year on the waiting list. This can be interpreted as the number of days a candidate with a specified set of characteristics is expected to live during the next year on the waiting list.

Since the baseline survival, $S_{WL,0}(t)$, is based on information collected on a per-day basis (e.g., patients alive or having died per day) rather then an hourly basis, the survival probability stays the same during an entire day. This results in a "curve" that is actually a large set of stair-steps. Similarly the candidate's waiting list survival curve, $S_{WL,i}(t)$, is also a stair-step function but with different heights for the steps (as shown in the previous figure.)

In this example, the area under the baseline survival curve, $S_{WL,0}(t)$, can be computed as the sum of the areas of the rectangles, where the width is 1 day and the height is the survival rate on that day:



Each candidate's set of characteristics will adjust the height of each rectangle: $S_{WL,0}(t)$ is adjusted by the candidate's characteristics to $S_{WL,i}(t)$. The height of the rectangle for candidate i from 0 to 1 day is $S_{WL,i}(0)$, from 1 to 2 days the rectangle's height is $S_{WL,i}(1)$, and so on. The width of the rectangles remains the same for all candidates: 1 day.

The waiting list urgency measure (WL_i), the area under the waiting list survival probability curve during the next 1 year, can be written mathematically as:

$$WL_i = \sum_{k=1}^{365} Height_k * Width_k = \sum_{k=1}^{365} S_{WL,i}(k-1) * 1\,day, \text{ for candidate i}$$

Theoretically WL_i can range from approximately 0 days (if the expected survival is 0 at day 1) to 365 days (if the expected survival is 100% during the entire next year on the waiting list). But these are the most extreme cases; most candidates will have a WL_i value greater than 0 but less than 365 days.

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Step 2. Calculate the expected post-transplant survival probability during the first post-transplant year:

$$S_{TX,i}(t) = S_{TX,0}(t)^{e^{\alpha_1 Y_{1i} + \alpha_2 Y_{2i} + \ldots + \alpha_q Y_{qi}}}$$

where

$S_{TX,i}(t)$ is the expected post-transplant survival probability at time t for candidate i
$S_{TX,0}(t)$ is the baseline post-transplant survival probability at time t,
i.e., the survival probability for a candidate with all characteristics at the baseline value (Appendix 2)
$\alpha_1, \alpha_2, \ldots \alpha_q$ are the parameter estimates from the post-transplant model (Table 2)
Y_{ji} is the value of characteristic j for candidate i (j = 1, 2, …, q)
i = 1, 2, …, N is the candidate identifier

This is the same calculation as was performed in Step 1, but now the characteristics, parameter estimates and baseline survival are for the post-transplant period rather than for the waiting period.

Table 2. Parameter estimates for post-transplant model

CHARACTERISTIC (Y)		BASELINE VALUE	α
Age at transplant (years)		0 years	0.003510
Creatinine at transplant (mg/dl)		0 mg/dl	0.061986
Functional status: Requires no or some assistance to perform activities of daily living		Requires total assistance to perform activities of daily living	-0.488525
FVC for Groups B and D (% predicted)		0%	-0.002751
PCW mean ≥20 mm Hg for Diagnosis Group D		<20 mm Hg	0.033046
Continuous mechanical ventilation at transplant		Not on continuous mechanical ventilation	0.312846
Diagnosis group*	Group B	Group A	0.623207
	Group C	Group A	0.008514
	Group D	Group A	0.413173
Diagnosis detailed	Bronchiectasis	Group A	0.056116
	Eisenmenger's syndrome	Group A	0.393526
	Lymphangioleiomyomatosis	Group A	-0.624209
	Obliterative bronchiolitis (non-retransplant)	Group A	-0.443786
	Pulmonary Fibrosis other	Group A	0.172243
	Sarcoidosis and PA mean > 30 mm Hg	Group A	-0.122351
	Sarcoidosis and PA mean ≤ 30 mm Hg	Group A	-0.016505

* Diagnosis groups are defined as:
Group A = Obstructive lung disease (e.g., emphysema)
Group B = Pulmonary vascular disease (e.g., primary pulmonary hypertension)
Group C = Cystic fibrosis or immunodeficiency disorder
Group D = Restrictive lung disease (e.g., idiopathic pulmonary fibrosis)

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As with the waiting list survival probability computation in Step 1, the expected post-transplant survival probability computation requires 3 separate calculations:

(i) Sum the product of parameter estimates and characteristic values for candidate i: $\alpha_1 Y_{1i} + \alpha_2 Y_{2i} + \ldots + \alpha_q Y_{qi}$ (For α values see Table 2.)

(ii) Exponentiate this sum: $e^{\alpha_1 y_{1i} + \alpha_2 y_{2i} + \ldots + \alpha_q y_{qi}}$

(iii) Apply the exponent to the baseline survival at all time points during the first post-transplant year: $S_{TX,0}(t)^{e^{\alpha_1 Y_{1i} + \alpha_2 Y_{2i} + \ldots + \alpha_q Y_{qi}}}$ (For baseline survival values see Appendix 2.)

Step 3. Calculate the post-transplant survival measure:

The logic for this computation is identical to the waiting list side. The ***post-transplant survival measure*** for candidate i (PT_i) is the area under the post-transplant curve during the first year. It can be calculated by summing the area of rectangles with height of $S_{TX,i}(t)$ and width of 1day.

$$PT_i = \sum_{k=1}^{365} Height_k * Width_k = \sum_{k=1}^{365} S_{TX,i}(k-1) * 1\,day, \text{ for candidate i}$$

As with WL_i, the theoretical range of PT_i is 0 days to 365 days, though most candidates will fall somewhere in between.

Step 4. Calculate the raw allocation score:

The ***transplant benefit measure*** for candidate i ($Benefit_i$) is:

$Benefit_i$ = $PT_i - WL_i$
= expected days lived during 1st year post-transplant – expected days lived during additional year on waiting list
= additional days of life lived with a transplant than without a transplant

The ***raw allocation score*** for candidate i ($Raw\ score_i$) is:

$Raw\ score_i$ = $Benefit_i - WL_i$
= $PT_i - 2*WL_i$

Since WL_i and PT_i both range from 0 to 365 the range of the raw score is -730 to 365.

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Step 5. Normalize the raw allocation score to obtain the LAS:
To obtain a final score that ranges from 0 to 100, the raw score must be normalized.

After normalization, the raw score of -730 should correspond to an LAS of 0; and a raw score of 365 will correspond to an LAS of 100.

Therefore the normalization is:

$$LAS_i = 100*\frac{[\text{Raw score}_i - \textit{minimum}]}{\textit{range}}$$

$$= 100*\frac{[\text{Raw score}_i - (-730)]}{1095}$$

$$= 100*\frac{[\text{Raw score}_i + 730]}{1095}$$

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EXAMPLE

Assume that Candidate Z has the following set of characteristics:

Characteristic	Value for Candidate Z
Diagnosis	Emphysema (Group A)
Age	51 years
Height	5 ft. 8 in. (1.727 m)
Weight	165 lbs (74.84 kg)
Diabetes	Not diabetic
Functional status	Requires no assistance to perform activities of daily living (ADL)
FVC (% predicted)	50%
PA systolic pressure	40 mm Hg
PCW pressure	10 mm Hg
O_2 required at rest	2 L/min
Six-minute walk distance	800 ft
Continuous mechanical ventilation	Not on continuous mechanical ventilation
PCO_2	52 mm Hg
Increase in PCO_2 (%)	30%
Creatinine	1.0 mg/dl

BMI = weight (kg) /height $(m)^2$
$=.84\ kg/(1.727\ m)^2$
$= 25.092799\ kg/m^2$

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Step 1. Calculate the waiting list survival probability:

$$S_{WL,Z}(t) = S_{WL,0}(t)^{e^{\beta_1 X_{1z} + \beta_2 X_{2z} + \ldots + \beta_p X_{pz}}}$$

a) First, calculate the exponent: $\beta_1 X_{1z} + \beta_2 X_{2z} + \ldots + \beta_p X_{pz}$

Characteristic		Value for Candidate Z (X_{pz}†)	β_p	$\beta_p * X_{pz}$
Age at offer for Diagnosis Groups A,B,C (years)		51	0.015097	0.769947
Age at offer for Diagnosis Group D (years)		0	0.021223	0
BMI (kg/m^2)		25.092799	-0.051781	-1.29933
Diabetes (regardless of insulin dependency)		0	0.158821	0
Functional status	Requires some assistance to perform ADL	0	0	0
	Requires total assistance to perform ADL	0	0	0
FVC (% predicted)		50	-0.019675	-0.98375
PA systolic for Diagnosis Groups A, C, and D (mm Hg)		40	0.015889	0.63556
O_2 requirement at rest for Diagnosis Groups A and D (L/min)		2	0.187599	0.375198
O_2 requirement at rest for Diagnosis Group B (L/min)		0	0.040766	0
O_2 requirement at rest for Diagnosis Group C (L/min)		0	0.125568	0
Six-minute walk distance < 150 feet		0	0.330752	0
Continuous mechanical ventilation		0	1.213804	0
PCO_2 – 40 mm Hg		12	0.005448	0.065376
Increase in $PCO_2 \geq 15\%$		1	0.076370	0.076370
Diagnosis Group	Group B	0	2.376700	0
	Group C	0	0.943377	0
	Group D	0	0.996936	0
Diagnosis detailed	Bronchiectasis	0	0.157212	0
	Eisenmenger's syndrome	0	-0.627866	0
	Lymphangioleiomyomatosis	0	-0.197434	0
	Obliterative bronchiolitis (non-retransplant)	0	-0.256480	0
	Pulmonary Fibrosis other	0	-0.265233	0
	Sarcoidosis and PA mean > 30 mm Hg	0	-0.707346	0
	Sarcoidosis and PA mean $\leq$ 30 mm Hg	0	0.455348	0
TOTAL		$\beta_1 X_{1z} + \beta_2 X_{2z} + \ldots + \beta_p X_{pz} =$		-0.360629

Note: If the characteristic is dichotomous (e.g., Yes/No) and the candidate does not have the characteristic, the value of X is 0. If the candidate does have the characteristic X = 1.

b) Exponentiate the exponent: $e^{\beta_1 X_{1i} + \beta_2 X_{2i} + \ldots + \beta_p X_{pi}} = e^{-0.360629} = 0.697238$

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c) Compute the waiting list survival probabilities at each time point for Candidate Z.

(Baseline waiting list survival excerpted from Appendix 1)

Time (days) = t	Baseline waiting list survival = $S_{WL,O}(t)$	$S_{WL,Z}(t) = S_{WL,O}(t)^{0.867006}$
0	1	1
0	0.999468	0.999539
1	0.998841	0.998995
2	0.998204	0.998443
3	0.997649	0.997961
4	0.996712	0.997149
5	0.996239	0.996738
6	0.995858	0.996408
7	0.995472	0.996073
8	0.994889	0.995567
9	0.994101	0.994884
10	0.993705	0.994540
…	…	…
364	0.902917	0.915264
$\sum S_{WL}$ = WL	346.265635 days	351.804123 days

Step 2. Calculate the waitlist urgency measure:

$$WL_z = \sum_{k=1}^{365} S_{WL,Z}(k-1) * 1\,day = 351.804123\,days$$

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Step 3. Calculate the post-transplant survival probability during the first post-transplant year:

$$S_{TX,Z}(t) = S_{TX,0}(t)^{e^{\alpha_1 Y_{1z} + \alpha_2 Y_{2z} + \ldots + \alpha_q Y_{qz}}}$$

a) First, calculate the exponent: $\alpha_1 Y_{1z} + \alpha_2 Y_{2z} + \ldots + \alpha_q Y_{qz}$

Characteristic		Value for Candidate Z (Y_{qz}†)	α_q	$\alpha_q * Y_{qz}$
Age at transplant (years)		51	0.003510	0.179010
Creatinine at transplant (mg/dl)		1.0	0.061986	0.061986
Requires no or some assistance to perform ADL		1	-0.488525	-0.488525
FVC for Groups B and D (% predicted)		0	-0.002751	0
PCW mean ≥20 mm Hg for Diagnosis Group D		0	0.033046	0
Continuous mechanical ventilation		0	0.312846	0
Diagnosis group	Group B	0	0.623207	0
	Group C	0	0.008514	0
	Group D	0	0.413173	0
Diagnosis detailed	Bronchiectasis	0	0.056116	0
	Eisenmenger's syndrome	0	0.393526	0
	Lymphangioleiomyomatosis	0	-0.624209	0
	Obliterative bronchiolitis (non-retransplant)	0	-0.443786	0
	Pulmonary Fibrosis other	0	0.172243	0
	Sarcoidosis and PA mean > 30 mm Hg	0	-0.122351	0
	Sarcoidosis and PA mean ≤ 30 mm Hg	0	-0.016505	0
TOTAL		$\beta_1 X_{1z} + \beta_2 X_{2z} + \ldots + \beta_p X_{pz} =$		-0.247529

†**Note**: If the characteristic is dichotomous (e.g., Yes/No) and the candidate does not have the characteristic, the value of Y is 0. If the candidate does have the characteristic Y = 1.

b) Exponentiate the exponent: $e^{\alpha_1 Y_{1i} + \alpha_2 Y_{2i} + \ldots + \alpha_q Y_{qi}} = e^{-0.247529} = 0.780728$

c) Compute the post-transplant survival probabilities at each time point for Candidate Z.

(Baseline post-transplant survival excerpted from Appendix 2.)

Time (days) = t	Baseline post-transplant survival = $S_{TX,O}(t)$	$S_{TX,Z}(t) = S_{TX,O}(t)^{0.780728}$
0	1	1
0	0.994709	0.995867
1	0.988348	0.990891
2	0.985519	0.988676
3	0.983042	0.986736
4	0.980918	0.985071
5	0.979148	0.983683
6	0.978439	0.983127
7	0.977022	0.982015
8	0.974540	0.980067
9	0.972058	0.978117
10	0.970283	0.995867
…	…	…
364	0.802510	0.842174
$\sum S_{TX}$ = PT	317.449122 days	327.238539 days

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Step 4. Calculate the post-transplant survival measure:

$$PT_i = \sum_{k=1}^{365} S_{TX,i}(k-1) * 1\,day = 327.238539 \text{ days}$$

Step 5. Calculate the raw allocation score:

Raw $score_i$ = $PT_i - 2*WL_i$
= 327.238539 – 2*351.804123
= -376.369707

Step 6. Normalize the raw allocation score to obtain the LAS:

LAS = $\frac{100*[\text{Raw score}_i + 730]}{1095}$
= $\frac{100*[-37.369707 + 730]}{1095}$
= 32.295004

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Appendix 1. Baseline waiting list (WL) survival probability

Time (days)	WL survival	Time (days)	WL survival	Time (days)	WL survival	Time (days)	WL survival	Time (days)	WL survival	Time (days)	WL survival
0	1.000000	61	0.978241	123	0.964647	185	0.949266	247	0.931258	309	0.916383
0	0.999468	62	0.977998	124	0.964084	186	0.948939	248	0.931258	310	0.916383
1	0.998841	63	0.977876	125	0.963943	187	0.948446	249	0.931258	311	0.915969
2	0.998204	64	0.977387	126	0.963520	188	0.948116	250	0.931073	312	0.915969
3	0.997649	65	0.977264	127	0.963378	189	0.947785	251	0.930701	313	0.915762
4	0.996712	66	0.977019	128	0.963237	190	0.947785	252	0.930515	314	0.915762
5	0.996239	67	0.976896	129	0.963237	191	0.947287	253	0.930515	315	0.915762
6	0.995858	68	0.976649	130	0.962810	192	0.947120	254	0.930515	316	0.915762
7	0.995472	69	0.976152	131	0.962667	193	0.946787	255	0.930328	317	0.915553
8	0.994889	70	0.976152	132	0.962382	194	0.946619	256	0.929579	318	0.915343
9	0.994101	71	0.976027	133	0.961522	195	0.946117	257	0.929391	319	0.914924
10	0.993705	72	0.975529	134	0.961522	196	0.946117	258	0.928825	320	0.914924
11	0.993106	73	0.975154	135	0.960946	197	0.945612	259	0.928258	321	0.914924
12	0.992502	74	0.975028	136	0.960801	198	0.944937	260	0.928068	322	0.914924
13	0.992194	75	0.974652	137	0.960512	199	0.944937	261	0.927497	323	0.914502
14	0.991783	76	0.974526	138	0.960222	200	0.944768	262	0.927115	324	0.914502
15	0.991368	77	0.974274	139	0.959929	201	0.944768	263	0.927115	325	0.913655
16	0.990846	78	0.974020	140	0.959783	202	0.944599	264	0.927115	326	0.913442
17	0.990530	79	0.973893	141	0.959490	203	0.944091	265	0.927115	327	0.913017
18	0.990424	80	0.973765	142	0.958903	204	0.943751	266	0.927115	328	0.912378
19	0.990001	81	0.973765	143	0.958606	205	0.943581	267	0.926923	329	0.911521
20	0.989788	82	0.973637	144	0.958606	206	0.943241	268	0.926923	330	0.911521
21	0.989573	83	0.973509	145	0.958309	207	0.942729	269	0.926731	331	0.911090
22	0.989357	84	0.973123	146	0.958161	208	0.942559	270	0.926538	332	0.910657
23	0.989140	85	0.972866	147	0.957862	209	0.942388	271	0.926345	333	0.910223
24	0.989031	86	0.972737	148	0.957563	210	0.942217	272	0.926345	334	0.909790
25	0.988596	87	0.972349	149	0.957412	211	0.941705	273	0.926151	335	0.909790
26	0.988269	88	0.972349	150	0.957110	212	0.941533	274	0.925569	336	0.909135
27	0.988160	89	0.972219	151	0.956807	213	0.941190	275	0.925180	337	0.908479
28	0.987721	90	0.972089	152	0.956503	214	0.940675	276	0.924402	338	0.908260
29	0.987390	91	0.971568	153	0.956199	215	0.940158	277	0.924207	339	0.908041
30	0.987059	92	0.971306	154	0.955741	216	0.939469	278	0.924012	340	0.907600
31	0.986615	93	0.971044	155	0.955434	217	0.939123	279	0.923620	341	0.907160
32	0.986390	94	0.971044	156	0.955127	218	0.938777	280	0.923424	342	0.906939
33	0.986052	95	0.971044	157	0.954973	219	0.938082	281	0.923031	343	0.906939
34	0.985713	96	0.970781	158	0.954665	220	0.938082	282	0.922638	344	0.906717
35	0.985487	97	0.970517	159	0.954355	221	0.937908	283	0.922440	345	0.906052
36	0.985147	98	0.970119	160	0.954355	222	0.937384	284	0.922045	346	0.905607
37	0.985033	99	0.969854	161	0.953888	223	0.937209	285	0.922045	347	0.905607
38	0.984692	100	0.969587	162	0.953107	224	0.937209	286	0.921846	348	0.905607
39	0.984236	101	0.969454	163	0.952950	225	0.937033	287	0.921250	349	0.905385
40	0.983893	102	0.969454	164	0.952950	226	0.936505	288	0.921250	350	0.905385
41	0.983433	103	0.969186	165	0.952480	227	0.936505	289	0.921050	351	0.905385
42	0.982972	104	0.968916	166	0.952480	228	0.936328	290	0.921050	352	0.905162
43	0.982972	105	0.968512	167	0.952323	229	0.935796	291	0.921050	353	0.904938
44	0.982044	106	0.968106	168	0.951847	230	0.935618	292	0.920850	354	0.904715
45	0.981928	107	0.967835	169	0.951847	231	0.935618	293	0.920247	355	0.904268
46	0.981695	108	0.967699	170	0.951847	232	0.935440	294	0.919845	356	0.904268
47	0.981461	109	0.967562	171	0.951688	233	0.935261	295	0.919845	357	0.904044
48	0.981109	110	0.967425	172	0.951369	234	0.934541	296	0.919643	358	0.904044
49	0.980991	111	0.967151	173	0.951209	235	0.934181	297	0.919643	359	0.904044
50	0.980638	112	0.967151	174	0.951049	236	0.934181	298	0.918834	360	0.903594
51	0.980638	113	0.967014	175	0.951049	237	0.934000	299	0.918631	361	0.903594
52	0.980638	114	0.967014	176	0.950566	238	0.933456	300	0.918428	362	0.903369
53	0.980520	115	0.966738	177	0.950405	239	0.933092	301	0.918224	363	0.903143
54	0.980165	116	0.966461	178	0.950244	240	0.932728	302	0.918224	364	0.902917
55	0.979569	117	0.966322	179	0.950244	241	0.932728	303	0.918021		
56	0.979329	118	0.966183	180	0.950244	242	0.932545	304	0.917612		
57	0.979209	119	0.965905	181	0.950244	243	0.932362	305	0.917203		
58	0.979089	120	0.965068	182	0.950081	244	0.932178	306	0.917203		
59	0.978726	121	0.964928	183	0.949755	245	0.931995	307	0.916588		
60	0.978363	122	0.964647	184	0.949266	246	0.931627	308	0.916583		

A Guide to Calculating the Lung Allocation Score

Appendix 2. Baseline post-transplant (TX) survival probability

Time (days)	TX survival	Time (days)	TX survival	Time (days)	TX survival	Time (days)	TX survival	Time (days)	TX survival	Time (days)	TX survival
0	1.000000	61	0.917466	123	0.887385	185	0.861943	247	0.841525	309	0.820030
0	0.994709	62	0.916392	124	0.887027	186	0.860510	248	0.841525	310	0.820030
1	0.988348	63	0.915318	125	0.886310	187	0.860510	249	0.841525	311	0.819672
2	0.985519	64	0.914244	126	0.885952	188	0.860510	250	0.841166	312	0.819315
3	0.983042	65	0.913528	127	0.885952	189	0.860152	251	0.840808	313	0.819315
4	0.980918	66	0.912812	128	0.885593	190	0.860152	252	0.840808	314	0.819315
5	0.979148	67	0.911738	129	0.885235	191	0.859077	253	0.840450	315	0.818957
6	0.978439	68	0.911380	130	0.885235	192	0.858361	254	0.840450	316	0.818241
7	0.977022	69	0.911022	131	0.885235	193	0.857286	255	0.839733	317	0.817883
8	0.974540	70	0.909590	132	0.885235	194	0.856928	256	0.839017	318	0.817526
9	0.972058	71	0.908874	133	0.883802	195	0.856928	257	0.839017	319	0.817526
10	0.970283	72	0.907800	134	0.883086	196	0.856928	258	0.839017	320	0.816095
11	0.968508	73	0.907084	135	0.883086	197	0.856928	259	0.837941	321	0.815380
12	0.966377	74	0.906726	136	0.883086	198	0.855853	260	0.837225	322	0.815022
13	0.964244	75	0.906011	137	0.882012	199	0.855853	261	0.836866	323	0.815022
14	0.963889	76	0.905653	138	0.882012	200	0.855853	262	0.836508	324	0.815022
15	0.961756	77	0.905653	139	0.881654	201	0.855495	263	0.836149	325	0.814664
16	0.961756	78	0.905295	140	0.881295	202	0.854420	264	0.835433	326	0.813591
17	0.959621	79	0.904579	141	0.879862	203	0.854420	265	0.835074	327	0.812876
18	0.958197	80	0.903147	142	0.879862	204	0.854420	266	0.835074	328	0.812160
19	0.957486	81	0.903147	143	0.879504	205	0.854061	267	0.835074	329	0.812160
20	0.956417	82	0.902430	144	0.879146	206	0.853703	268	0.834716	330	0.811803
21	0.954992	83	0.901714	145	0.878071	207	0.853345	269	0.834358	331	0.811803
22	0.953923	84	0.900998	146	0.878071	208	0.853345	270	0.833999	332	0.811445
23	0.953567	85	0.900998	147	0.877713	209	0.852628	271	0.833999	333	0.811087
24	0.951428	86	0.900640	148	0.876638	210	0.852628	272	0.833282	334	0.811087
25	0.949288	87	0.899924	149	0.876279	211	0.851912	273	0.832924	335	0.810729
26	0.947148	88	0.899566	150	0.876279	212	0.850837	274	0.832924	336	0.810729
27	0.946435	89	0.899208	151	0.875921	213	0.850837	275	0.831849	337	0.810014
28	0.945364	90	0.899208	152	0.875562	214	0.850479	276	0.831849	338	0.809299
29	0.943579	91	0.898850	153	0.874846	215	0.849763	277	0.831490	339	0.809299
30	0.942150	92	0.898492	154	0.874128	216	0.849763	278	0.830774	340	0.808942
31	0.941079	93	0.898133	155	0.873411	217	0.849763	279	0.830415	341	0.808942
32	0.940365	94	0.898133	156	0.873411	218	0.849763	280	0.830415	342	0.808942
33	0.938936	95	0.897059	157	0.872694	219	0.849047	281	0.830057	343	0.808584
34	0.938221	96	0.897059	158	0.871977	220	0.849047	282	0.829699	344	0.808584
35	0.937149	97	0.896700	159	0.871977	221	0.848689	283	0.829341	345	0.807869
36	0.936792	98	0.895625	160	0.871260	222	0.848689	284	0.828625	346	0.807869
37	0.936434	99	0.894908	161	0.871260	223	0.848330	285	0.828266	347	0.807869
38	0.934647	100	0.894192	162	0.870184	224	0.847614	286	0.827908	348	0.807512
39	0.933931	101	0.893833	163	0.869467	225	0.846898	287	0.827550	349	0.807512
40	0.932143	102	0.893833	164	0.869109	226	0.846540	288	0.827550	350	0.807512
41	0.930712	103	0.893475	165	0.868750	227	0.846181	289	0.827550	351	0.807512
42	0.929996	104	0.893117	166	0.868750	228	0.846181	290	0.826475	352	0.807512
43	0.929281	105	0.893117	167	0.868392	229	0.846181	291	0.826475	353	0.807155
44	0.928207	106	0.892758	168	0.868033	230	0.846181	292	0.826475	354	0.806440
45	0.927849	107	0.892042	169	0.867317	231	0.846181	293	0.826117	355	0.806440
46	0.926060	108	0.892042	170	0.867317	232	0.846181	294	0.825759	356	0.805368
47	0.925702	109	0.890967	171	0.867317	233	0.845107	295	0.825401	357	0.804654
48	0.925702	110	0.890250	172	0.866600	234	0.845107	296	0.825401	358	0.804654
49	0.924628	111	0.890250	173	0.866600	235	0.845107	297	0.824684	359	0.804654
50	0.924628	112	0.890250	174	0.866600	236	0.844749	298	0.824684	360	0.804296
51	0.924270	113	0.890250	175	0.866241	237	0.844391	299	0.823610	361	0.802867
52	0.922121	114	0.890250	176	0.865883	238	0.844032	300	0.823610	362	0.802867
53	0.921763	115	0.889892	177	0.864450	239	0.844032	301	0.823610	363	0.802867
54	0.920688	116	0.889892	178	0.864450	240	0.844032	302	0.822894	364	0.802510
55	0.920330	117	0.889892	179	0.863733	241	0.843674	303	0.822894		
56	0.919614	118	0.889534	180	0.863017	242	0.843674	304	0.822536		
57	0.918898	119	0.888817	181	0.863017	243	0.843316	305	0.822178		
58	0.918898	120	0.888101	182	0.862659	244	0.842958	306	0.821820		
59	0.918540	121	0.888101	183	0.861943	245	0.842241	307	0.821104		
60	0.918540	122	0.887385	184	0.861943	246	0.841525	308	0.820746		