

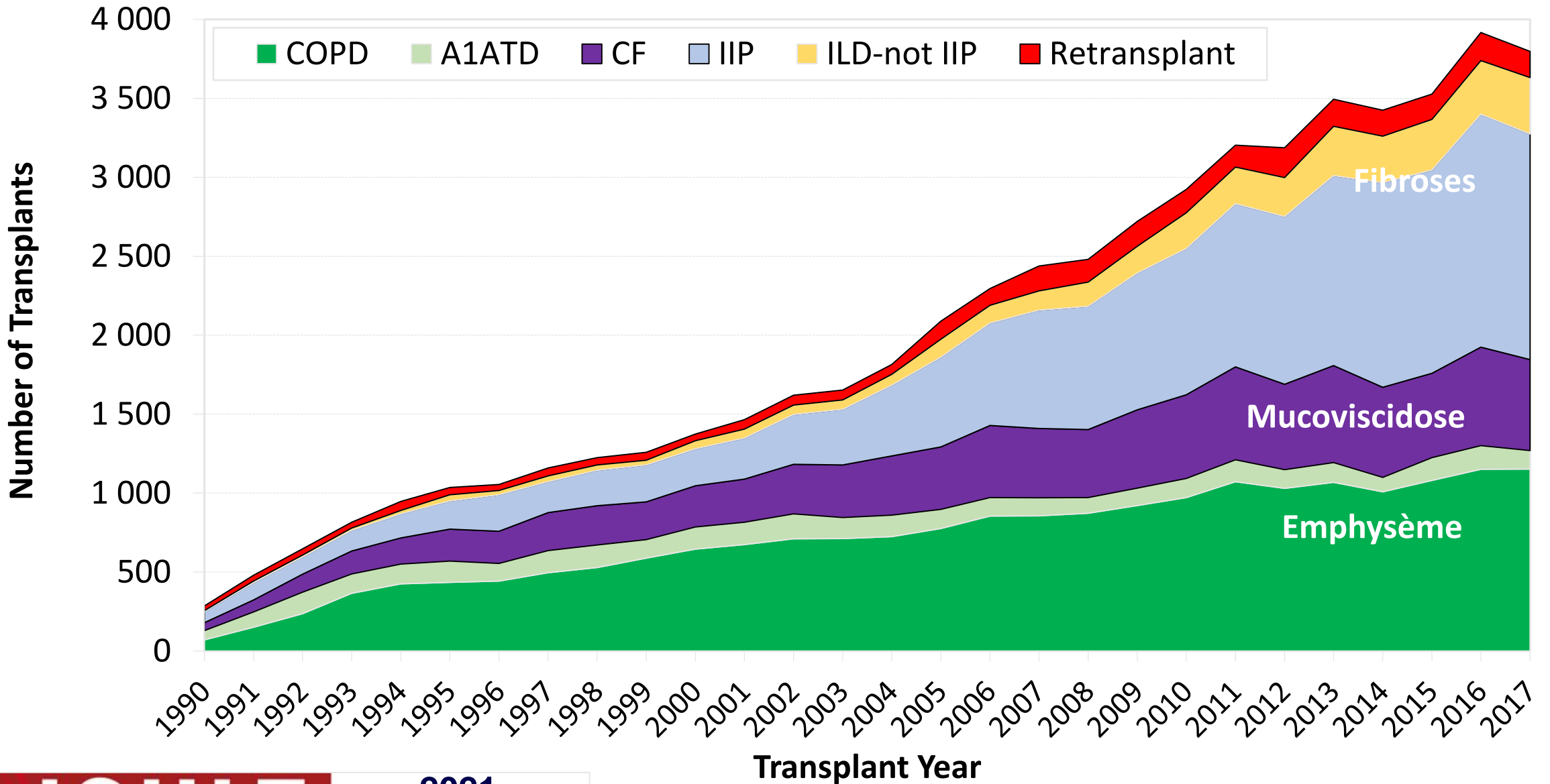
# Greffes multiples – Greffe des patients âgés Quelles limites ?



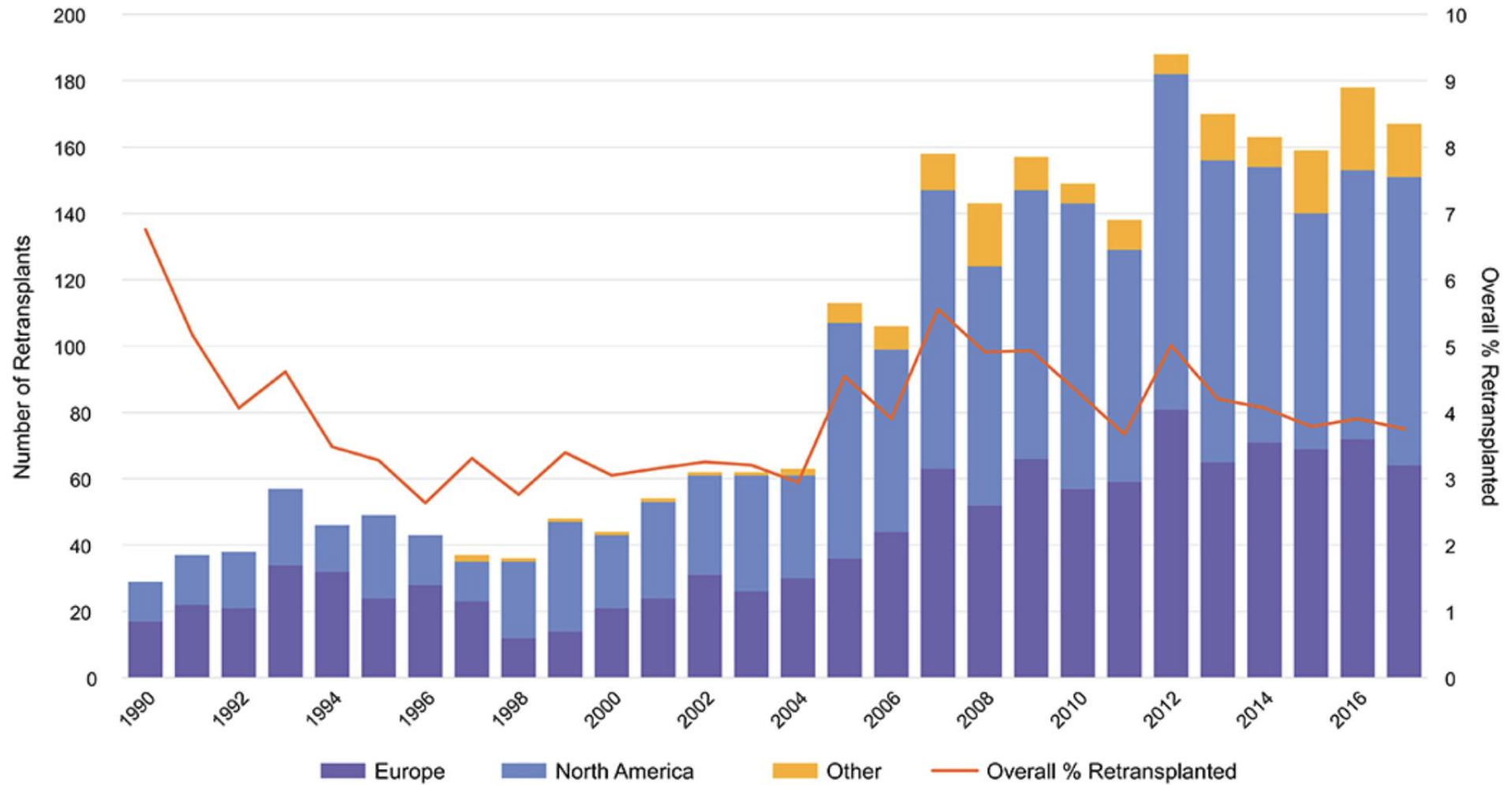
Benjamin COIFFARD  
Maladies Rares et Transplantation Pulmonaires  
CHU Nord, APMH



Greffes multiples

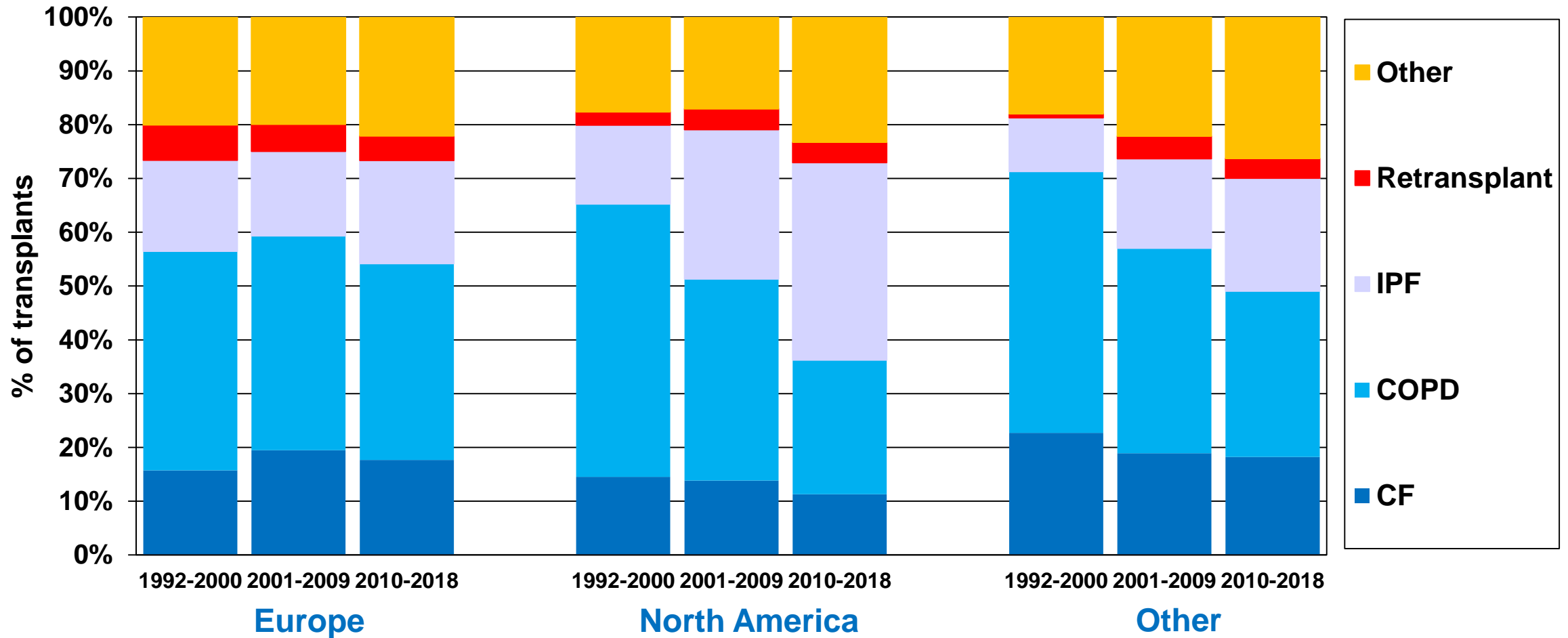


# Re-transplantation



# Adult Lung Transplants

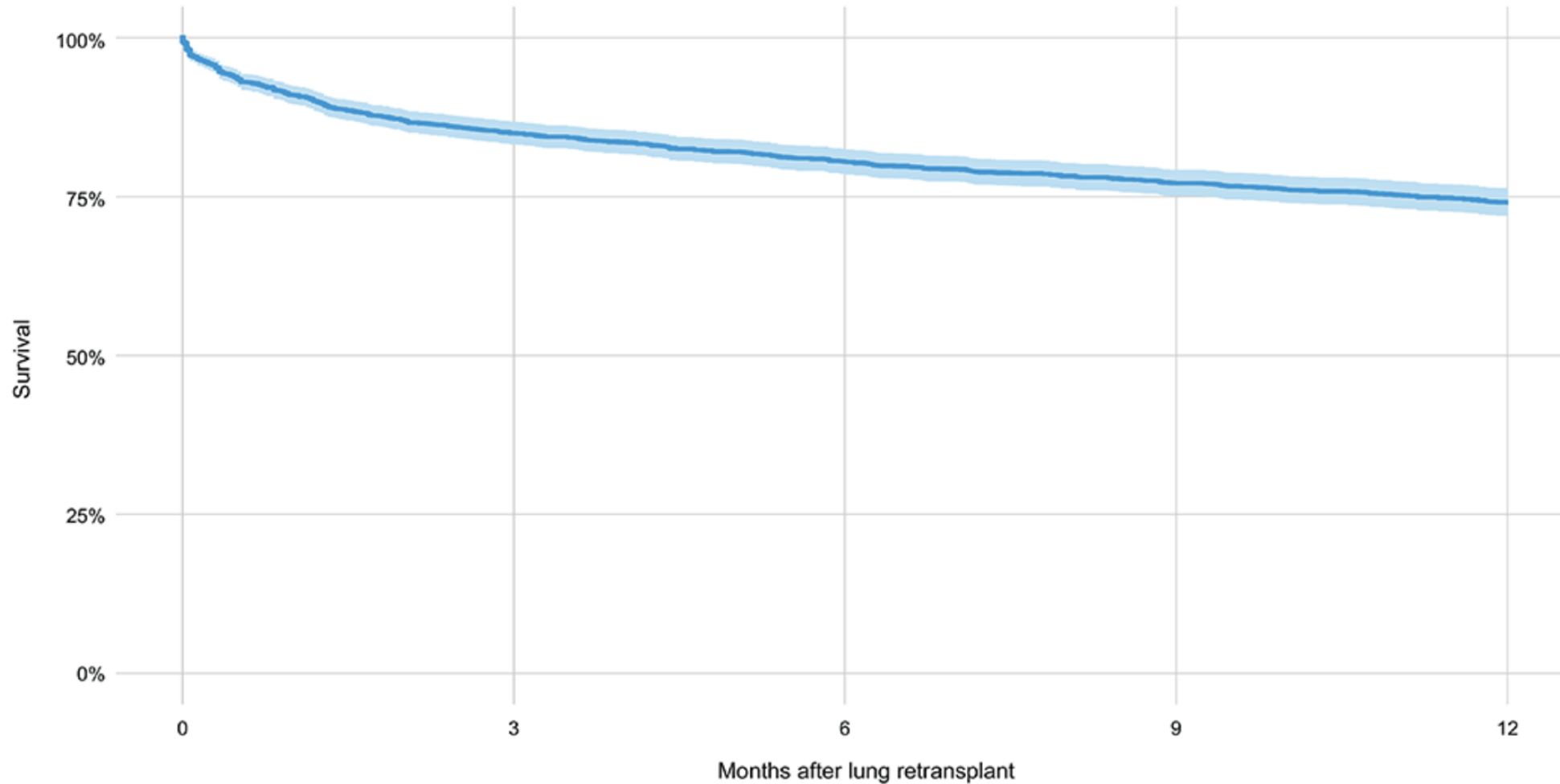
## Recipient Diagnosis Distribution by Location and Era (Transplants: Jan 1992 – Jun 2018)

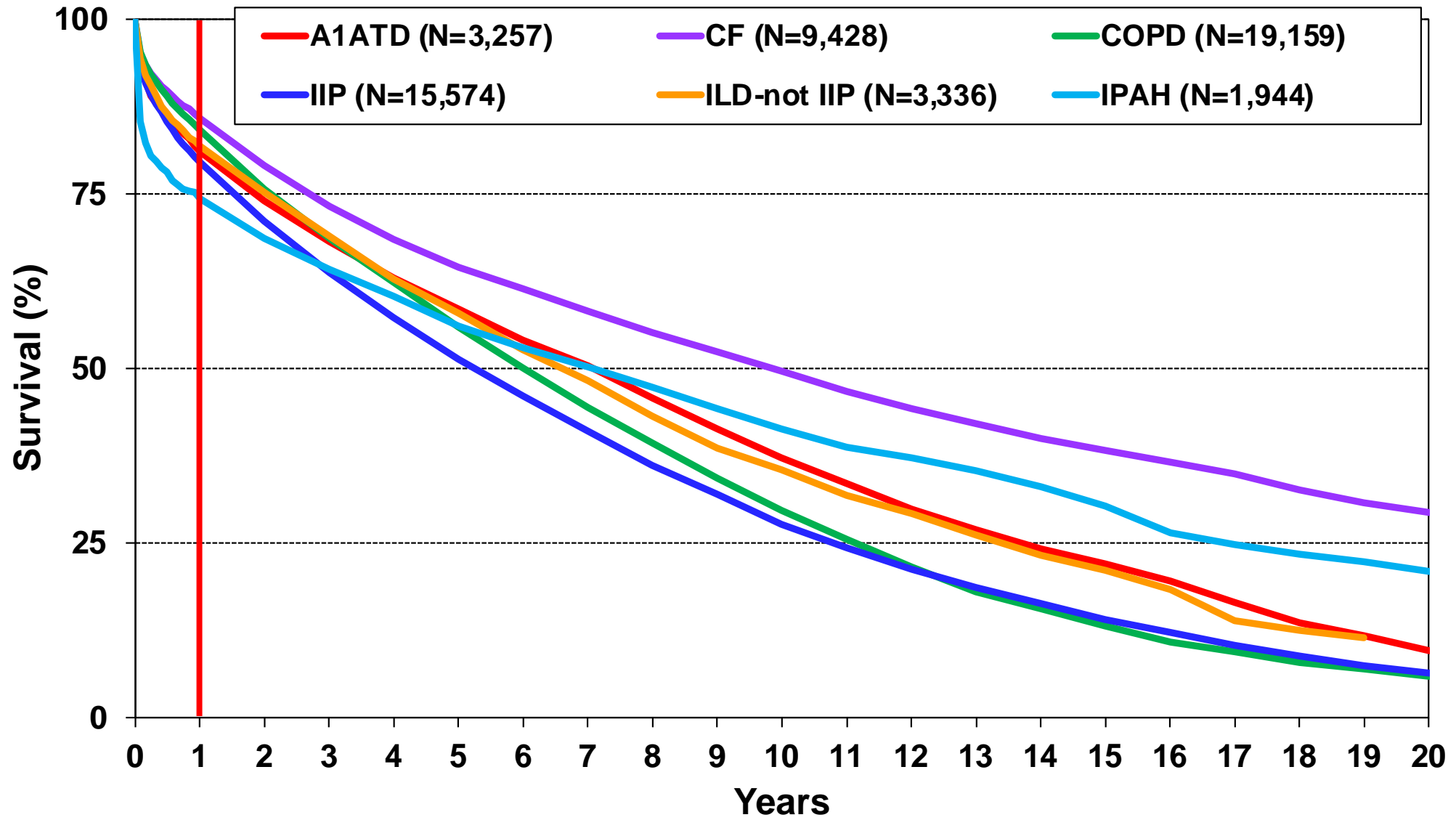


# Nombre de greffes pulmonaires (ABM 2022)

Indication	2017			2018			2019			2020			2021			2022		
	N	%	pmh	N	%	pmh	N	%	pmh	N	%	pmh	N	%	pmh	N	%	pmh
<b>Poumon</b>																		
Total	424	100	6,3	420	100	6,2	463	100	6,9	321	100	4,7	352	100	5,2	339	100	5,0
Autre ou indéterminée	41	10	0,6	42	10	0,6	46	10	0,7	40	12	0,6	72	20	1,1	32	9	0,5
COVID-19	0	0,0	0,0	0	0,0	0,0	0	0,0	0,0	0	0,0	0,0	2	1	0,0	2	1	0,0
Deficit en alpha anti-trypsine	3	1	0,0	3	1	0,0	3	1	0,0	4	1	0,1	6	2	0,1	6	2	0,1
Emphysème-BPCO	134	32	2,0	152	36	2,3	168	36	2,5	115	36	1,7	93	26	1,4	113	33	1,7
Fibrose pulmonaire	112	26	1,7	104	25	1,5	113	24	1,7	86	27	1,3	122	35	1,8	145	43	2,1
Hypertension artérielle pulmonaire	39	9	0,6	27	6	0,4	32	7	0,5	31	10	0,5	37	11	0,5	25	7	0,4
Mucoviscidose	82	19	1,2	75	18	1,1	95	21	1,4	26	8	0,4	14	4	0,2	8	2	0,1
Retransplantation-Echec de greffe	13	3	0,2	17	4	0,3	6	1	0,1	19	6	0,3	6	2	0,1	8	2	0,1

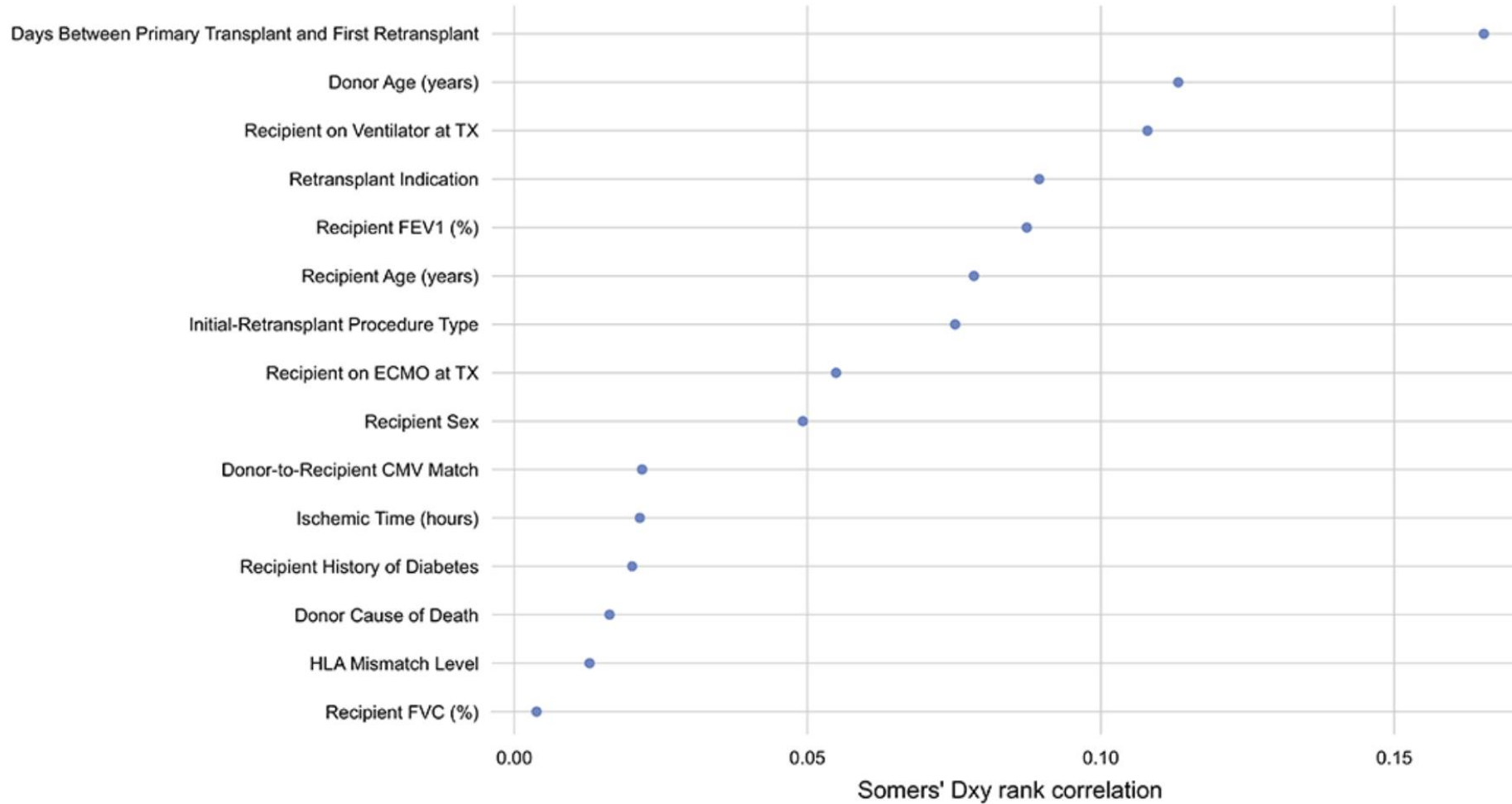
# Re-transplantation / 1-year Mortality



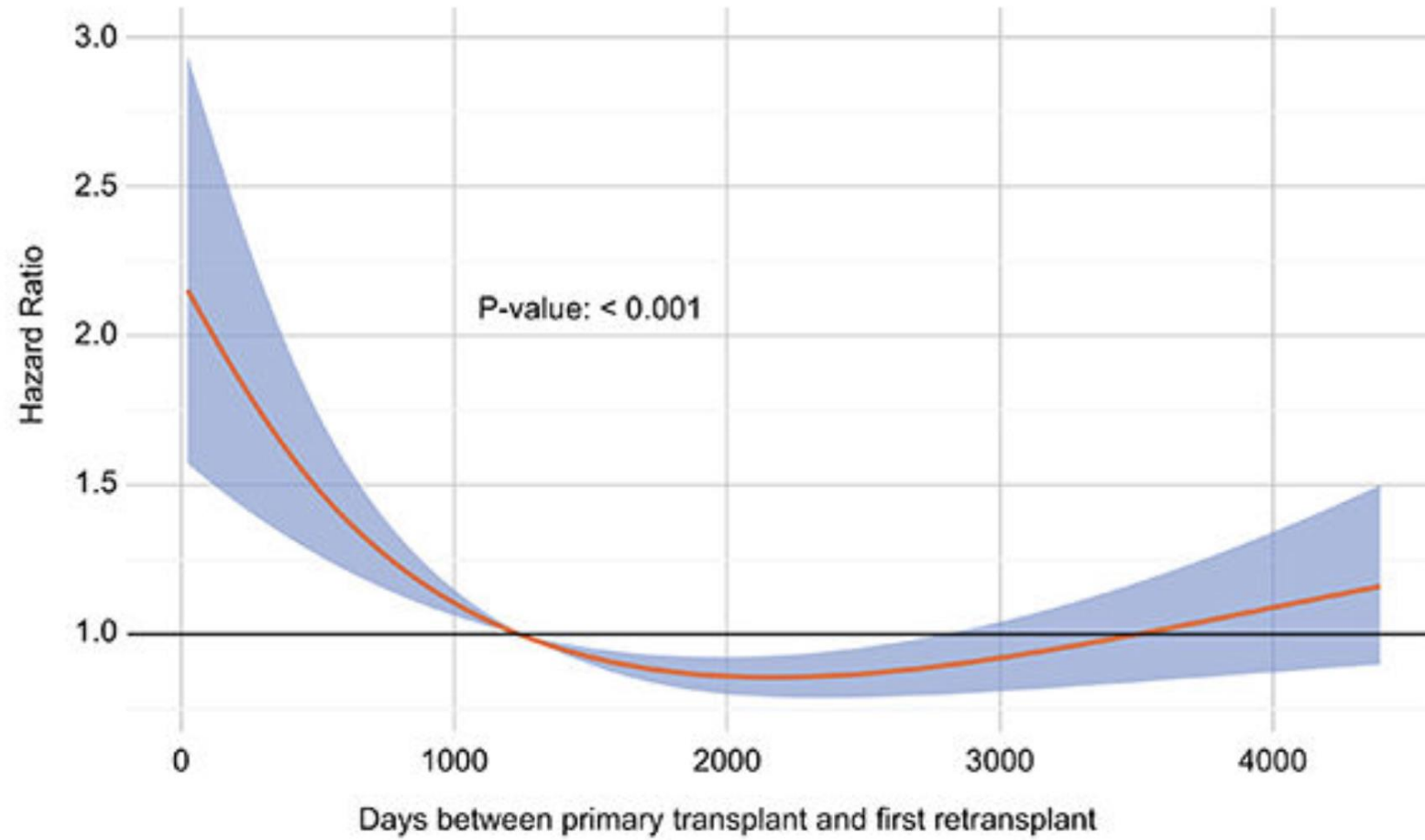




# Re-transplantation / 1-year Mortality



# Re-transplantation / 1-year Mortality



Combien ?

## Multiple Lung Transplant in a Patient Within 25 Years: A Case Report

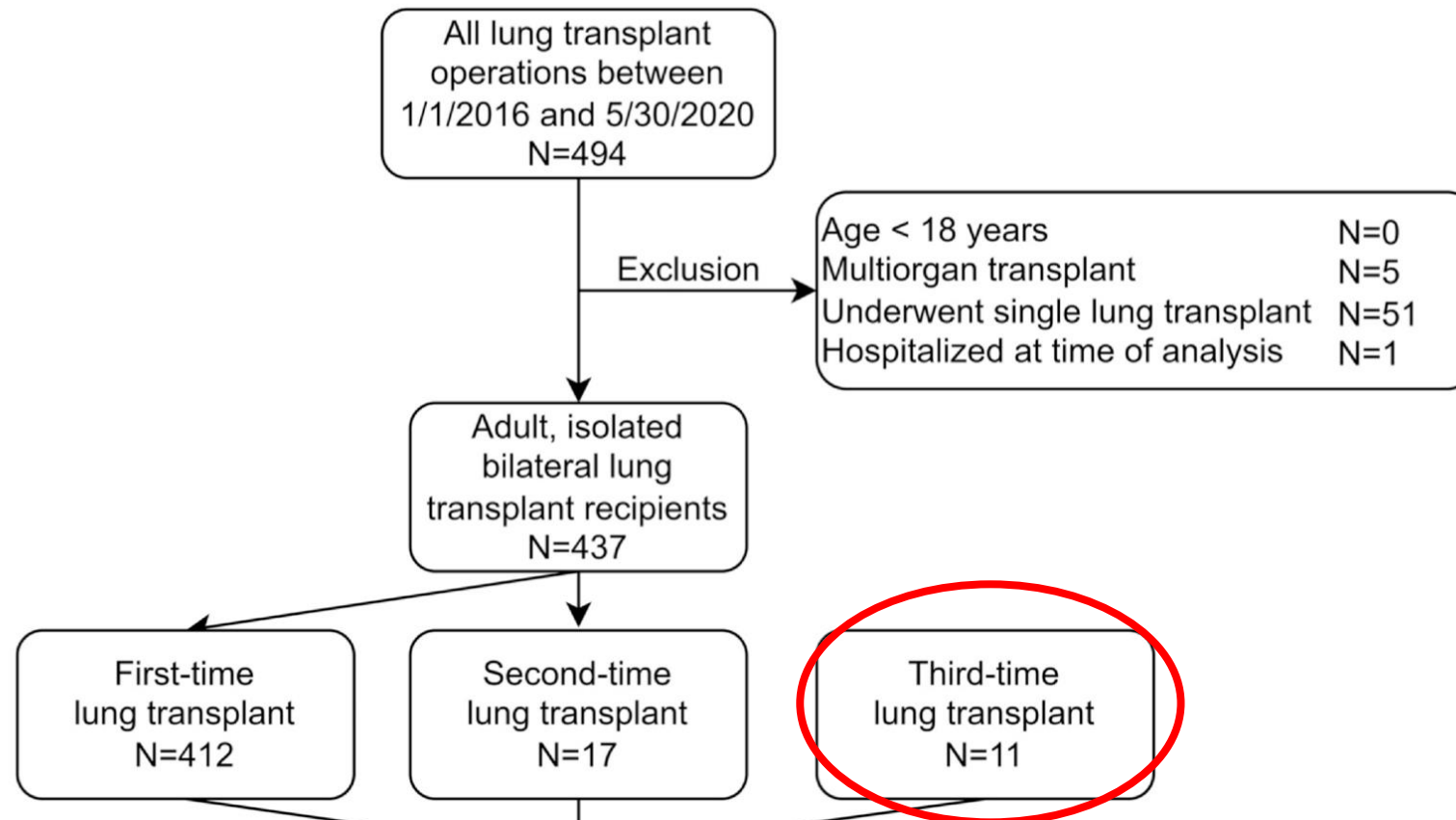
*Min Zhang,<sup>1</sup> Ana Rita SecoAntunes,<sup>2</sup> Romain Kessler,<sup>3</sup> Gilbert Massard<sup>4</sup>*

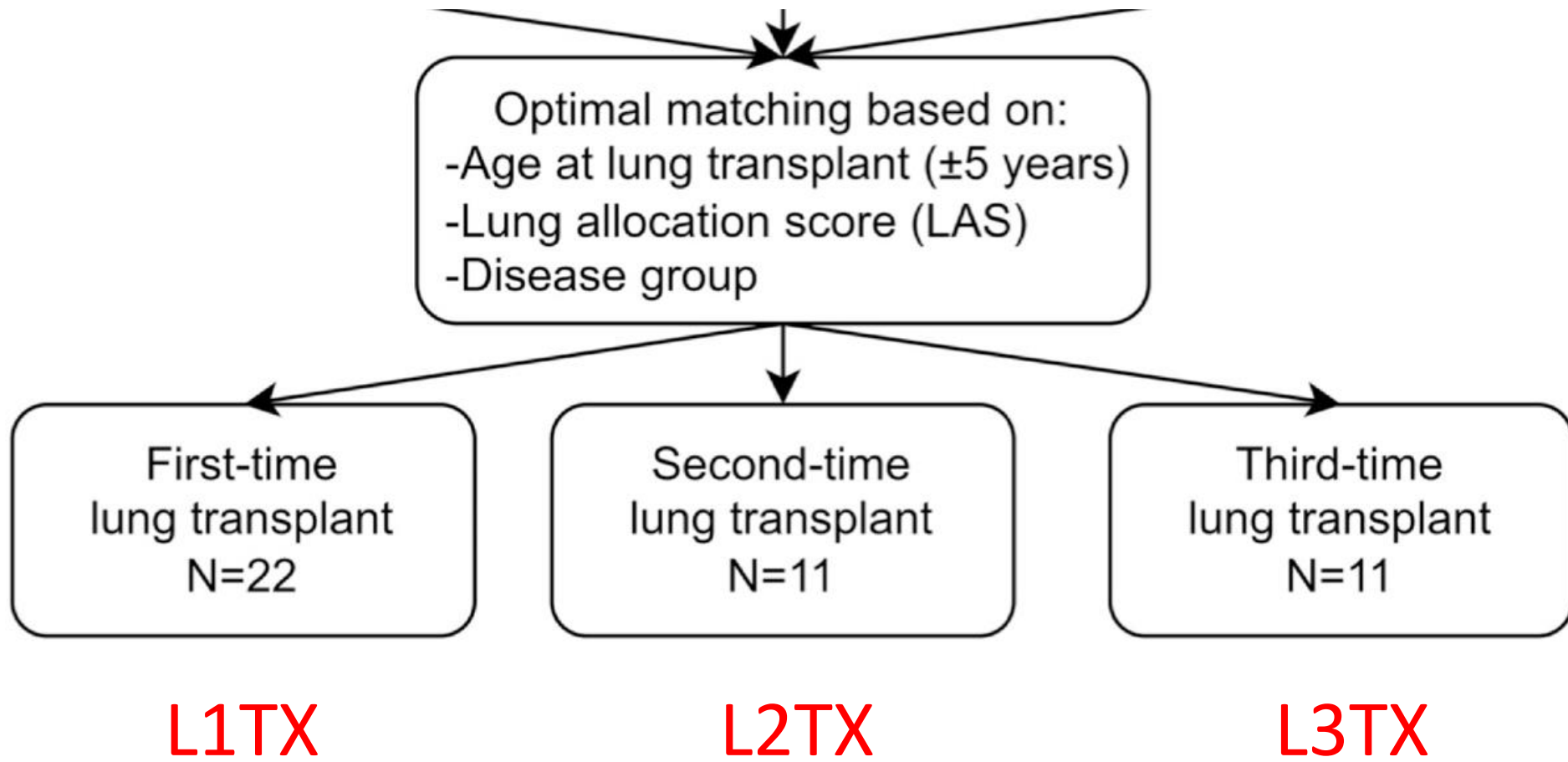
- 1990 : bi-pulmonaire (16 ans)
- 1991 : cœur-poumons
- 1995 : mono-pulmonaire gauche
- 2005 : mono-pulmonaire droite
  
- 2014 : décès (40 ans)

# Short-term outcomes after third-time lung transplantation: A single institution experience

Vikram F. Gupta, BA   • Samantha E. Halpern, MD, MHS • Arya Pontula, BSPH • ...

Jacob A. Klapper, MD • Matthew G. Hartwig, MD, MHS • John C. Haney, MD, MPH • [Show all authors](#)





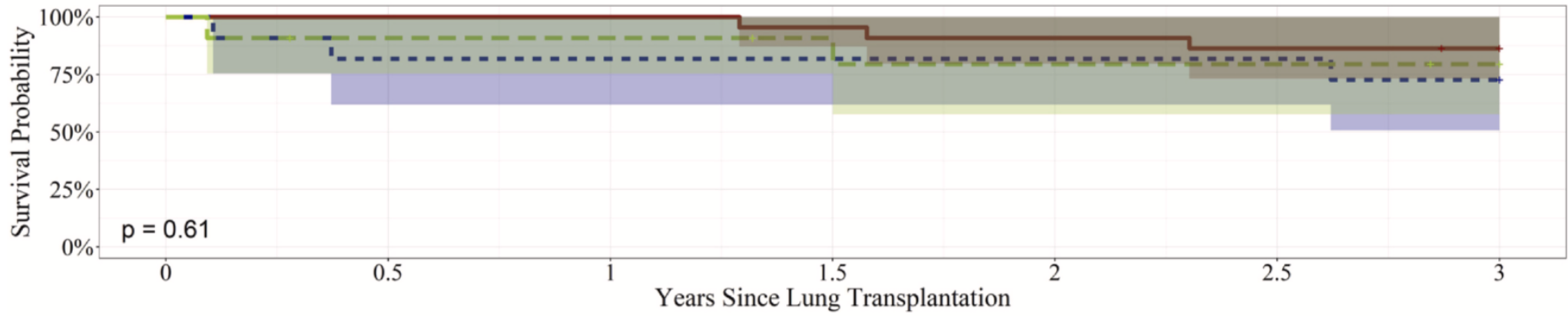
Characteristic	L1Tx N = 22	L2Tx N = 11	L3Tx N = 11	p-value (KW or Fisher's Exact)
Age (years)	40.0 [33.5, 48.0]	34.0 [28.0, 46.5]	37.0 [29.5, 44.0]	0.68
Sex				
Male	12 (54.5%)	4 (36.4%)	3 (27.3%)	0.35
Female	10 (45.5%)	7 (63.6%)	8 (72.7%)	
Race				
Caucasian/White	12 (54.5%)	10 (90.9%)	10 (90.9%)	<b>0.05</b>
Black or African American	8 (36.4%)	1 (9.1%)	0 (0.0%)	
Other	2 (9.1%)	0 (0.0%)	1 (9.1%)	
PRA at transplant (%)				
Class I <sup>a</sup>	12.6 (27.9)	1.2 (2.9)	10.8 (23.0)	0.68
Class II <sup>a</sup>	2.9 (13.4)	20.3 (28.3)	19.6 (33.7)	<b>0.03</b>
Initial etiology of respiratory failure				<b>&lt; 0.001</b>
Idiopathic pulmonary fibrosis	7 (31.8%)	1 (4.5%)	1 (4.5%)	
Obliterative bronchiolitis	5 (22.7%)	0 (0.0%)	0 (0.0%)	
Bronchiectasis	2 (9.1%)	0 (0.0%)	0 (0.0%)	
Sarcoidosis	2 (9.1%)	0 (0.0%)	0 (0.0%)	
Mixed connective tissue disease	2 (9.1%)	0 (0.0%)	0 (0.0%)	
ARDS/pneumonia	1 (4.5%)	1 (4.5%)	0 (0.0%)	
Pulmonary veno-occlusive disease	1 (4.5%)	0 (0.0%)	1 (4.5%)	
Hypersensitivity pneumonitis	1 (4.5%)	1 (4.5%)	0 (0.0%)	
Scleroderma	1 (4.5%)	0 (0.0%)	0 (0.0%)	
Pulmonary arterial hypertension	0 (0.0%)	1 (4.5%)	1 (4.5%)	
Cystic fibrosis	0 (0.0%)	7 (63.6%)	8 (72.7%)	

**Table 4** Post-Transplant Outcomes.

Characteristic	L1Tx N = 22	L2Tx N = 11	L3Tx N = 11	p-value (KW or Fisher's exact)
Reintervention <sup>a</sup>	6 (27.3%)	7 (63.6%)	10 (90.9%)	<b>0.001</b>
Unplanned surgical	3 (13.6%)	4 (36.4%)	7 (63.6%)	<b>0.01</b>
Planned surgical	3 (13.6%)	3 (27.3%)	3 (27.3%)	0.44
Radiologic	0 (0.0%)	0 (0.0%)	0 (0.0%)	-
Postoperative complications <sup>b</sup>	3 (13.6%)	6 (54.5%)	7 (63.6%)	<b>0.006</b>
Phrenic nerve injury	0 (0.0%)	0 (0.0%)	0 (0.0%)	-
Grade 3 PGD at 72 hours	7 (31.8%)	5 (45.5%)	2 (18.2%)	0.41
Post-operative ECMO	2 (9.1%)	7 (63.6%)	1 (9.1%)	<b>0.002</b>
Extubated in > 48 hours	8 (36.4%)	8 (72.7%)	4 (36.4%)	0.15
Reintubated <sup>c</sup>	6 (27.3%)	5 (45.5%)	5 (45.5%)	0.50
Tracheostomy <sup>c</sup>	9 (40.9%)	6 (54.5%)	3 (27.3%)	0.45
Renal replacement therapy <sup>c</sup>	1 (4.5%)	4 (36.4%)	4 (36.4%)	<b>0.02</b>
ICU readmission <sup>a</sup>	5 (22.7%)	2 (18.2%)	0 (0.0%)	0.21
		Missing 1 (9.1%)	Missing 1 (9.1%)	
Hospital readmission <sup>a</sup>	4 (18.2%)	2 (18.2%)	2 (18.2%)	0.54
		Missing 1 (9.1%)	Missing 1 (9.1%)	
Hospital LOS (days)	25.0 [20.0, 28.8]	34.0 [22.0, 38.5]	33.0 [25.0, 51.0]	0.29
ICU LOS (days)	4.5 [3.0, 12.5]	3.0 [2.0, 8.5]	2.0 [1.0, 5.5]	0.14
Acute rejection <sup>a</sup>	3 (13.6%)	3 (27.3%)	1 (9.1%)	0.56
Mortality within 30 days	0 (0.0%)	0 (0.0%)	0 (0.0%)	-
Mortality within 1 year	0 (0.0%)	2 (18.2%)	1 (9.1%)	0.12
Mortality within 3 years	3 (13.6%)	3 (27.3%)	2 (18.2%)	0.70
In-hospital mortality	2 (9.1%)	3 (27.3%)	1 (9.1%)	0.51



### Patient Survival

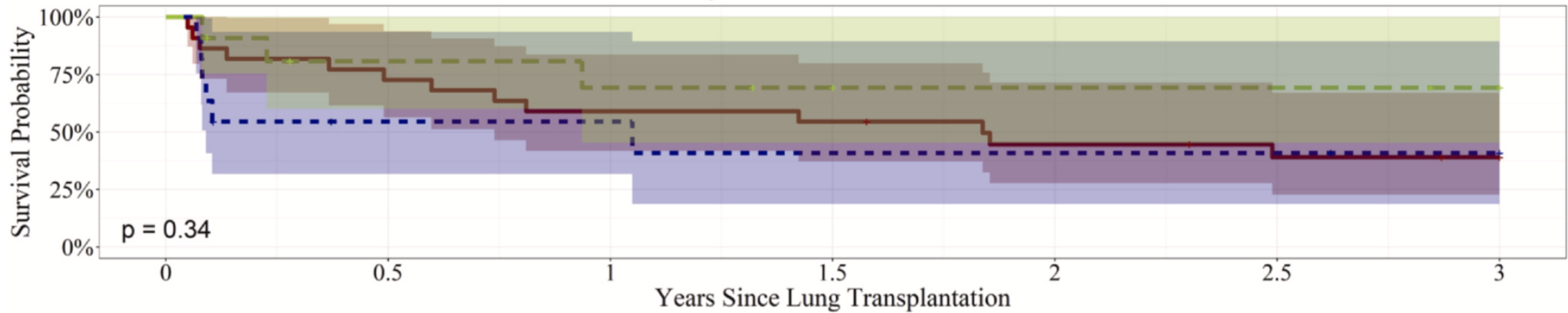


#### Number at risk

L1Tx	22	22	22	21	20	19	18
L2Tx	11	9	9	9	9	9	8
L3Tx	11	9	9	8	7	7	6

— L1Tx — L2Tx — L3Tx

### Rejection-free Survival



#### Number at risk

L1Tx	22	16	13	12	9	7	6
L2Tx	11	4	4	3	3	3	2
L3Tx	11	7	6	5	4	4	3

— L1Tx — L2Tx — L3Tx



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# **Consensus document for the selection of lung transplant candidates: An update from the International Society for Heart and Lung Transplantation**



The Journal of Heart and Lung Transplantation, Vol 40, No 11, November 2021

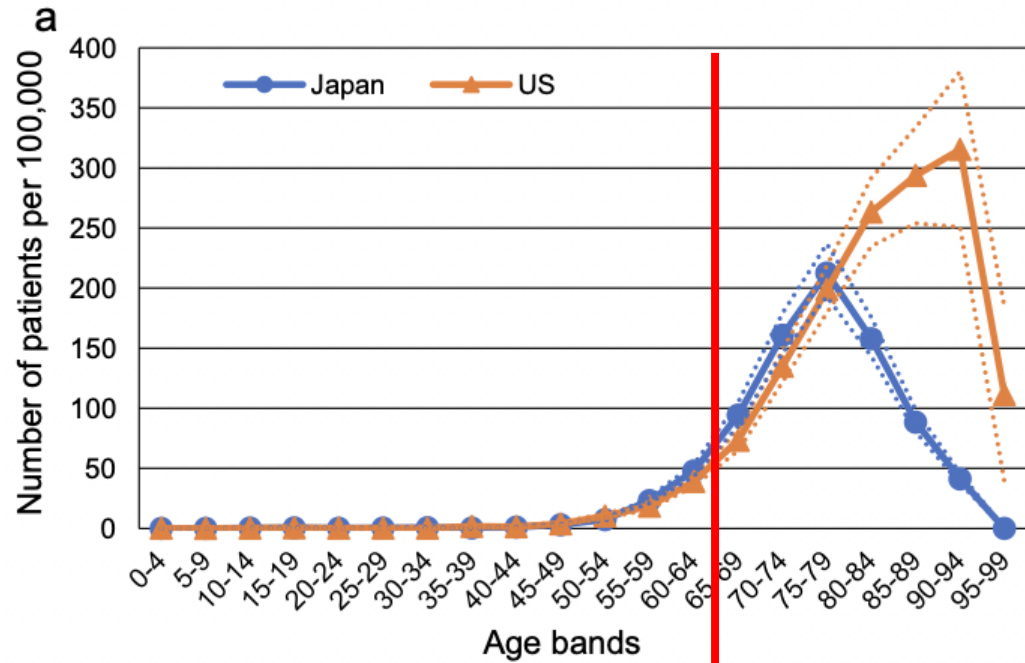
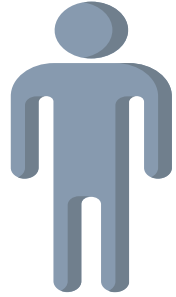
## **RISK FACTOR :**

- Retransplant >1 year for obstructive CLAD

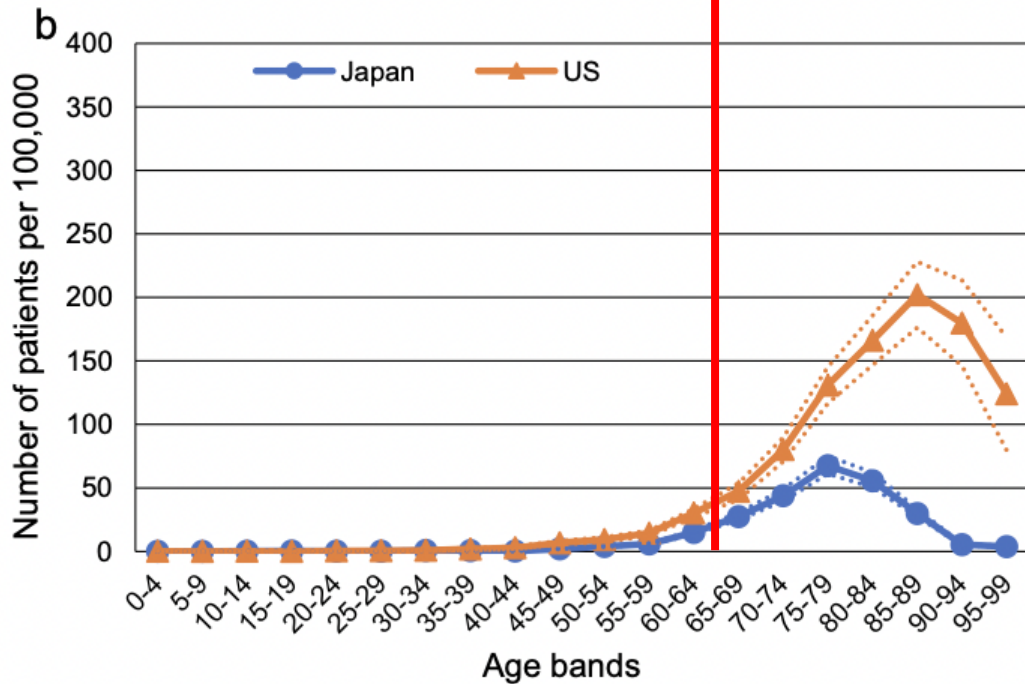
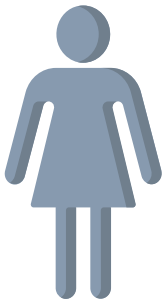
## **RISK FACTORS WITH HIGH OR SUBSTANTIALLY INCREASED RISK :**

- Retransplant <1 year following initial lung transplant
- Retransplant for restrictive CLAD
- Retransplant for AMR as etiology for CLAD

Greffe des patients âgés



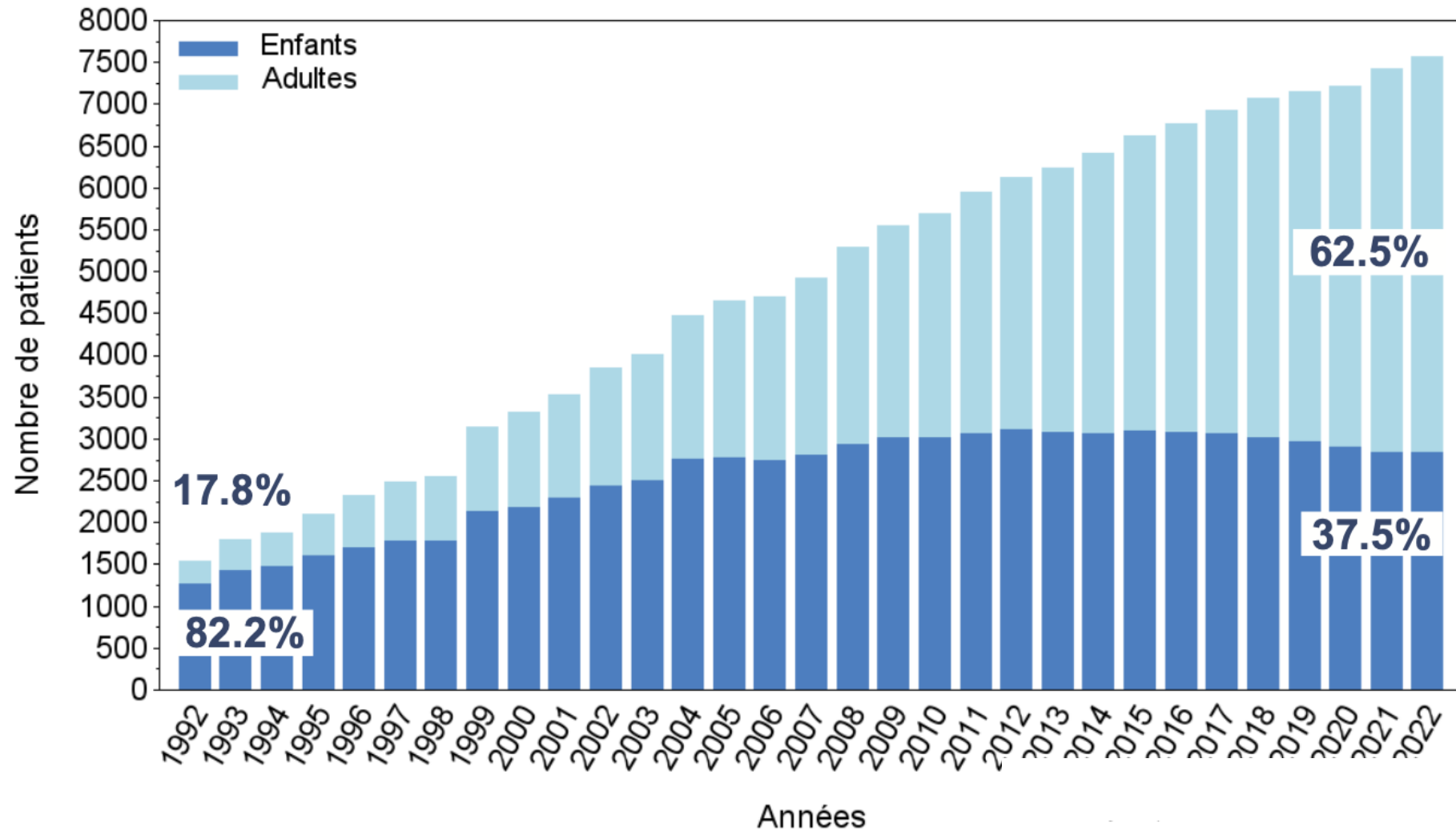
FPI

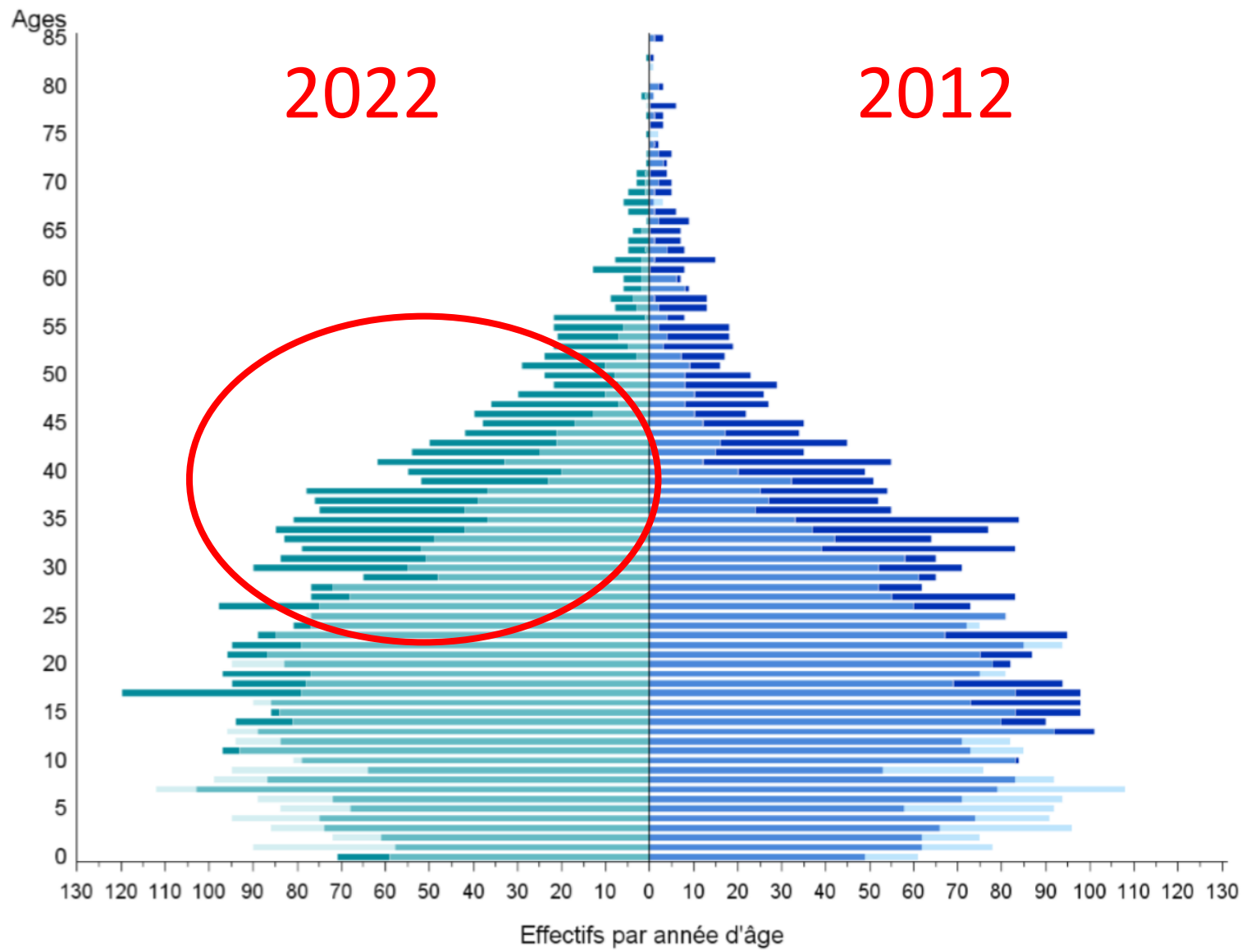


# Emphysème

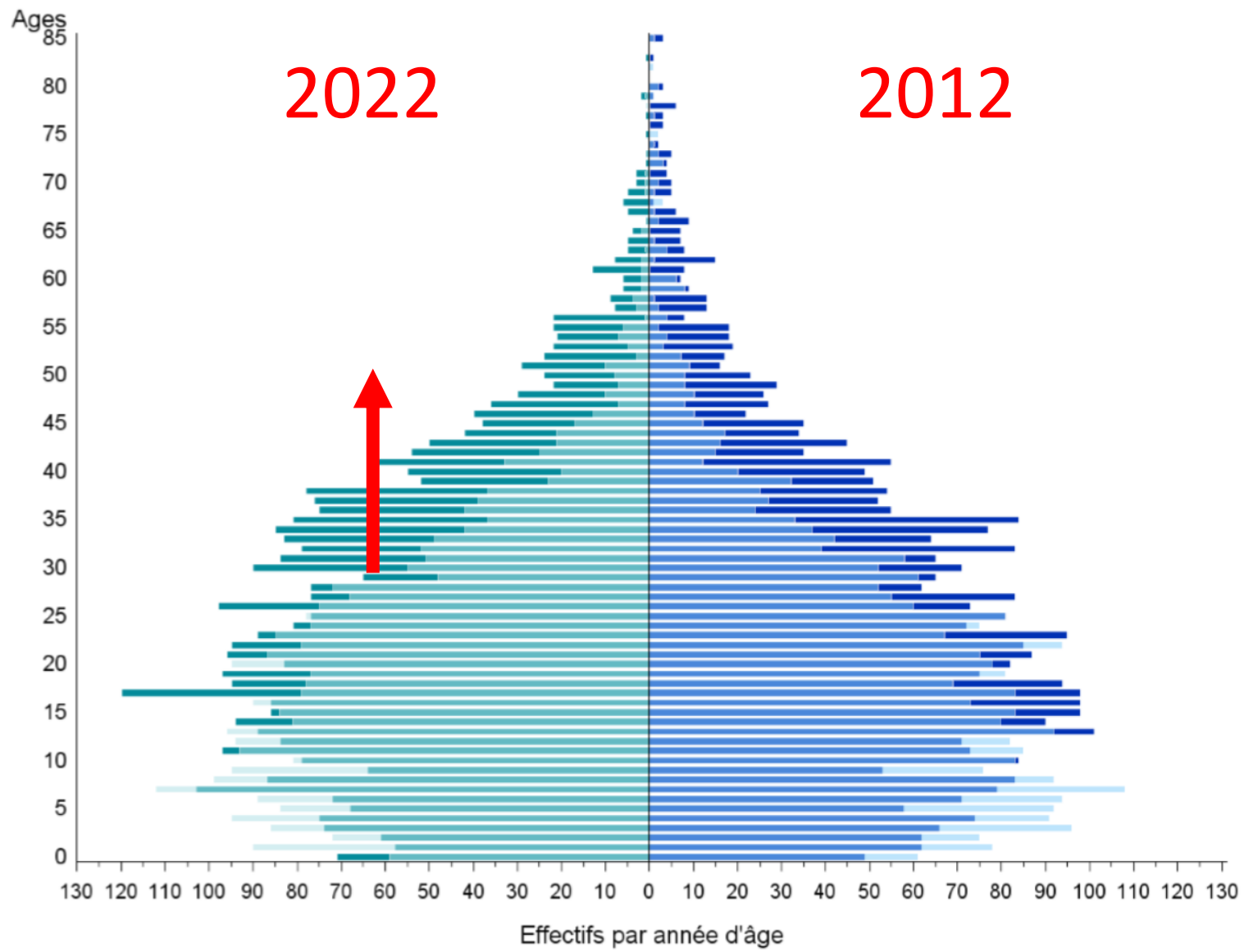


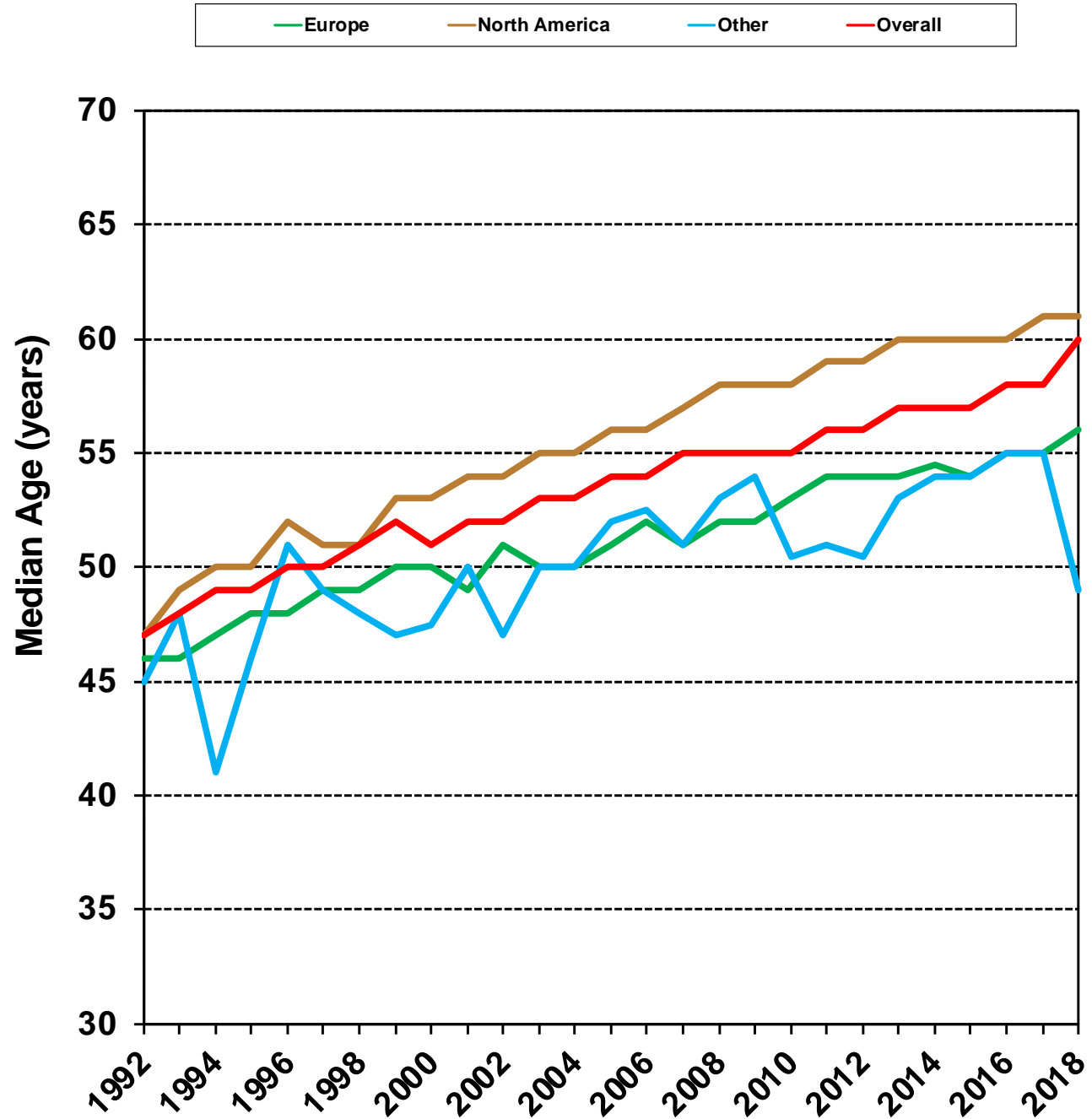
# Mucoviscidose

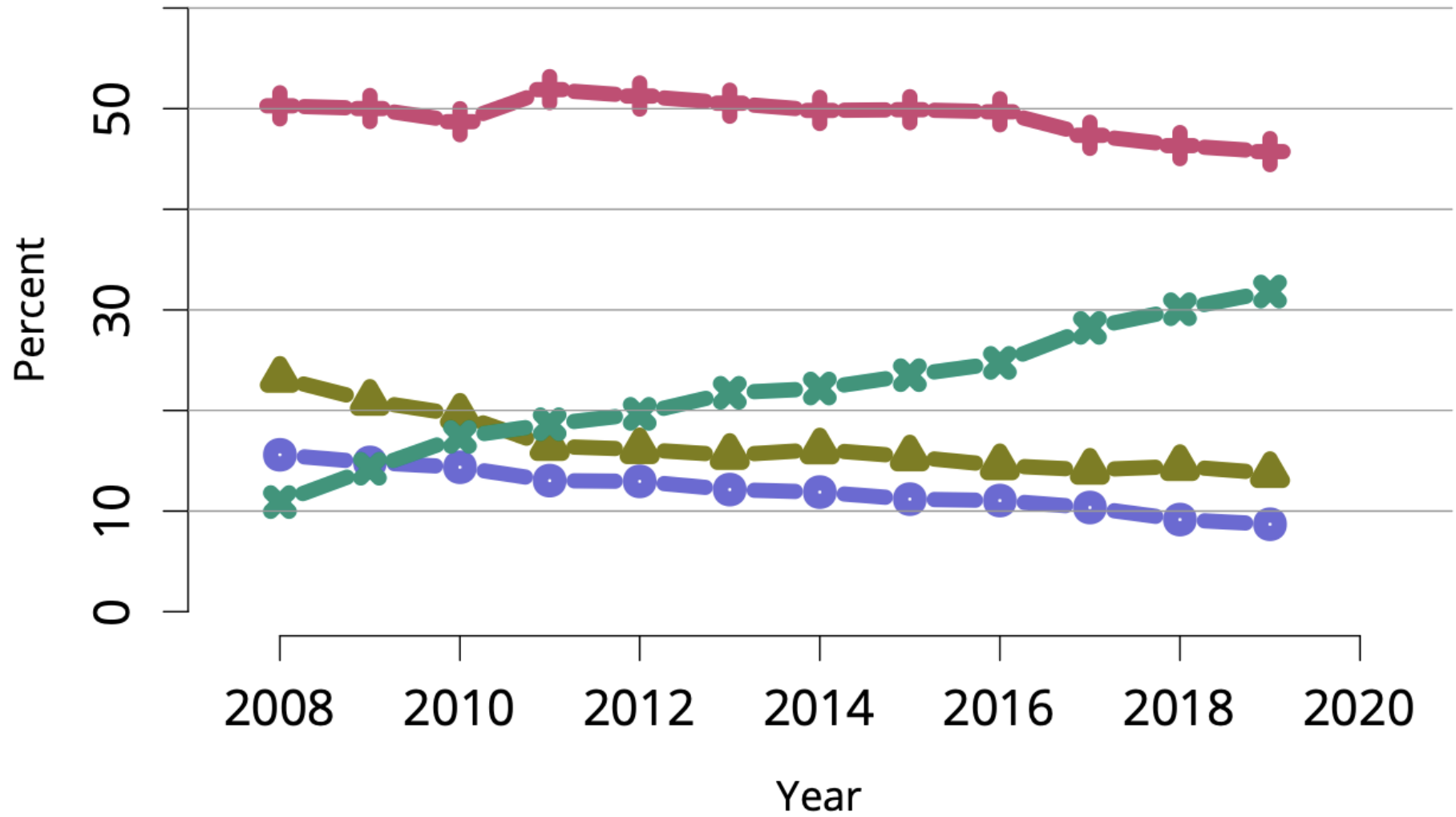




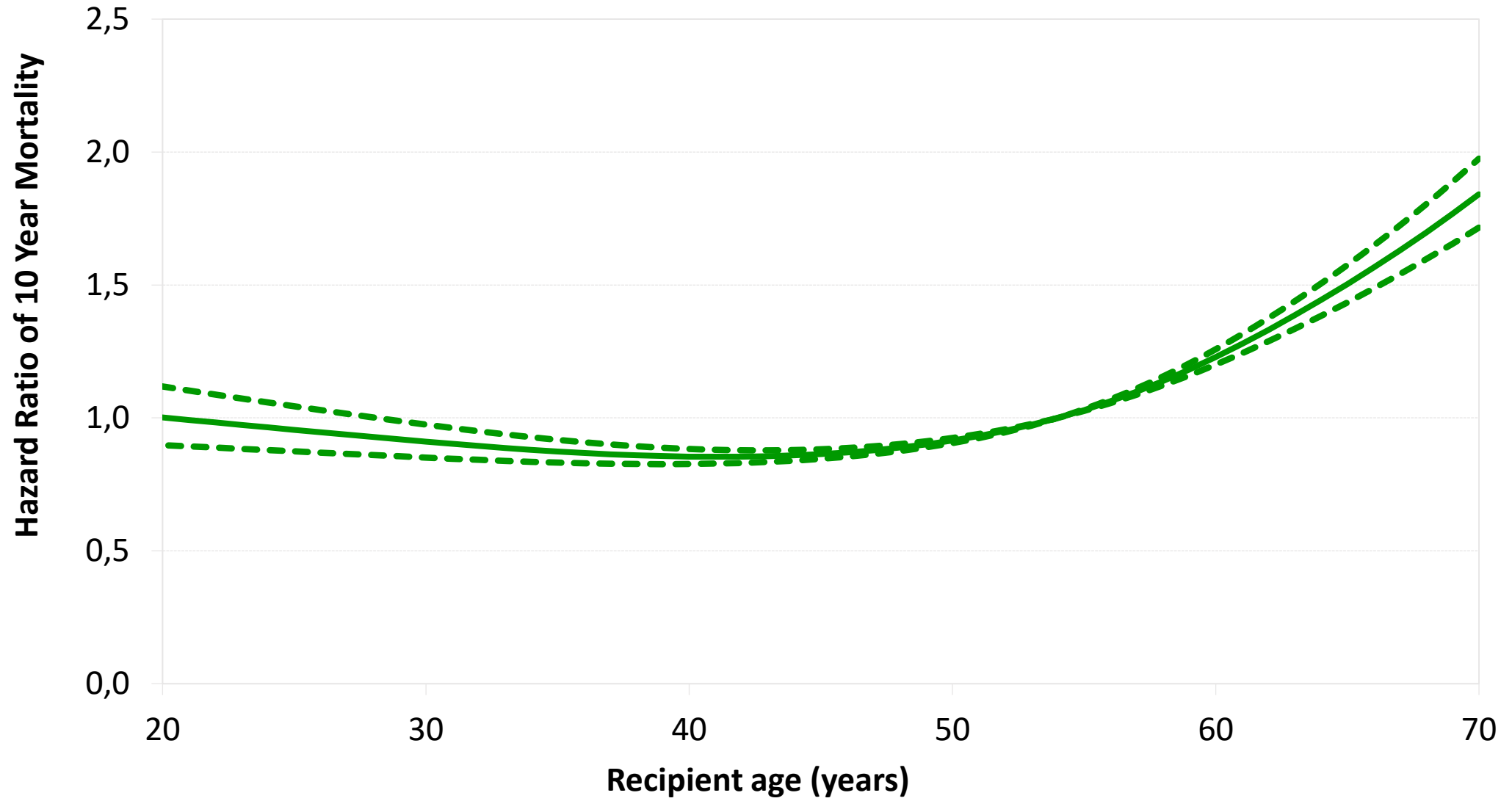




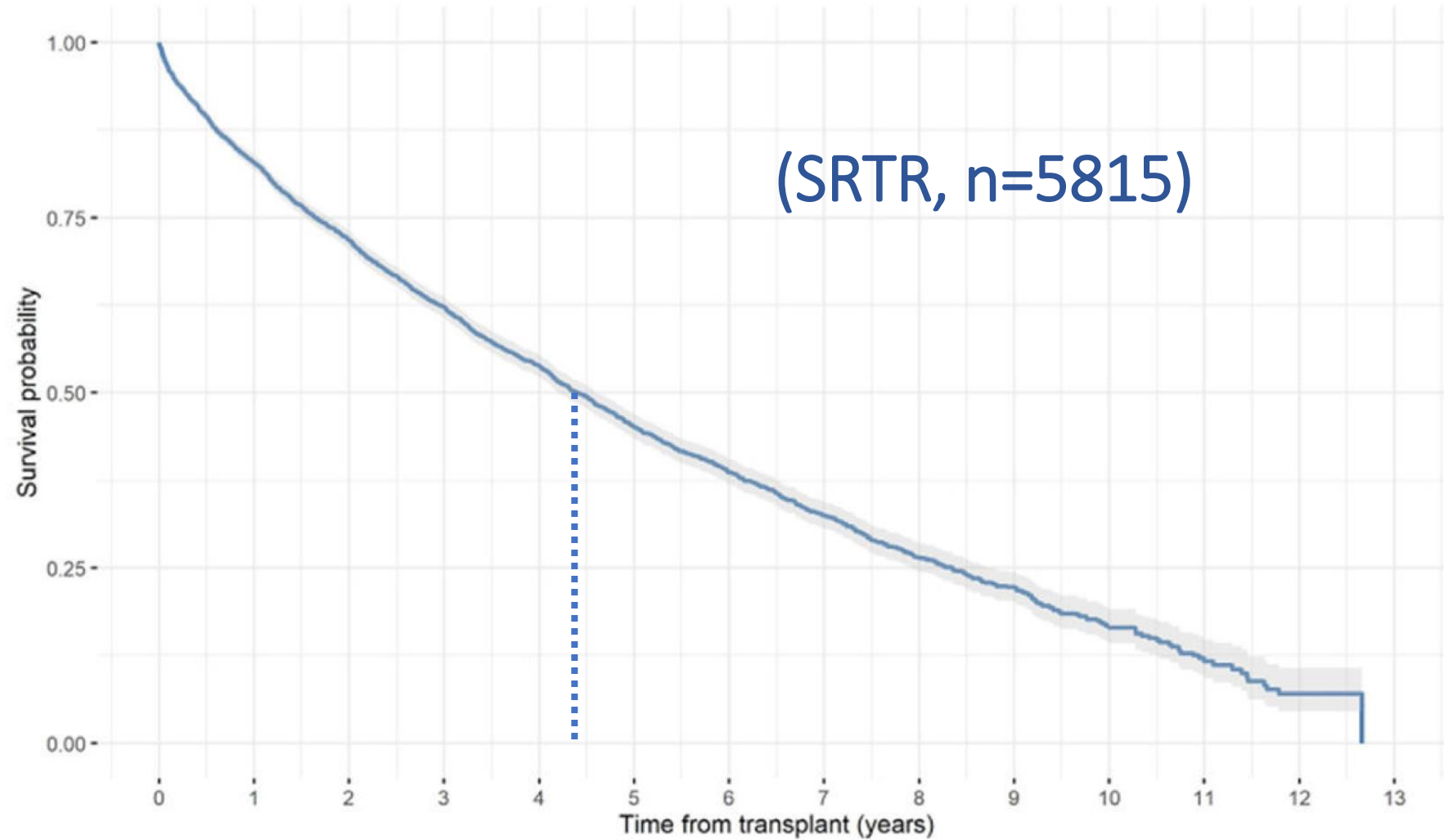




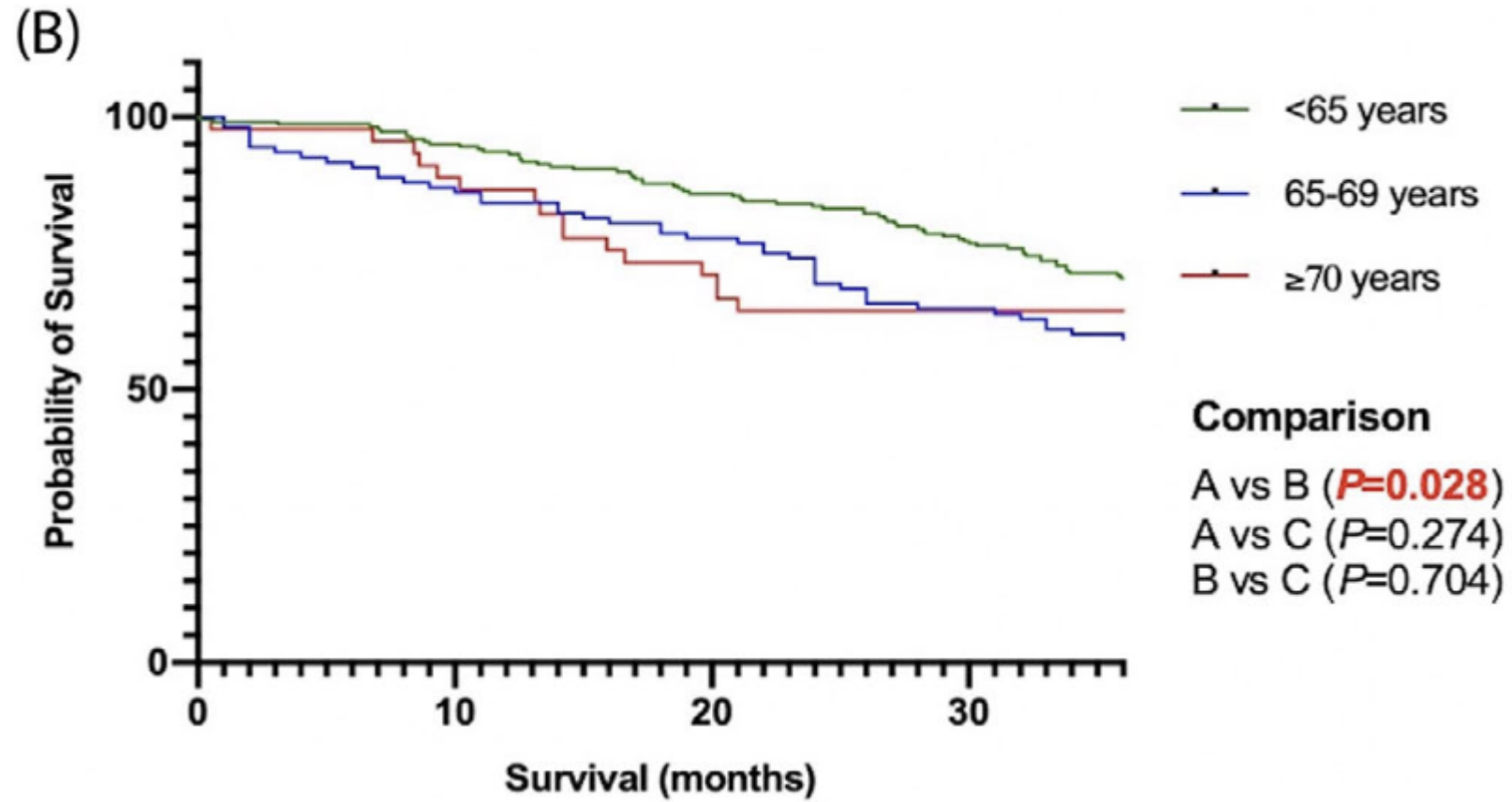
Age maximal ?



# Risk factors for mortality in LTx aged $\geq 65$ years



# Outcomes after lung transplantation in recipients aged 70 years or older



## Risk factors for mortality in LTx aged $\geq 65$ years

Variable	HR	p-value
Âge $\geq 75$ ans	1,47	<0,001
Mono	1,41	<0,001
Hospitalisé	1,40	<0,001
Réanimation	2,84	<0,001
Créatinine	1,27	<0,001
Bilirubine	1,92	<0,001
Corticoïdes	1,17	<0,001
Diabète donneur	1,34	<0,001
Mismatch CMV	1,29	<0,001



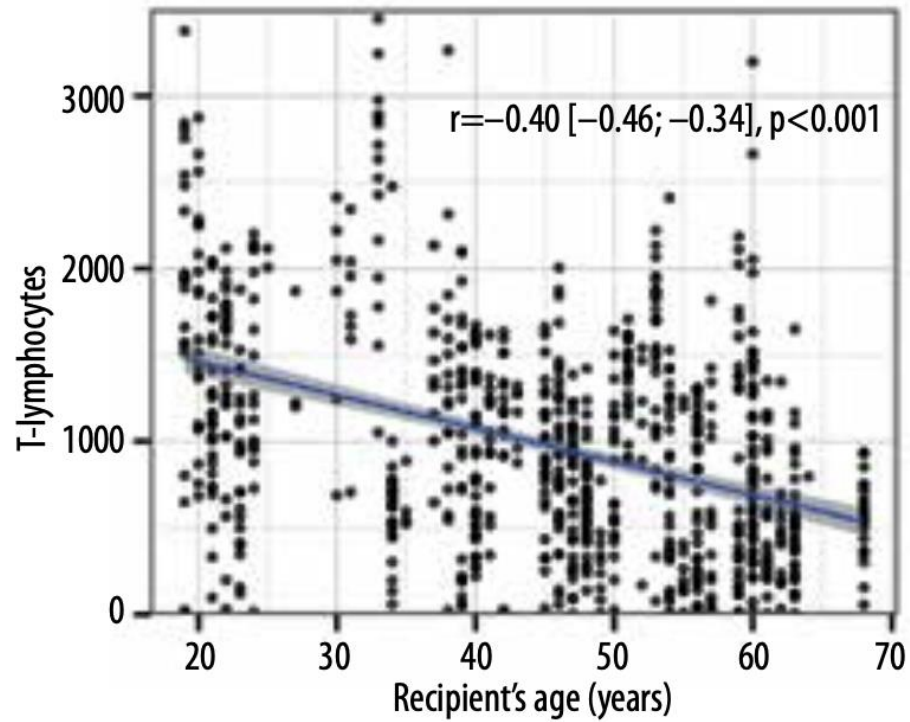
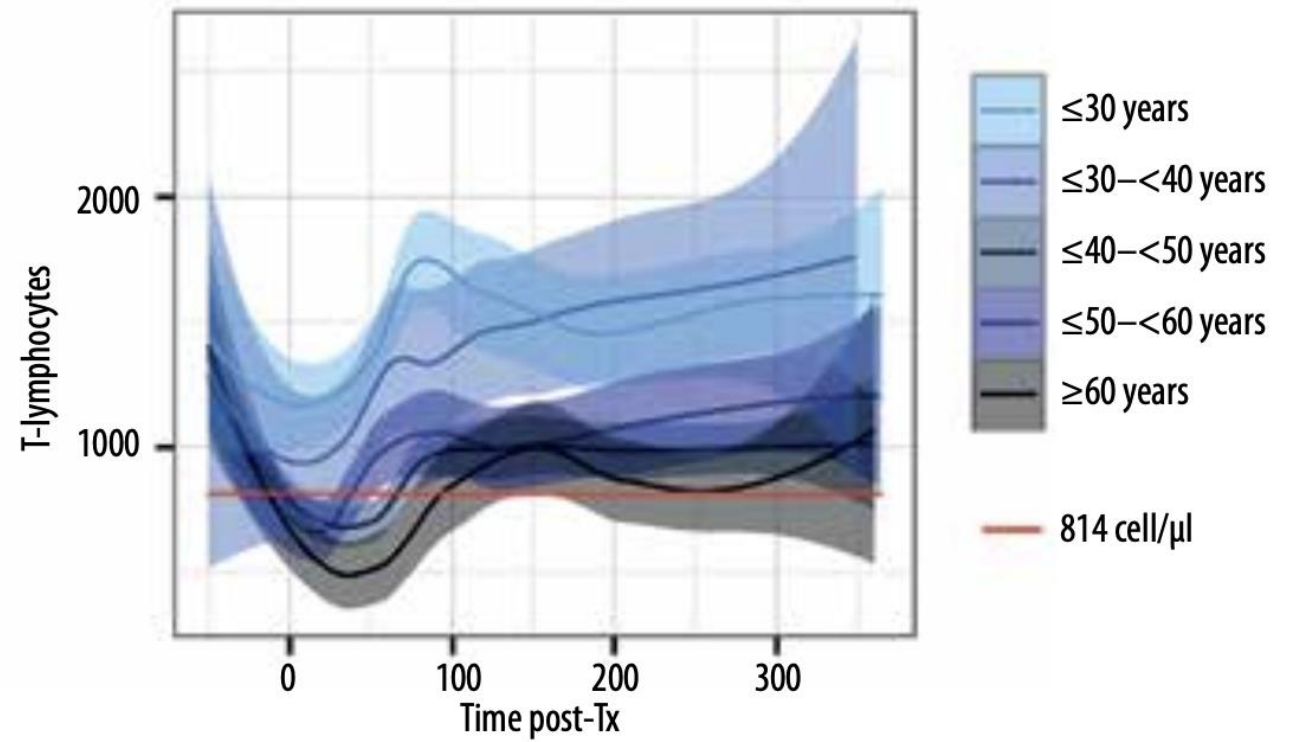
# The Effect of Recipient's Age on Lung Transplant Outcome

**Table 3:** Mortality by period after transplant

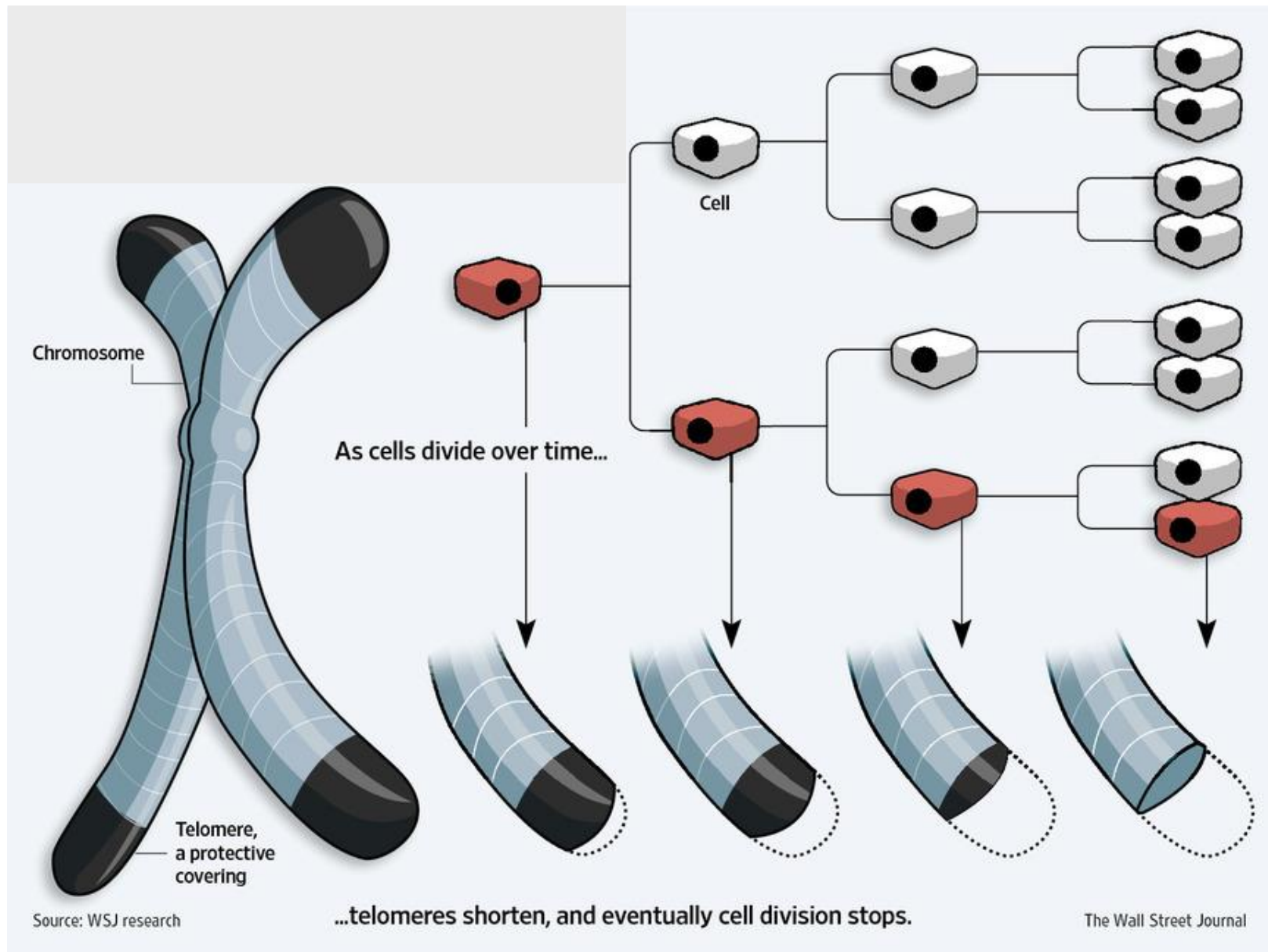
	Older	Younger	RR	95% CI	p-Value <sup>1</sup>
Early ( $\leq 6$ months)					
Cause					
Infection	10	2	2.73	(0.87–8.59)	0.028
Other	1	4			
Total	11	6			
Late ( $> 6$ month)					
BO	5	6	0.42	(0.17–1.04)	0.108
CA	6	1	3.00	(0.42–21.65)	0.371
Other	9	3	1.50	(0.30–13.07)	0.694
Total	20	10			

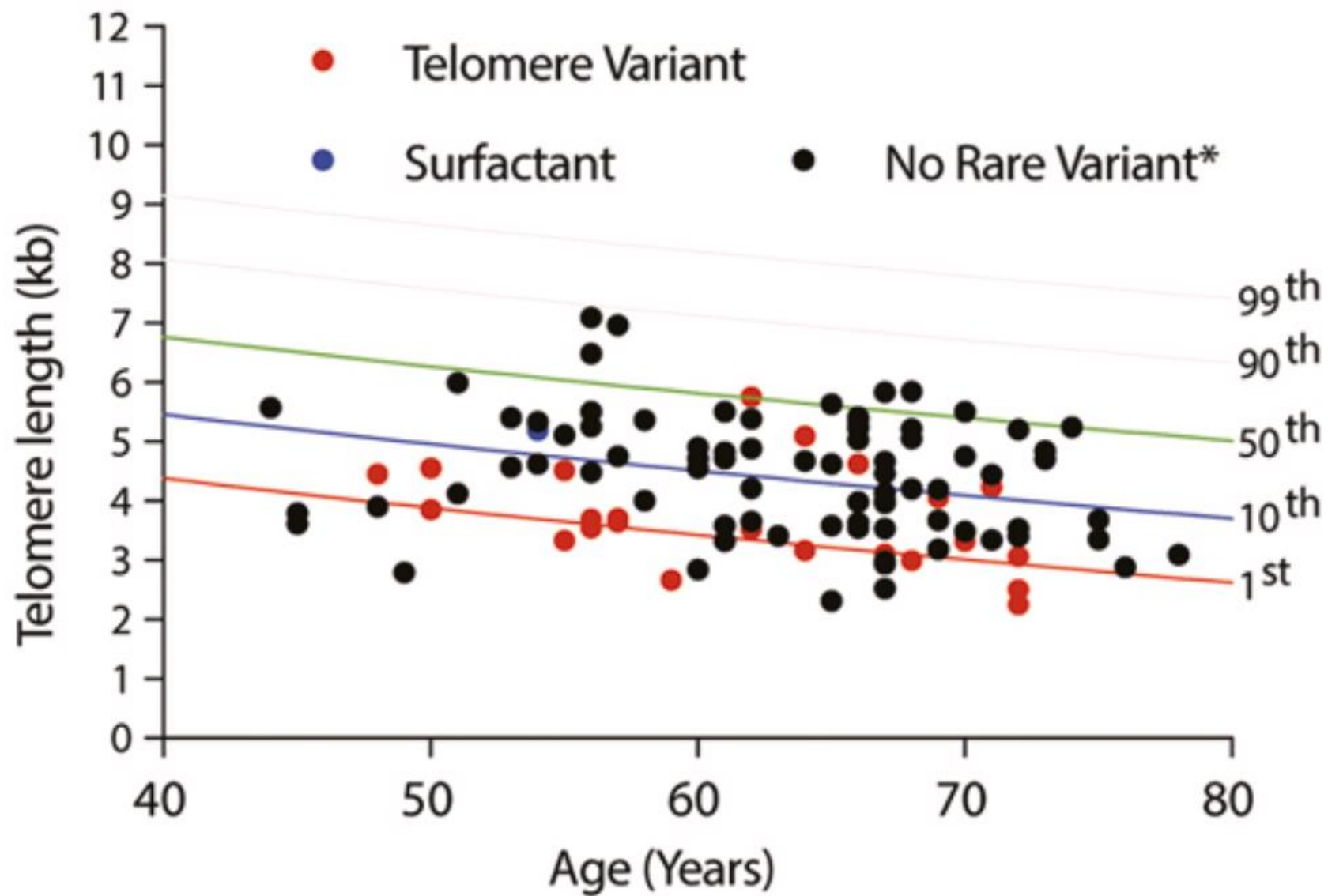
Matched:  
n=42 ( $\leq 60$ yo)  
vs n=42 ( $> 60$  yo)

<sup>1</sup>Chi-square or Fisher's exact test.

**A****B**

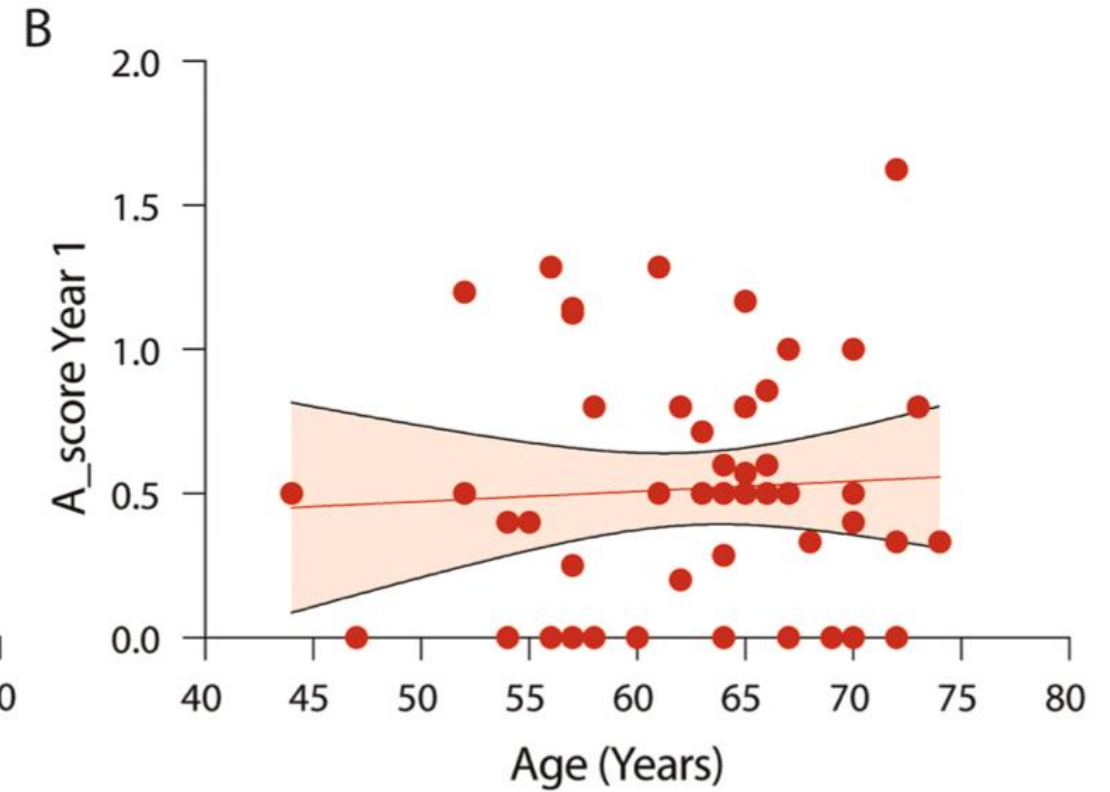
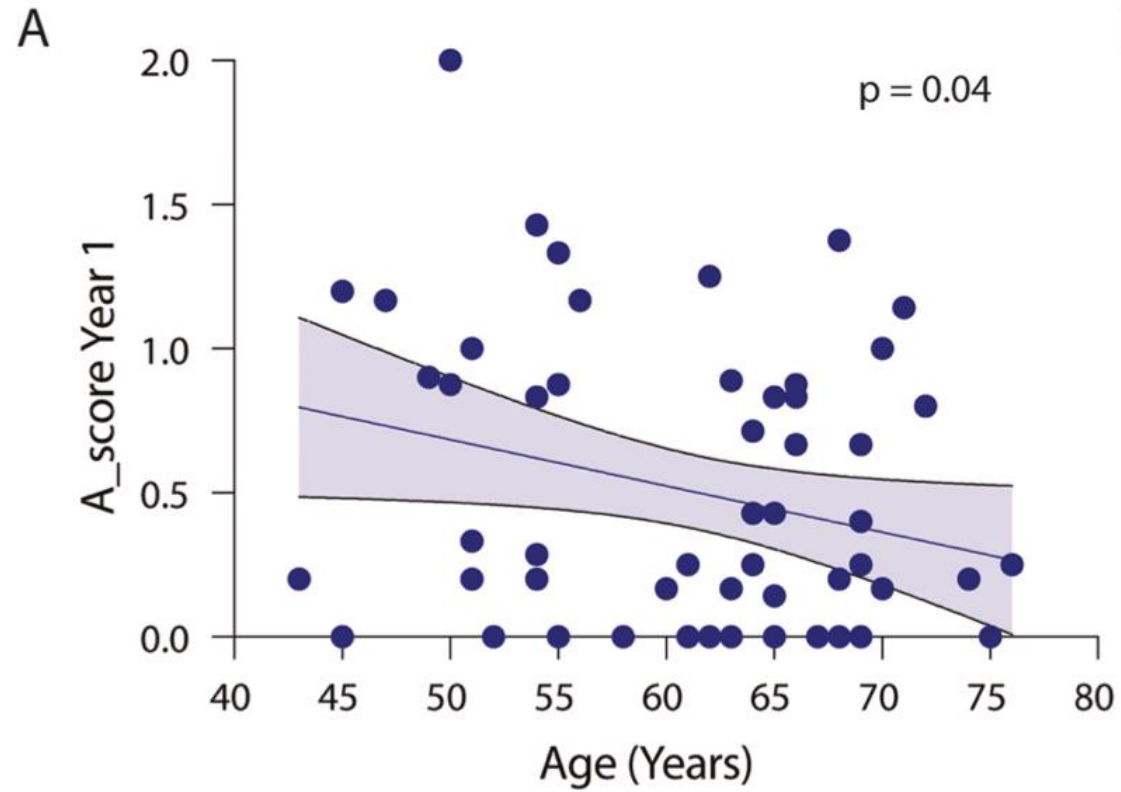
# Téломères

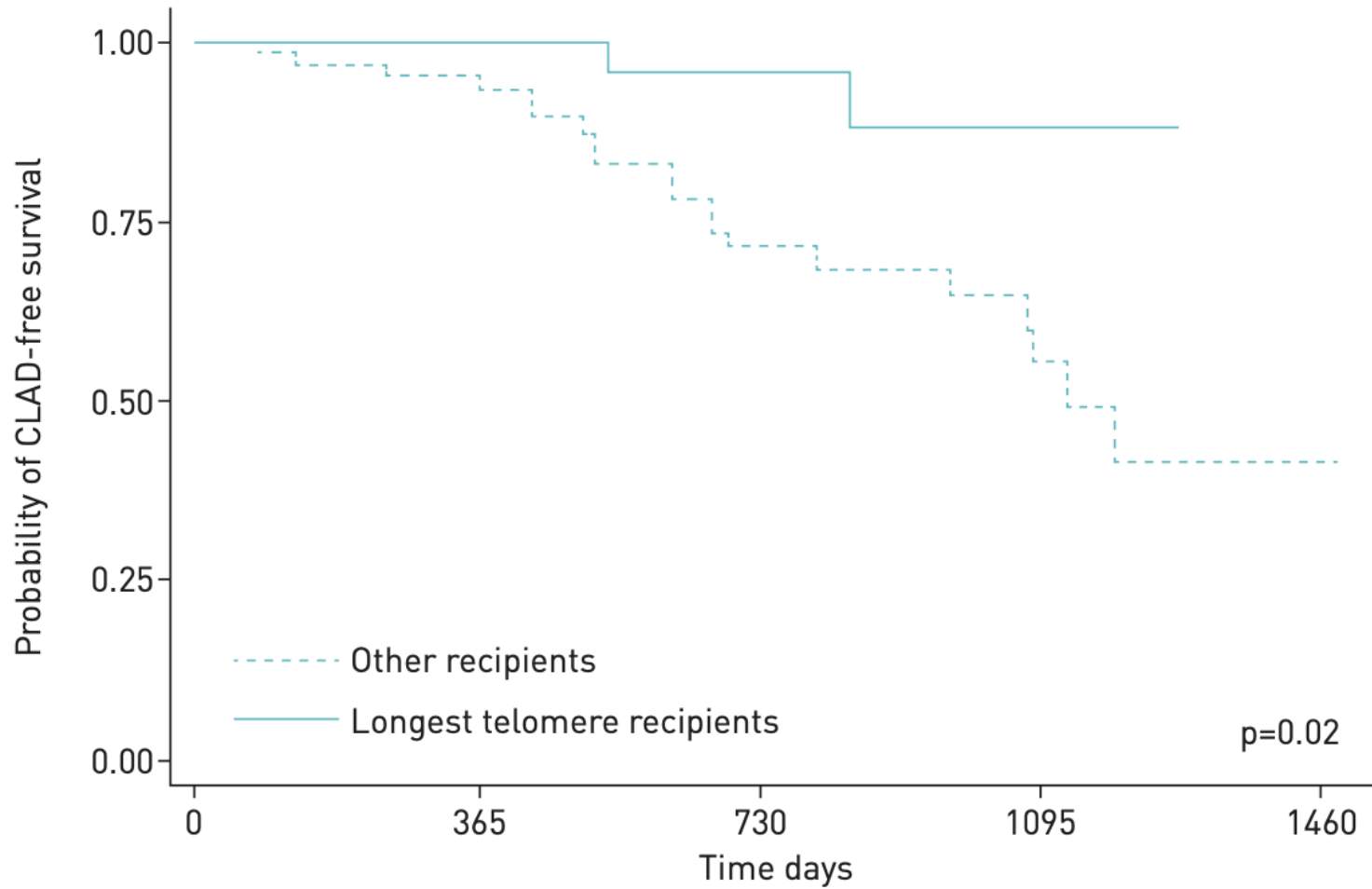




# Short telomere

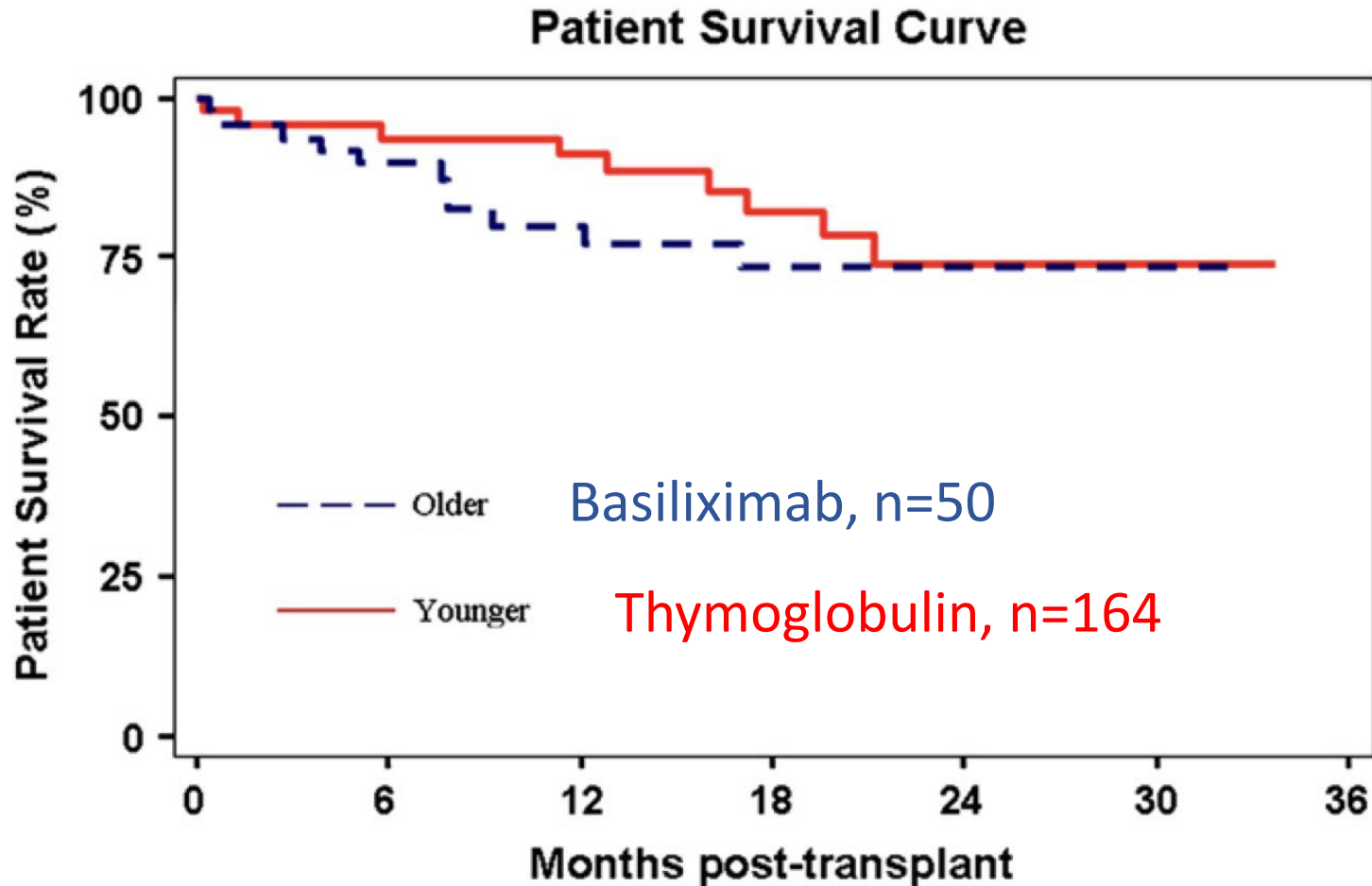
# Normal telomere





At risk n	0	365	730	1095	1460
Other recipients	65	41	16	0	0
Longest telomere recipients	32	22	9	0	0

# Effect of induction? Thymoglobulin vs Basiliximab



JTCVS 2008





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The Journal of Heart and Lung Transplantation, Vol 40, No 11, November 2021



## **RISK FACTOR :**

- Age 65-70 years

## **RISK FACTORS WITH HIGH OR SUBSTANTIALLY INCREASED RISK :**

- Age > 70 years

## RISK FACTOR :

- Age 65-70 years

## RISK FACTORS WITH HIGH OR SUBSTANTIALLY INCREASED RISK :

- Age > 70 years

In summary, while older age is increasingly accepted in lung transplant candidates, the reduced long-term survival and the relevance of ensuring a just distribution of scarce resources should be considered.

# Conclusion

Greffes multiples = faisable

- ↑ Re-transplantation
- ↑ Re-re-...-transplantation

Greffes des patients âgés = faisable

- ↓ Survie
- ↑ Infection

→ Pénurie d'organe ?

→ Indication restreinte / Bilan pré-(re-re-...)-greffe