

Lung Transplant for ILD

When to Refer
What to Expect

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Disclosures

I have had sponsored research agreements with Celgene/Bristol Myers Squibb and Bayer

I am speaking for myself, and this does not represent the formal views of the MGH lung transplant program



Why does the evaluation take so long?

Why isn't my patient getting a transplant?

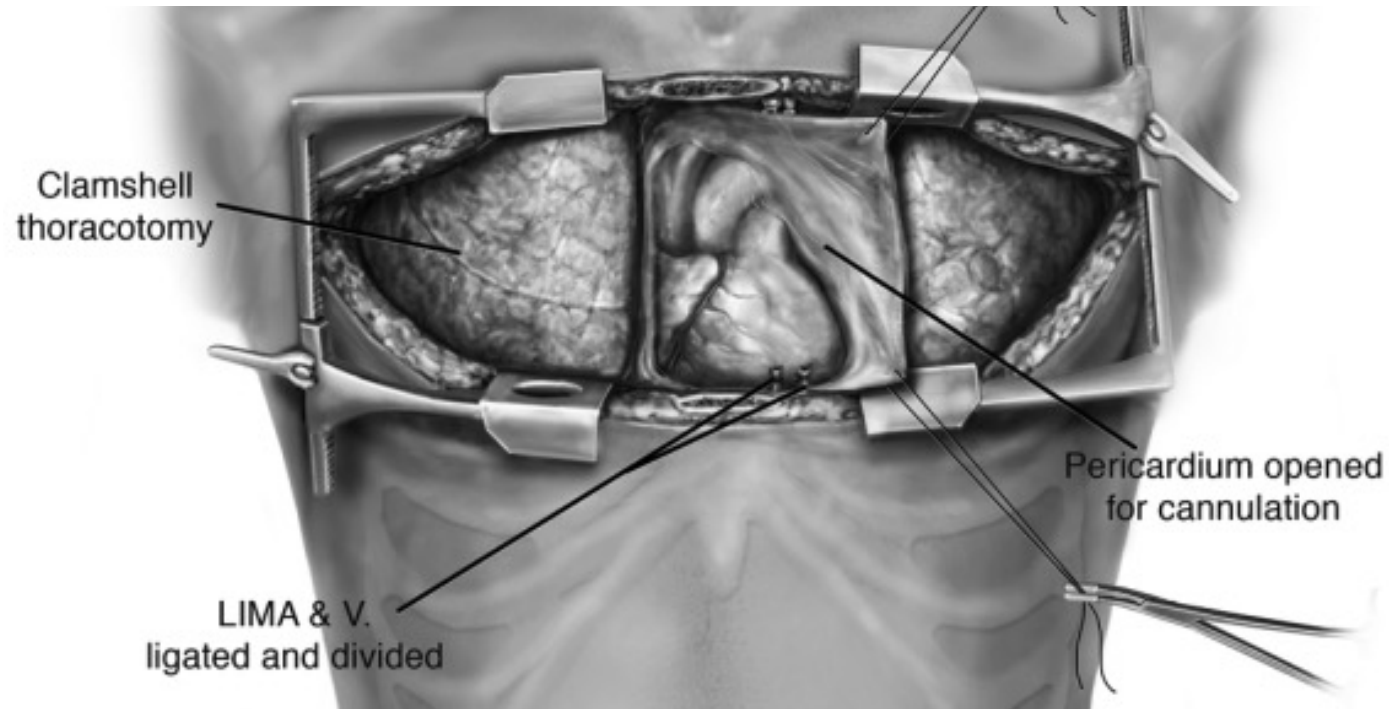


Lung Transplant History

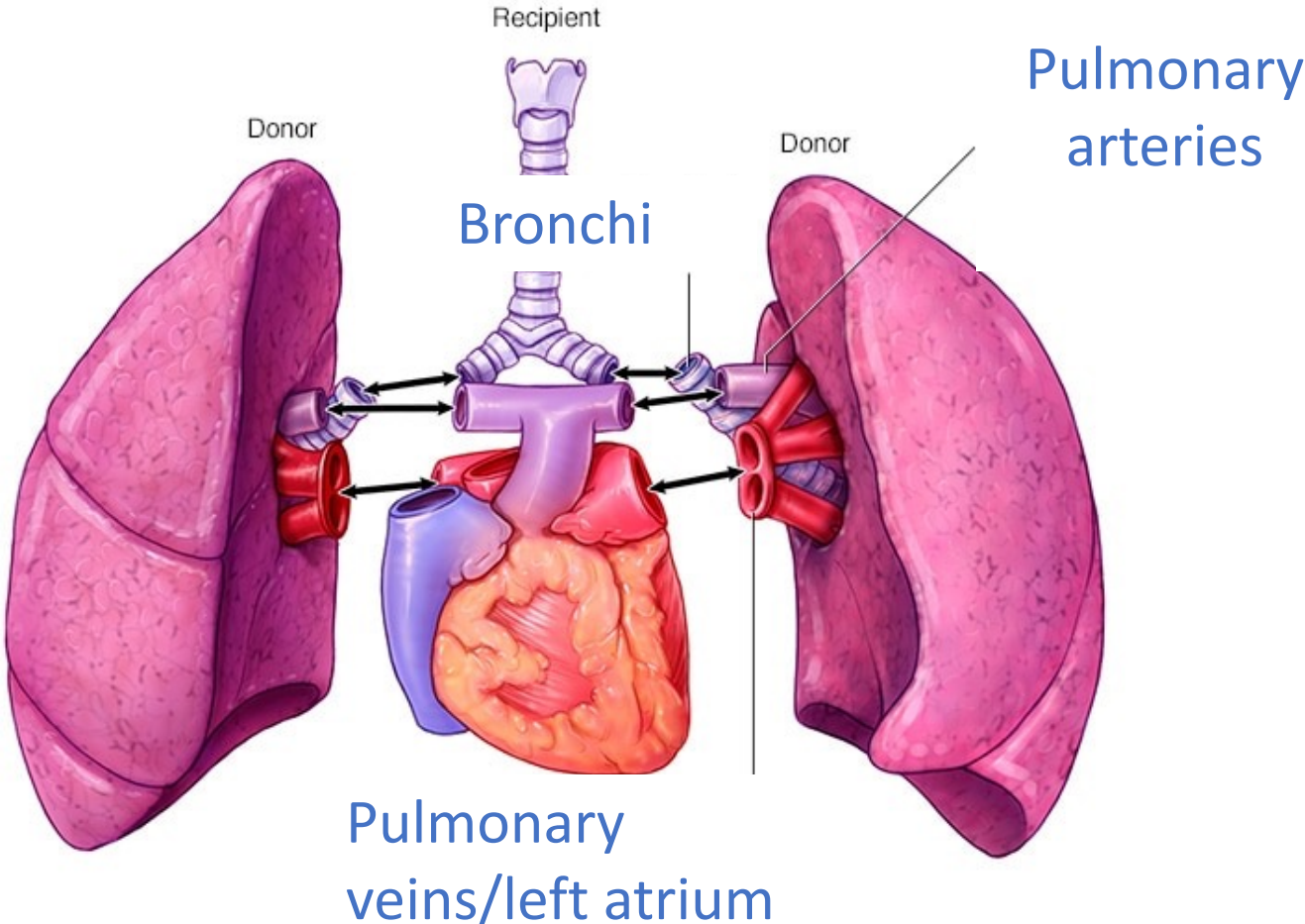
- 1963:** First human single lung transplant (lived 18 days)
- 1983:** First single lung transplant with long term survival
58 year old with IPF; lived 7 years
- 1986:** Double lung transplant *en bloc*
- 1990:** Successful bilateral sequential lung transplants
- Jan 1992–June 2018:** 67,493 lung transplants worldwide

Bilateral Sequential Lung Transplant

Clamshell incision: bilateral thoracotomy and transverse sternotomy



Bilateral Sequential Lung Transplant



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US Transplants

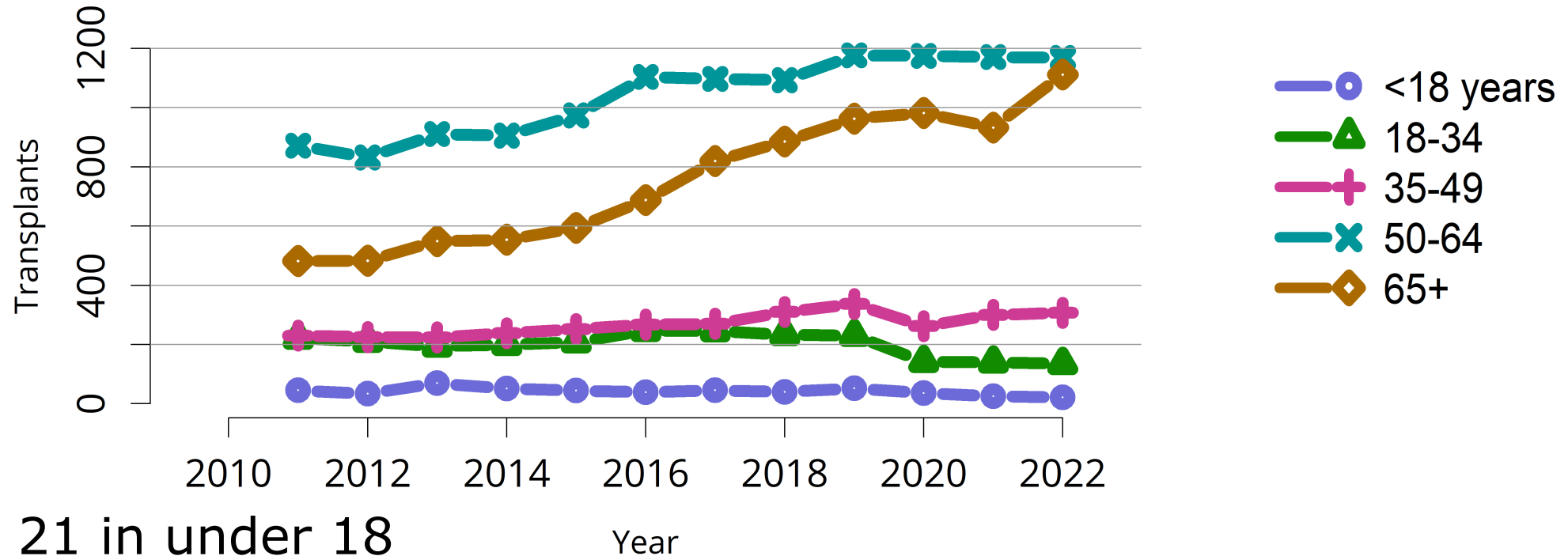
Adult transplants	2023	2022	2021	1988-now
Lung only	2972	2674	2501	53,485
Heart-Lung	54	48	43	1,547
Kidney	27,332	23,851	22,107	584,109
Liver	10,659	9002	8735	217,192
Heart	4,545	3620	3330	94,321
Intestine	95	60	57	3,513
Re-transplant	95	73	93	1,896

1,658 in 2024 so far

Last living lobar transplant in US 2013

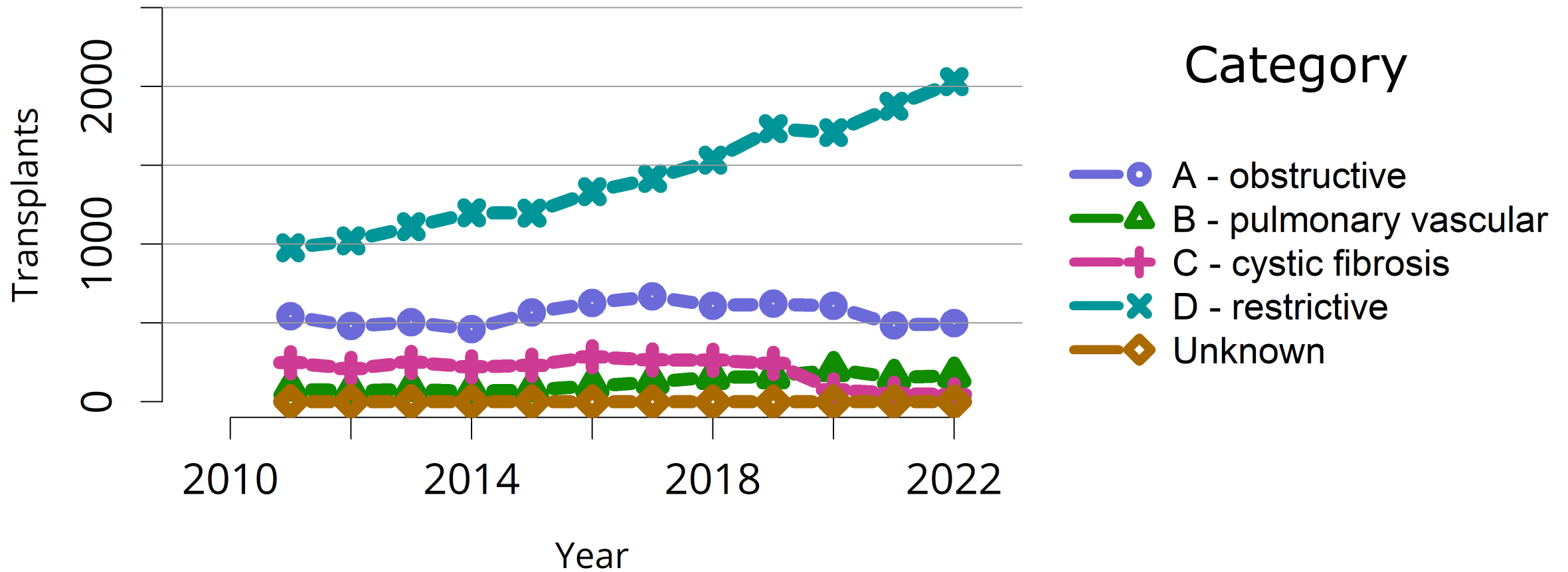


US Lung Transplants - Age



21 in under 18
125 in 18-35
307 in 35-49
1168 in 50-64
1112 in 65 and older (41%)

US Lung Transplants - Diseases



Restrictive Disease accounted for 74% of all lung transplants in 2022

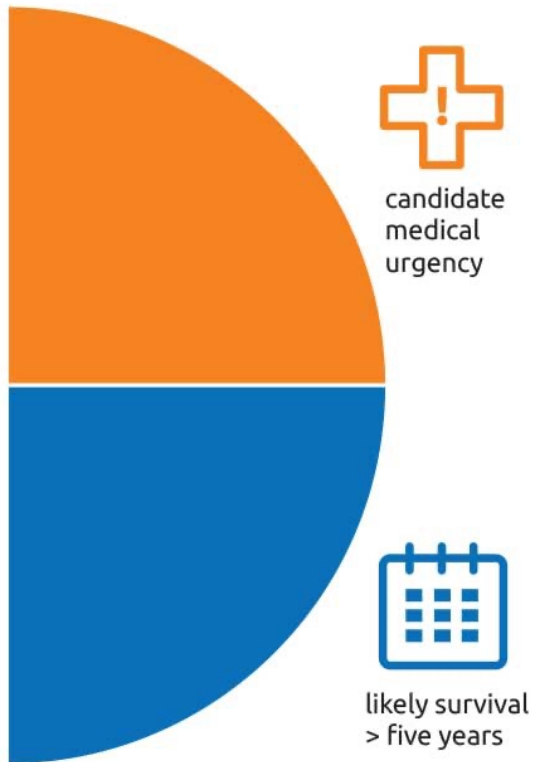
ISHLT guidance for referral

Lung transplantation should be considered for adults with chronic, end-stage lung disease who meet all the following general criteria:

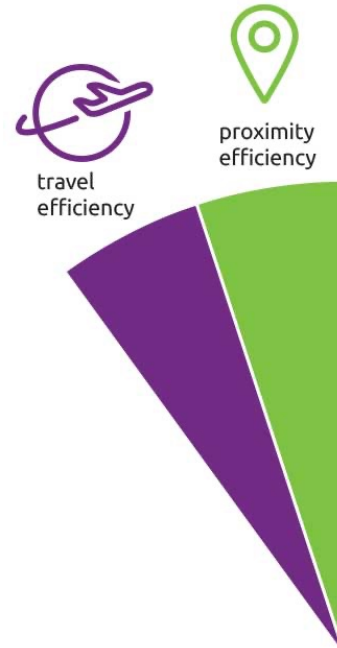
1. High (>50%) risk of **death from lung disease within 2 years** if lung transplantation is not performed.
2. High (>80%) likelihood of **5-year post-transplant survival** from a general medical perspective provided that there is adequate graft function.



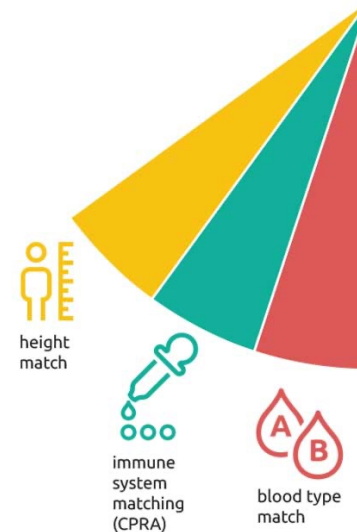
Composite Allocation Score



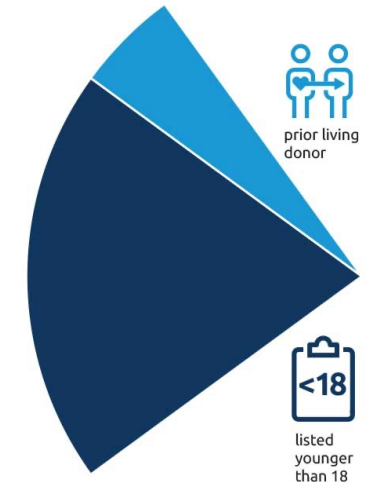
Patient factors
-Urgency (≤ 25)
-5 year survival (≤ 25)



Distance
-travel expense (≤ 5)
-proximity (≤ 5)



Hard to Match
-Extreme of height (≤ 5)
-Sensitized to donors (≤ 5)
-Rare blood type



Extra Credit
-Under 18 (≤ 10)
-Prior living donor (≤ 5)

ISHLT guidance on referral for ILD

Any UIP on pathology or probable or definite UIP on CT

Any pulmonary fibrosis with FVC <80% or DLCO <40%

Relative fall in FVC >10%, DLCO >15%

Any supplemental oxygen use - even exertional

Progression despite therapy if inflammatory ILD

Early referral **for CTD or familial pulmonary fibrosis**



ISHLT guidance on listing for ILD

Decrease in FVC $>10\%$, DLCO $>15\%$

Decrease in 6 minute walk test of 50meters/146 feet

Pulmonary hypertension

Hospitalization for exacerbation



Early Risks of Lung Transplant

Surgical issues

cardiac arrest, bleeding, stroke

Post-surgical issues

Persistent respiratory failure, impaired wound healing, kidney failure, infections

Rehabilitation

prolonged weakness, feeding intolerance, compression fractures



Later Risks of Lung Transplant

Infections

Opportunistic and standard

Rejection

“Chronic Lung Allograft Dysfunction” – CLAD

Antibody Mediated Rejection

Medication toxicity

Renal failure, hepatotoxicity, leukopenia

Malignancy



Lung Transplant Evaluation

Disease severity

Comorbidities

Anatomy

Functional status, nutritional status, frailty

Health-related behaviors

Psychosocial circumstances



Lung Transplant Evaluation

Disease severity PFTs, 6MWT, VQ scan

Comorbidities- R+L cath, swallow evaluation, cancer screen, echocardiogram

Anatomy – CT scans

Functional status, nutritional status, frailty

Health-related behaviors - pulm rehab, dietician, drug screens, social worker, psychiatrist, pharmacist

Psychosocial circumstances – financial consult



Considerations for candidacy

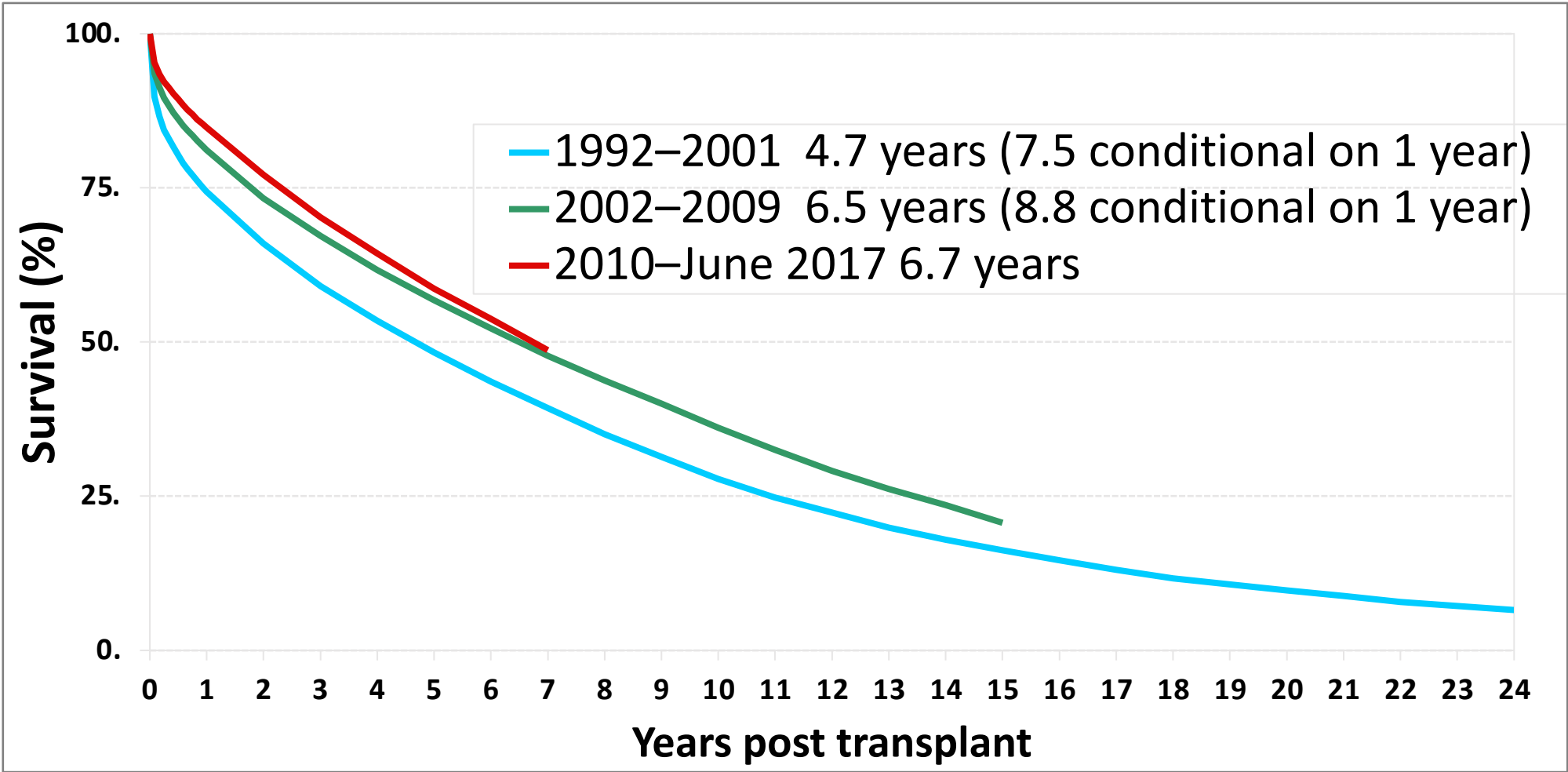
- No formal age limit
- Malignancy with low risk of recurrence not contraindication
- BMI over 35 is problematic
- Multiple small issues may be worse than one large one
- **Physical fitness and social support are crucial to surviving transplant**



Survival (%) after lung transplant

	1 year	3 year	5 year
All Lung	87.0	74.8	61.2
Double Lung	87.7	71.8	58.6
Single Lung	86.7	64.5	47.3
Lung for "IPF"	87.0	68.2	52.5
Lung for COPD	89.7	72.3	56.0
Lung re-transplant	68.3	34.3	33.8
Kidney	97.1	93%	86%
Intestine	83%	69%	59%
Heart-lung	81%	58%	50%

Worldwide survival

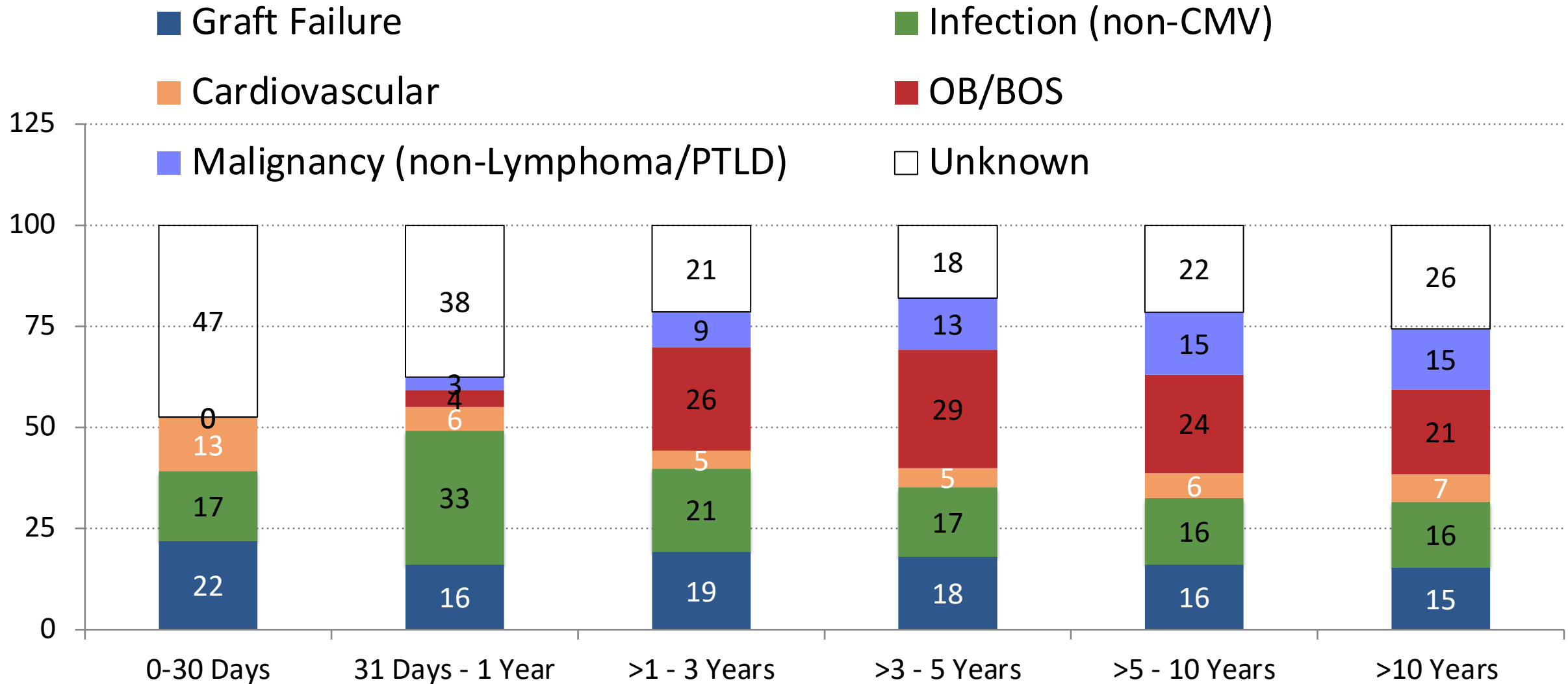


Common Post-Transplant Complications

Complications (1995–2017)	1 year	5 year	10 year
All severe renal dysfunction	5.6%	16.0%	24.6%
Creatinine > 2.5 mg/dl	4.2%	12.6%	14.8%
Chronic Dialysis	1.4%	2.8%	6.4%
Renal Transplant	0.0%	0.5%	3.5%
Diabetes	19%	33%	
Malignancy (all non skin cancer types)	5.3%	20.4%	32.6%
Bronchiloitis obliterans syndrome	8.5%	41.4%	67.1%



Causes of death after transplant



References

https://srtr.transplant.hrsa.gov/annual_reports/2022/Lung.aspx

<https://optn.transplant.hrsa.gov/data/view-data-reports/national-data/#>

<https://optn.transplant.hrsa.gov/data/allocation-calculators/lung-cas-calculator/>

J Heart Lung Transplant 2021 40(11):1349-1379

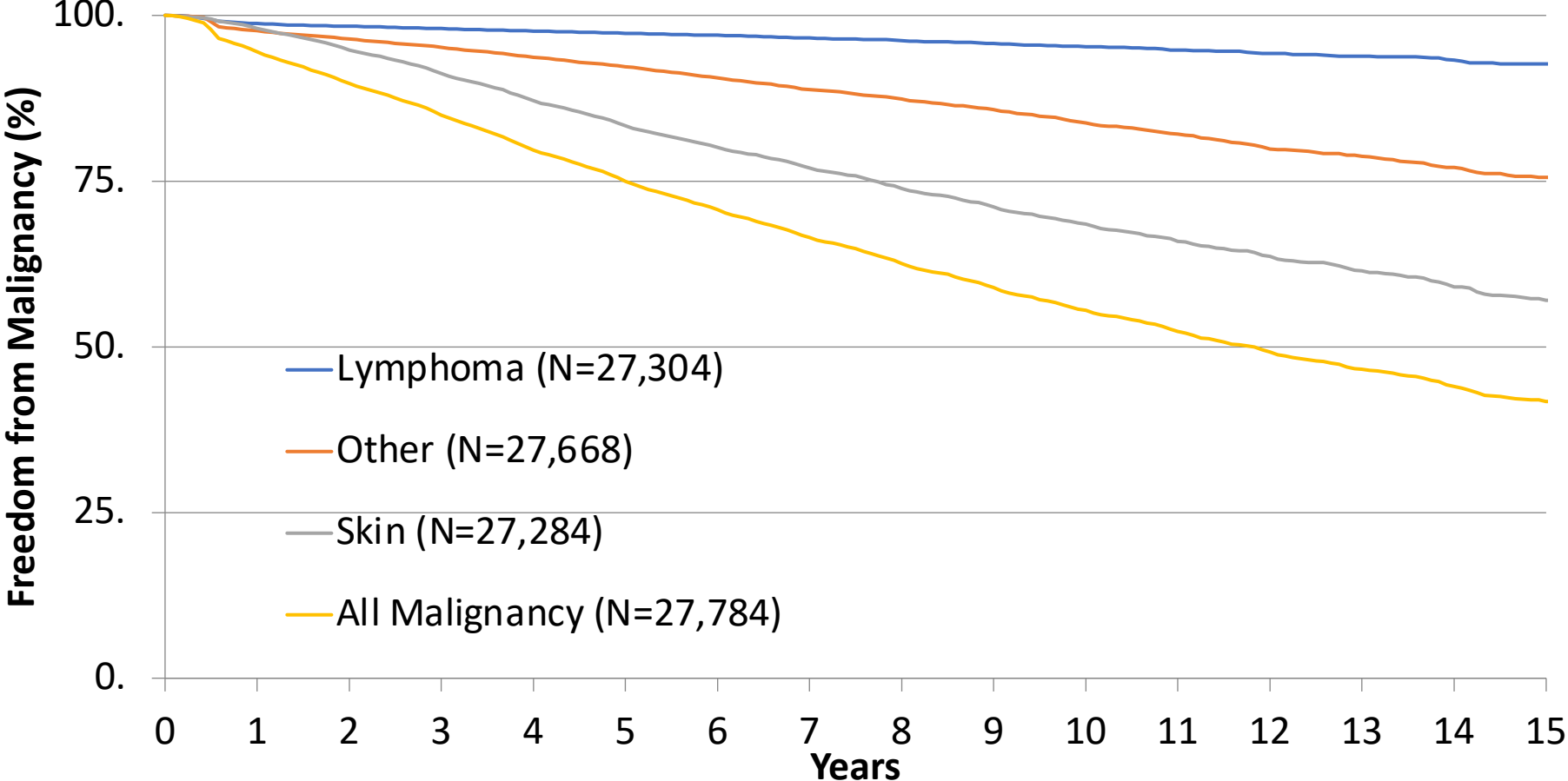
J Heart Lung Transplant 2019 Oct; 38(10): 1015-1066



Thank you



Freedom from Malignancy Post-Transplant



Outcomes

Textbook outcome

Freedom from:

- Length of stay > 30 days,
- 90-day mortality
- Intubation/ECMO at 72 h post-transplant
- Ventilator support lasting ≥ 5 days
- Postoperative airway dehiscence,
- Inpatient dialysis
- Pre-discharge acute rejection,
- Grade 3 primary graft dysfunction at 72h

4664 of 8959 (52.1%) overall
ranged at centers 27.0% to 72.4
Bilateral 1537/3197 (48.1%) Single 931/467 (63.5%)

8959 Adult patients isolated LTx 2016 – 2019

