Scarred Lungs, Stolen Breath:

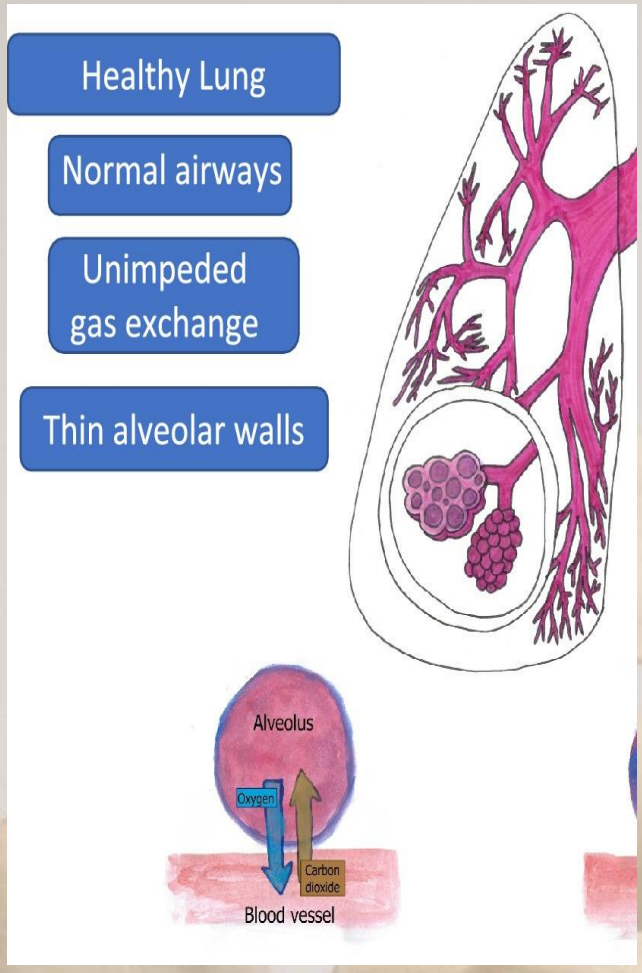
Understanding Pulmonary Fibrosis

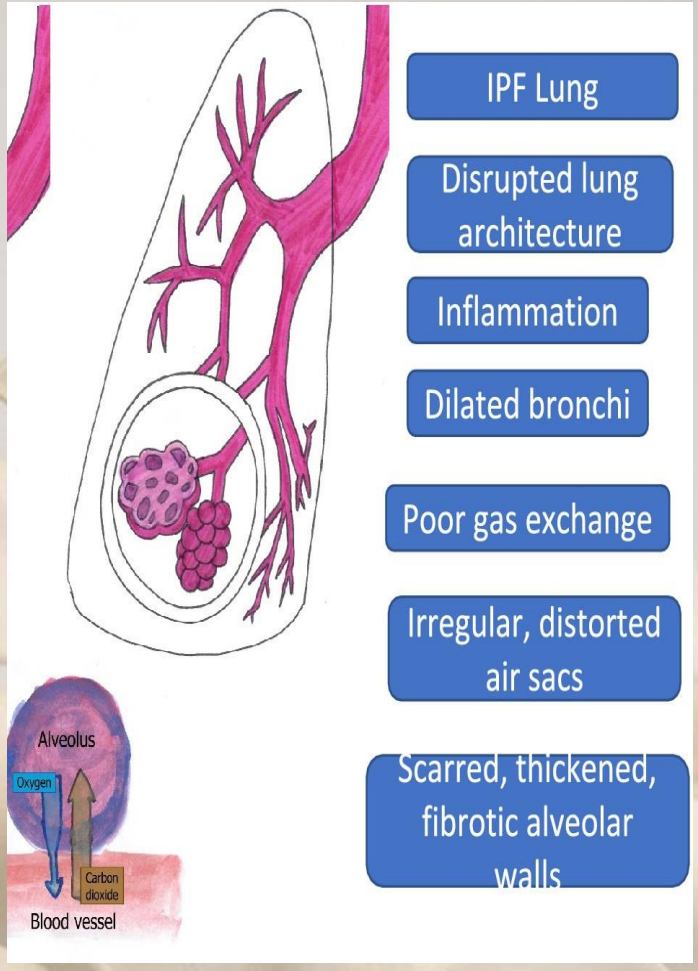
Section 1: What is Pulmonary Fibrosis?

Idiopathic pulmonary fibrosis (IPF) is an interstitial lung disease (ILD), which is characterized by disease progression and functional decline. [1]

Healthy lung

Fibrotic lung





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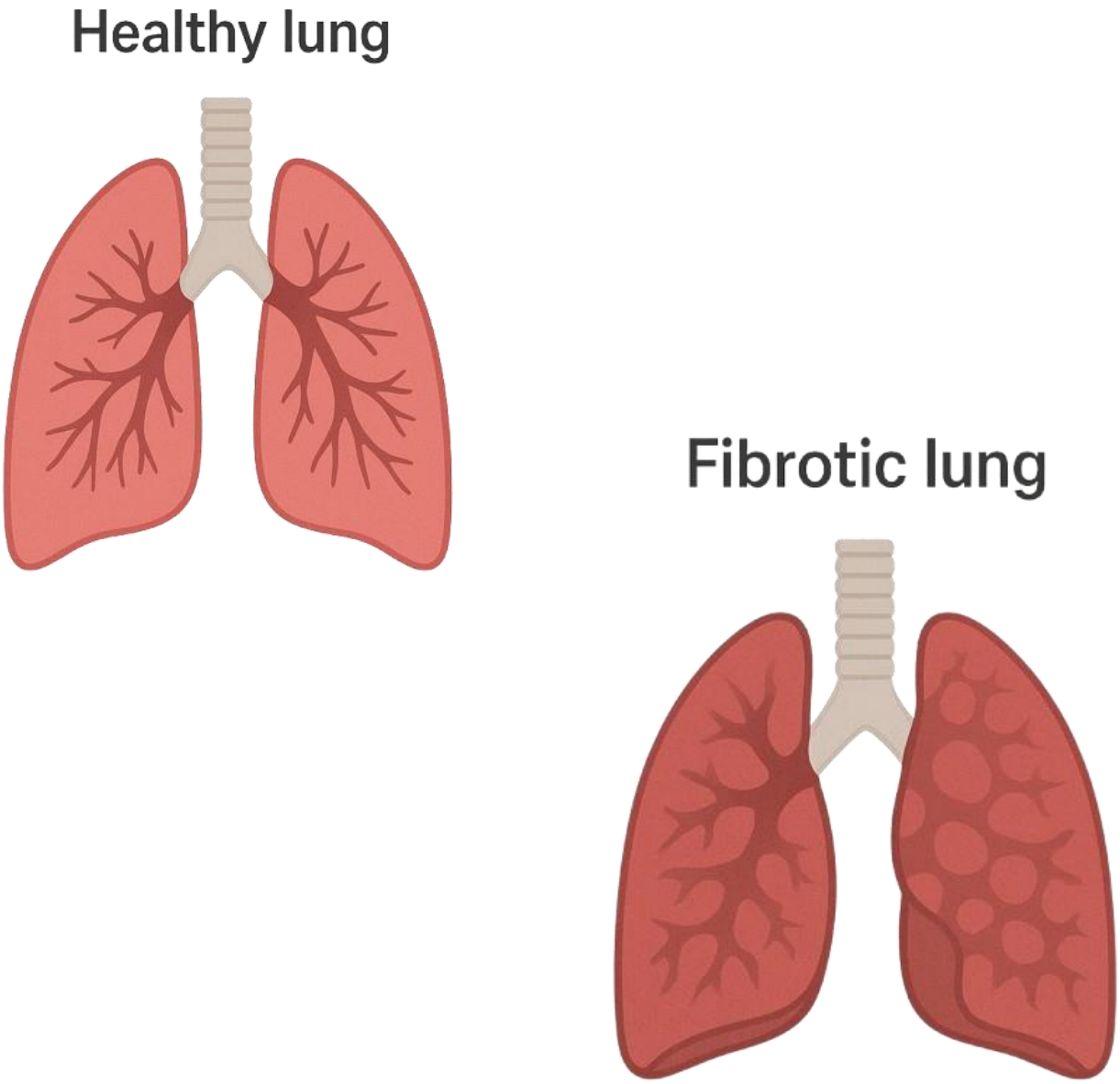
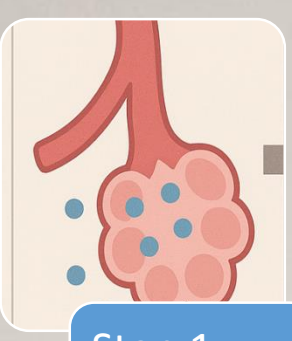


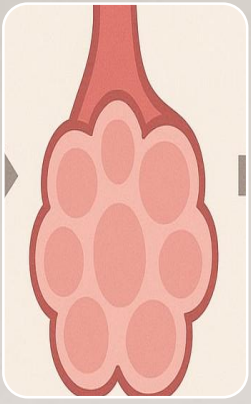
Comparing a healthy lung to an infected lung

Section 2: How It Disrupts Oxygen Delivery



Step 1

- Air enters the alveoli

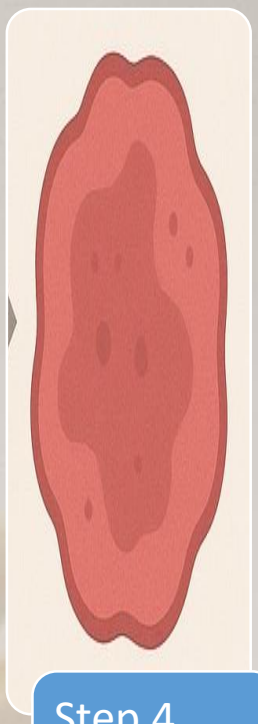


Step 2

- Scar tissue thickens walls

Step 3

- Oxygen
- Diffuses



Step 4

- Tissues become hypoxic

Step by step process on how pulmonary fibrosis disrupts oxygen delivery

Section 3: Causes

The causes of IPF remain unknown [1]

Section 4: Symptoms[1]

- Shortness of breath

- Fatigue

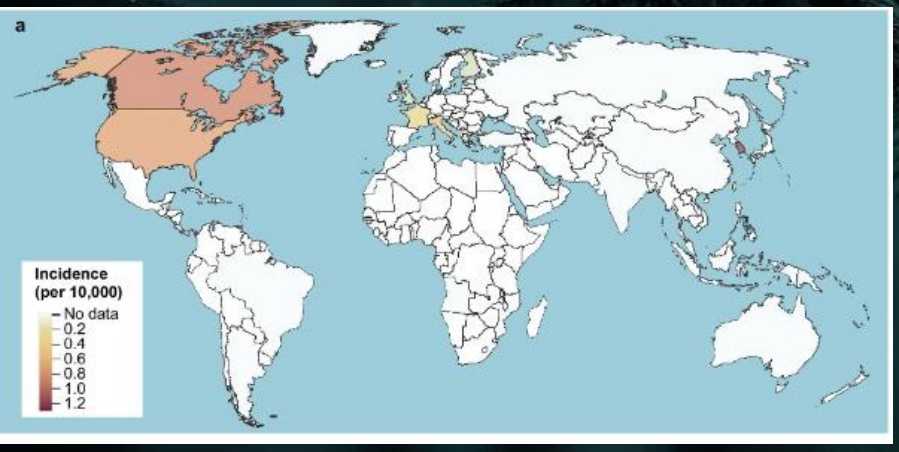
- Chest discomfort

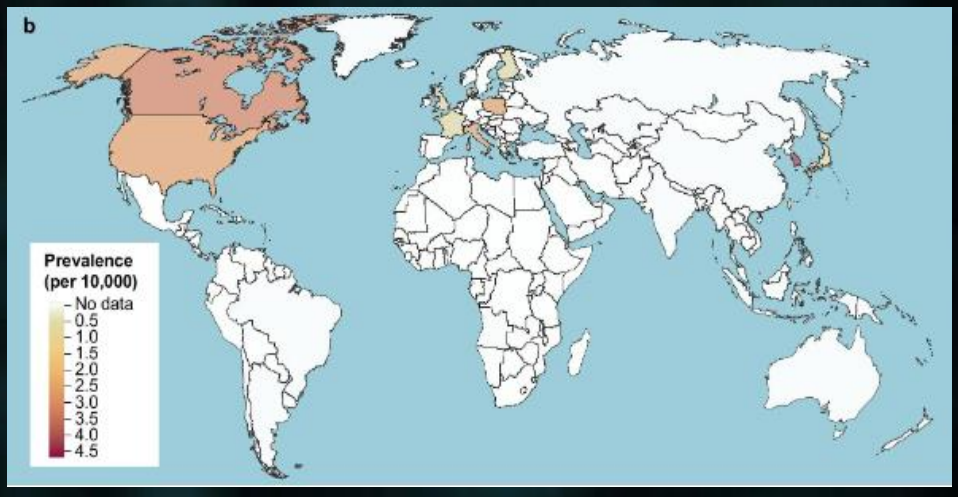
- Dry cough

Section 5: Facts & Figures

Incidence and Prevalence [2]

- range of 0.09–1.30 and 0.33–4.51 per 10,000 persons, respectively
- There are high incidences in North America
- Incidences are moderate in Europe
- Japan also has a notable value.
- South Korea has the highest prevalence
- Its moderate in Europe
- Its also high in north America

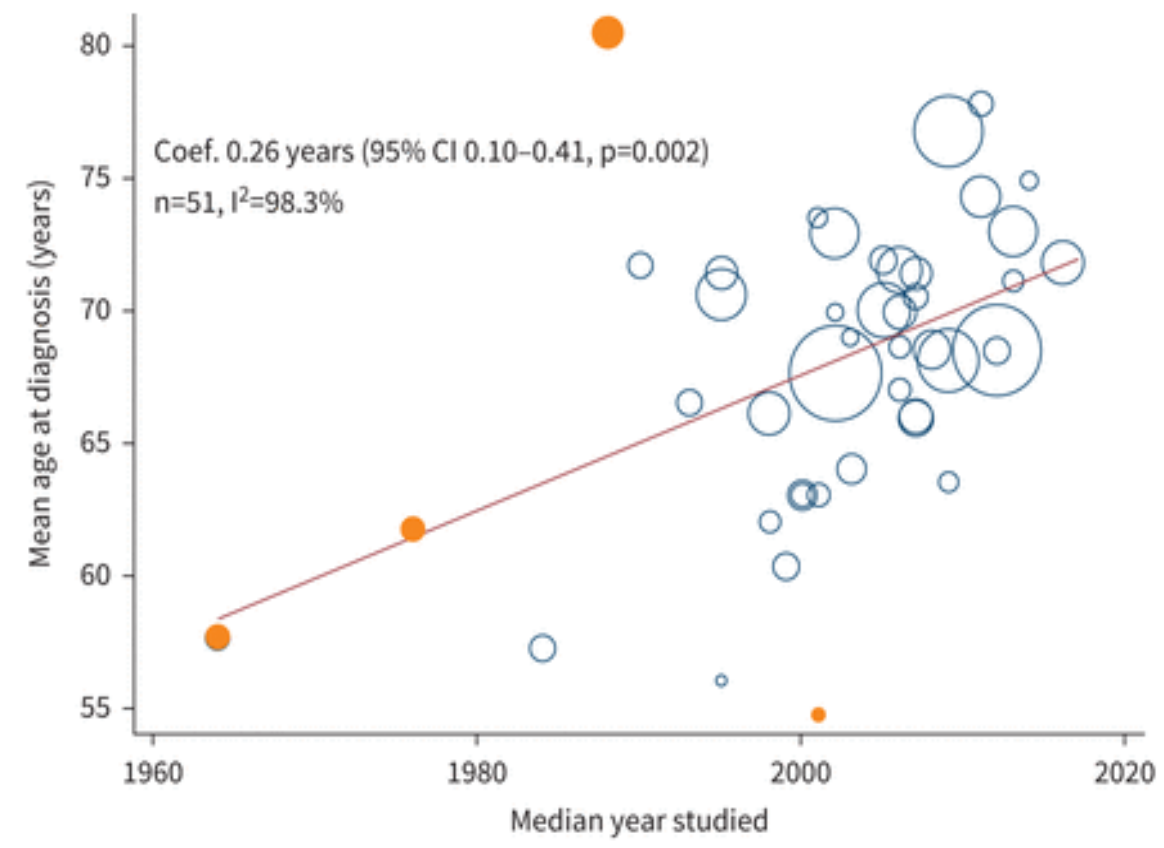




Section 5: Facts & Figures

Mean age at diagnosis[5]

- Study covers years 1960- 2020
- Diagnosis age increases over time



Section 5: Facts & Figures

Antifibrotic effect on mortality [4]

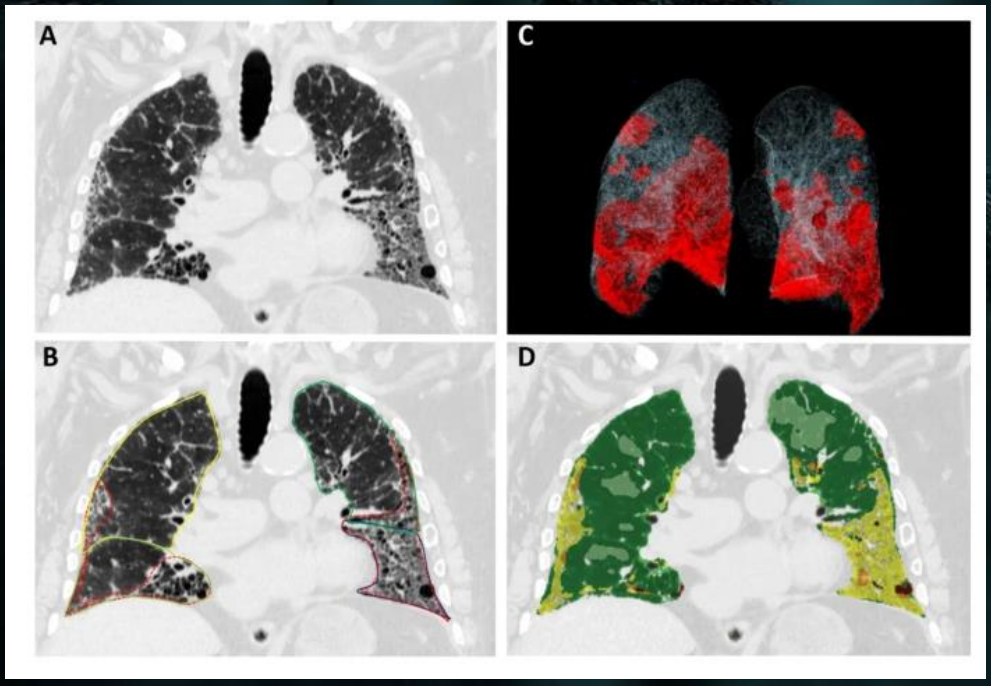
- Early treatment shows low mortality
- There is a stronger effect in older patients

Results: All three statistical methods yielded nonsignificant results for the antifibrotic effect on mortality, with the stratified analysis for patients with early antifibrotic initiation suggesting evidence for reduced mortality risk (for all patients, hazard ratio, 0.89; 95% confidence interval, 0.79–1.01; $P = 0.08$; for patients who were 65 years or older, hazard ratio, 0.85; 95% confidence interval, 0.73–0.98; $P = 0.03$). Methods that mishandle immortal time bias demonstrated significantly lower mortality risk for antifibrotic users. Bias of these methods was evident in the simulation study, where appropriate methods performed well with little to no bias.

Section 5: Facts & Figures

Opacity based quantification of fibrosis [3]

- Green area indicates healthier tissues
- Gray area shows healthy tissues
- Shows the baseline images for comparison



Exemplary results of the multi-texture lung analysis tool and the opacity-based lung analysis tool. CT in coronal view of a 62 year old patient with idiopathic pulmonary fibrosis (**A**), analyzed by the opacity-based Pneumonia tool (Siemens Healthineers), the red lines represent the segmented fibrotic areas (**B**) with additional 3D reconstruction (**C**). (**D**) Analysis with the multi-texture lung analysis tool (CALIPER, Biomedical imaging resource laboratory, Mayo Clinic) with the yellow areas representing fibrotic altered tissue.

Section 6: Management & Solutions

oral antifibrotic drugs

- Pirfenidone

- Nintedanib

Section 7: References

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4. Xu, H., Hui, S. L., Lee, J. S., Zhang, Z., & Boente, R. D. (2024). Effect of Antifibrotic Use on Mortality in Patients with Idiopathic Pulmonary Fibrosis. *Annals of the American Thoracic Society*, *21*(10), 1407–1415. https://doi.org/10.1513/AnnalsATS.202312-1054OC
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