

Lung donor availability and implications for pediatric candidates aged 9-11 years

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Introduction

- Lungs are allocated differently to pediatric candidates aged 0-11 and ≥12 years in the US.
- Candidates aged 9-11 years are given first priority for offers from donors aged <12 years, and can access offers from donors aged ≥12 years only after they have been turned down by older candidates.
- In 2013, US policy was modified to allow a pathway to increased access to lungs from donors aged ≥12 years for candidates aged 0-11 years.
- We estimated the number of potential lung donations to which candidates aged 9-11 years could gain increased access. This cohort was chosen because these candidates are closest in age to the age 12 cutoff and are most likely to be appropriately sized to receive lungs from donors aged ≥12 years.

Methods

- Using SRTR standard analysis files, we determined the acceptable donor height range for candidates aged 9-11 years by examining candidate height restrictions at listing.
- We considered donors with height 105-165 cm potentially acceptable. These boundaries were the median minimum and maximum acceptable heights reported for candidates aged 9-11 years listed between 2000 and 2011. Among recipients aged 9-11 years, observed donor heights were 96-180 cm (Figure 1).
- We excluded donors with positive hepatitis B or C status or >20 pack-years of smoking history, current smokers, and CDC high-risk donors.
- We further limited donors to those for whom at least one match run was performed (not necessarily resulting in a transplant); if a match run was not performed, the organ could not be made available to any candidates.

Results

- In 2008-2013, 16,062 potential lung donors were included in match runs. Over 1100 were aged 0-11 years, but only 223 (20%) were aged 9-11 years (Table 1).
- Forty-three candidates aged 9-11 years were newly listed for lung transplant 2008-2012. Twelve (28%) died within 1 year after listing, and 17 (40%) underwent transplant (Table 2).
- Of 32,481 donors, 2008-2013, 49% were included in match runs, and 14% were 105-165cm in height (Table 3, Figure 2).
- Allowing pediatric candidates higher priority for adolescent donor lungs would double the potential donor pool available to candidates aged 9-11 years, from roughly 80 to 160 donors per year. Higher priority for adult donor lungs would increase the potential donor pool to roughly 750 donors per year (Table 3, Figure 3).

Table 1: Characteristics of deceased donors with at least one lung recovered for transplant

Characteristic	Level	N	%
Donors	All	16,062	100
Age group (years)	0-8	880	5.5
	9-11	223	1.4
	12-17	1398	8.7
	18-24	3257	20.3
	25-54	8188	51.0
	55-69	2016	12.6
	70+	100	0.6
Sex	Male	9494	59.1
	Female	6568	40.9
Race	White	9475	59.0
	Black	3314	20.6
	Hispanic	2629	16.4
	Asian	503	3.1
	Other	141	0.9
Height (cm)	< 105	599	3.7
	105-165	4457	27.7
	> 165	11,006	68.5
Blood type	A	5685	35.4
	B	2025	12.6
	AB	576	3.6
	O	7776	48.4
Cause of Donor death	Anoxia	3038	18.9
	Stroke	5547	34.5
	Head trauma	6925	43.1
	CNS tumor	141	0.9
	Other/unlk	411	2.6
Disposition	Transplanted	15,796	98.3
	Not transplanted	266	1.7

Deceased donors, 2008-2013, with non-missing height values

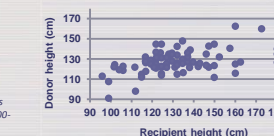
CNS = central nervous system

Table 2: Characteristics of lung transplant candidates aged 9-11 years

Characteristic	Level	N	%
Patients	All	43	100
Sex	Male	22	51.2
	Female	21	48.8
Race	White	25	58.1
	Black	4	9.3
	Hispanic	13	30.2
	Asian	1	2.3
Height (cm)	120-129	16	37.2
	130-139	14	32.6
	140-149	10	23.3
	150+	3	7.0
1-year outcomes	Transplanted	17	39.5
	Died	12	27.9
	Removed	1	2.3
	Still waiting	13	30.2

Candidates first listed for a lung transplant, 2008-2012

Figure 1: Donor and recipient heights



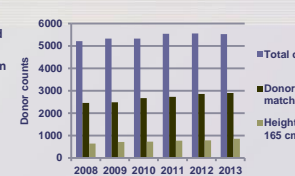
Transplant recipients aged 9-11 years, 2000-2013

Table 3: Estimates of donor availability for candidates aged 9-11 years

Year	Total Donors	Donors with match run within height range of 105-165 cm						
		Any age	Age < 70	Age < 55	Age < 25	Age < 18	Age < 12	
2008	5216	2456	635	634	539	249	170	87
2009	5327	2480	701	696	602	246	164	87
2010	5327	2659	718	714	604	259	159	87
2011	5537	2717	764	756	624	235	140	63
2012	5549	2849	783	773	643	257	158	90
2013	5525	2901	856	842	668	248	154	81

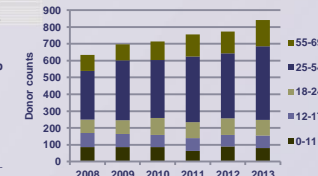
Deceased donors, 2008-2013, with non-missing height values

Figure 2: Counts of all donors and donors included in lung match run



Deceased donors, 2008-2013

Figure 3: Counts of donors 105-165 cm tall, by donor age group



Deceased donors, 2008-2013, with non-missing height values

Summary

- On June 23, 2014, the OPTN/UNOS Board of Directors voted to make permanent the temporary policy that improves pediatric access to adult donor lungs.
- Candidates aged <12 years may request an exception from the Lung Review Board to be classified as both pediatric and adult candidates.
- This analysis demonstrates that eliminating the 12-year age restriction on allocation could increase the potential donor pool by a factor of 10 for pediatric lung candidates.
- We recognize, however, that not all donors will be suitable for any specific candidate.