

Balancering af donorer og recipienter for optimalt outcome efter lunge transplantation

Hans Henrik L Schultz
Det Danske Lunge transplantations program
Rigshospitalet

Årsmøde Dansk Selskab for Intern Medicin 2023

UNIVERSITY OF COPENHAGEN



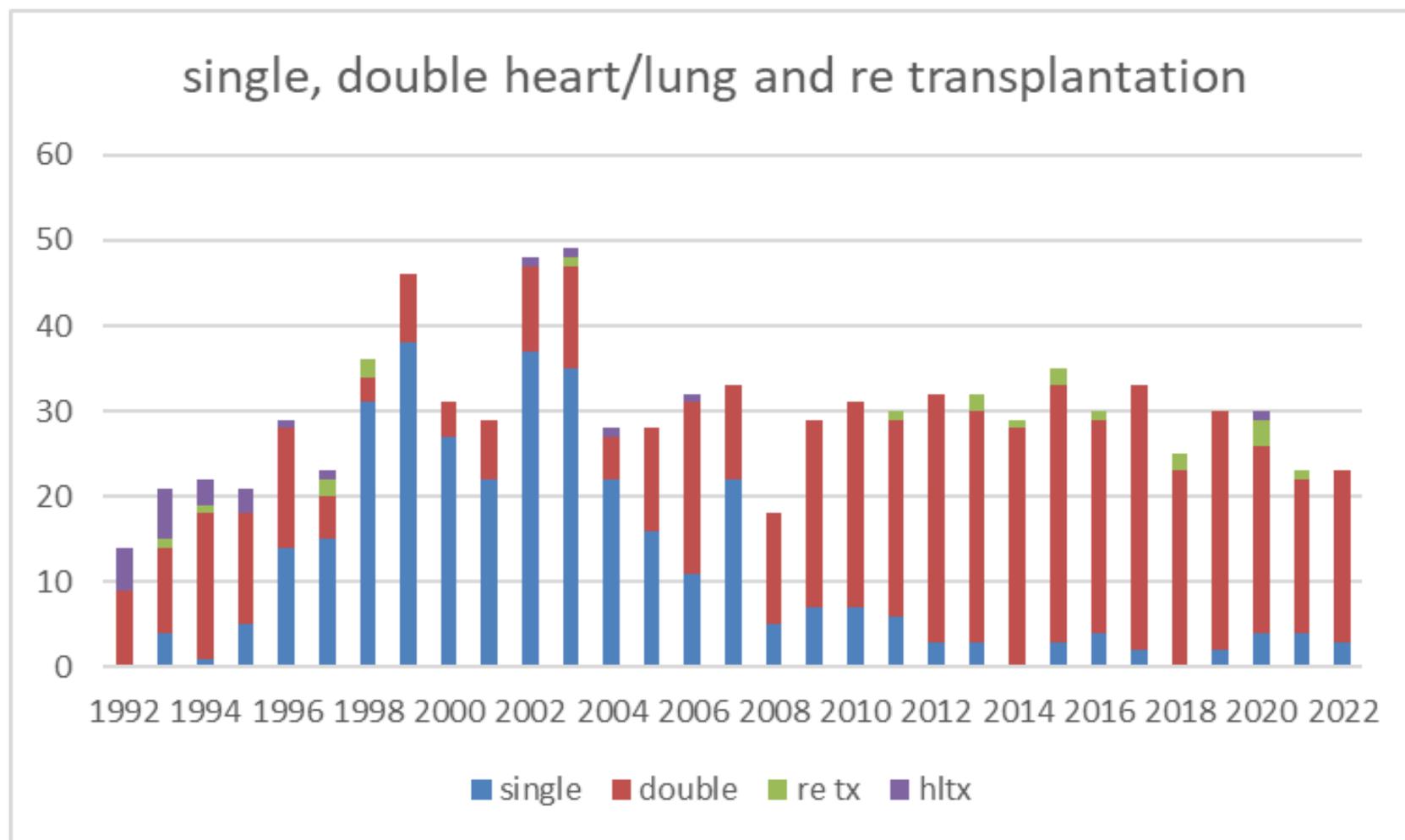
at vælge den rigtige donor og den rigtige recipient



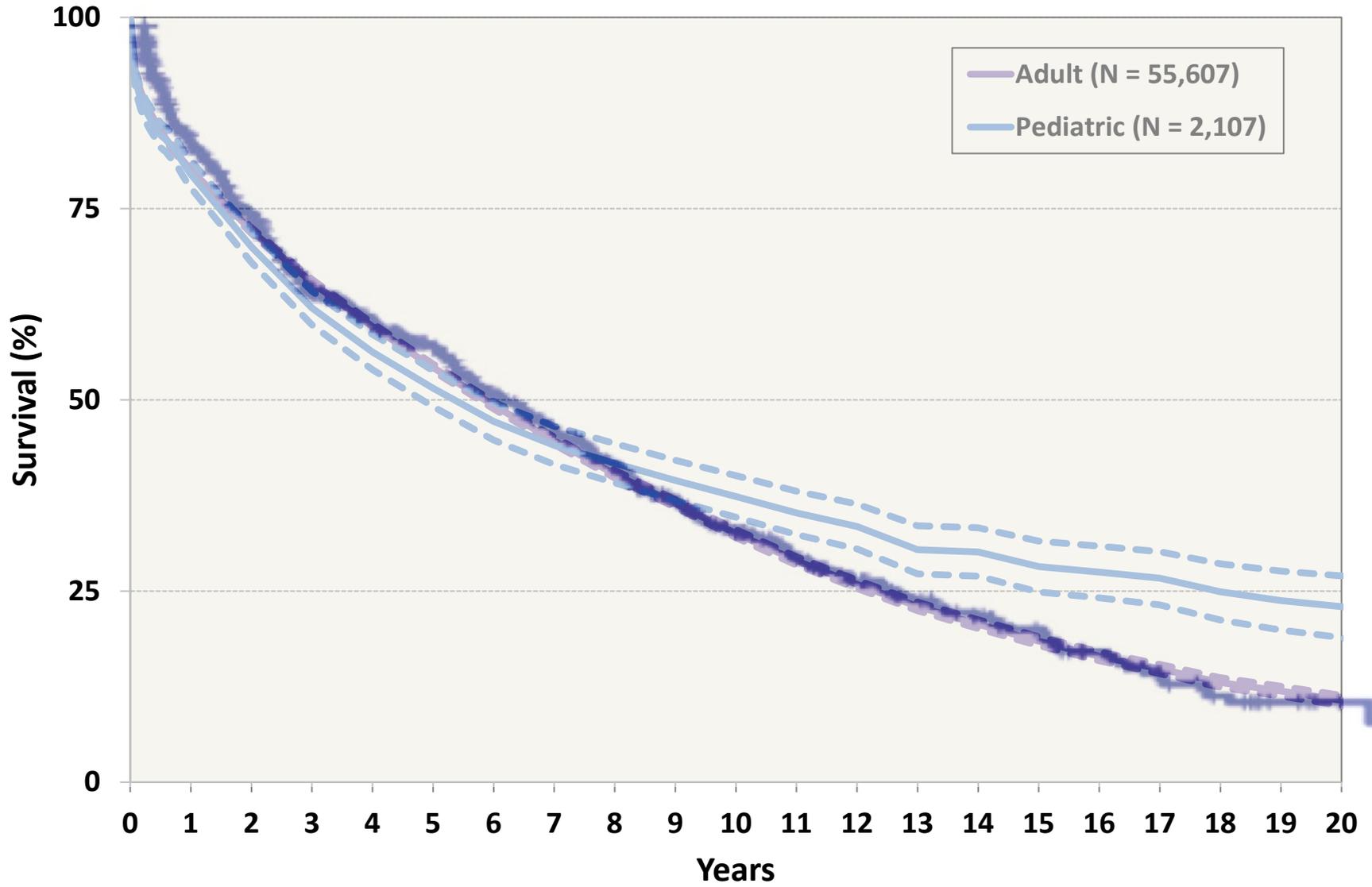
Generelt



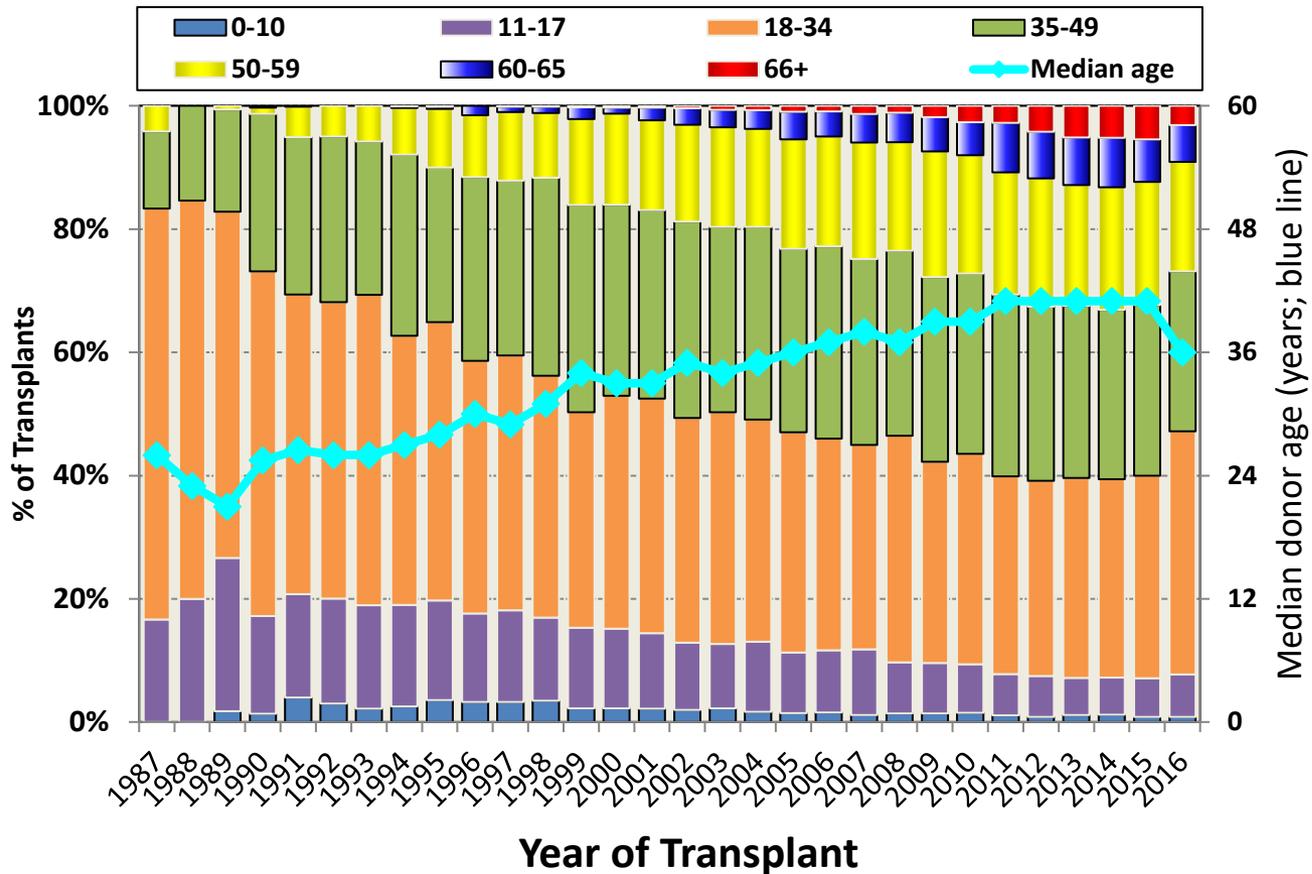
Transplantationer i Danmark



overlevelse efter lunge transplantation



Donor alder



Donar alder som risikofaktor?

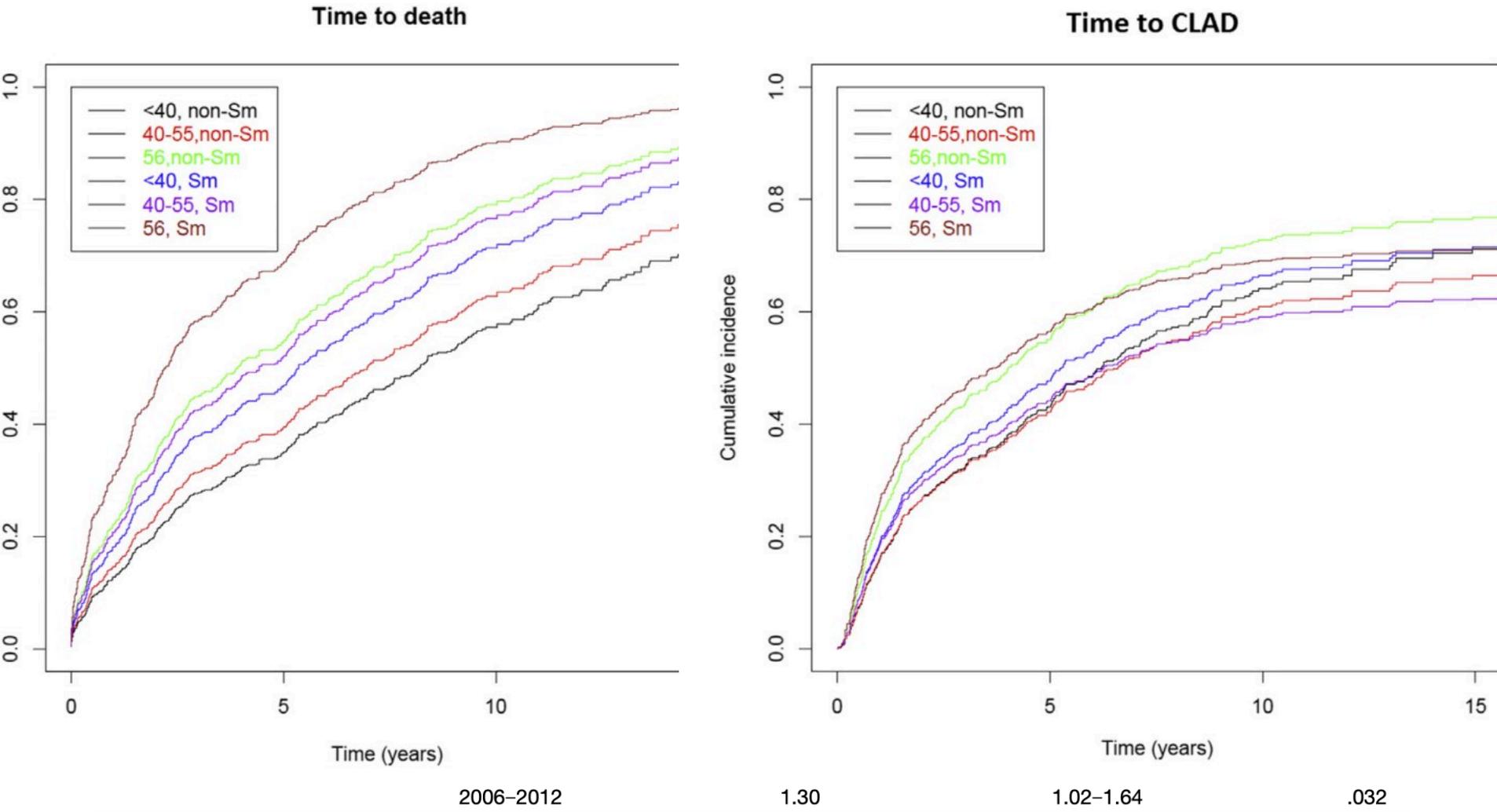
Table 4. Impact of Smoking and Donor Age

Variable	Donor Age 0–39 years (n = 169)	Donor Age 40–54 years (n = 203)	Donor Age ≥55 years (n = 82)	P Value
Age	27.79 ± 8.56	47.1 ± 4.2	59.0 ± 3.2	<.001*
Gender male (%)	95 (56%)	85 (42%)	40 (49%)	.042†
Height (meters)	1.75 ± 0.09	1.73 ± 0.08	1.73 ± 0.09	.121*
Weight (kg)	71.1 ± 11.8	73.7 ± 12.7	73.6 ± 10.4	.195*
Cause of death				
Trauma (%)	68 (41.1%)	24 (11.8%)	8 (10.1%)	
Cerebral haemorrhage (%)	77 (45.0%)	165 (81.0%)	73 (89.1%)	<.001†
Other (%)	24 (13.9%)	14 (7.2%)	1 (0.8%)	
Temperature	36.8 ± 1.1	36.6 ± 1.4	36.2 ± 1	.341*
Pulse	105.5 ± 21.9	99.3 ± 20.9	90.3 ± 20.5	.000*
Systolic blood pressure	118.5 ± 21.4	119.5 ± 24.5	120.1 ± 22.8	.945*
Diastolic blood pressure	68.6 ± 15.9	70.2 ± 14.0	66.3 ± 12.8	.087*
Fraction of inspired O ₂	34.8 ± 6.8	35.8 ± 6.8	35.5 ± 5.4	.247*
Partial pressure of O ₂ in arterial blood	17.9 ± 4.3	18.0 ± 7.3	17.6 ± 3.5	.760*
Bilirubin	15.7 ± 14.7	12.6 ± 8.3	12.6 ± 7.6	.100*
Alkaline phosphatase	112.0 ± 60.7	107.5 ± 65.2	99.4 ± 67.4	.235*
Estimated Donor TLC in liters	6.41 ± 1.12	6.16 ± 1.13	6.25 ± 1.16	.060*

*Continuous variable were compared using Kruskal-Wallis.

†Nominal variables were compared using the c2 test.

Table 5. Hazard Ratios for Different Variables with Death and CLAD-free Survival as Endpoints



Alpha-1 antitrypsin deficiency is abbreviated A1ATD, and Idiopathic Pulmonary Fibrosis is abbreviated IPF.

*Compared with Chronic Obstructive Pulmonary Disease.

†Compared with 44- year-old recipients.

‡Compared with 1992-1998.

Årsagen?



Table 3. Impact of Donor Age

Baseline Values	Donors Under 40 years	Donors From 40–55 years	Donors Above 55 years	P Value
FEV ₁ (L)				
Sltx	1.74 (±0.30)	1.53 (±0.33)	1.47 (±0.30)	.001
Dltx	2.89 (±0.37)	2.64 (±0.34)	2.32 (±0.42)	.01
FVC (L)				
Sltx	2.41 (±0.28)	2.29 (±0.29)	2.21 (±0.30)	.125
Dltx	3.37 (±0.34)	3.37 (±0.34)	3.06 (±0.37)	.324
DLCO (mmol/min/kPa)				
Sltx	5.84 (±0.39)	4.62 (±0.36)	3.97 (±0.40)	<.0001
Dltx	6.08 (±0.31)	5.64 (±0.34)	5.02 (±0.24)	.03
RV/TLC ratio	0.42 (±0.35)	0.44 (±0.33)	0.49 (±0.27)	.003
	(n = 86)	(n = 89)	(n = 28)	

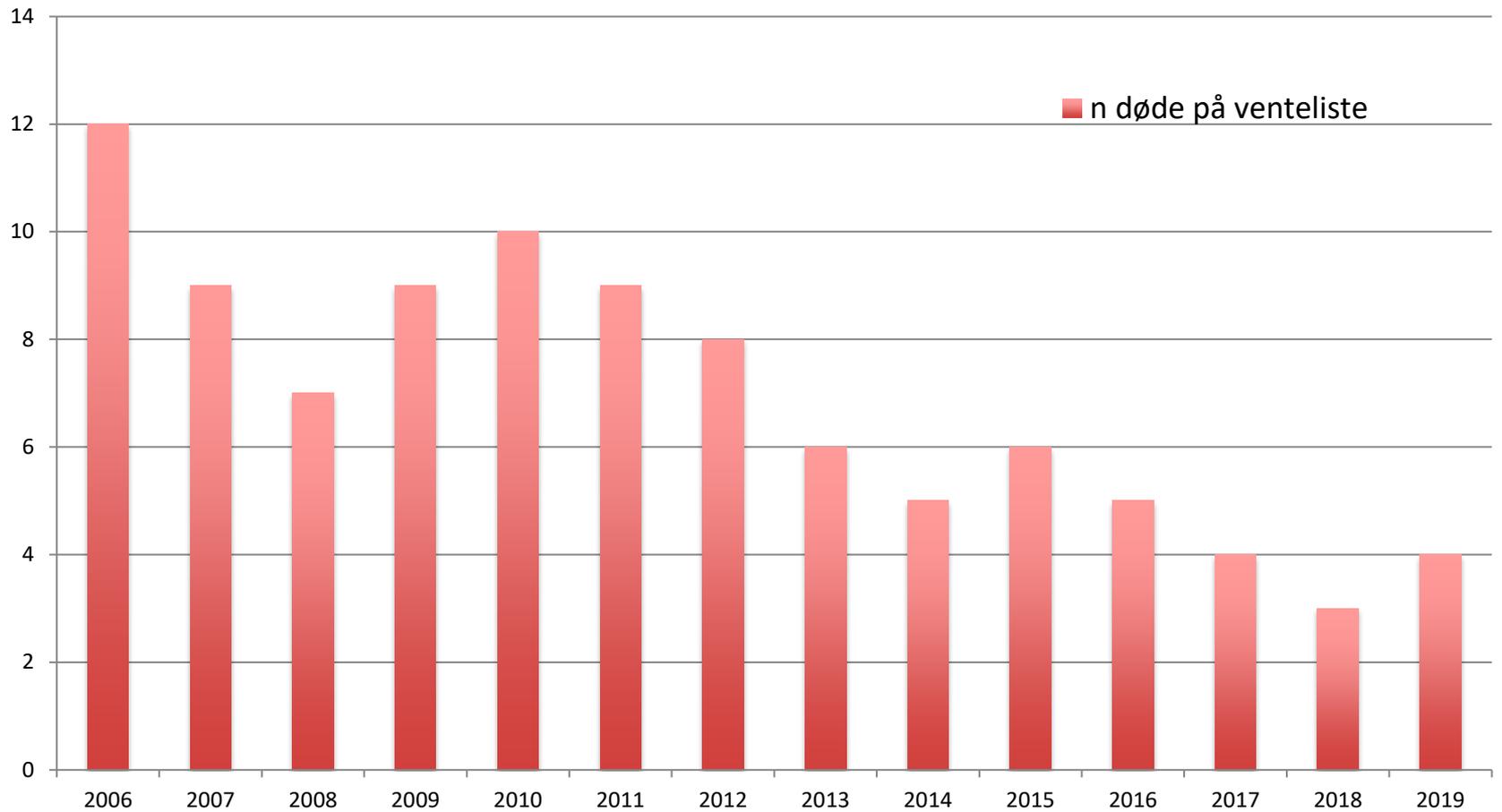
Table 2. Impact of Donor Smoking

Baseline Values	Non-Smoker	Unknown Smoking Status	Smoker or Former Smoker	P Value
FEV ₁ (L)				
Sltx	1.58 (±0.32)	1.69 (±0.29)	1.49 (±.33)	.036
Dltx	2.72 (±0.37)	2.94 (±0.35)	2.44 (±0.37)	.011
FVC (L)				
Sltx	2.32 (±0.30)	2.46 (±0.27)	2.190 (±0.43)	.022
Dltx	3.37 (±0.35)	3.53 (±0.35)	3.06 (±0.32)	.040
DLCO (mmol/min/kPa)				
Sltx	4.98 (±0.40)	5.31 (±0.36)	4.30 (±.43)	.003
Dltx	6.01 (±0.32)	5.93 (±0.34)	5.17 (±0.36)	.020
RV/TLC ratio	0.43 (±0.33)	0.43 (±0.37)	0.472 (±0.29)	.016
	(n = 82)	(n = 62)	(n = 59)	

Organer er en mangelvare



Døde på venteliste



Scandiatriplant

Øg antallet af organer!

DR

Nyheder

TV

Radio

Privatlivspolitik

KONTAKT DR

SØG PÅ DR.DK

SENESTE NYT

INDLAND

UDLAND

PENGE

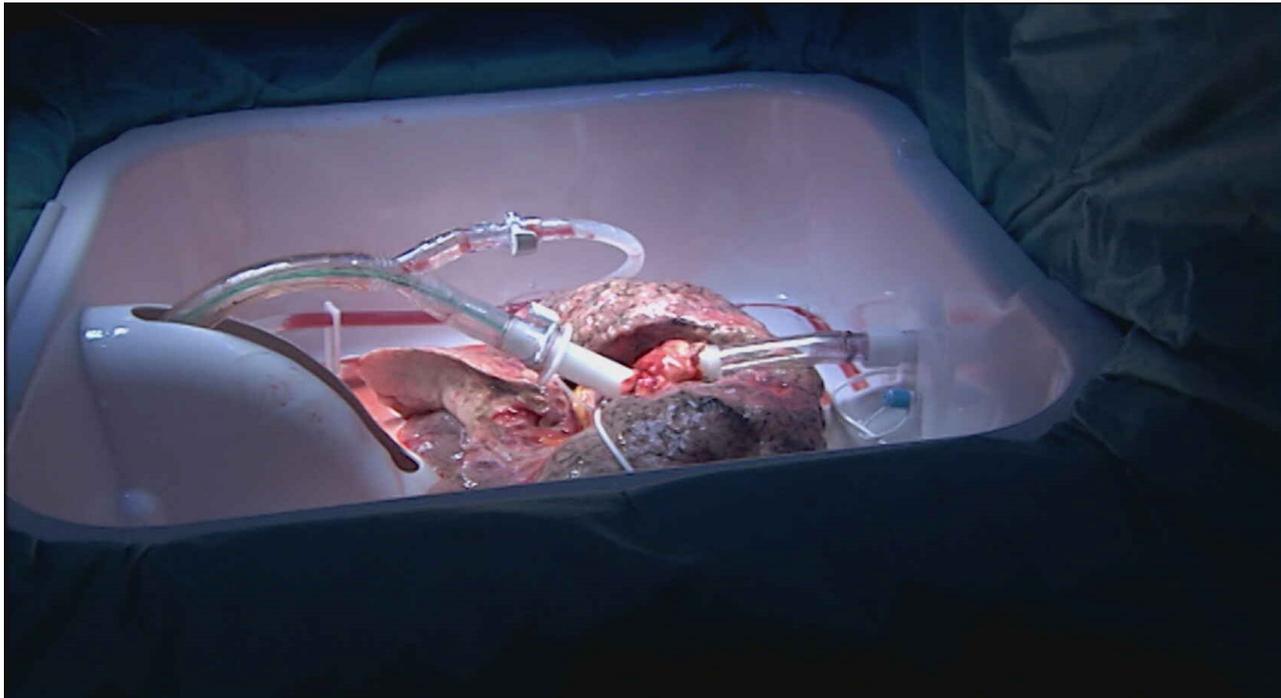
POLITIK

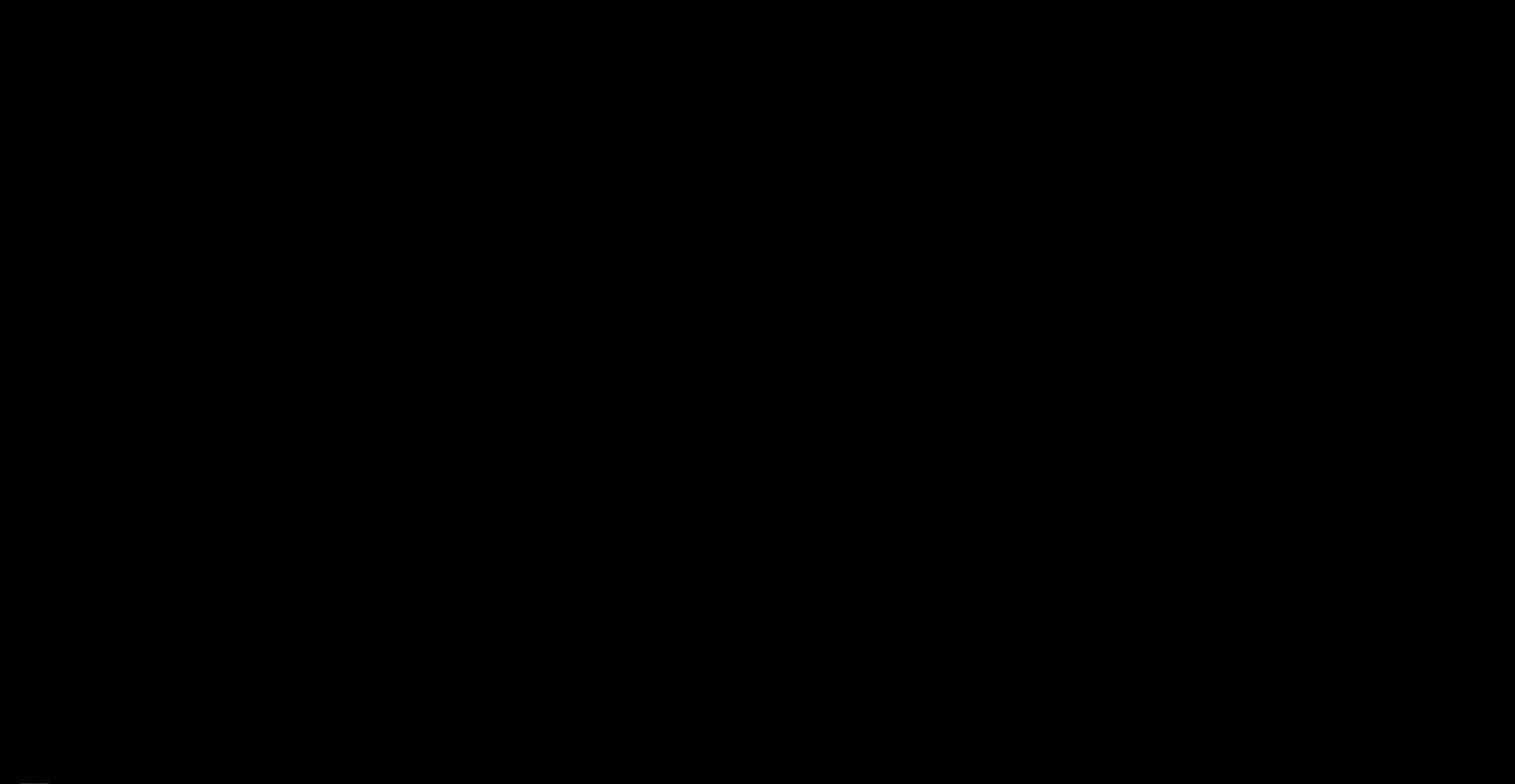
REGIONALT

INDLAND

Hanne skal have transplanteret vaskede lunger: Jeg får et nyt liv

En ny teknologi, hvor organer bliver vasket, betyder, at flere organdonorer kan bruges.





Giv adgang til en større donorpool



ELSEVIER

**Urgency
Scar**

Henrik
Gerdt
Göran
Arnt E
Are M

*From the
ical Medi
plantatio.
Surgery,
Sahlgren.
Clinical &
Transpla.
Universit
Copenha,*



Journal of
and Lung
plantation

www.jhltonline.org



CrossMark

Deterioration: everyone gets urgent



- Mismatch between listings and capacity?
- Solution:
 - Give access to larger pool

Table 3 Characteristics of Patients Before and After Implementation of Scandiatransplant Urgent Lung Allocation System

	Pre-implementation (January 1, 2005 to April 30, 2009)	Post-implementation (May 1, 2009 to December 31, 2014)	<i>p</i>
Patients on WL	733	1,023	
Died or withdrawn from WL	133 (18%)	143 (14%)	0.041 ^a
On WL at the end of period	112 (15%)	108 (11%)	0.003 ^a
Transplanted patients	488 (67%)	772 (75%)	<0.001 ^a
Age (years)	54 (41 to 58)	53 (43 to 59)	0.605
Males	251 (51%)	399 (52%)	0.954
Height (cm)	170 (164 to 177)	171 (165 to 178)	0.403
Blood type (ABO)			0.367
O	184 (38%)	270 (35%)	
A	238 (49%)	377 (49%)	
B	47 (9.6%)	79 (10%)	
AB	19 (3.9%)	46 (6.0%)	
Diagnosis			
Obstructive	235 (48%)	295 (38%)	0.001 ^a
Restrictive	114 (23%)	228 (30%)	0.016 ^a
Suppurative	67 (14%)	126 (16%)	0.229
Vascular	28 (5.7%)	46 (6.0%)	0.903
ReTx	20 (4.1%)	46 (6.0%)	0.156
Other	24 (4.9%)	31 (4.0%)	0.480
Life support			
ECMO	14 (2.9%)	42 (5.4%)	0.035 ^a
MV	5 (1.0%)	17 (2.2%)	0.184

Continuous data are presented as median (interquartile range). Categorical data are presented as count (%). ECMO, extracorporeal membrane oxygenation; MV, mechanical ventilation; ReTx, retransplant; WL, waiting list.

^a*p* < 0.05.

Table 1 Characteristics of Patients on Waiting List for Lung Transplantation From May 1, 2009 to 2014, Stratified by Urgent Status

	Waiting list status		<i>p</i>
	Regular	Urgent	
Number	952	71	
Age at listing (years)	54 (45 to 59)	40 (29 to 50)	<0.001 ^a
0 to 16 years	19 (2.0%)	5 (7.0%)	0.021 ^a
17 to 39 years	141 (15%)	29 (41%)	<0.001 ^a
40 to 60 years	568 (60%)	33 (46%)	0.034 ^a
>60 years	224 (24%)	4 (5.6%)	<0.001 ^a
Males	460 (48%)	30 (42%)	0.389
Height (cm)	170 (163 to 177)	168 (163 to 179)	0.520
pTLC (liters)	5.7 (5.0 to 7.1)	5.4 (5.0 to 7.0)	0.348
Blood type (ABO)			0.547
O	370 (39%)	33 (46%)	
A	437 (46%)	28 (39%)	
B	97 (10%)	8 (11%)	
AB	48 (5.0%)	2 (2.8%)	
Diagnosis			
Obstructive	400 (42%)	2 (2.8%)	<0.001 ^a
Age at listing (years)	56 (52 to 60)	45 (43 to 48)	0.042 ^a
Restrictive	270 (28%)	28 (39%)	0.057
Age at listing (years)	56 (49 to 61)	49 (39 to 52)	<0.001 ^a
Suppurative	127 (13%)	21 (30%)	0.001 ^a
Age at listing (years)	35 (24 to 45)	27 (20 to 41)	0.065
Vascular	56 (5.9%)	6 (8.5%)	0.433
Age at listing (years)	39 (22 to 51)	39 (34 to 50)	0.668
Tx graft failure	59 (6.2%)	7 (9.9%)	0.212
Age at listing (years)	49 (39 to 57)	36 (29 to 46)	0.047 ^a
Other	40 (4.2%)	7 (9.9%)	0.038 ^a
Age at listing (years)	42 (30 to 54)	34 (22 to 46)	0.256
Tx procedure (planned)			
BLTx	782 (82%)	68 (96%)	0.002 ^a
SLTx	157 (16%)	2 (2.8%)	0.001 ^a
HLTx	13 (1.4%)	1 (1.4%)	0.999
Life support			
ECMO	22 (2.3%)	32 (45%)	<0.001 ^a
MV	20 (2.1%)	7 (9.9%)	0.002 ^a
Last follow-up			
6MWT (meters)	295 (205 to 397)	296 (148 to 487)	0.775
FEV ₁ (% of predicted)	28 (20 to 45)	36 (29 to 50)	0.011 ^a
HLA immunization (PRA)			
No immunization (PRA 0%)	774 (81%)	47 (66%)	0.005 ^a
Low immunization (PRA 1% to 9%)	29 (3.1%)	3 (4.2%)	0.482
Medium immunization (PRA 10% to 79%)	98 (10%)	9 (13%)	0.545
High immunization (PRA 80% to 100%)	23 (2.4%)	4 (5.6%)	0.111
Not analyzed	28 (2.9%)	8 (11.3%)	0.002 ^a

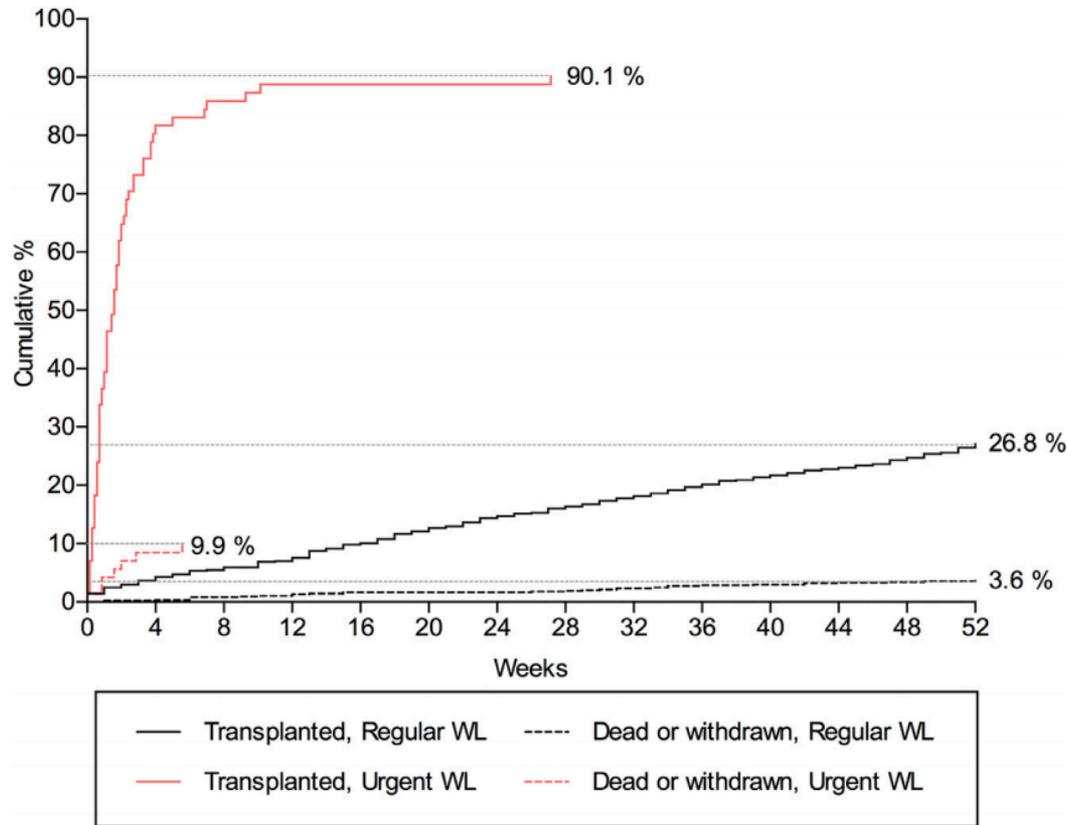


Figure 2 Cumulative proportions of patients on the waiting list for lung transplantation who were transplanted or died or were withdrawn from the waiting list during the first year after listing.

Spørgsmål?



The New England Journal of Medicine

©Copyright, 1982, by the Massachusetts Medical Society

Volume 306

MARCH 11, 1982

Number 10

HEART-LUNG TRANSPLANTATION

Successful Therapy for Patients with Pulmonary Vascular Disease

BRUCE A. REITZ, M.D., JOHN L. WALLWORK, M.B., CH.B., SHARON A. HUNT, M.D., JOHN L. PENNOCK, M.D.,
MARGARET E. BILLINGHAM, M.B., PHILIP E. OVER, M.D., PH.D., EDWARD B. STINSON, M.D.,
AND NORMAN E. SHUMWAY, M.D., PH.D.

Abstract We report our initial experience with three patients who received heart-lung transplants. The primary immunosuppressive agent used was cyclosporin A, although conventional drugs were also administered.

In the first patient, a 45-year-old woman with primary pulmonary hypertension, acute rejection of the transplant was diagnosed 10 and 25 days after surgery but was treated successfully; this patient still had normal exercise tolerance 10 months later. The second patient, a 30-year-old man, underwent transplantation for Eisenmenger's syndrome due to atrial and ventricular septal defects. His graft was not rejected, and his condition was markedly improved

eight months after surgery. The third patient, a 29-year-old woman with transposition of the great vessels and associated defects, died four days postoperatively of renal, hepatic, and pulmonary complications.

We attribute our success to experience with heart-lung transplantation in primates, to the use of cyclosporin A, and to the anatomic and physiologic advantages of combined heart-lung replacement. We hope that such transplants may ultimately provide an improved outlook for selected terminally ill patients with pulmonary vascular disease and certain other intractable cardiopulmonary disorders. (N Eng J Med. 1982; 306:557-64.)

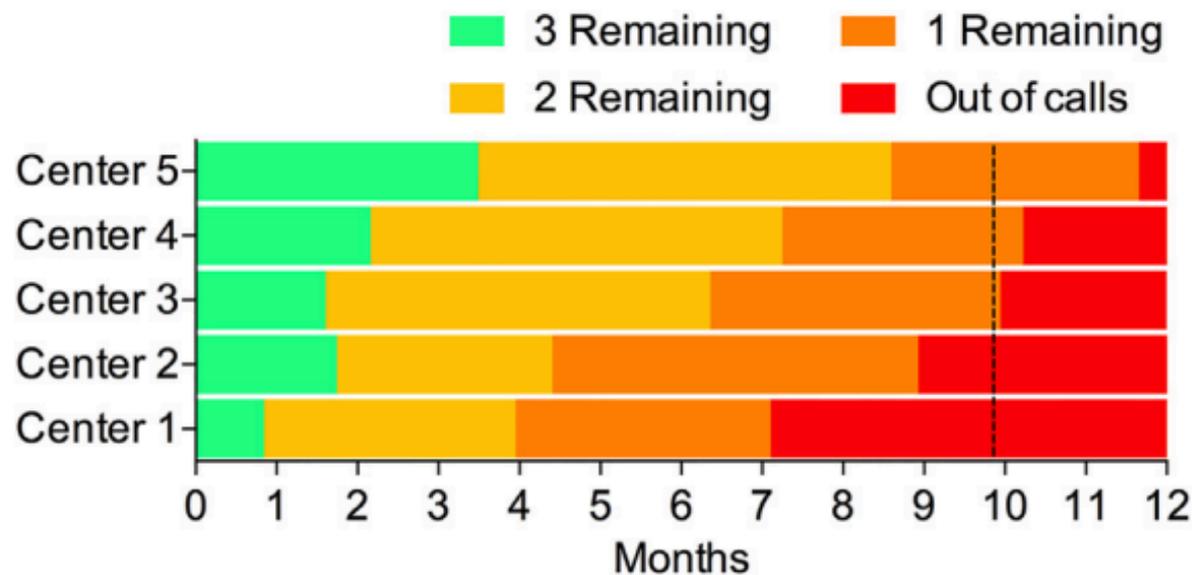


Figure 3 Average utilization of the Scandiatransplant Urgent Lung Allocation System from May 1, 2009 to 2014. Bars indicate average percent for the year with 3, 2, 1, or 0 urgent call(s) remaining for each center.