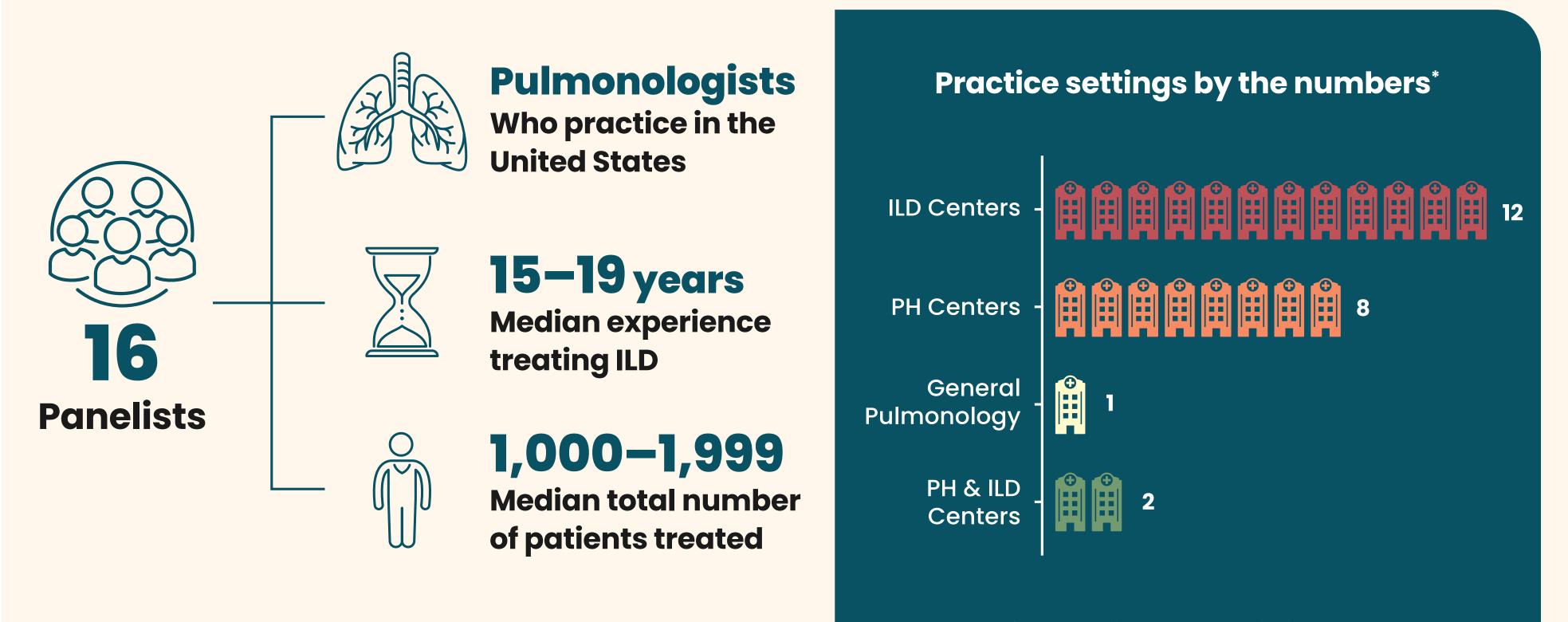
# **Screening Strategies for Pulmonary Hypertension** in Patients with Interstitial Lung Disease

A Multidisciplinary Delphi Study

## **Study Overview**

Early PH evaluation can improve ILD patient outcomes, as an approved therapy is now available. A modified Delphi study was conducted to determine best practices for PH screening in ILD using expert consensus.



\* Some panelists practice in multiple settings

#### Method & panel selection

The modified Delphi method is a systematic approach of obtaining consensus opinions from a panel of independent experts. A PH-ILD working group convened by United Therapeutics constituted most of the Delphi panel. The remaining panelists were nominated by working group members, reviewed, and invited based on the number of nominations and diversity to ensure the Delphi panel was composed of experts from varied backgrounds and practices.

## **Delphi Panel of Experts**



Franck Rahaghi, MD **Cleveland Clinic Florida** Weston, FL



Kevin Flaherty, MD University of Michigan Health System Ann Arbor, MI



Nicholas Kolaitis, MD UCSF Health San Francisco, CA



Lisa Lancaster, MD Vanderbilt University Medical Center Nashville, TN



Ayodeji Adegunsoye, MD The University of Chicago School of Medicine Chicago, IL



**Joyce Lee, MD** University of Colorado School of Medicine Aurora, CO



Joao de Andrade, MD Vanderbilt University Medical Center Nashville, TN



**Deborah Levine, MD** Stanford University Stanford, CA





**Ioana Preston, MD Tufts Medical Center** Boston, MA



**Mary Beth Scholand, MD** University of Utah Health Salt Lake City, UT



Zeenat Safdar, MD **Houston Methodist** Houston, TX

**Oksana Shlobin, MD** 

Inova Fairfax Hospital

Falls Church, VA



Rajan Saggar, MD UCLA School of Medicine Los Angeles, CA



David Zisman, MD Sansum Clinic Santa Barbara, CA



Sandeep Sahay, MD **Houston Methodist** Houston, TX



Steven Nathan, MD Inova Fairfax Hospital Falls Church, VA

# **Expert Consensus for PH-ILD Screening**

## **Triggers for PH Screening in Routine ILD Evaluations**

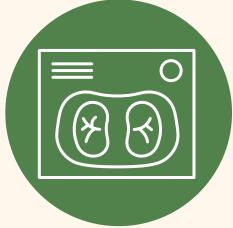
#### Panelists reached consensus on several triggers raising the suspicion for PH including:



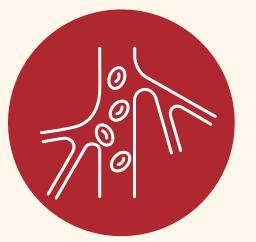




**Clinical signs** 



**Chest CT scan** findings or other imaging



**Pulse oximetry** abnormalities



**6MWT** worsening unexplained in pulmonary function tests

# **2** Initial Set of PH Screening

Panelist consensus: When PH is suspected, echocardiogram and BNP or NT-proBNP are useful as subsequent screening tests



Echocardiogram



**BNP or NT-proBNP elevation** brain natriuretic peptide or N-terminal pro-brain natriuretic peptide

# **Confirm a PH Diagnosis**

#### **Right heart catheterization**

## **Clinical Process for PH Diagnosis**



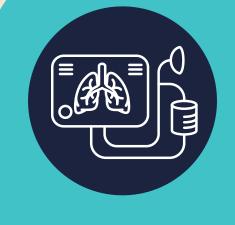
### **Risk factors/symptoms**

• History of pulmonary embolism or heart failure • Dizziness, palpitations, syncope

### Signs

- Altered heart sounds (loud P2 or S2)
- Signs of right heart failure
- Jugular venous distention
- Ankle swelling/peripheral edema
- Hepatomegaly/ascites

### Tests used in concert to risk stratify for PH



## • DLCO **decline** ≥ 15%

**PFTs** 

- DLCO < 40% predicted
- Worsening FVC/DLCO
- FVC%/DLC0% > 1.6



#### **Oxygen saturation & 6MWT**

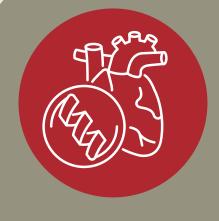
- Any supplemental oxygen needs
- Desaturation disproportionate to ILD severity
- Worsening desaturation
- Lower distance on 6MWT



#### **CT** scan

RV enlargement

- PA enlargement
- PA/aorta ratio > 1.0



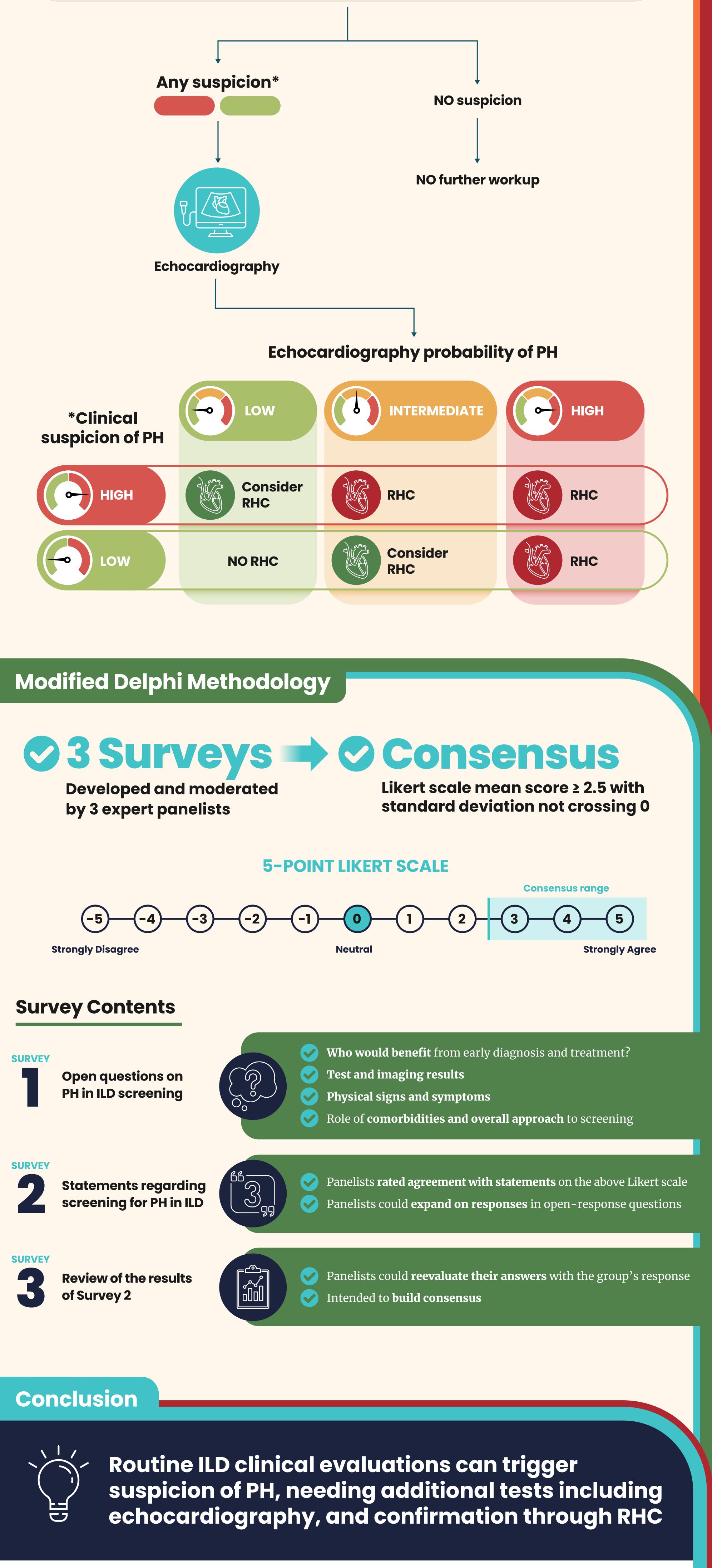
### **BNP/NT-proBNP**

- Elevated BNP (> 200 pg/mL)
- Elevated NT-proBNP (> 395 pg/mL)

Individual laboratories may have different thresholds

Testing that is routinely obtained in patients with ILD

Not routinely obtained, but considered if there is suspicion for underlying heart failure or PH in patients with ILD



6MWD, 6-minute walk distance; 6MWT, 6-minute walk test; BNP, brain natriuretic peptide; DLCO, diffusing capacity of lung for carbon monoxide; ILD, interstitial lung disease; NT-proBNP, N-terminal pro-brain natriuretic peptide; n, number; PA, pulmonary artery; PFT, pulmonary function test; PH, pulmonary hypertension; RHC: right heart catheterization; RV, right ventricular; SD, standard deviation

