Executive Summary

- This activity focused on improving the diagnosis of Pulmonary Arterial Hypertension (PAH) with updated guidelines, using risk stratification to adjust therapy and addressing adverse effects while improving patient adherence.

- 917 attendees in multiple professional specialties were reached in this program.

- Improvement across all learning domains was noted ranging from 29% to 65%.

- Overall, the program improved the ability of learners to recognize how to diagnosis and manage PAH.

Persistent Educational Gaps

- Though improvements were observed, learners demonstrated persistent gaps in the several areas including:
  - Diagnosing PAH and interpreting the impact of pulmonary pressures
  - Recognizing the difference between Ventilation-Perfusion scanning and CT Pulmonary Angiogram for the diagnosis of CTEPH
  - Treatment strategies for PAH and how to further adjust treatment based on risk
  - Management of medication related adverse events

The post-test scores, and self reported confidence regarding the management of patients with PAH, signifies a clear gap in knowledge and an unmet need among clinicians. It continues to be an important area for future educational programs.

*These numbers represent the total number of attendees, irrespective of assessment participation*
## Learning Objectives

1. Describe new definitions of PAH and approaches to improving diagnosis

2. Outline an approach to rule out and appropriately manage chronic thromboembolic pulmonary hypertension (CTEPH), if present

3. Utilize risk stratification for selecting and escalating therapy in patients with PAH

4. Describe the management of adverse events with PAH therapies and strategies to improve patient adherence
Course Director
Franck Rahaghi, MD, MHS, FCCP
Chairman, Department of Pulmonary Medicine
Director, Pulmonary Hypertension Clinic
Head, Pulmonary Education and Rehabilitation
Department of Pulmonary and Critical Care
Cleveland Clinic Florida
Weston, FL

Faculty
Farbod N. Rahaghi, MD, PhD *
Instructor, Harvard Medical School
Applied Chest Imaging Laboratory
Pulmonary Vascular Disease Program
Brigham and Women's Hospital
Pulmonary and Critical Care Internal Medicine
Boston, MA

Gregory Cosgrove, MD
Associate Professor
Assistant Director, Interstitial Lung Disease Program
Department of Medicine
Division of Pulmonary, Critical Care & Sleep Medicine
Endowed Chair in Interstitial Lung Disease
National Jewish Health
Denver, CO

Sandhya Khurana, MD
Professor, Pulmonary and Critical Care Medicine
Director, Mary Parkes Center for Asthma, Allergy & Pulmonary Care
University of Rochester School of Medicine
Rochester, NY

Mehdi Mirsaeidi MD, MPH
Director of UM and VA Sarcoidosis Programs
IRB Vice-Chairman, Miami VA Healthcare System
Division of Pulmonary, Critical Care, Sleep and Allergy
Department of Medicine
University of Miami
Miller School of Medicine
Miami, FL

Farbod N. Rahaghi, MD, PhD *
Instructor, Harvard Medical School
Applied Chest Imaging Laboratory
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Gregory Cosgrove, MD
Associate Professor
Assistant Director, Interstitial Lung Disease Program
Department of Medicine
Division of Pulmonary, Critical Care & Sleep Medicine
Endowed Chair in Interstitial Lung Disease
National Jewish Health
Denver, CO

Samuel Gurevich, MD, FCCP
Medical Director, Respiratory Therapy
Cleveland Clinic Florida
Clinical Assistant Professor of Medicine
Cleveland Clinic
Cleveland Clinic Lerner College of Medicine of Case Western Reserve University
Weston, FL

Sajive Aleyas, MD
Interventional Pulmonary
Cleveland Clinic Florida
Weston, FL

Activity Planning Committee
Gregg Sherman, MD
Michelle Frisch, MPH, CCMEP
Sandy Bihlmeyer M.Ed
Franck Rahaghi, MD, MHS, FCCP
Sheila Lucas, CWEP
Joshua F. Kilbridge
Cedric Nazareth, MBBS
Deborah Paschal, CRNP

*Presented PAH lecture
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- Grifols
- Mallinckrodt, LLC
- Shire
Levels of Evaluation

Consistent with the policies of the ACCME, NACE evaluates the effectiveness of all CME activities using a systematic process based on Moore’s model. This outcome study reaches Level 5.

- **Level 1: Participation**
- **Level 2: Satisfaction**
- **Level 3: Declarative and Procedural Knowledge**
- **Level 4: Competence**
- **Level 5: Performance**
- **Level 6: Patient Health**
- **Level 7: Community Health**

Level 1:
Participation and Demographics
Level 1: Participation

917 total attendees

On site: 97 attendees

National online simulcast: 820 attendees

November 23, 2019, Coral Springs, FL

90% Provide direct patient care
## Level 1: Demographics and Patient Reach

### Specialty

<table>
<thead>
<tr>
<th>Specialty</th>
<th>Patients seen each week, in any clinical setting:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulmonology</td>
<td>&gt;75: 23%</td>
</tr>
<tr>
<td>Internal Medicine/Primary Care</td>
<td>51-75: 20%</td>
</tr>
<tr>
<td>Cardiology</td>
<td>25-50: 27%</td>
</tr>
<tr>
<td>Hospitalist</td>
<td>&lt;25: 30%</td>
</tr>
<tr>
<td>Emergency Medicine</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
</tr>
</tbody>
</table>

### Profession

<table>
<thead>
<tr>
<th>Profession</th>
<th>Years in Practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>MD</td>
<td>&lt;5: 26%</td>
</tr>
<tr>
<td>DO</td>
<td>5-10: 17%</td>
</tr>
<tr>
<td>NP</td>
<td>11-20: 21%</td>
</tr>
<tr>
<td>PA</td>
<td>&gt;20: 36%</td>
</tr>
<tr>
<td>RN</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
</tr>
</tbody>
</table>

### Patient Care Focus: 90%

- Pulmonology: 56%
- Internal Medicine/Primary Care: 6%
- Cardiology: 3%
- Hospitalist: 4%
- Emergency Medicine: 26%
- Other: 4%

- MD: 17%
- DO: 2%
- NP: 59%
- PA: 12%
- RN: 7%
- Other: 3%

- Years in Practice:<br>
  - <5: 26%
  - 5-10: 17%
  - 11-20: 21%
  - >20: 36%
Level 2-5: Outcomes Metrics
Level 2: Satisfaction

88% rated the activity as excellent

89% indicated the activity improved their knowledge

88% stated that they learned new and useful strategies for patient care

91% said they would implement new strategies that they learned

98% said the program was fair-balanced and unbiased
Confidence Assessment

Please rate your confidence in your ability to manage patients with PAH:
(Learning Objectives 2, 3, 4)

Confidence Levels:
- Not at all confident
- Slightly confident
- Moderately confident
- Pretty much confident
- Very confident

Pre: 342  PCA: 161

N= 54%  Slightly confident: 41%
N= 33%  Moderately confident: 32%
N= 12%  Pretty much confident: 12%
N= 10%  Very confident: 3%
N= 8%   Not at all confident: 54%
Which of the following is **NOT** a critical reason for the necessity of right heart catheterization in the diagnosis of PH?

(Learning Objective 1)

- Obtaining accurate measures of mean pulmonary pressure for the purpose of establishing the diagnosis of PH
- Distinguishing precapillary and post-capillary PH
- Pulmonary vasodilatory testing
- Obtaining accurate measures of pulmonary pressures for prognostication/risk assessment
- Measuring Cardiac Index to evaluate degree of heart failure

N= 246
Pre: 246
Post: 249
PCA: 161

Pre to Post Change 29%
Pre to PCA Change 49%
25 y/o female with history of contraceptive use and obesity who was admitted for acute shortness of breath and diagnosed with acute pulmonary embolism comes in for follow up 6 month after the diagnosis. She has remained on anticoagulation and has been adherent to therapy. She says that although she feels better she still feels short of breath. Her chest x-ray remains clear. Which of the following tests would best rule out chronic thromboembolic disease.

(Learning Objective 2)

<table>
<thead>
<tr>
<th>Test</th>
<th>Pre (N=257)</th>
<th>Post (N=259)</th>
<th>PCA (N=161)</th>
<th>Pre to Post Change</th>
<th>Pre to PCA Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planar Pulmonary Angiography</td>
<td>8%</td>
<td>8%</td>
<td>8%</td>
<td></td>
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</tr>
<tr>
<td>Echocardiogram</td>
<td>9%</td>
<td>8%</td>
<td>13%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ventilation-Perfusion lung scanning</td>
<td>32%</td>
<td>49%</td>
<td>40%</td>
<td></td>
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</tr>
<tr>
<td>Cardiopulmonary Exercise Testing</td>
<td>4%</td>
<td>3%</td>
<td>6%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CT pulmonary angiography</td>
<td></td>
<td></td>
<td></td>
<td>47%</td>
<td>31%</td>
</tr>
</tbody>
</table>

P<=0.05
Which of the following is true of therapies in patients with pulmonary arterial hypertension?

(Learning Objective 3)

In high risk patients, monotherapy with IV Prostacyclin is recommended, as additional agents add very little to this therapy.

Transition from high risk to intermediate risk after therapy suggests that no further escalation of therapy is indicated.

Oxygen requirements are not a major component of the decision to escalate treatment in PAH.

Upfront combination therapy is not recommended in a patient with a new diagnosis of PAH who is deemed to be low-risk.

P <= .05

Pre to Post Change 65%
Pre to PCA Change 12%
Which of the following is true about adverse event management in treatments of PAH:
(Learning Objective 4)

- Switching medications within a class rarely effects tolerance of specific adverse events: Pre 22%, Post 16%, PCA 18%
- Constipation is a common side-effect of IV Prostacyclin therapy: Pre 13%, Post 9%, PCA 17%
- Headache associate with prostacyclin therapy should not be treated with over the counter medications: Pre 21%, Post 14%, PCA 19%
- Edema is not a side-effect of pulmonary vasodilators: Pre 9%, Post 5%, PCA 10%
- Upfront combination therapy can increase the incidence of certain adverse events: Pre 9%, Post 35%, PCA 36%

Knowledge Assessment

N= 175
Pre: 162
PCA: 161

Pre to Post Change 60%
Pre to PCA Change 3%

P<=.05
(4-week Post Assessment)

Please select the specific areas of *skills, or practice behaviors*, you have improved regarding the screening, diagnosis and treatment of Pulmonary Arterial Hypertension since this CME activity. (Select all that apply.)

N=117

- Timely referral: 37%
- Patient education: 34%
- Patient engagement: 20%
- Disease state awareness: 55%
- Non-pharmacotherapy: 16%
What specific barriers have you encountered that may have prevented you from successfully implementing screening, diagnosis and treatment of Pulmonary Arterial Hypertension since this CME activity? (Select all that apply)

N=117

- Insurance/Financial issues: 36%
- Medication costs: 36%
- Time constraints: 13%
- Patient adherence/compliance: 33%
- Lack of knowledge: 42%
Persistent Educational Gaps After 4 Weeks

- Diagnosing PAH and interpreting the impact of pulmonary pressures
- Recognizing the difference between Ventilation-Perfusion scanning and CT Pulmonary Angiogram for the diagnosis of CTEPH
- Treatment strategies for PAH and how to further adjust treatment based on risk
- Management of medication related adverse events
Participant Educational Gains

Greater recognition of the benefits of right heart catheterization in the diagnosis of PAH but that it is not required for prognostication/risk stratification.

Greater awareness that oxygen requirements are not a major component of the decision to escalate therapy in PAH.

More aware that Ventilation-Perfusion lung scanning is most appropriate to rule out chronic thromboembolic disease.

More aware of adverse events associated with PAH therapy and how to manage it.
Key Take-home Points

Significantly improved learner confidence in the ability to manage patients with PAH

After 4 weeks, participants reported the following improved skills regarding the screening, diagnosis and treatment of PAH: 55% disease state awareness, 37% timely referral, and 34% patient education

90% of learners are engaged in direct patient care and 91% reported that they will implement new strategies they learned

After 4 weeks, participants reported the following barriers regarding the screening, diagnosis and treatment of PAH: 42% lack of knowledge, 33% patient adherence/compliance, 36% insurance/financial issues