

Lung Transplant for Interstitial Lung Disease

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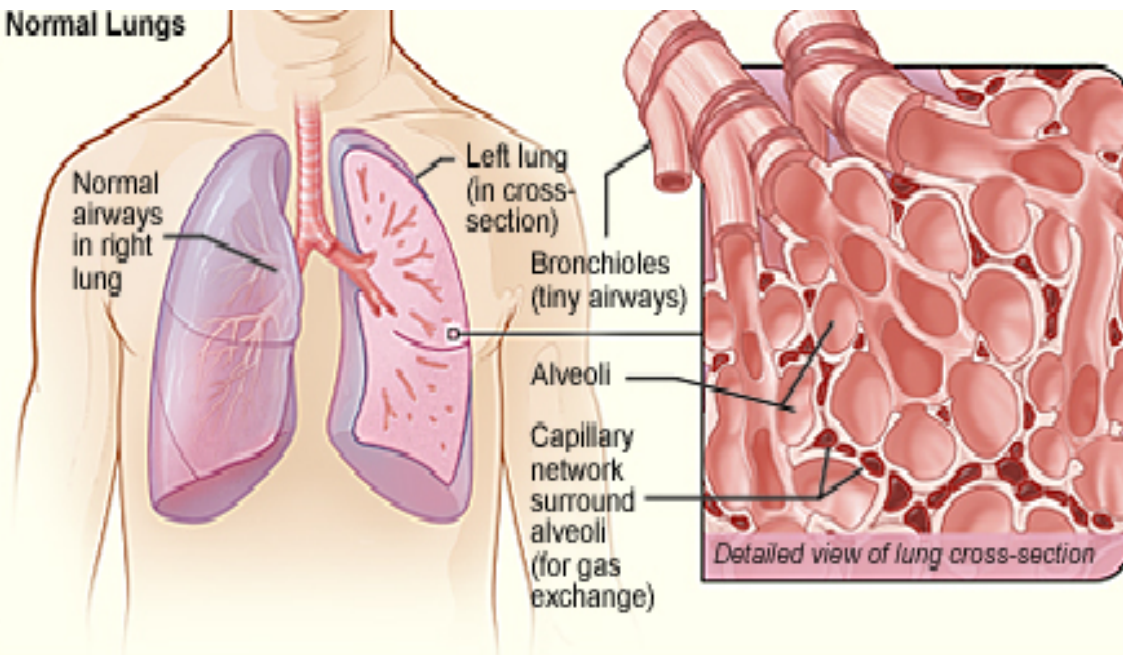
Living with IPF Patient Symposium
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Diffuse Lung Parenchymal Diseases

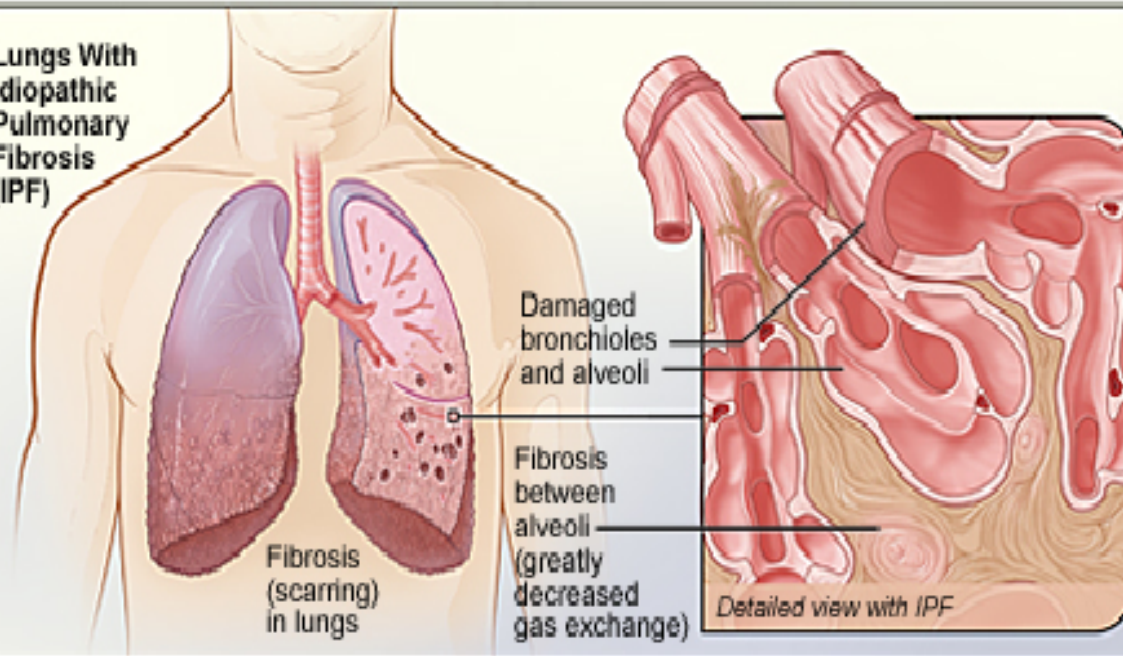
- Heterogeneous disorders
- Auto-immune disease, environmental/exposure
- 30-40% idiopathic
- Prevalence ~ 70 per 100,000
- Median survival ~ 3-5 years
- If disease progresses – lung transplantation remains an appropriate treatment

A Normal Lungs



B

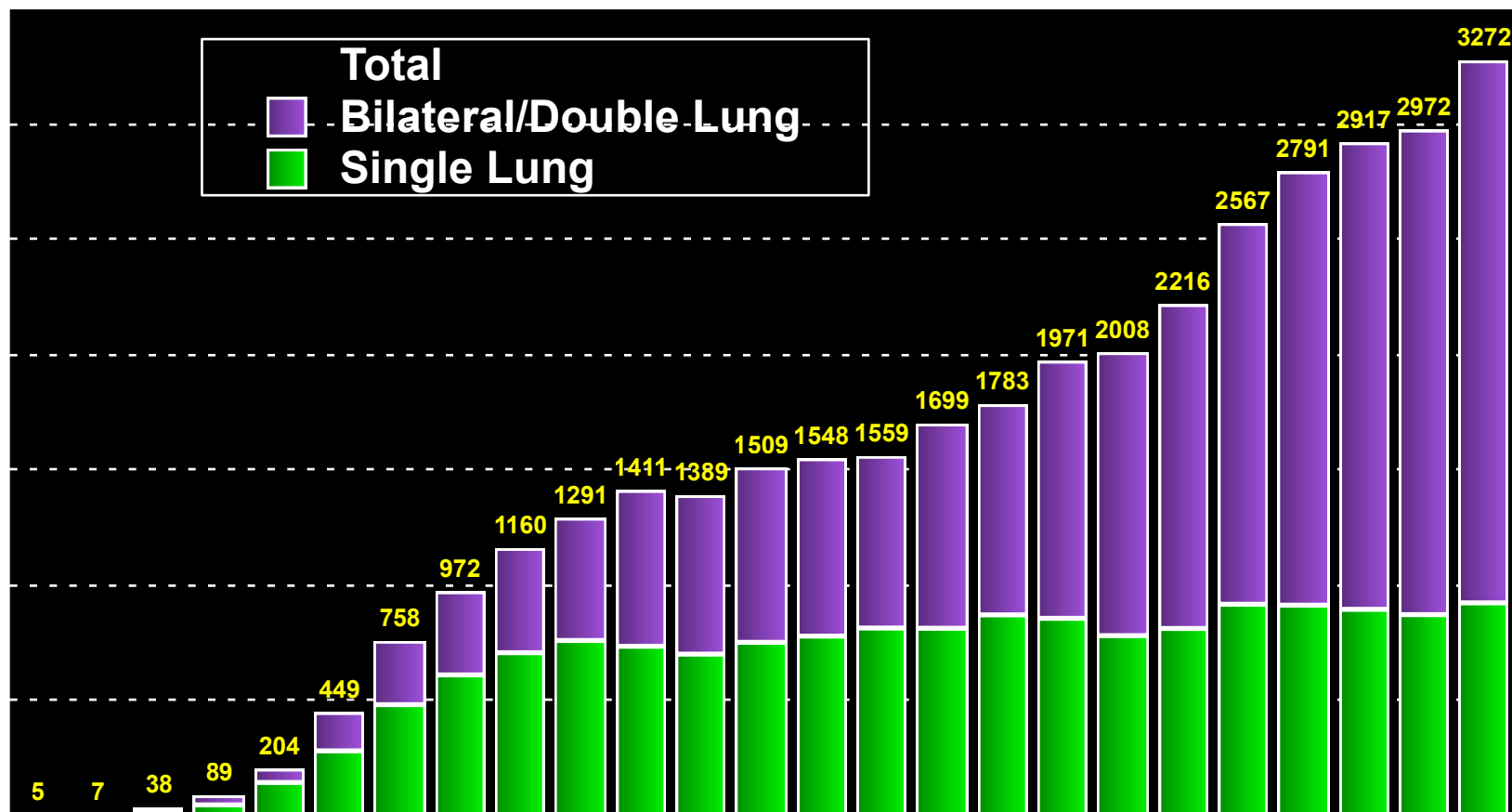
Lungs With Idiopathic Pulmonary Fibrosis (IPF)



Lung Transplantation for ILD

- 1983 Toronto Lung Transplant Group performed 1st single lung transplant on a patient with idiopathic pulmonary fibrosis
- Now ~ 3000 lung transplants performed per year for all end-stage lung diseases
- Lung transplant for IPF has been increasing
- IPF and diffuse parenchymal diseases now > 50% of all transplants in US
- ~ 7000 lung transplants performed for IPF between 1995 - 2010

NUMBER OF LUNG TRANSPLANTS REPORTED BY YEAR AND PROCEDURE TYPE



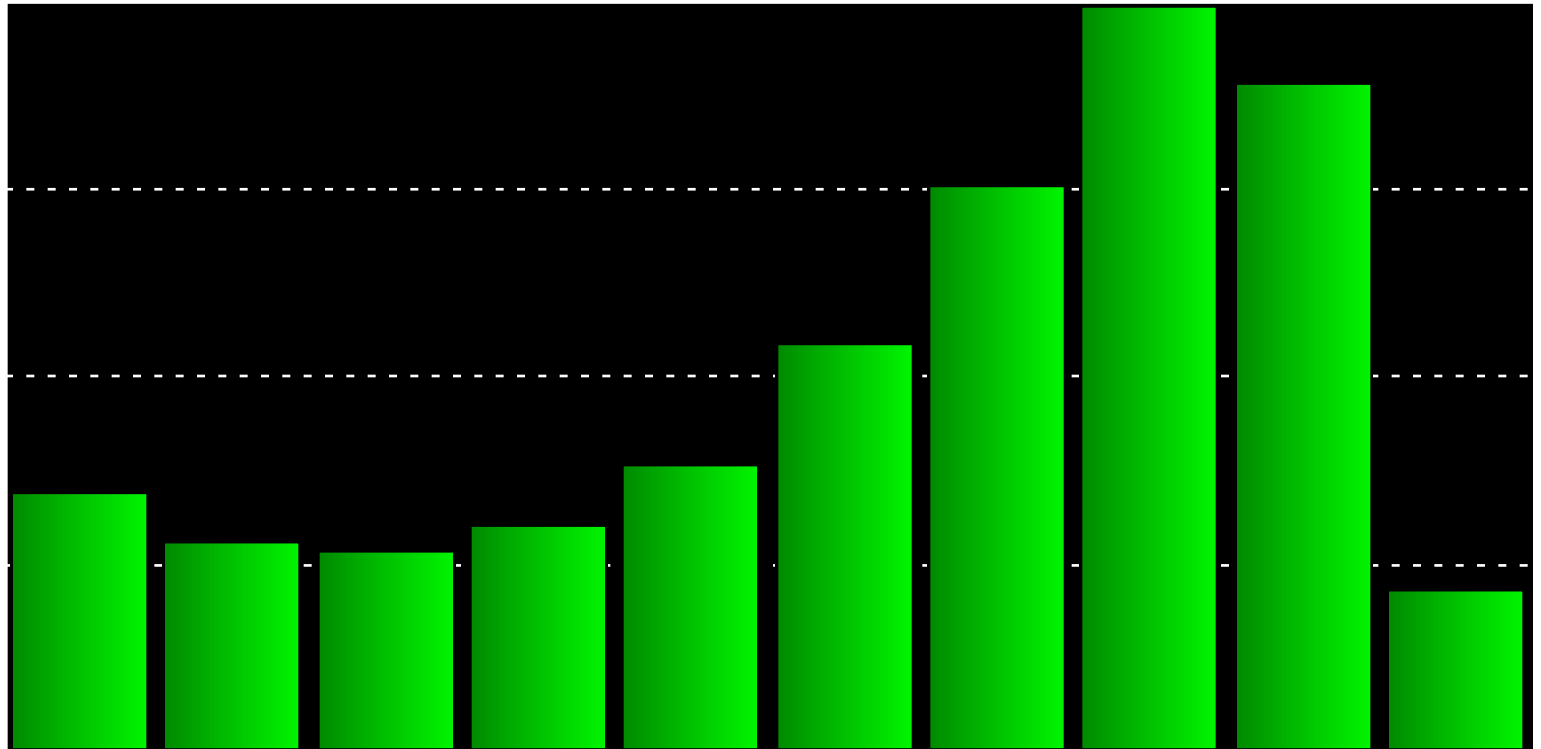
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NOTE: This figure includes only the lung transplants that are reported to the ISHLT Transplant Registry. As such, this should not be construed as representing changes in the number of lung transplants performed worldwide.

J Heart Lung Transplant. 2011 Oct; 30 (10): 1071-1132

AGE DISTRIBUTION OF ADULT LUNG TRANSPLANT RECIPIENTS (1/1985-6/2010)



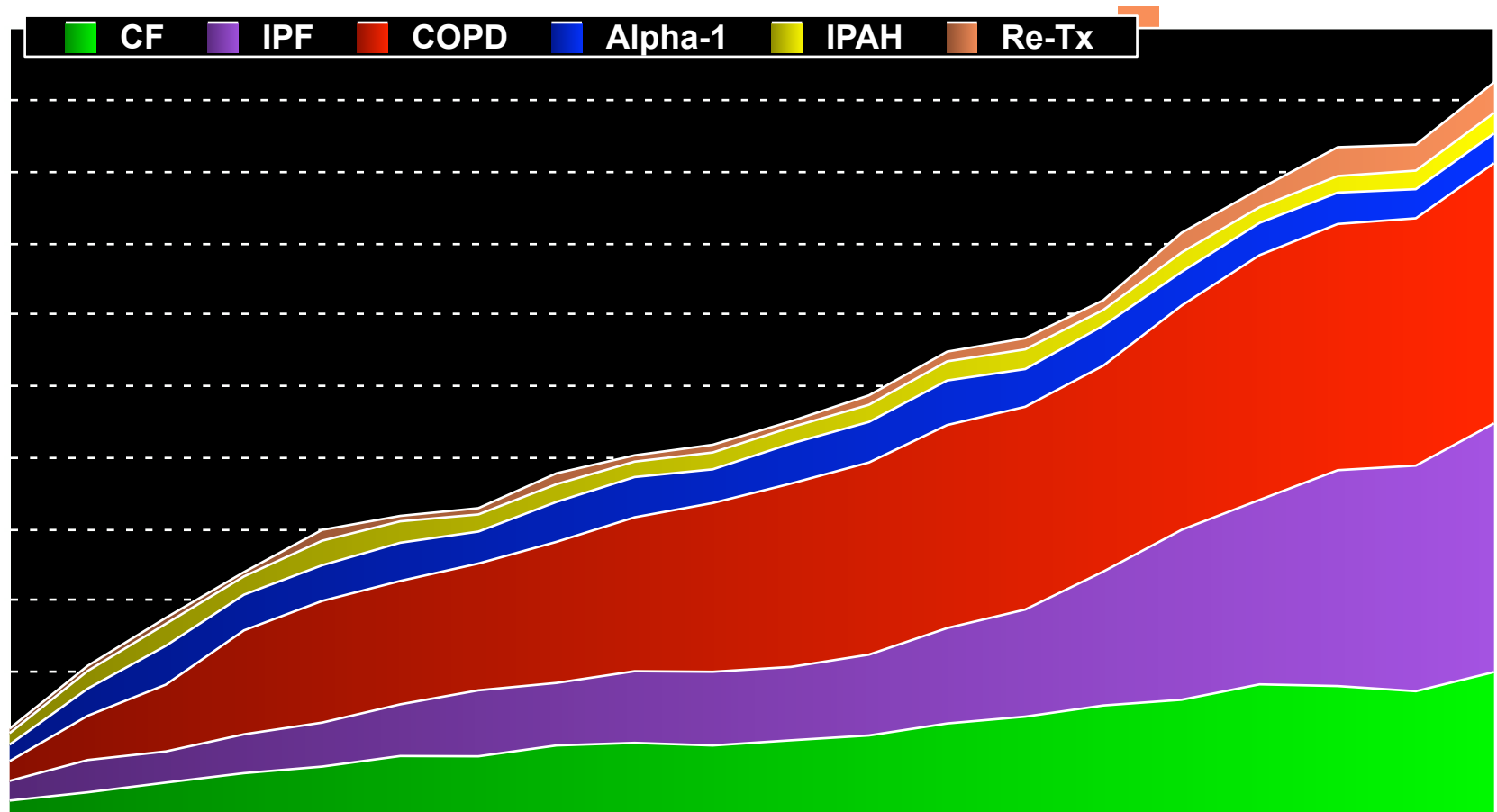
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ADULT LUNG TRANSPLANTATION

Major Indications By Year (Number)



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Lung Transplantation for ILD

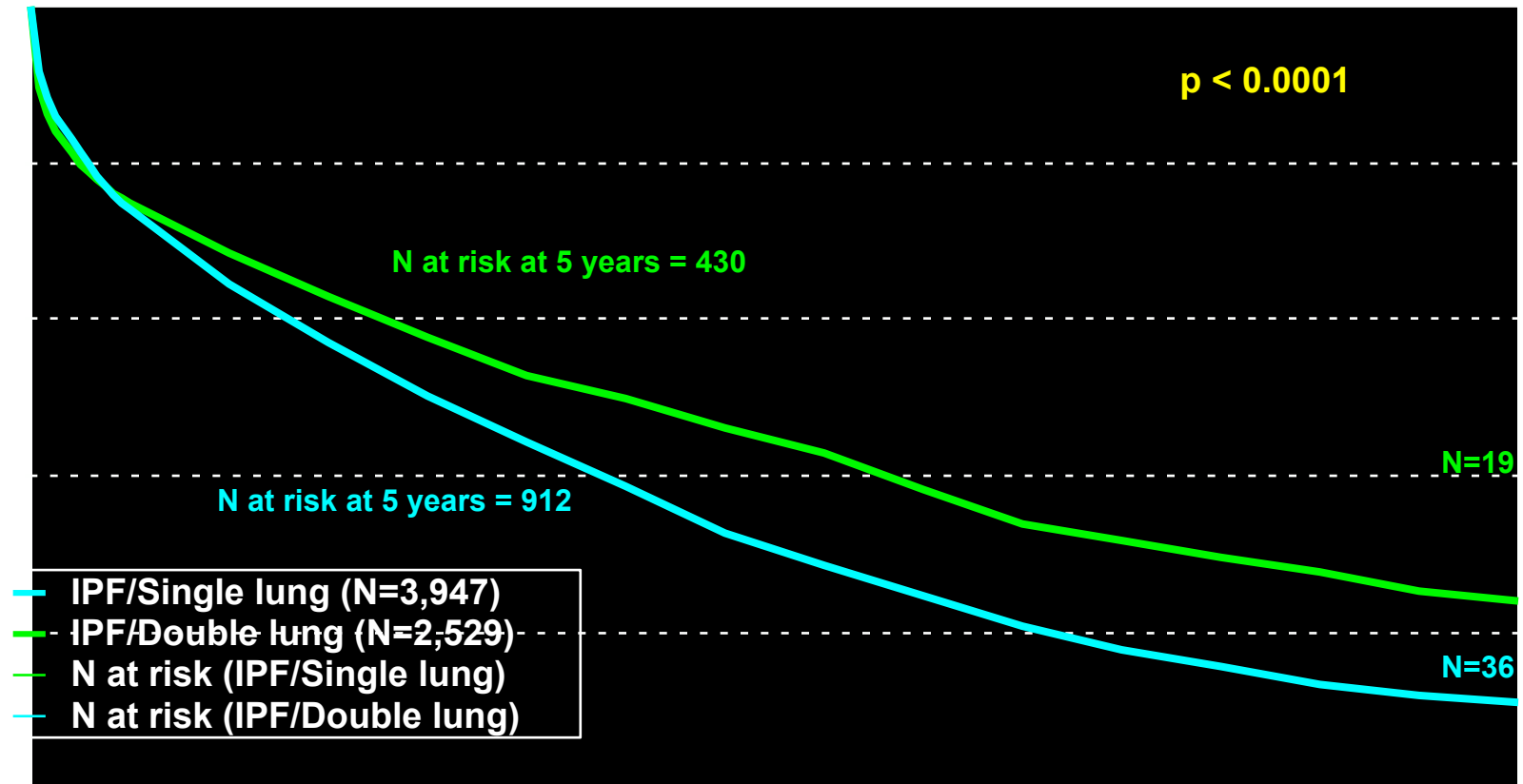
- 3 potential types of procedures: heart/lung, double lung, single lung
- Heart/lung transplantation 1980s now uncommon
- Double lung – if chronic suppurative infection or if pulmonary hypertension, will lessen graft dysfunction upon implantation
- Increasing trend for double lung transplant
- Increased mortality on wait list

ADULT LUNG TRANSPLANTATION

Kaplan-Meier Survival by Procedure Type

(Transplants: January 1990 – June 2009)

Diagnosis: Idiopathic Pulmonary Fibrosis



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Contra-indications for Lung Transplantation

- Malignancy/cancer within 2 years
- Untreatable dysfunction of other organ system
- Chronic incurable extra-pulmonary infection
- Chest deformity
- Non-adherence
- Substance addiction –tobacco, alcohol,

Relative Contra-indications for Lung Transplantation

- Age ?
- Severely limited functional status
- Colonization with resistant bacteria, fungi, mycobacteria
- Body mass index > 30 kg/m²
- Mechanical ventilation
- Other medical comorbidities – need to be optimized – diabetes, hypertension, gastroesophageal reflux, coronary artery disease

Lung Transplantation for ILD

- Early evaluation
- Progression of disease can be unpredictable
- More difficult to accomplish urgent/emergent work-up when critically ill
- Patients expected to participate in pulmonary rehab program
- Medical and psychosocial assessment

Lung Transplantation for ILD

- Risk factors and prognoses unique to ILD patients awaiting transplant
 - Fibrosis score on chest CT scan
 - Pulmonary function testing may not always correlate with outcome
 - 10% decline forced vital capacity identifies high risk
 - Drop in oxygen with exercise
 - “Acute exacerbations”

Lung Transplantation for ILD



Lung Transplantation for ILD

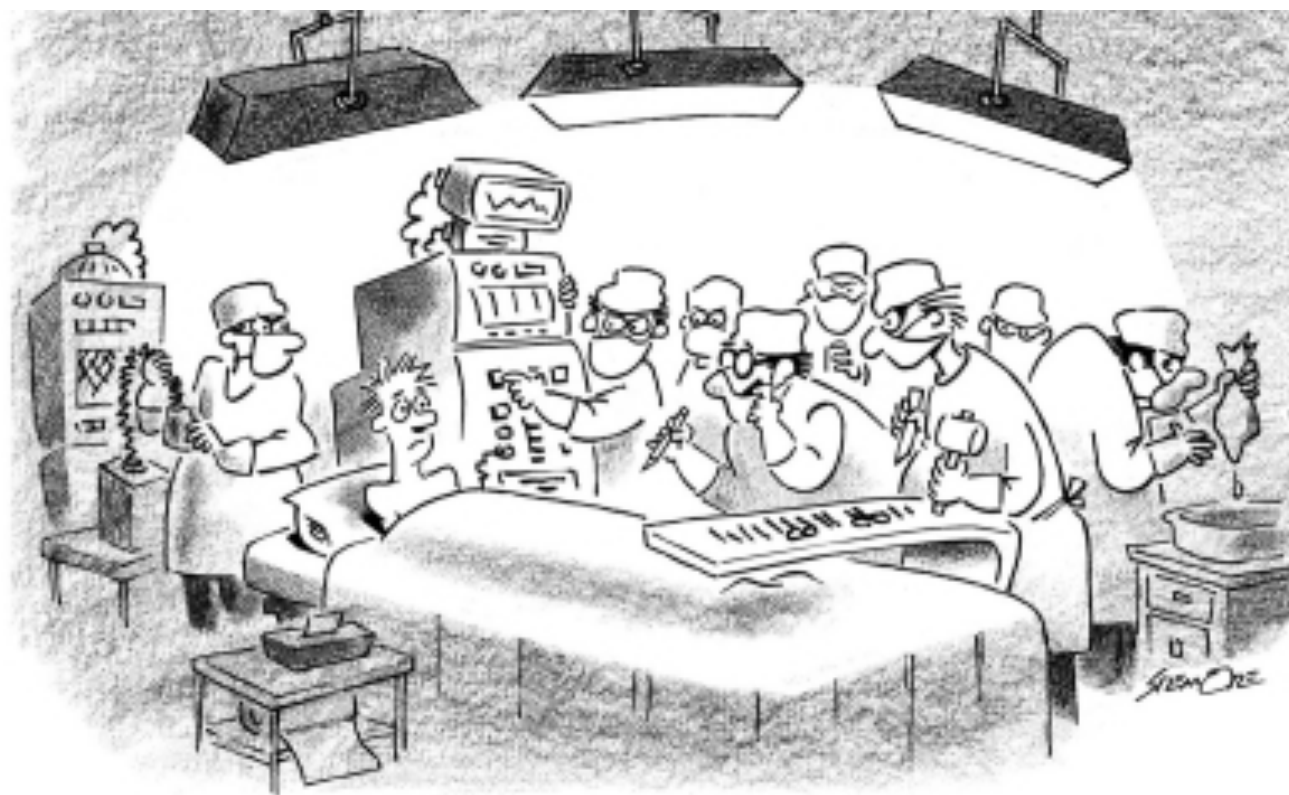
- Improved peri-operative outcomes
- Improved donor management, operative techniques, critical care
- Cardiopulmonary techniques to manage critically ill patients
- Patients often sicker at time transplant in current era

Lung Transplantation for ILD

- Lung allocated by blood group, size
- Lung Allocation Score (LAS)
 - DOB, height, weight
 - Diagnosis
 - Functional status, six minute walk distance
 - Diabetes, kidney tests
 - Ventilation, supplemental oxygen, breathing tests, carbon dioxide
 - Pulmonary artery pressure

Lung Transplantation for ILD

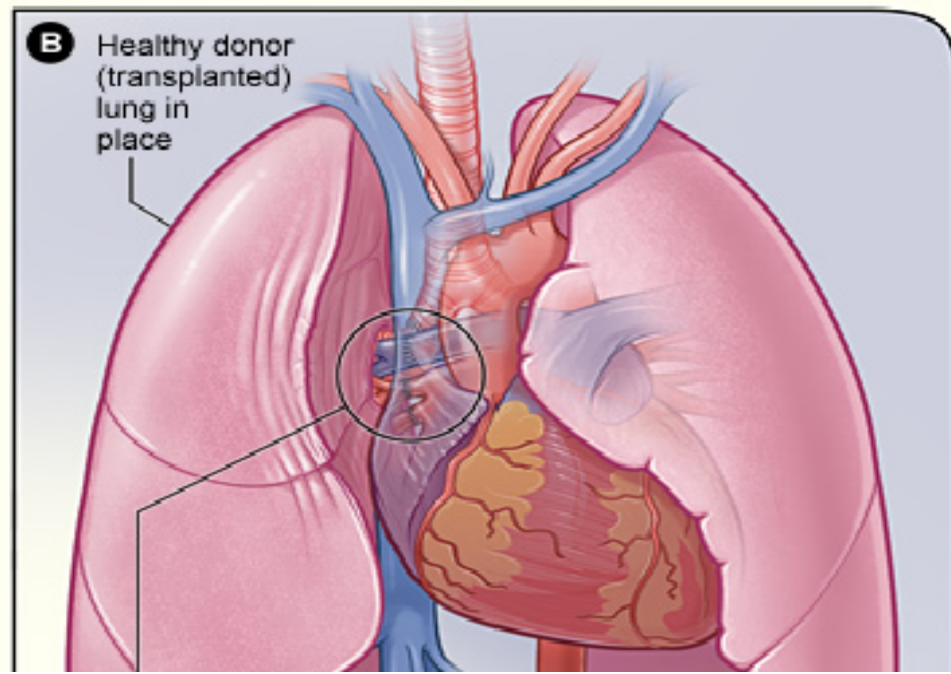
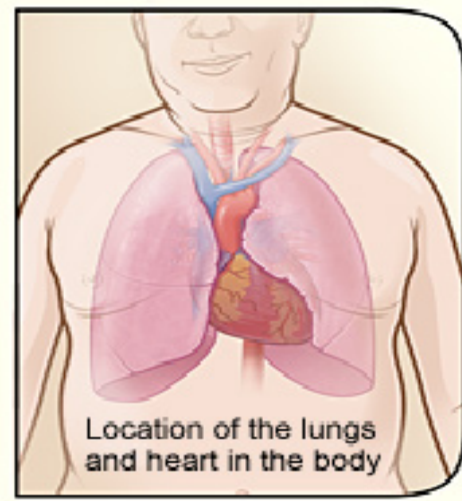
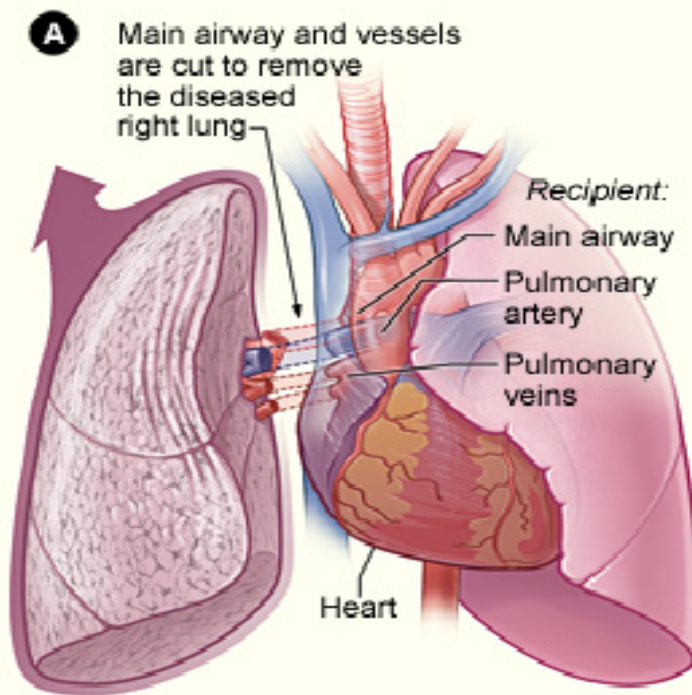
- Transplant team members
 - surgeon (MD)
 - pulmonologist (MD)
 - coordinators (RN, NP, PA)
 - psychologist
 - social worker
 - infectious diseases (MD)
 - financial coordinator
 - transplant administrators

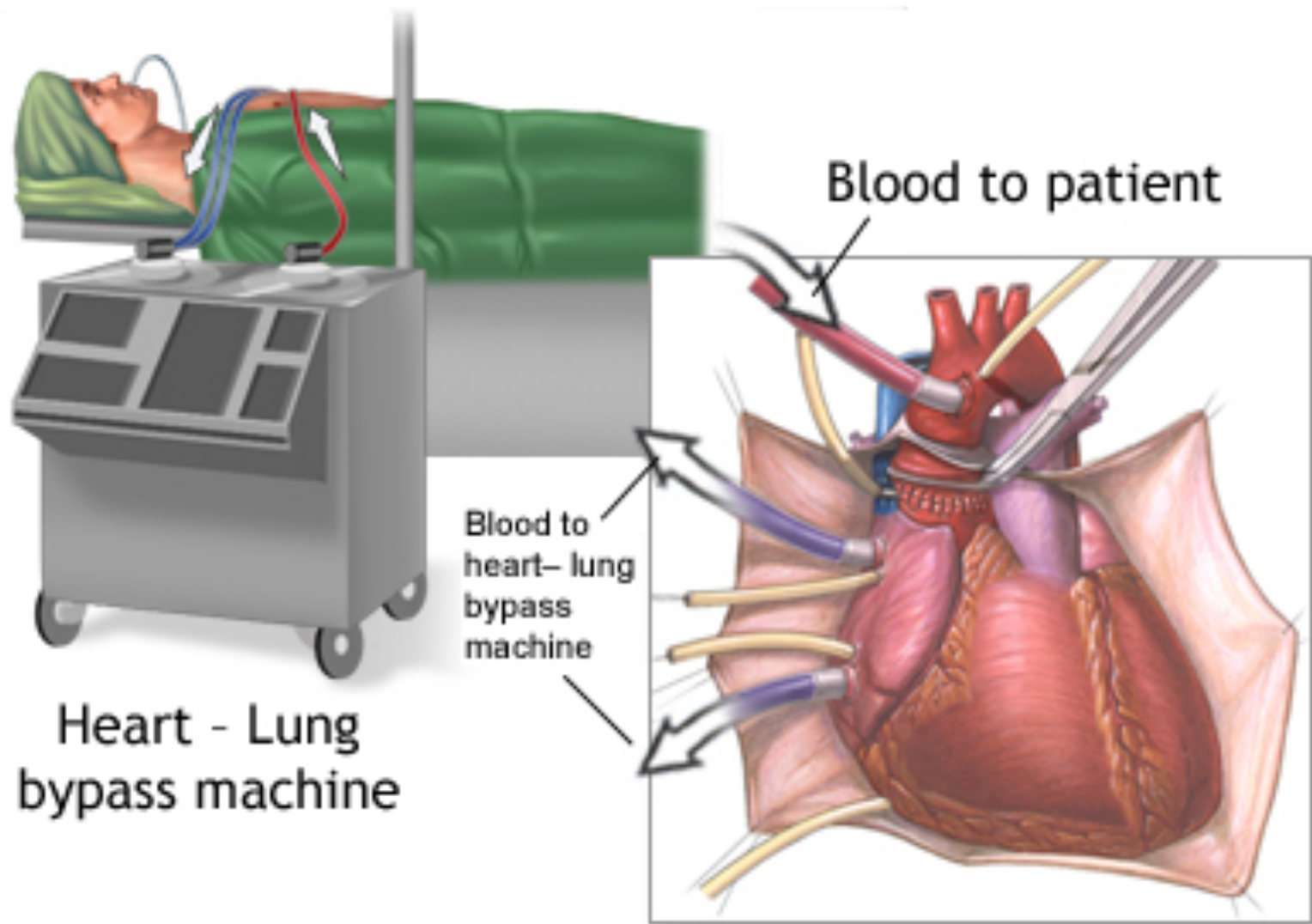


"Relax — we're all in this together."

Lung Transplantation for ILD

- Extensive testing
 - blood counts
 - kidney and liver function
 - CT scan of chest and abdomen
 - perfusion scanning
 - right and left heart catheterization
 - serologies to common viruses – CMV, EBV
 - blood types, antibodies to donor proteins





Blood to patient

Blood to heart- lung bypass machine

Heart - Lung bypass machine

Lung Transplantation for ILD

- Recovery
 - Intensive care unit (ICU) with breathing tube, ventilator and chest tubes
 - Regular hospital ward – nutrition, airway clearance, incentive spirometer, chest tubes
 - Education about medical regimen and active learning about self-care
 - Length of stay may vary anticipate 14-21 days

Lung Transplantation for ILD

- Primary Graft Dysfunction
 - Early re-implantation and perfusion
 - Cold preservation solution to warm re-perfusion
 - Reactive oxygen
 - Severity graded by oxygenation
 - Higher incidence in ILD and high pulmonary circulation pressures

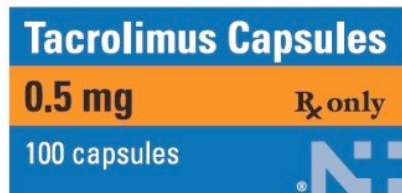
Lung Transplantation for ILD

- Early events –
 - Infection – hospitalization, donor, community
 - Anti-viral and anti-fungal prophylaxis
- Life-long immunosuppression
 - Deplete immune cells at the time of transplant
 - Steroids
 - Calcineurin inhibitor (tacrolimus or cyclosporin)
 - Anti-metabolite (azathioprine or mycophenolate mofetil)

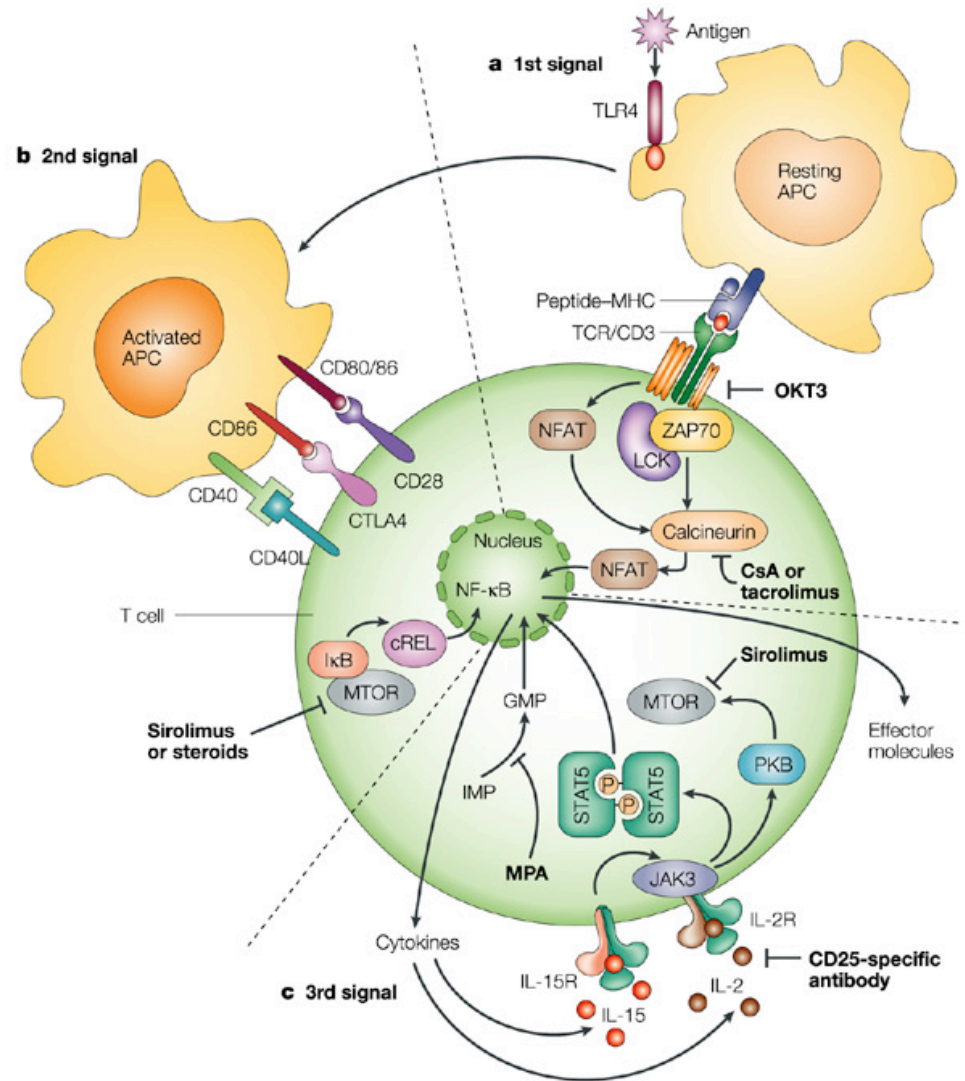
Lung Transplantation for ILD



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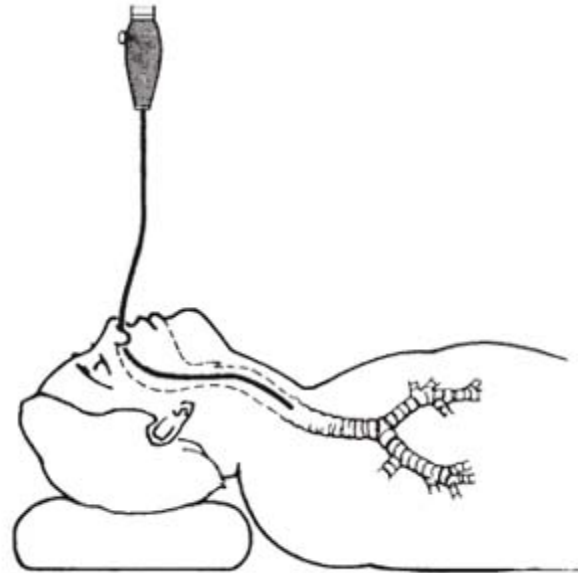


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Lung Transplantation for ILD



Lung Transplant for ILD

- Acute rejection
 - Present with cough, fatigue, shortness of breath
 - 30-40 % within 1st year
 - Acute rejection - foreign proteins on the donor lungs and the recipient's immune system response
 - Diagnosed with tissue sample read by pathologist
 - Treat acute rejection with steroids
 - If persistent, add stronger biological therapy to deplete immune cells

Lung Transplant for ILD

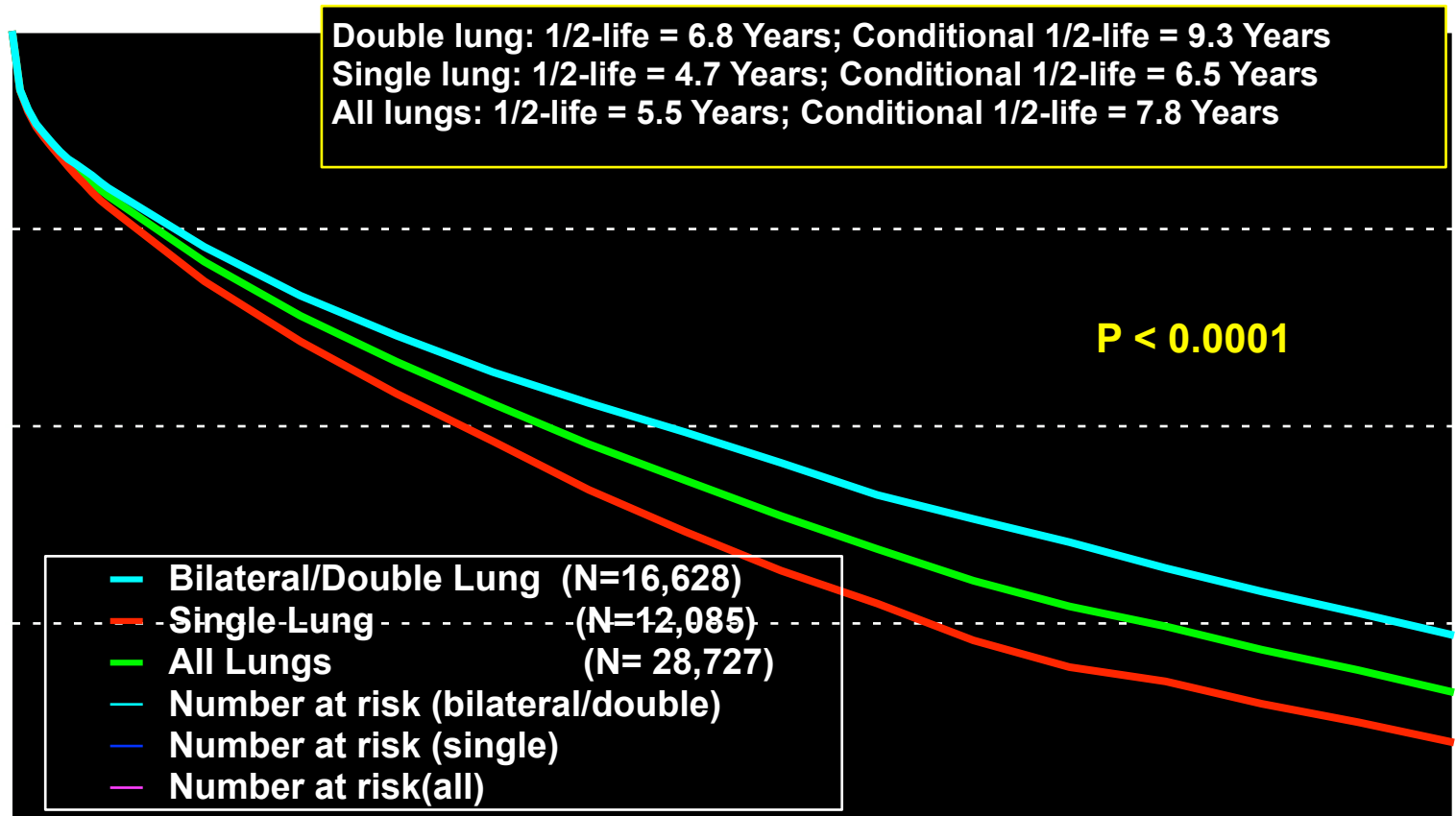
- Chronic lung allograft dysfunction
 - Recipient response to donor lungs over time causing scarring
 - ~ 45 % of patients develop by 5 years time
 - Diagnosed by following pulmonary function testing
 - Multiple causes – repeated acute rejection, antibodies to the donor lungs, chronic aspiration, responses to viral infections

Lung Transplantation for ILD

- Long term complications
 - Chronic lung allograft rejection
 - Kidney insufficiency and high blood pressure
 - Diabetes
 - Anemia
 - Skin cancers and post-transplant lymphoma
 - Osteoporosis

ADULT LUNG TRANSPLANTATION

Kaplan-Meier Survival (Transplants: January 1994 - June 2009)



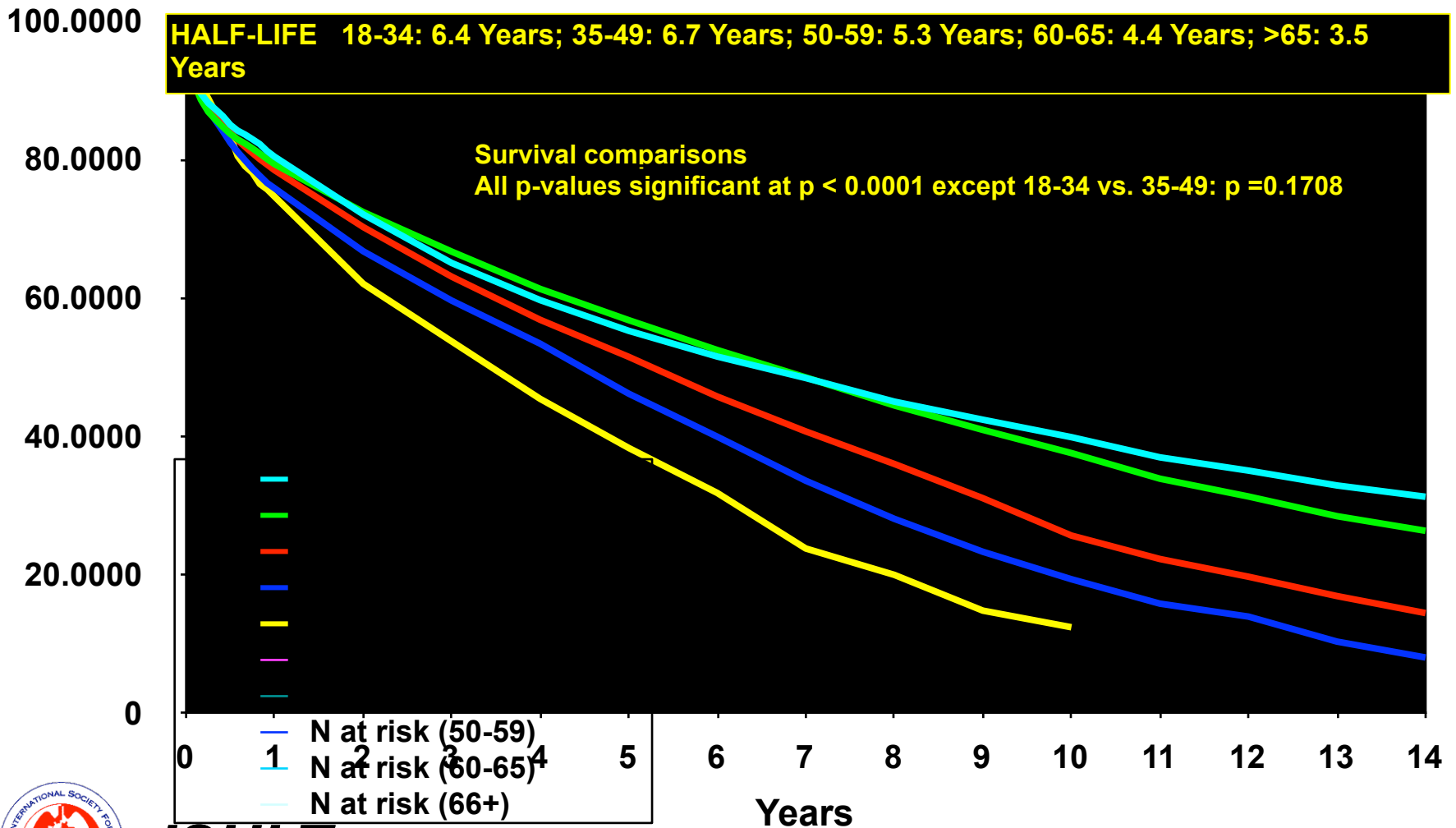
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ADULT LUNG TRANSPLANTATION

Kaplan-Meier Survival by Age Group (Transplants: January 1990 – June 2009)



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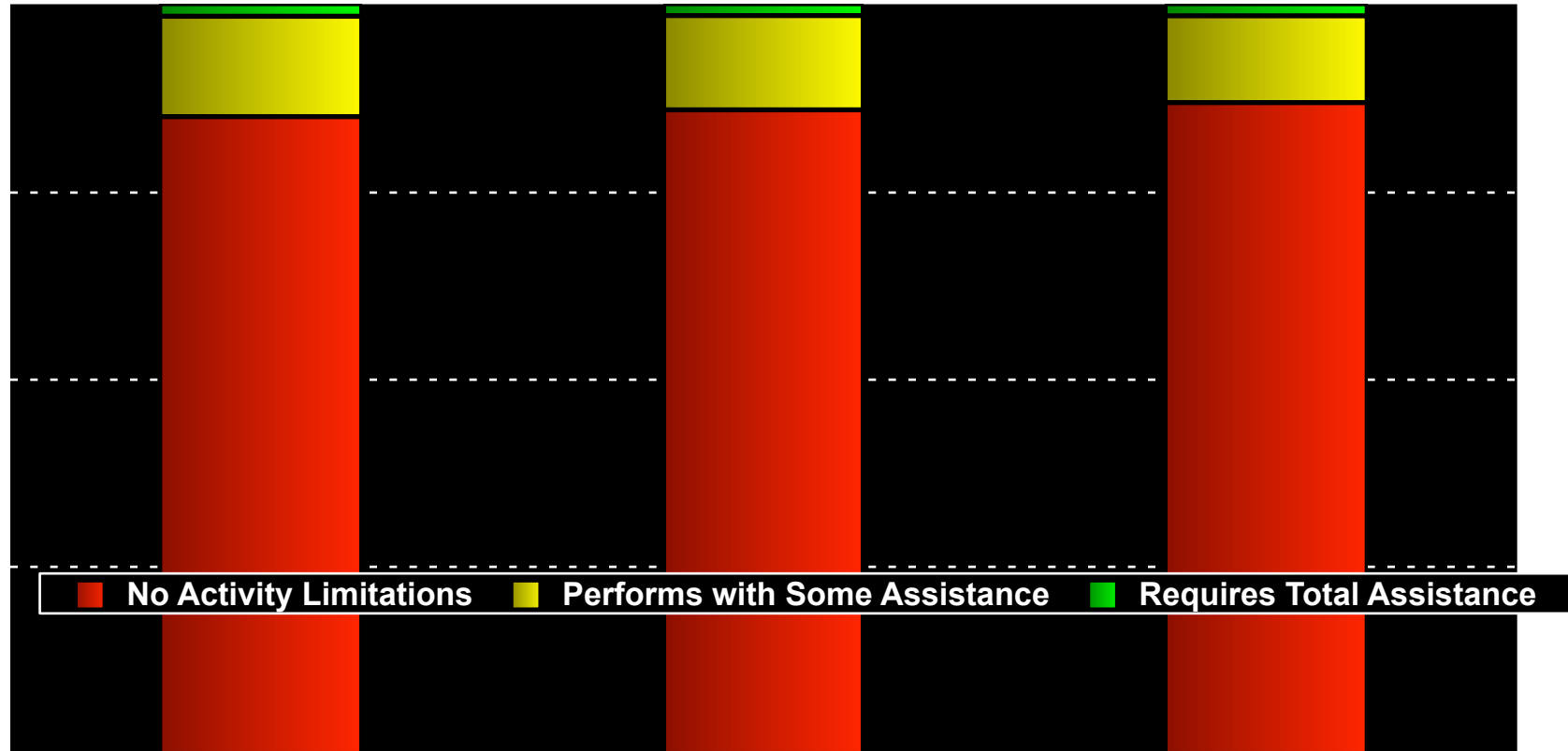
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ADULT LUNG RECIPIENTS

Cross-Sectional Analysis

Functional Status of Surviving Recipients

(Follow-ups: April 1994 – June 2010)



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Lung Transplantation for ILD

- Heterogeneous disease
- Difficult to predict timing of transplant
- IPF now > 50 % of lung transplants
- Early referral best
- Keep in shape, wear oxygen, exercise, nutrition
- Support groups
- Education
- THANK YOU !!