ΣΤΡΟΓΓΥΛΟ ΤΡΑΠΕΖΙ
Πνευμονική Εμβολή-
Πνευμονική υπέρταση

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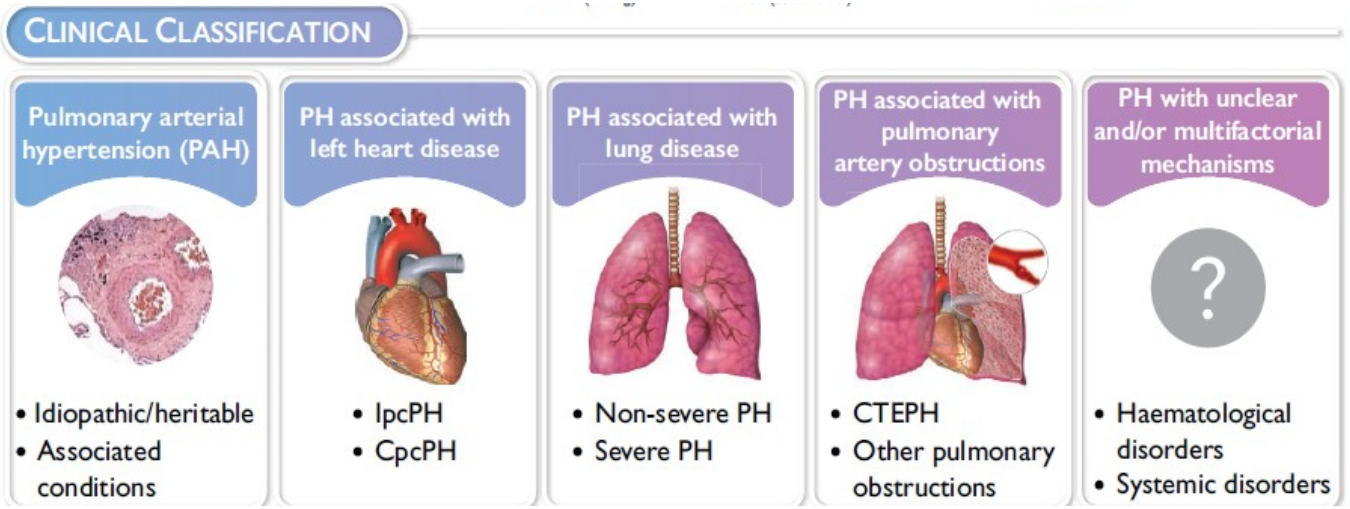
ΔΙΑΓΝΩΣΤΙΚΗ ΠΡΟΣΠΕΛΑΣΗ ΣΤΗΝ ΠΝΕΥΜΟΝΙΚΗ ΥΠΕΡΤΑΣΗ



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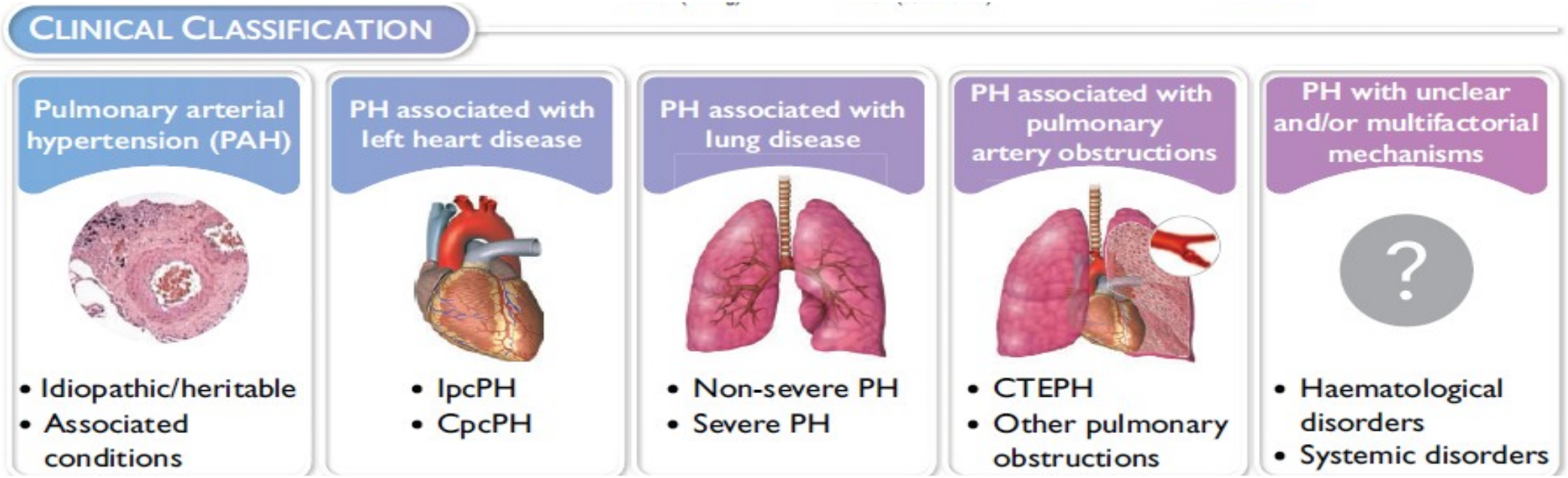
DEFINITIONS

The definitions for PH are based on haemodynamic assessment by right heart catheterization (RHC)

PH is defined by a mean pulmonary arterial pressure (mPAP)>20 mmHg at rest



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PH IN NUMBERS

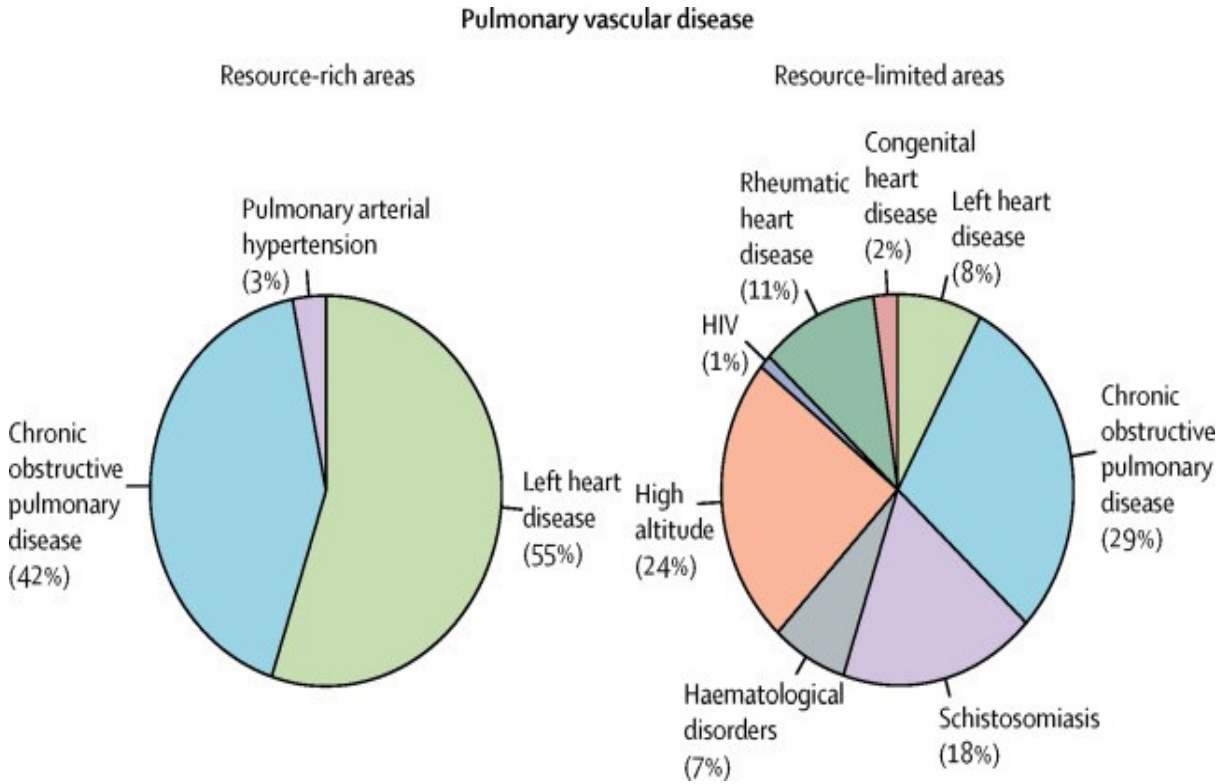
Pulmonary hypertension is a major global health issue. All age groups are affected.

PH prevalence of 1% of the global population.

Due to the presence of cardiac and pulmonary causes of PH, prevalence is higher in individuals aged >65 years.

Globally, LHD is the leading cause of PH. Lung disease, especially COPD, is the second most common cause.

Irrespective of the underlying condition, developing PH is associated with worsening symptoms and increased mortality



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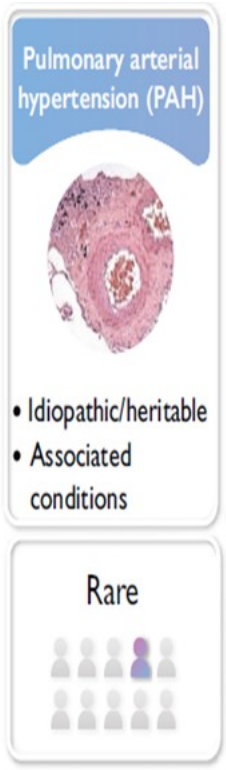
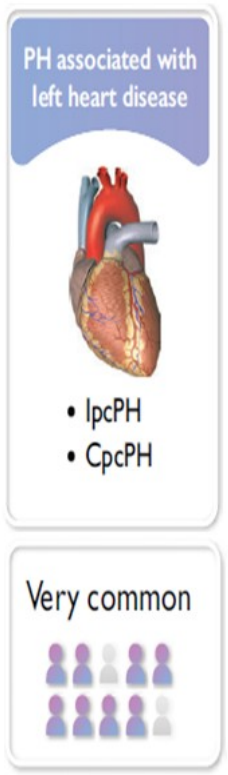
Rich, S., Haworth, S. G., Hassoun, P. M., & Yacoub, M. H. (2018). Pulmonary hypertension: the unaddressed global health burden. The Lancet Respiratory Medicine, 6(8), 577-579.

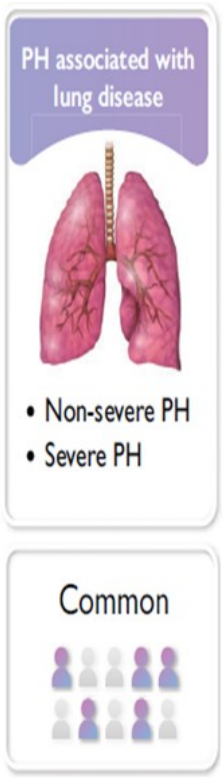
EPIDEMIOLOGY



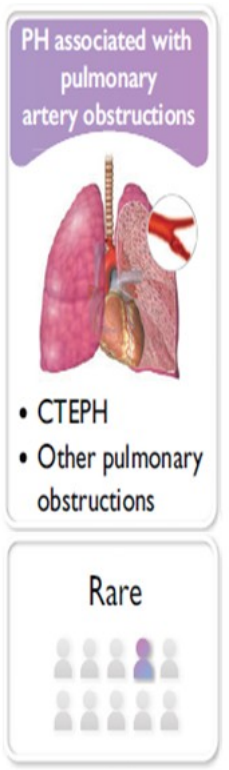
- Incidence: 6 cases/million/year
- Young females
- Now diagnosed in pts ≥65, with CV comorbidities



- 50% of pts with HEFpEF
- 60–70% of pts with severe mitral valve disease
- 50% of pts with sympt. AoVS



- 1–5% of patients with advanced COPD+CRF
- IPF: 8–15% at initial work-up, 30-50% in advanced, 60% in end-stage disease



- CTEPH incidence of 2–6 cases/million adults/year

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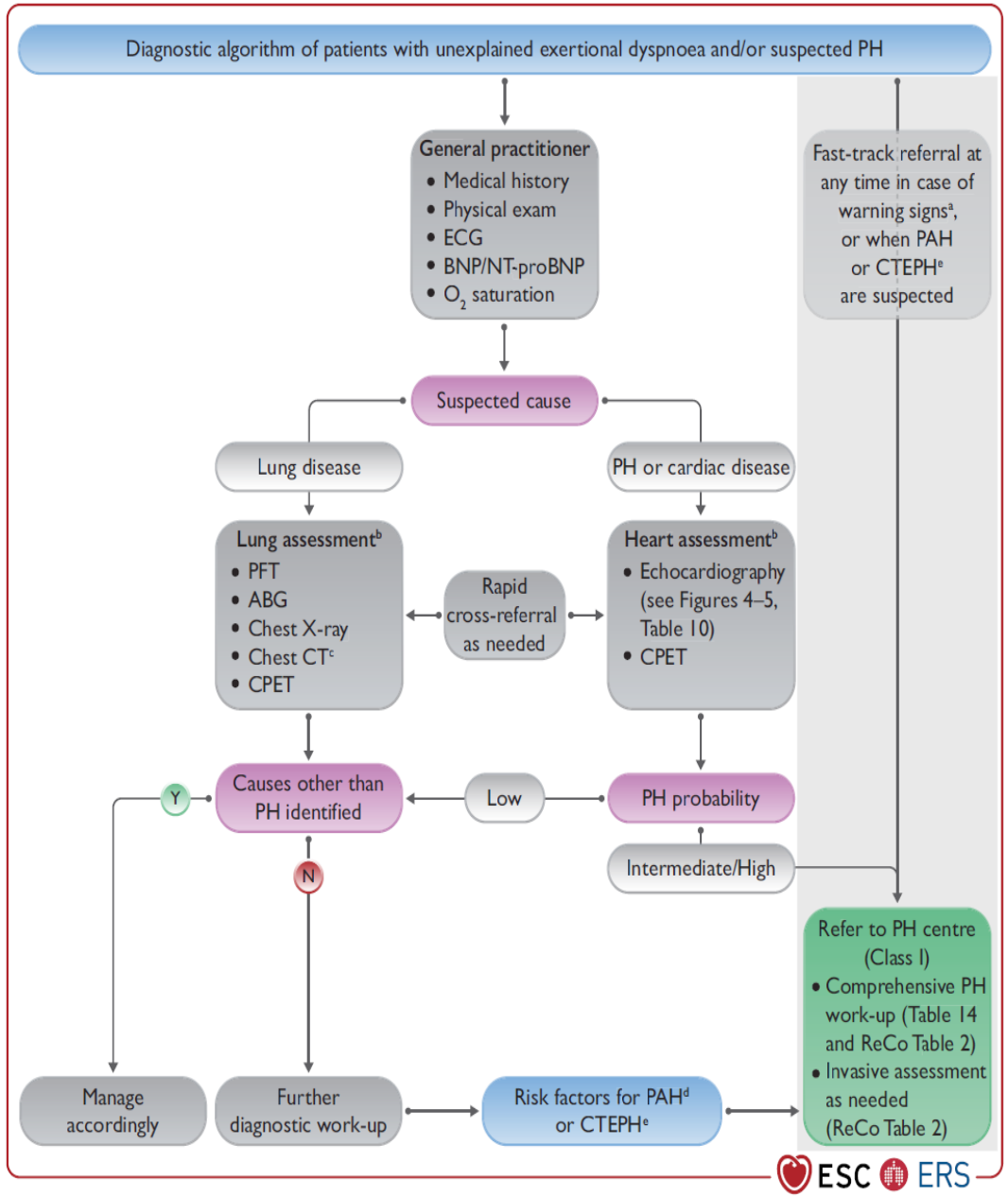
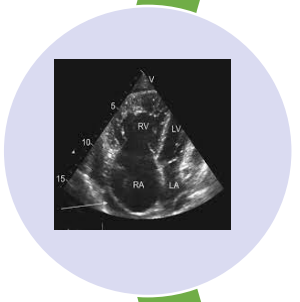
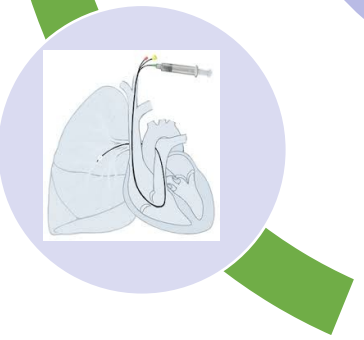


SUSPICION

DETECTION

CONFIRMATION



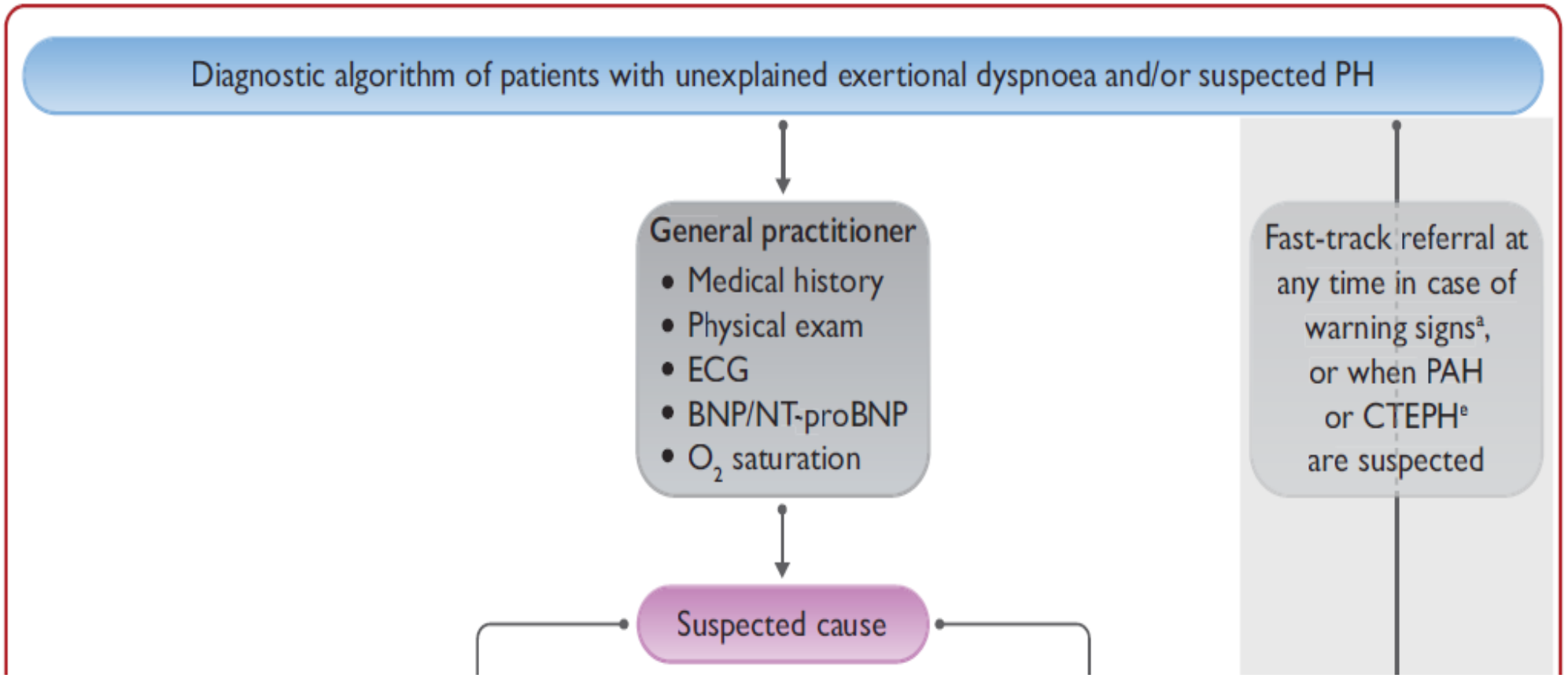


PH DIAGNOSIS

PH
DIAGNOSIS

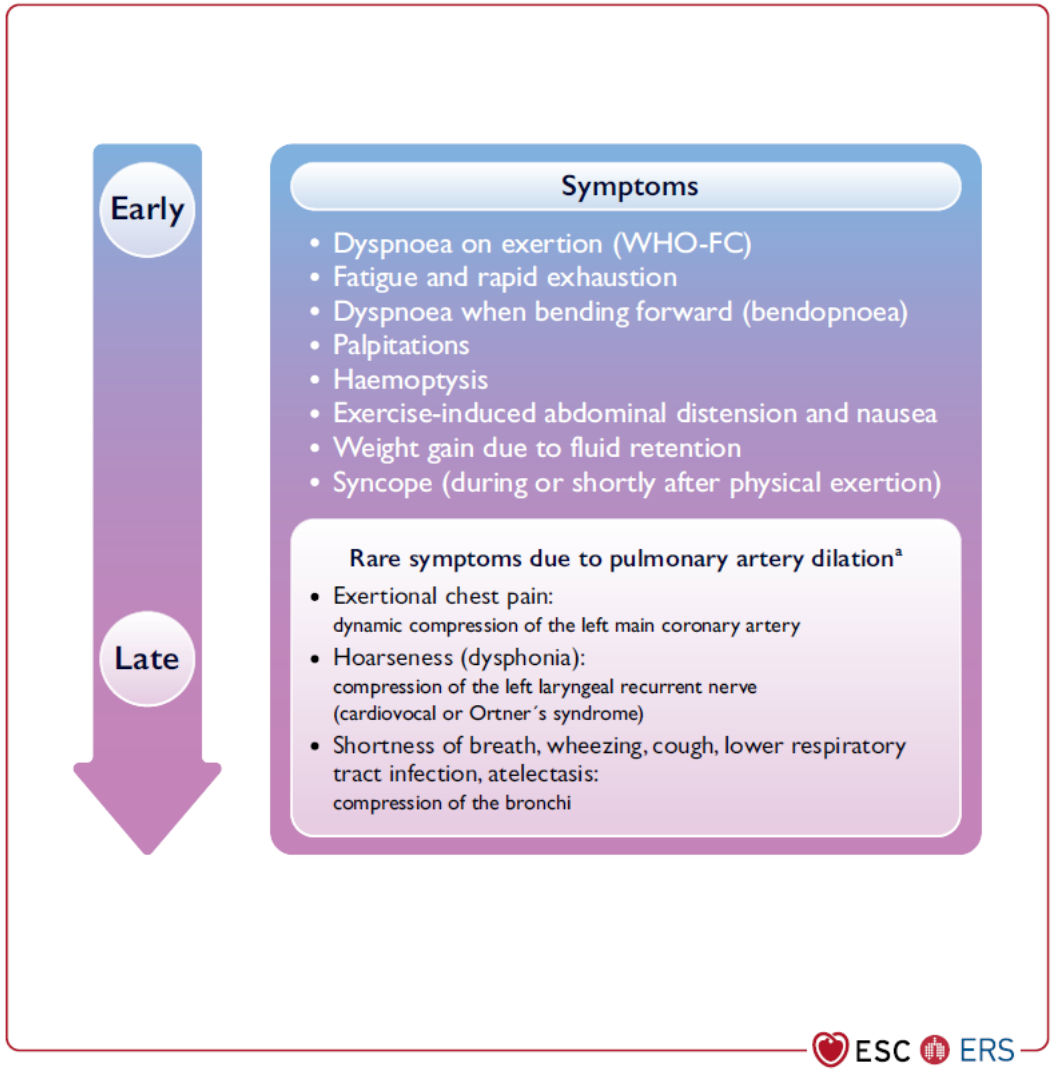
SUSPICION

STEP 1 → SUSPICION



SYMPTOMS

- Patients with PH are likely to be seen by first-line physicians (general practitioners)
- Non-specific symptoms.
- Symptoms of RV dysfunction associated with exercise in the earlier course of the disease.
- **The cardinal symptom is dyspnoea on progressively minor exertion**.



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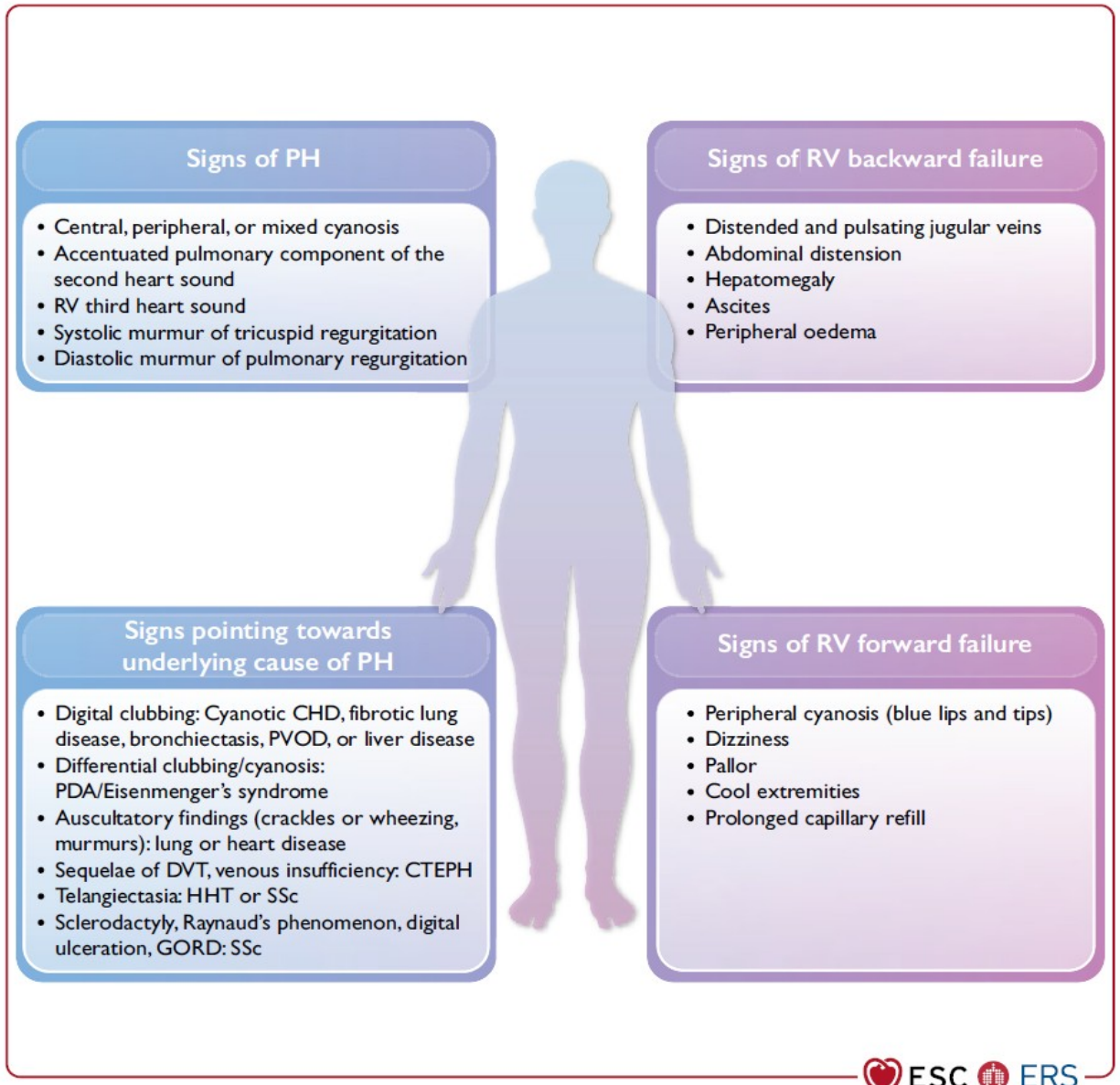
CLINICAL EXAMINATION

- Comprehensive medical (including familial) history and thorough physical examination

- Importantly, the physical examination may also be the key to identifying the underlying cause of PH



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ECG

- ✓ May raise suspicion of PH, deliver prognostic information, and detect arrhythmias/signs of LHD.
- ✓ In adults with clinical suspicion of PH, RAD has a high predictive value for PH.
- ✓ Normal ECG does not exclude the presence of PH
- ✓ Normal ECG + normal biomarkers (BNP/NT-proBNP) = low likelihood of PH

Table 8 Electrocardiogram abnormalities in patients with pulmonary hypertension

Typical ECG abnormalities in PH[66]
• P pulmonale (P >0.25 mV in lead II)
• Right or sagittal axis deviation (QRS axis >90° or indeterminable)
• RV hypertrophy (R/S >1, with R >0.5 mV in V1; R in V1 + S in lead V5 > 1 mV)
• Right bundle branch block—complete or incomplete (qR or rSR patterns in V1)
• RV strain pattern[a] (ST depression/T-wave inversion in the right pre-cordial V1–4 and inferior II, III, aVF leads)
• Prolonged QTc interval (unspecific)[b]

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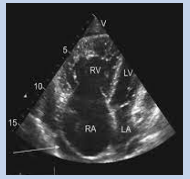
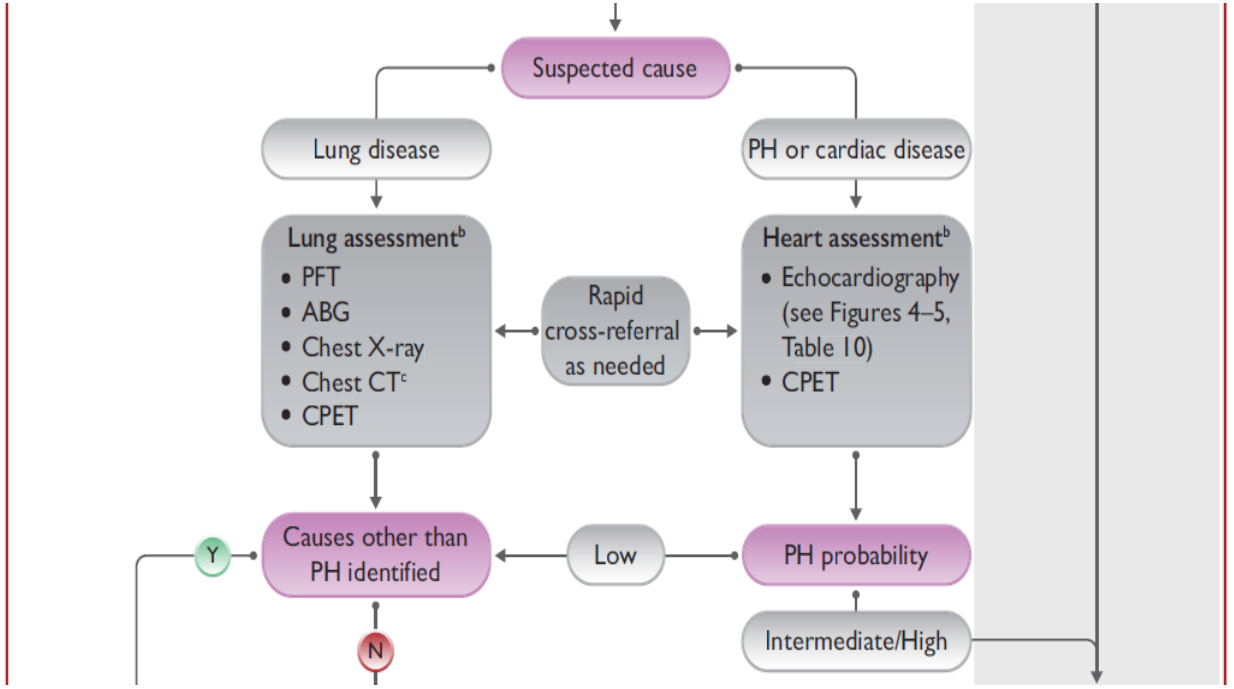
PH DIAGNOSIS



DETECTION

STEP 2 → DETECTION



The second step includes classical, non-invasive lung and cardiac testing.

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CHEST RADIOGRAPHY

Table 9 Radiographic signs of pulmonary hypertension and concomitant abnormalities

Signs of PH and concomitant abnormalities	Signs of left heart disease/ pulmonary congestion	Signs of lung disease
Right heart enlargement	Central air space opacification	Flattening of diaphragm (COPD/ emphysema)
PA enlargement (including aneurysmal dilatation)	Interlobular septal thickening 'Kerley B' lines	Hyperlucency (COPD/ emphysema)
Pruning of the peripheral vessels	Pleural effusions	Lung volume loss (fibrotic lung disease)
'Water-bottle' shape of cardiac silhouette[a]	Left atrial enlargement (including splayed carina) Left ventricular dilation	Reticular opacification (fibrotic lung disease)

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PFTs + ABGs

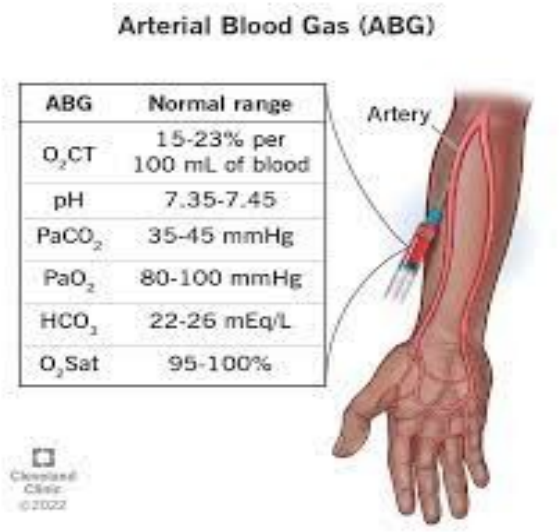
PFTs: REDUCED DLCO

IPAH: normal Va, restrictive pattern (20-50%) or normal, airway obstruction (20-40%) +/- small airways disease (ET-1 → bronchoconstriction)

Group 2: restrictive pattern (reduced TLC/FVC)

Group 3:
- COPD: obstruction + elevated RV
- ILDs: reduced FVC + reduced TLC
- CPFE: elevated or normal FVC/RV/TLC + **disproportionate** reduced DLCO

Group 4: 20-30% restrictive pattern



ABGs

- normal/reduced PaO2
- reduced PaCO2

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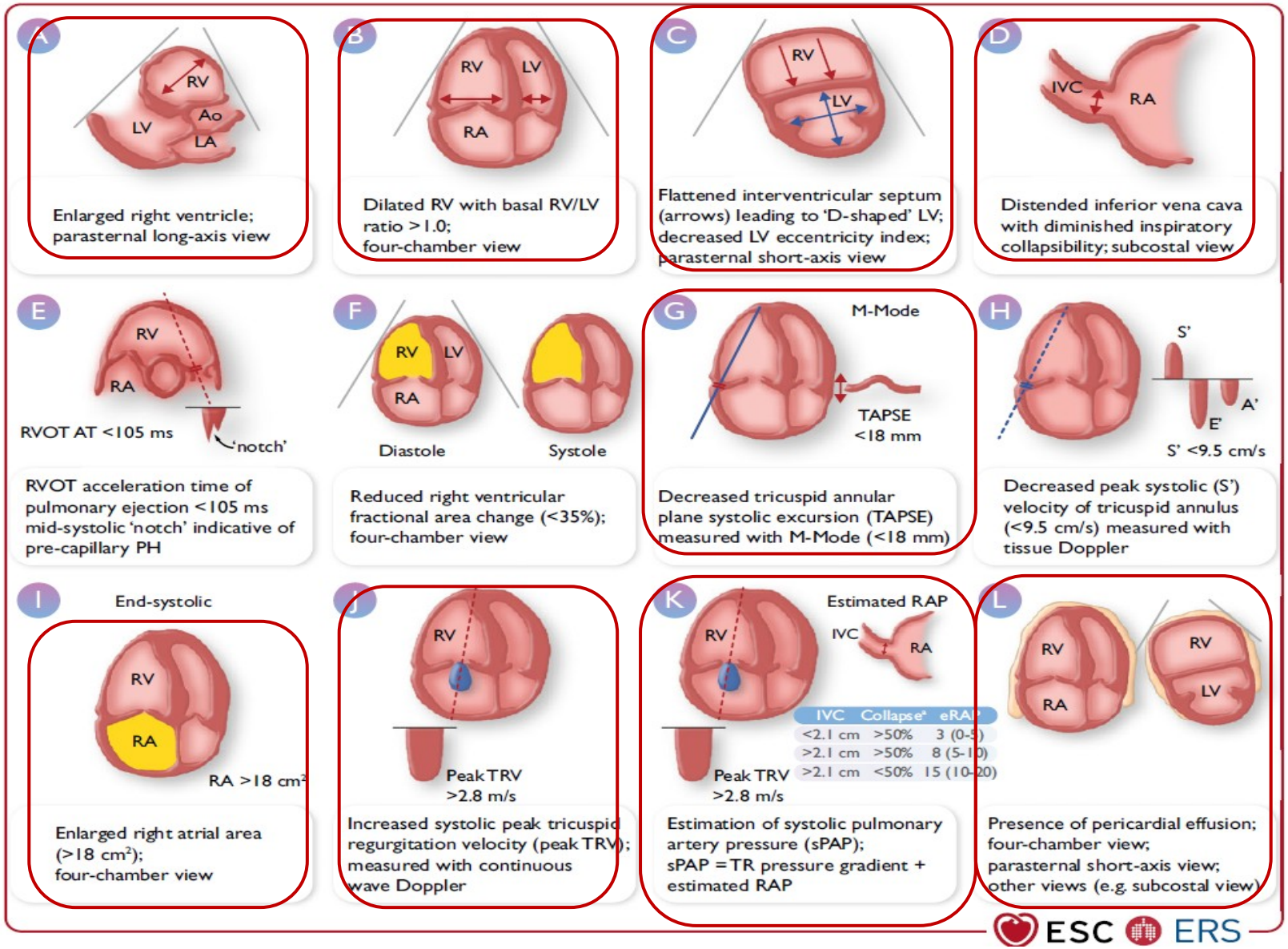
Low, A. T., et al. "Lung function in pulmonary hypertension." Respiratory medicine 109.10 (2015): 1244-1249.

TTE

- RV pressure overload and dysfunction, detected by TTE but insufficient to confirm a diagnosis of PH
- Valuable tool for detecting the cause of suspected or confirmed PH
- There is no single echocardiographic parameter that reliably informs about PH status and underlying aetiology



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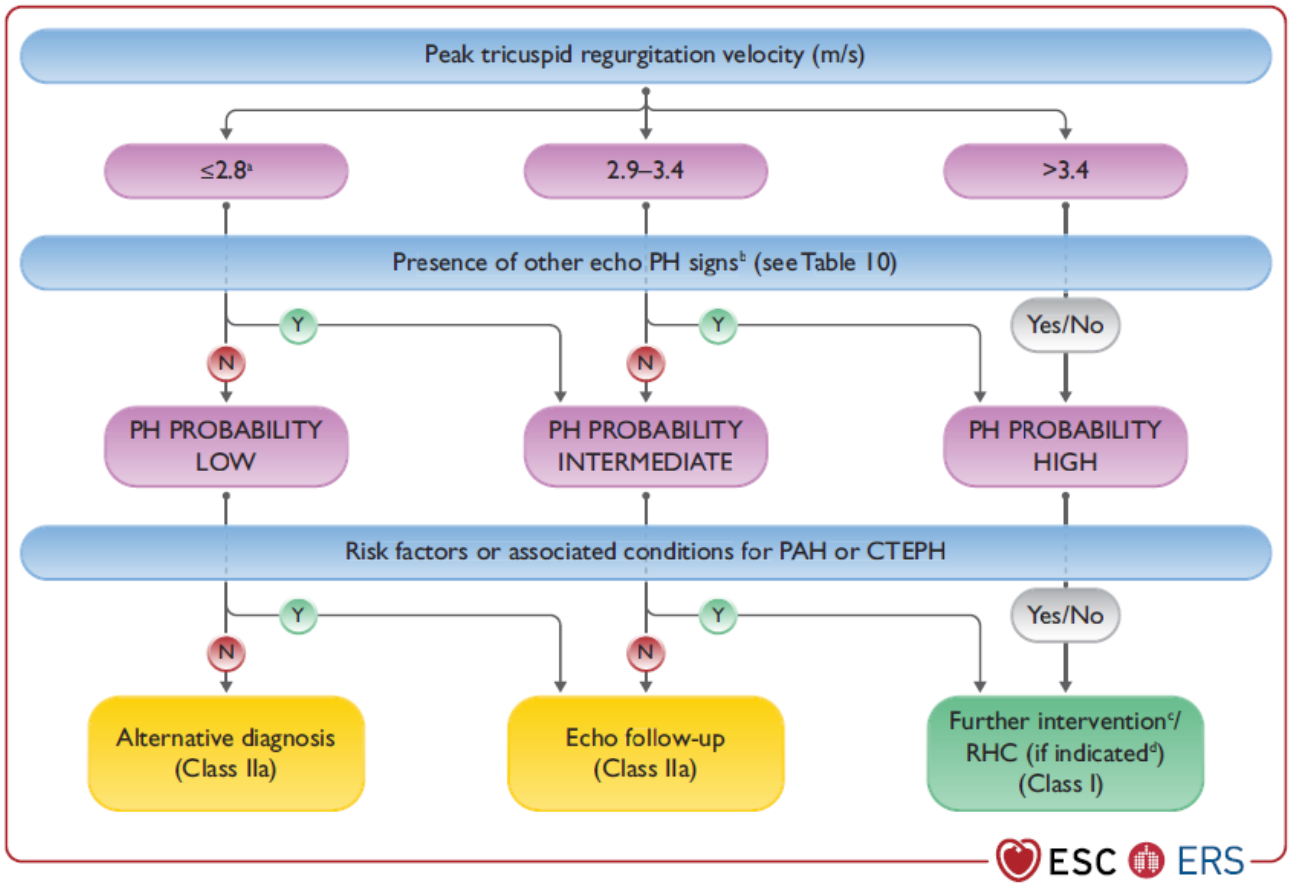
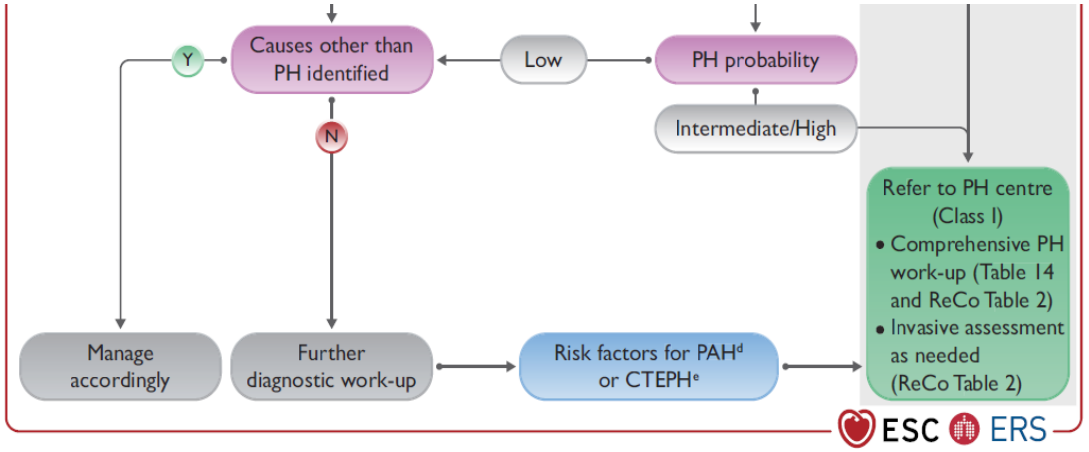
TTE

TRV(peak) = the key variable for assigning the echocardiographic probability of PH.





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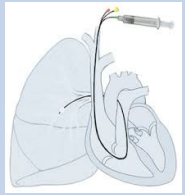
PH
DIAGNOSIS

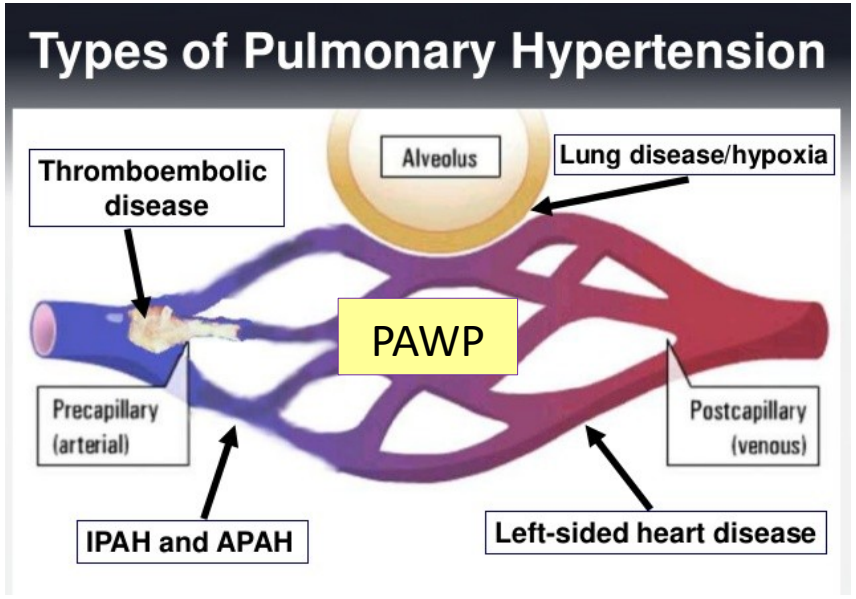


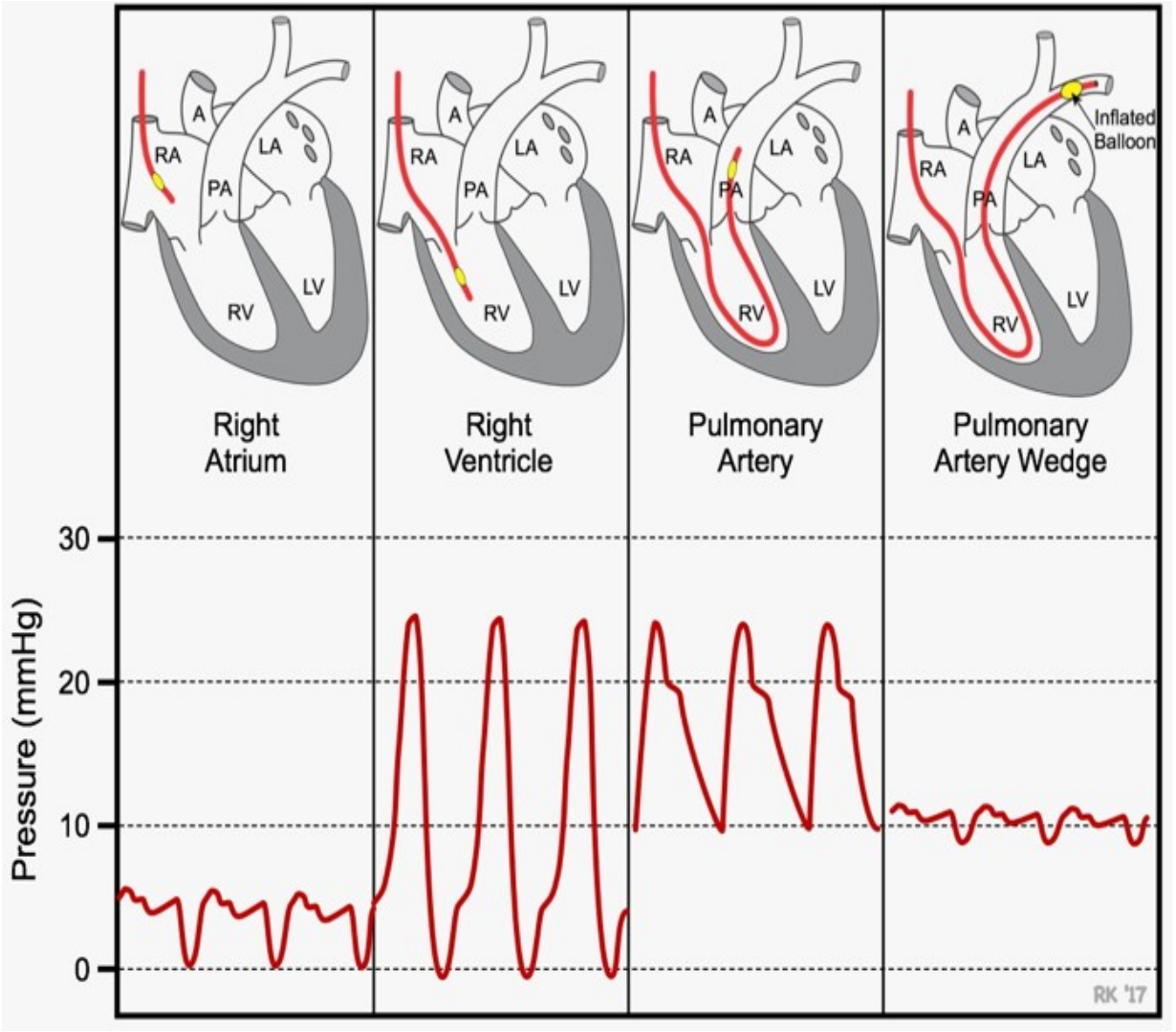
CONFIRMATION

STEP 3 → CONFIRMATION

RHC

- Gold standard for diagnosing and classifying PH
- Expertise and meticulous methodology following standardized protocols is required





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HEMODYNAMIC DEFINITION

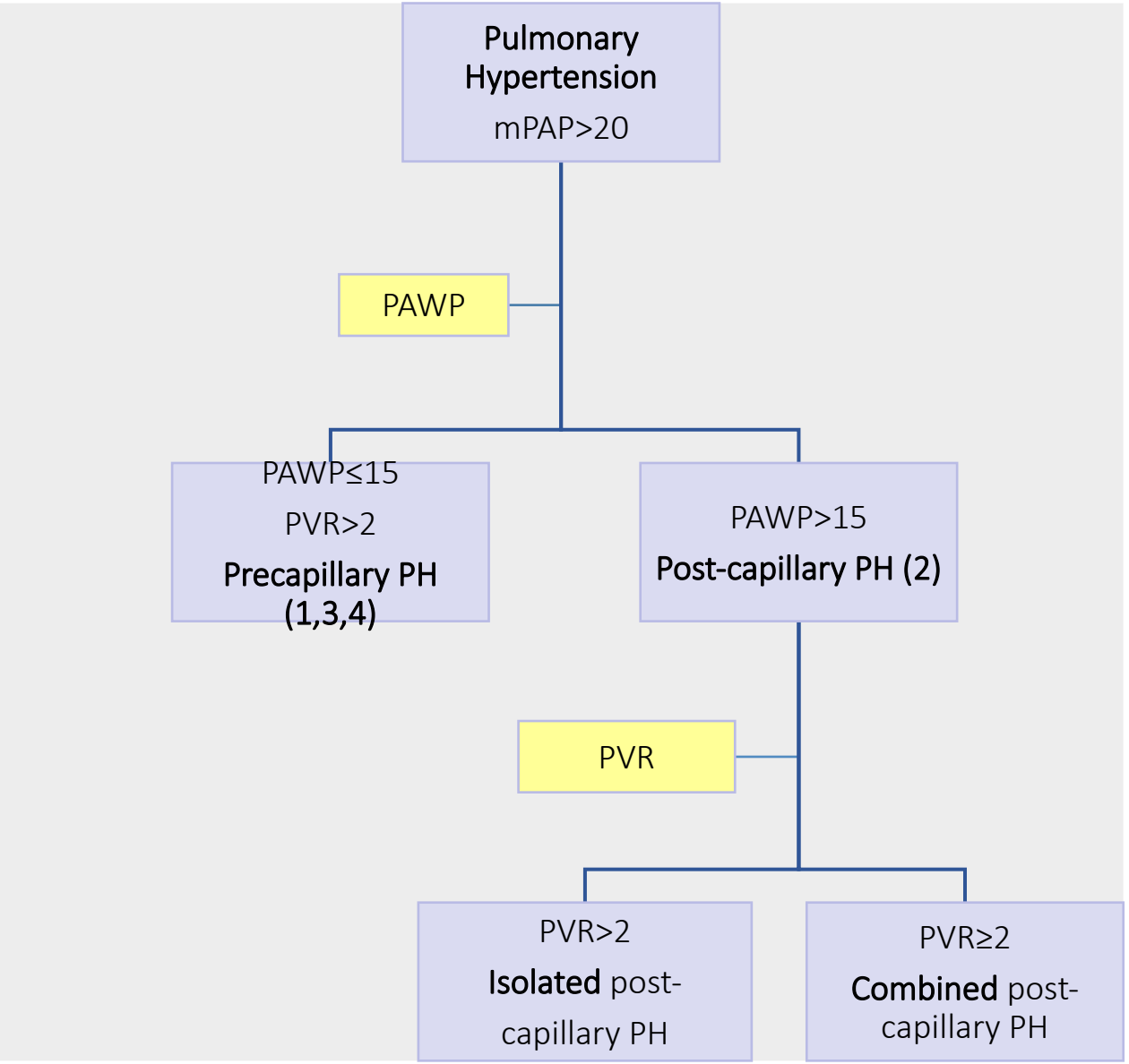

Table 6 Clinical classification of pulmonary hypertension

GROUP 1 Pulmonary arterial hypertension (PAH)
- 1.1 Idiopathic
- 1.2 Heritable[a]
- 1.3 Associated with drugs and toxins[a]
- 1.4 Associated with:
  - 1.4.1 Connective tissue disease
  - 1.4.2 HIV infection
  - 1.4.3 Portal hypertension
  - 1.4.4 Congenital heart disease
  - 1.4.5 Schistosomiasis
- 1.5 PAH with features of venous/capillary (PVOD/PCH) involvement

GROUP 2 PH associated with left heart disease
- 2.1 Heart failure:
- 2.2 Valvular heart disease

GROUP 3 PH associated with lung diseases and/or hypoxia
- 3.1 Obstructive lung disease or emphysema
- 3.2 Restrictive lung disease
- 3.4 Hypoventilation syndromes
- 3.5 Hypoxia without lung disease (e.g. high altitude)

GROUP 4 PH associated with pulmonary artery obstructions
- 4.1 Chronic thrombo-embolic PH
- 4.2 Other pulmonary artery obstructions[c]

GROUP 5 PH with unclear and/or multifactorial mechanisms
- 5.1 Haematological disorders[d]
- 5.2 Systemic disorders[e]
- 5.3 Metabolic disorders[f]

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SCREENING

Despite the advent of PAH therapies that prevent clinical worsening and effective interventions for CTEPH, the time from symptom onset to PH diagnosis remains at >2 years with most patients presenting with advanced disease

ASYMPTOMATIC HIGH RISK GROUPS

- SSc (prevalence: 5–19%)
- BMPR2 mutation carriers (14–42%)
- first-degree relatives of patients with HPAH
- patients undergoing assessment for liver transplantation

SYMPTOMATIC AT RISK GROUPS

- portal hypertension
- HIV infection (0.5%)
- non-SSc CTD
- early detection approaches in PE follow-up clinics
- PH-inducing drug exposure?

Biomarkers → ECG/TTE → PFTs/CPET

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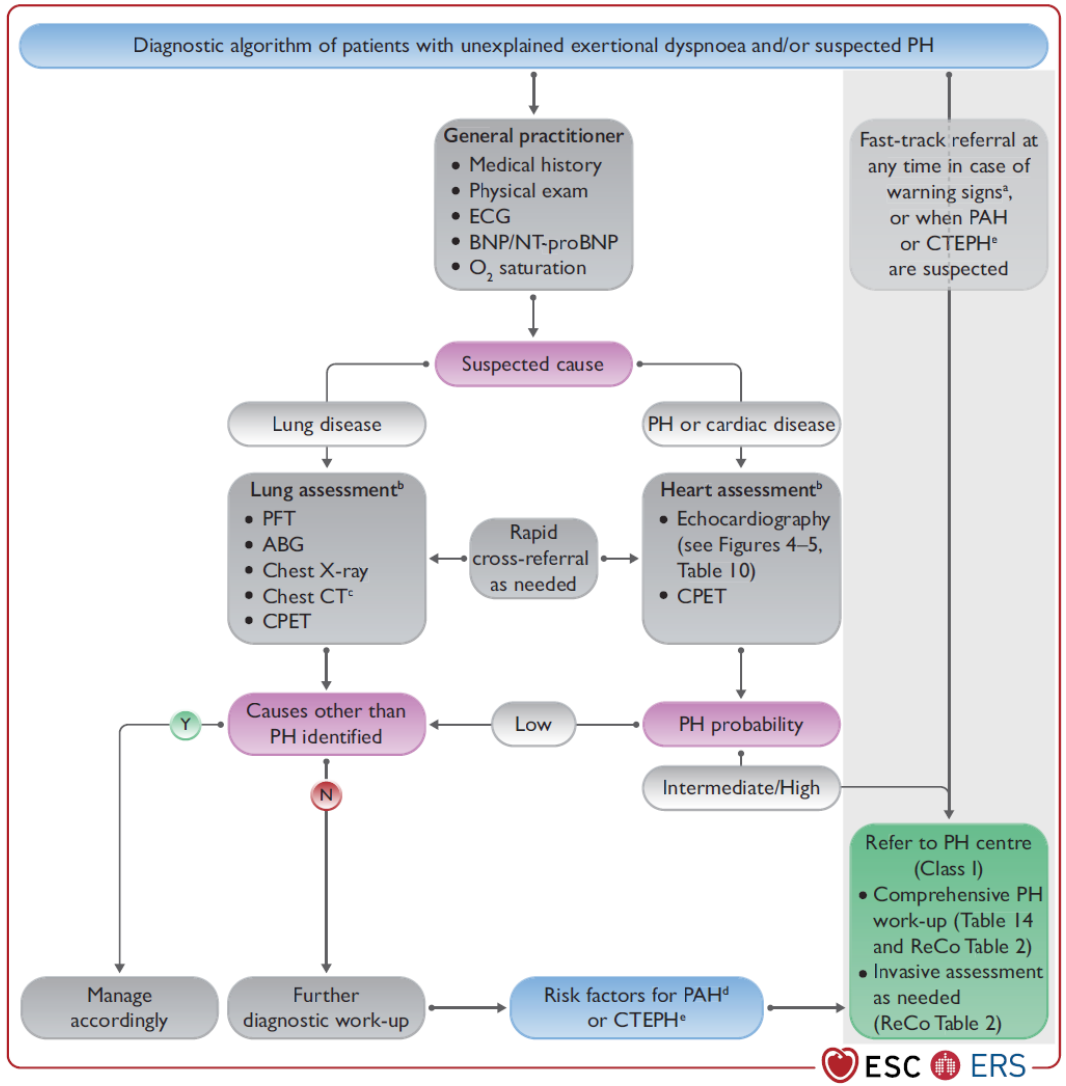
TAKE HOME MESSAGES



1. New onset exertional dyspnea → **SUSPECT** of PH

2. Assess probable lung or cardiac disease and **DETECT** the probable cause

3. If PH probability is high, **CONFIRM** by RHC or **REFER** the patient to a PH center.

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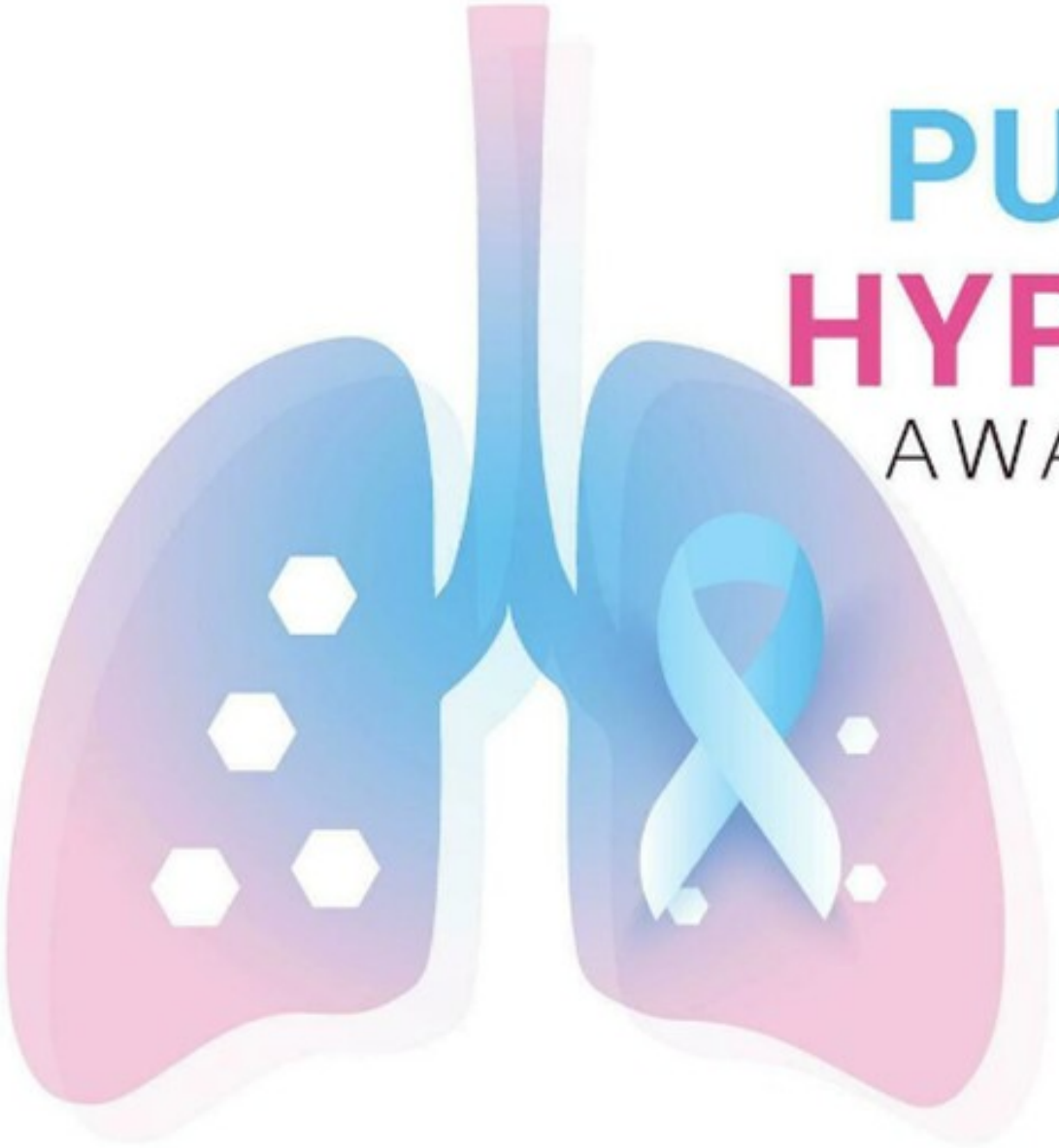

PULMONARY HYPERTENSION

AWARENESS MONTH

NOVEMBER

ΕΥΧΑΡΙΣΤΩ ΓΙΑ
ΤΗΝ ΠΡΟΣΟΧΗ ΣΑΣ!