

Emerging Challenges in Primary Care: 2018
**Evolving Strategies of Care in Pulmonary Arterial
Hypertension:
Integrating the Data into Practice**



Final Live Activities Outcomes Report
Prepared for: Actelion Pharmaceuticals US, Inc.

Grant ID: 39124651

October 26, 2018

Executive Summary

- ❖ This curriculum focused on the management of pulmonary arterial hypertension (PAH), including risk factors, diagnostic strategy, treatment options, and ongoing monitoring.
- ❖ Substantial improvements were measured in learners' awareness of the risk factors for PAH and in their confidence to recognize its features.



3,169*
Total Attendees



9 Cities

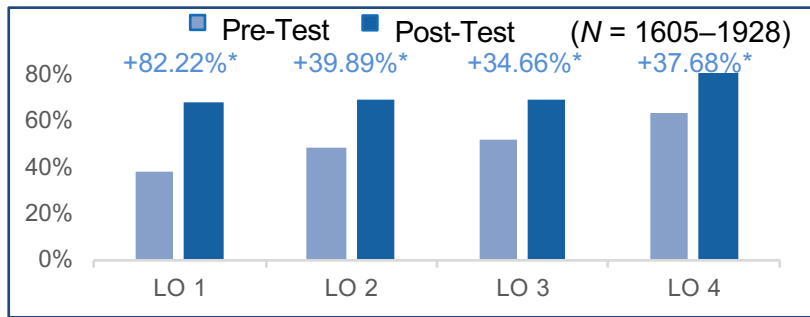


1,846*
On Site



1,323*
Simulcast / Virtual Symposium

Pre to Post Test Results By Learning Objective



- ❖ **82% Improvement:** Review the risk factors and classification of pulmonary hypertension (PH)
- ❖ **40% Improvement:** Discuss the appropriate diagnostic strategy for pulmonary arterial hypertension (PAH), including the roles of echocardiography, ventilation/perfusion (V/Q) scanning, and right heart catheterization (RHC)
- ❖ **35% Improvement:** Review current and emerging treatments for patients with PAH
- ❖ **38% Improvement:** Describe how to monitor patients with PAH for disease progression

Impact

- ❖ 3,169 attendees were reached via both online and live formats, with significant gains observed across cohorts and modalities from Pre-Test to Post-Test.
- ❖ Despite their substantial improvements, learners remain challenged in their awareness of risk factors for PAH and the importance of evaluating a patient's WHO functional class as part of the diagnostic workup.
- ❖ Learners demonstrated significant net increases on all scored items in the 4-week Post Curriculum Assessment. A substantial net increase was also measured in learners' reported Confidence.

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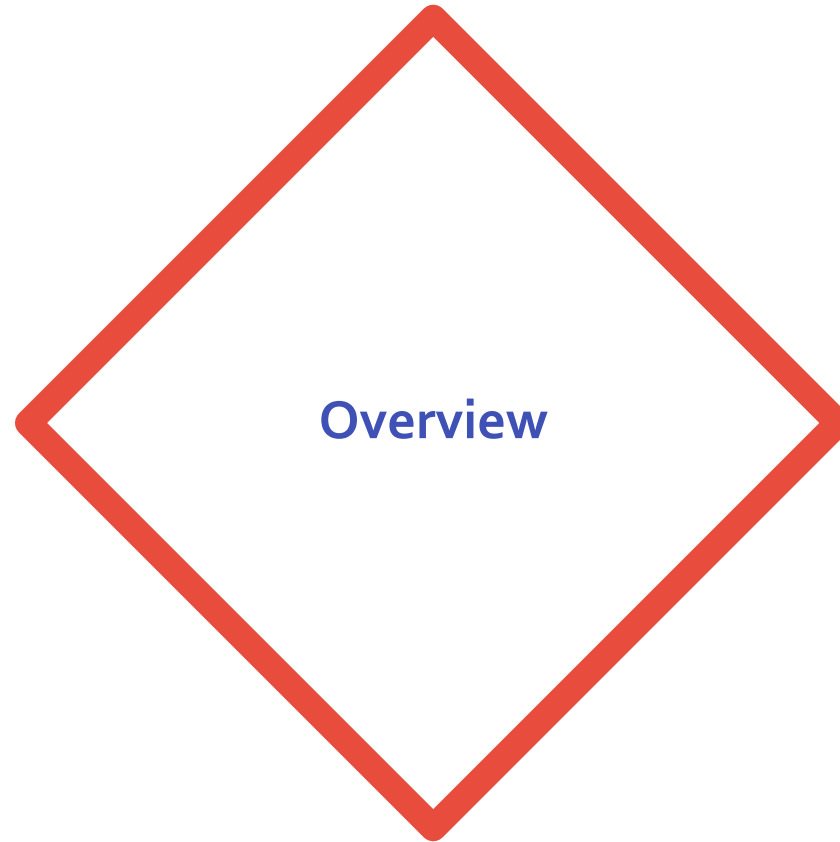
Emerging Challenges in Primary Care 2018

17th Annual Regional and Online CME Conference Series

Commercial Support

The Emerging Challenges in Primary Care: 2018 series of CME activities were supported through educational grants or donations from the following companies:

- ❖ Actelion Pharmaceuticals US, Inc
- ❖ AstraZeneca Pharmaceuticals LP
- ❖ ER/LA Opioid Analgesic REMS Program Companies
- ❖ Lilly USA
- ❖ Novo Nordisk Inc
- ❖ Sanofi Genzyme and Regeneron Pharmaceuticals





Emerging Challenges in Primary Care 2018

17th Annual Regional and Online CME Conference Series

8 Accredited Live Regional Symposia
April 28, 2018 – August 18, 2018



Online Interactive Enduring CME Activity :

- ❖ Launch Date: September 6, 2018
- ❖ End Date: September 5, 2019
- ❖ Hosted at: http://naceonline.com/CME-Courses/course_info.php?course_id=1029



Evolving Strategies of Care in Pulmonary Arterial Hypertension

PULMONARY DISEASE

Curriculum:

Evolving Strategies of Care in Pulmonary Arterial Hypertension: Integrating the Data into Practice

Credits:

1 AANP Contract Hours 1 AMA PRA Category 1 Credit(s)TM

START COURSE

REMIND ME LATER

1 Accredited Live Virtual Symposium:
June 23, 2018



Clinical Highlights eMonograph -

eMonograph containing key teaching points from the CME Activity was distributed 1 week after the meeting to all attendees.

Emerging Challenges in Primary Care

LIVE CONFERENCE SERIES

2018 Clinical Highlights

Evolving Strategies of Care in Pulmonary Arterial Hypertension: Integrating the Data into Practice

Faculty
Alexander Duarte, MD
 Professor
 Division of Pulmonary Critical Care & Sleep Medicine
 Department of Internal Medicine
 University of Texas Medical Branch

- Pulmonary Hypertension is an imprecise term!
- One interpretation is increased pulmonary pressure, which is not a disease but a manifestation of disease.
- It is a set of diseases which manifest with increased pulmonary pressure.

Learning Objectives

- ❖ Review the risk factors and classification of pulmonary hypertension (PH)
- ❖ Discuss the appropriate diagnostic strategy for pulmonary arterial hypertension (PAH), including the roles of echocardiography, ventilation/perfusion (V/Q) scanning, and right heart catheterization (RHC)
- ❖ Review current and emerging treatments for patients with PAH
- ❖ Describe how to monitor patients with PAH for disease progression

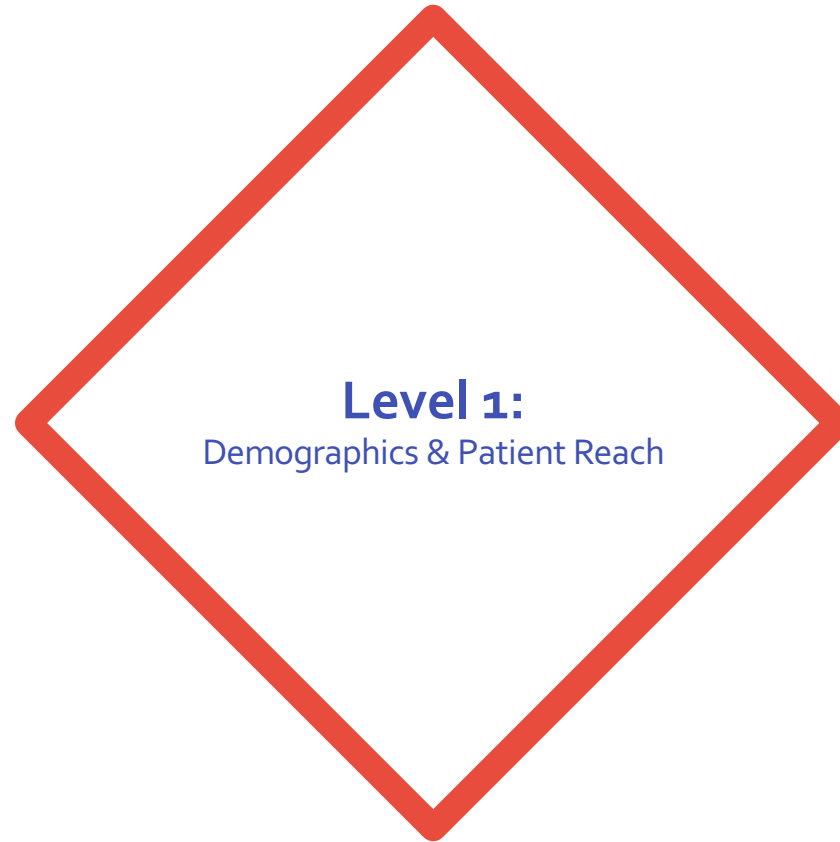
Outcomes Methodology

Learning outcomes were measured using matched Pre-Test and Post-Test scores for Knowledge, Competence, Confidence, and practice strategy and across all of the curriculum's Learning Objectives.

| Outcomes Metric | Definition | Application |
|-------------------------------|--|---|
| Percentage change | This is how the score changes resulting from the education are measured. The change is analyzed as a relative percentage difference by taking into account the magnitude of the Pre-Test average. | Differences between Pre-Test, Post-Test, and PCA score averages |
| P value (p) | This is the measure of the statistical significance of a difference in scores. It is calculated using dependent or independent samples t-tests to assess the difference between scores, taking into account sample size and score dispersion. Differences are considered significant for when $p \leq .05$. | Significance of differences between Pre-Test, Post-Test, and PCA scores and among cohorts; significance of drivers in predictive modeling |
| Effect size (d) | This is a measure of the strength/magnitude of the change in scores (irrespective of sample size). It is calculated using Cohen's d formula, with the most common ranges of d from 0-1: $d < .2$ is a small effect, $d = .2-.8$ is a medium effect, and $d > .8$ is a large effect. | Differences between Pre-Test, Post-Test, and PCA score averages |
| Power | This is the probability (from 0 to 1) that the "null hypothesis" (no change) will be appropriately rejected. It is the probability of detecting a difference (not seeing a false negative) when there is an effect that is dependent on the significance (p), effect size (d), and sample size (N). | Differences between Pre-Test, Post-Test, and PCA score averages |
| Percentage non-overlap | This is the percentage of data points at the end of an intervention that surpass the highest scores prior to the intervention. In this report, it will reflect the percentage of learners at Post-Test who exceed the highest Pre-Test scores. | Differences between Pre-Test, Post-Test, and PCA score averages |

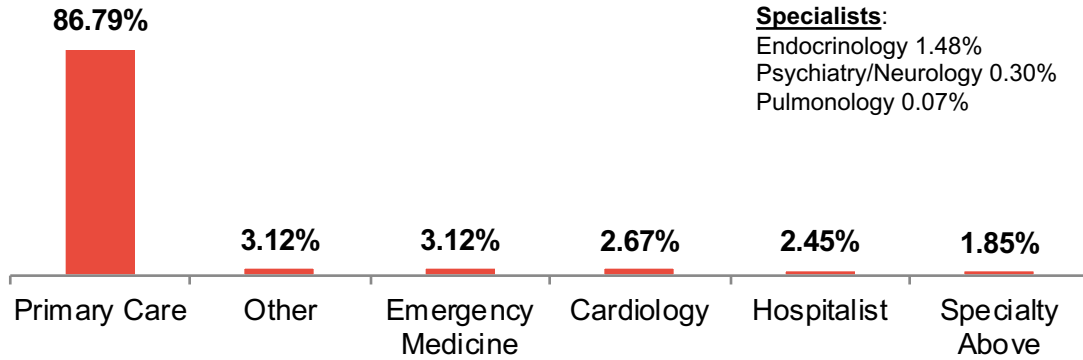
Participation

| 2018 Meeting/Simulcast | Date | Attendees |
|-------------------------|---------|--------------|
| Miami, FL | 4/28/18 | 179 |
| Baltimore, MD | 5/5/18 | 218 |
| Baltimore, MD Simulcast | 5/5/18 | 372 |
| St. Louis, MO | 5/12/18 | 129 |
| Birmingham, AL | 5/19/18 | 195 |
| Atlanta, GA | 6/2/18 | 233 |
| Atlanta, GA Simulcast | 6/2/18 | 296 |
| Tampa, FL | 6/9/18 | 275 |
| Raleigh, NC | 6/16/18 | 168 |
| Virtual Symposium | 6/23/18 | 655 |
| Anaheim, CA | 8/11/18 | 204 |
| Houston, TX | 8/18/18 | 245 |
| Total | | 3,169 |



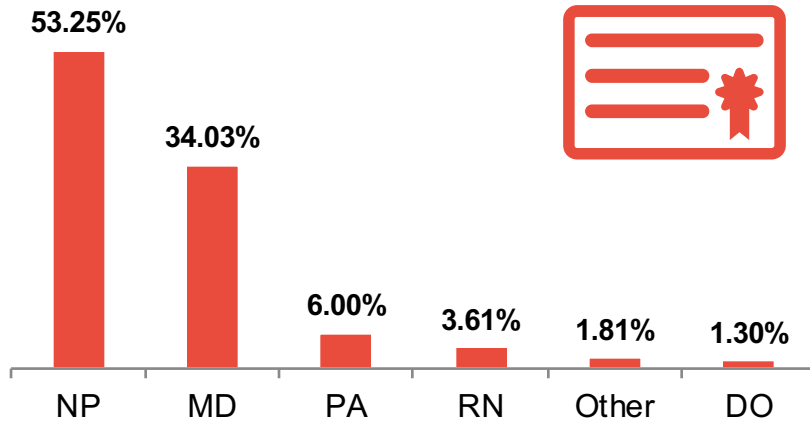
Level 1: Participation

Specialty

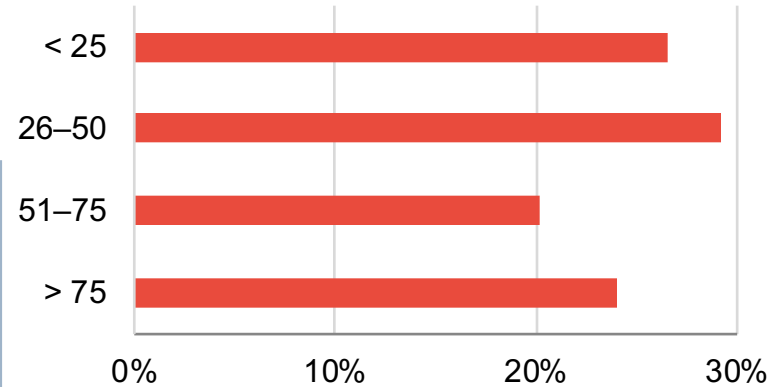


Patient Care Focus: 94%

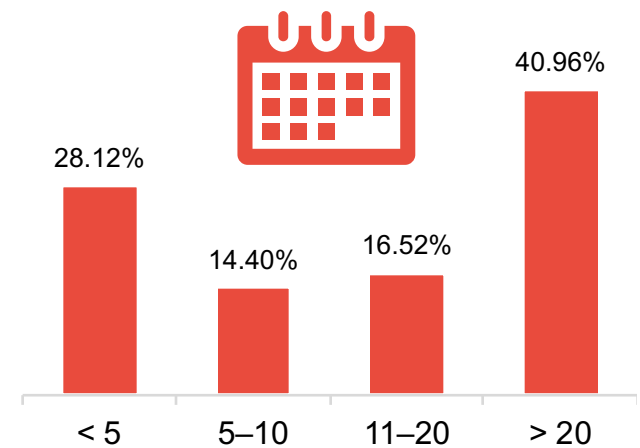
Profession



Patients seen each week, in any clinical setting:



Years in Practice

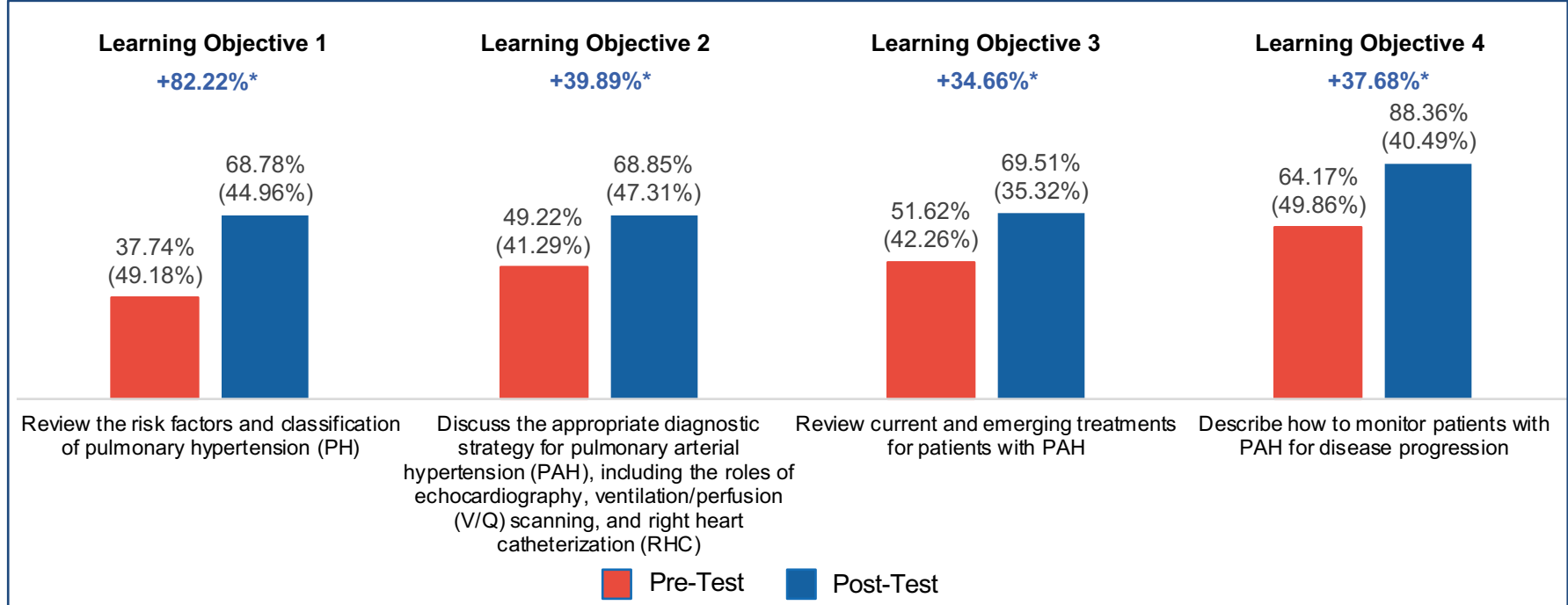




Level 2-5:
Outcomes Metrics

Learning Objectives Analysis

(N = 1605–1928)

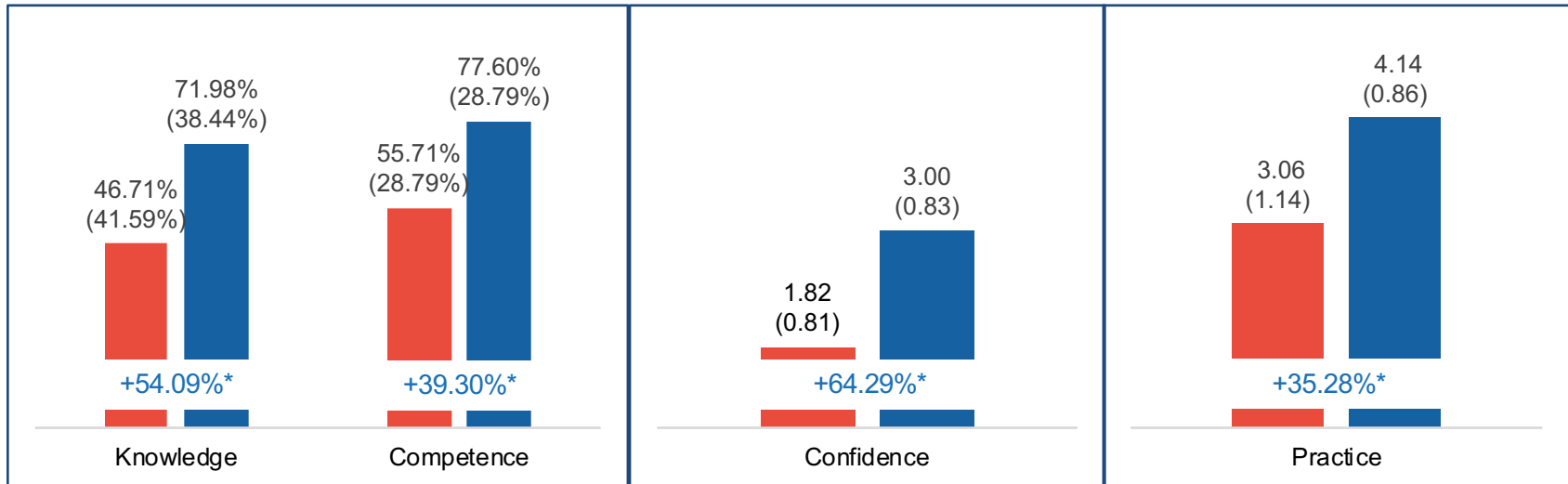


**significant at the $p \leq 0.05$ level*

- ❖ Substantial and significant gains (ranging from 35% to 82%) from low Pre-Test averages were achieved on all Learning Objectives.
- ❖ Post-Test averages remained low (<70%) on the three Learning Objectives related to risk factors, diagnostic strategies, and treatments for PAH. Only Learning Objective 4 on the monitoring of patients with PAH showed a high Post-Test score (88%).
 - The high score on Learning Objective 4 was due to a high level of proficiency achieved on the use of echocardiograms for the ongoing monitoring of a patient with PAH who is being treated with combination therapy.

Learning Domain Analysis

(N = 1254–1792)



■ Pre-Test ■ Post-Test

**significant at the $p \leq 0.05$ level, matched data*

- ❖ Significant gains (35%–64%) were achieved in all learning domains.
- ❖ The substantial 54% increase in Knowledge was due to increases of 25% and 82% on the two individual Knowledge questions related to PAH risk factors and the efficacy of combination therapies.
- ❖ The 39% increase in Competence was due to increases ranging from 26% to 50% on questions addressing the management of a patients with PAH from diagnosis to monitoring.
- ❖ Learners substantially (64%) increased their reported Confidence in their ability to recognize the features of PAH. The Post-Test rating, however, remained low (3.0).
- ❖ There was also a substantial (35%) increase, resulting in a high Post-Test rating, in learners' reported intent to order an echocardiogram for a patient with unexplained shortness of breath.

Curriculum/Activity Intervention Effect

| Learning Domain | Effect Size* | % Non-Overlap |
|-----------------|--------------|---------------|
| Knowledge | 0.631 | 45.77% |
| Competence | 0.653 | 43.41% |

Effect Size Definition: This is a standardized measure of the strength/magnitude of the change in scores, irrespective of sample size. This metric quantifies the association between outcome and exposure to education, in a way which makes meta-analysis possible. There exist many types of effect size measures, each appropriate in different situations. We select Cohen's d for this analysis, which is a standardized difference in mean. Most commonly, d ranges from 0–1: $d < 0.2$ is a small effect, $d = 0.2–0.8$ is a medium effect, and $d > 0.8$ is a large effect.

Learning Domain by Professional Cohort

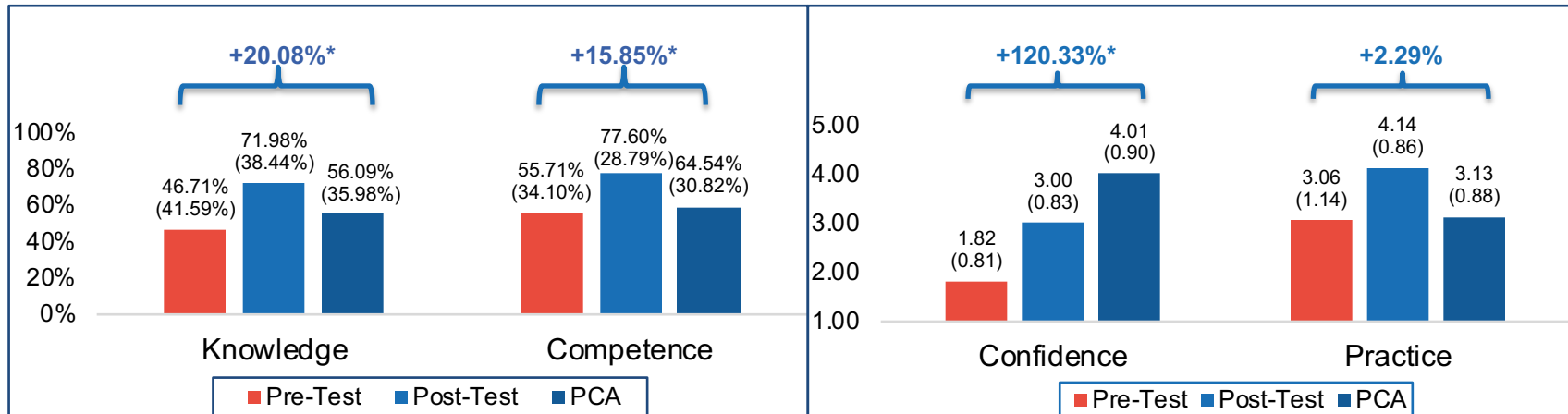
| Learning Domain | Nurse Practitioner | | | | Physician | | | |
|-----------------|--------------------|--------------------|--------------------|-----------------|-----------|--------------------|--------------------|-----------------|
| | N | Pre-Test | Post-Test | % Change | N | Pre-Test | Post-Test | % Change |
| Knowledge | 531 | 43.97% (39.91%) | 75.33% (36.10%) | +71.31%* | 345 | 53.04% (42.71%) | 70.72% (39.54%) | +33.33%* |
| Competence | 562 | 55.81% (33.92%) | 81.17% (27.33%) | +45.43%* | 365 | 55.30% (32.49%) | 79.82% (26.47%) | +44.34%* |
| Confidence | 367 | 1.64 (0.77) | 2.86 (0.81) | +73.80%* | 285 | 1.93 (0.81) | 3.14 (0.80) | +62.73%* |
| Practice | 386 | 3.01 (1.15) | 4.11 (0.81) | +36.81%* | 295 | 3.14 (1.10) | 4.21 (0.89) | +34.38%* |

**significant at the $p \leq 0.05$ level*

- ❖ Nurse practitioners (NPs) and physicians demonstrated statistically significant gains in all learning domains.
- ❖ In Knowledge and Competence, NPs demonstrated modestly higher Post-Test averages compared to physicians.
 - NPs' Pre-Test average in Knowledge was lower than that of physicians; however, their substantially greater gain, which was more than twice as large as that of physicians, resulted in their higher Post-Test score.
- ❖ On the Confidence and practice strategy ratings, physicians demonstrated moderately higher Pre-Test and Post-Test averages.

4-Week Retention Analysis

(N = 670)



**significant at the $p \leq 0.05$ level*

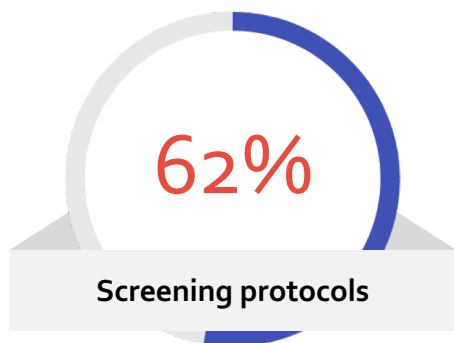
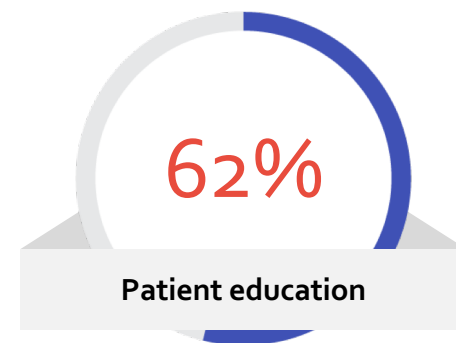
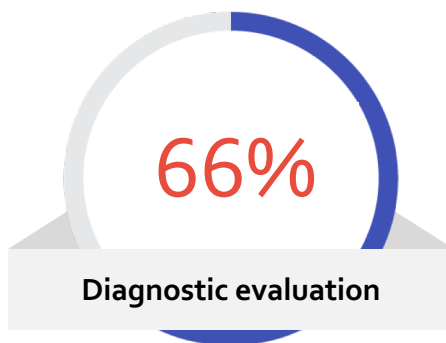
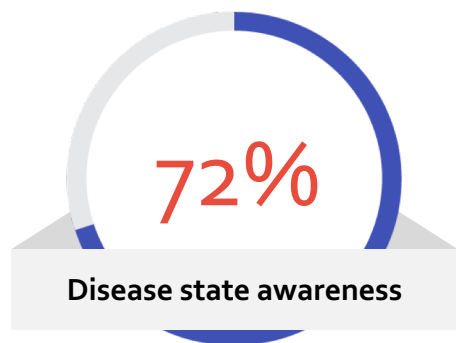
At follow-up:

- ❖ Statistically significant net gains were measured from Pre-Test to the Post Curriculum Assessment (PCA) in all areas except for practice strategy.
- ❖ Significant net gains were measured in Knowledge and Competence; however, the score slippage that was observed in these domains resulted in low PCA scores, reinforcing the need for continued education on the management of PAH.
- ❖ The greatest net increase (120%) were observed in Confidence, in part due to further increases in reported Confidence from Post-Test to the PCA.
- ❖ A modest non-significant 3% net increase was measured in practice strategy, due to the score slippage from Post-Test to the PCA.

(4-week Post Assessment)

Please select the specific areas of *skills, or practice behaviors*, you have improved regarding the treatment of patients with PAH since this CME activity. (Select all that apply.)

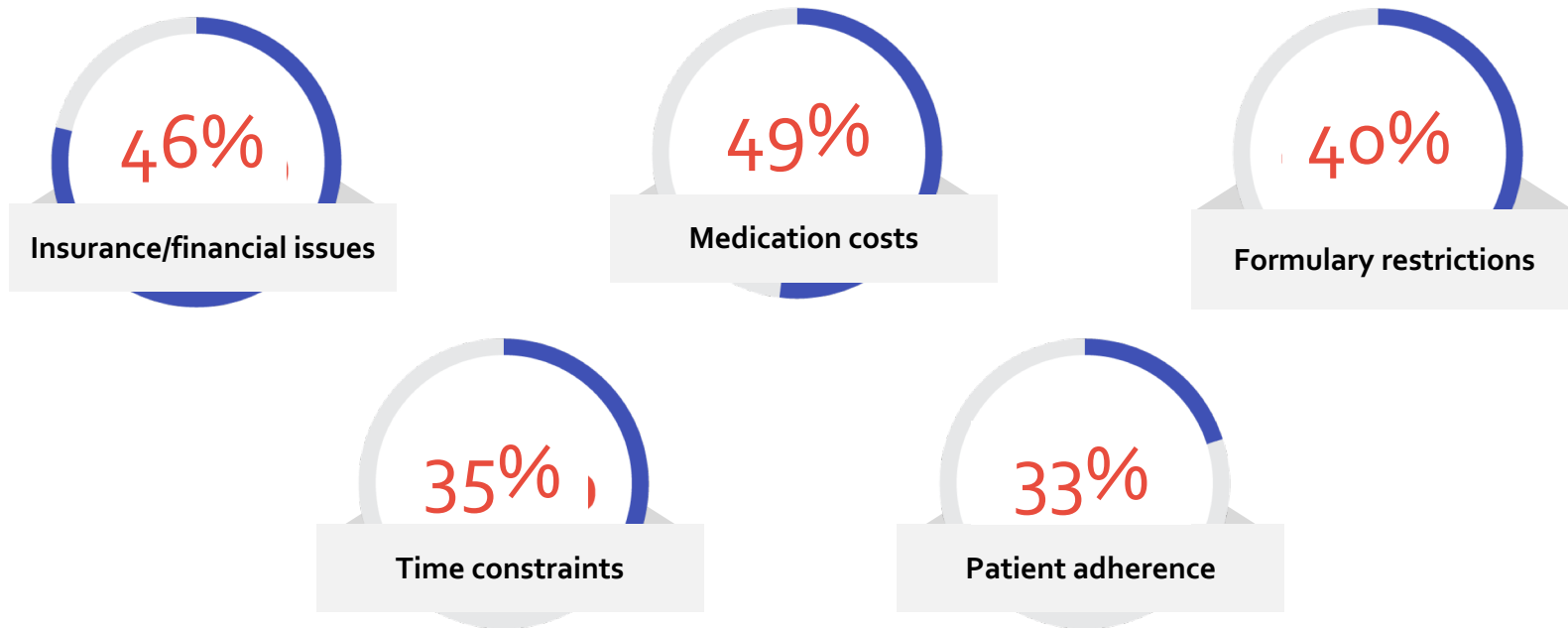
N=516



(4-week Post Assessment)

What specific *barriers* have you encountered that may have prevented you from successfully implementing strategies for patients with PAH since this CME activity? (Select all that apply)

N=516



Identified Learning Gaps:

Risk factors for PAH

Despite an 82% improvement, learners remained challenged on a Knowledge question that addressed risk factors for PAH.

Which of the following conditions is associated with risk of PAH?

Results:

- At Post-Test, 69% of learners correctly answered: “Connective tissue disorders.”

Importance of determining WHO functional class in patients diagnosed with PAH

Learners also demonstrated a low score on a Competence question addressed the importance of determining the WHO functional class of a patient presenting with PAH symptoms, before further treatment and management.

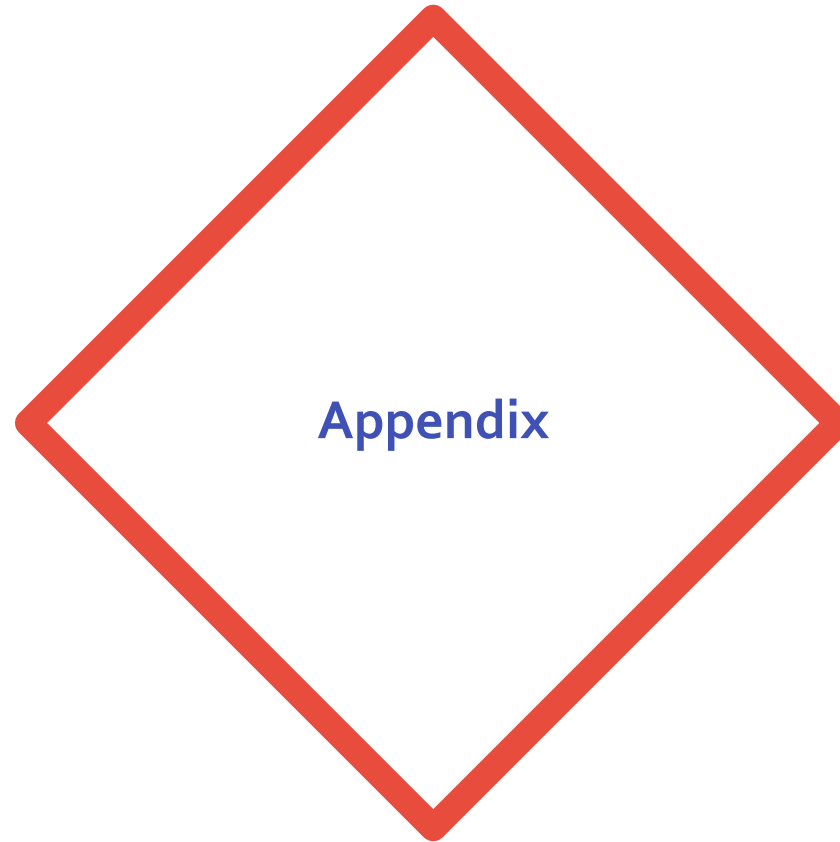
A 57-year-old overweight man presents with progressive dyspnea on exertion. History includes hypertension and dyslipidemia. He never smoked. Exam: BP 140/88 mmHg, lungs clear to auscultation, regular rate and rhythm, mild edema of lower extremities, and mild hepatomegaly. ECG normal except for right axis deviation. PFTs normal except for reduced DLCO (65%). Echocardiogram shows LVEF 65%, moderate Tricuspid Regurgitation, and calculated RVSP was 50 mmHg. RHC findings are consistent with PAH, with no vasodilator response. Current medications include lisinopril, hydrochlorothiazide, and atorvastatin. What is an appropriate next step for this patient?

Results:

- At Post-Test, 50% of learners correctly answered: “Determine the patient’s WHO functional class.”

Overall Educational Impact

- ❖ Significant improvements (ranging from 35% – 64%) were seen across all learning domains.
 - The cohort analysis of professions showed that NPs demonstrated higher Post-Test scores than physicians in Knowledge and Competence (75% and 81% for NPs vs. 71% and 80% for physicians, respectively), while physicians demonstrated higher Post-Test averages on the Confidence and practice strategy ratings (2.86 and 4.11 for NPs vs. 3.14 and 4.21 for physicians, respectively).
 - Live onsite learners demonstrated substantially higher Post-Test averages than online participants in the Competence and Confidence domains (80% and 3.06 for live onsite vs. 69% and 2.81 for live online, respectively), with comparable scores in Knowledge and practice strategy.
 - Analysis of learning retention in the PCA showed that net gains from Pre-Test were measured in all learning domains (2% – 120%). The greatest increase was measured in learners' reported Confidence to recognize PAH (1.82, Pre-Test to 4.01, PCA), in part due to further increases from Post-Test to the PCA.
- ❖ Significant improvements (ranging from 35% – 82%) were measured across all Learning Objectives. A high Post-Test score was measured on the Learning Objective on treatment monitoring; however, low Post-Test scores were measured on the three Learning Objectives on risk factors, diagnosis, and treatment.
 - Onsite learners achieved higher Post-Test averages and greater score increases than online learners on all Learning Objectives.
- ❖ The analysis of the Knowledge and Competence domains identified two **persistent learning gaps related to risk factors for PAH and the evaluation of WHO functional class for PAH patients.**
 - Despite an 82% improvement, learners remained challenged on the risk for PAH by individuals with connective tissue disorders.
 - 69% of learners answered this Knowledge question correctly at Post-Test. 23% of learners incorrectly selected “left heart dysfunction.”
 - On the Competence question that addressed the importance of determining a patient's WHO functional class, 50% of learners answered this question correctly.
 - An increasing number of learners (35% at Pre-Test to 43% at Post-Test) incorrectly selected “Initiate a phosphodiesterase-5 (PDE5) inhibitor.”



Learning Objectives Analysis – Live Onsite vs. Live Online Audience

- “Live onsite learners” include only those attending in-person meetings.
- “Live online learners” include those from both the Simulcast and Virtual Symposium.

| Learning Objective | Live Onsite Learners | | | | Live Online Learners | | | |
|--|----------------------|--------------------|--------------------|-----------------|----------------------|--------------------|--------------------|-----------------|
| | N | Pre-Test | Post-Test | % Change | N | Pre-Test | Post-Test | % Change |
| Review the risk factors and classification of pulmonary hypertension (PH) | 1289 | 38.56% (48.67%) | 71.32% (45.23%) | +84.96%* | 396 | 35.10% (47.73%) | 60.65% (48.85%) | +72.78%* |
| Discuss the appropriate diagnostic strategy for pulmonary arterial hypertension (PAH), including the roles of echocardiography, ventilation/perfusion (V/Q) scanning, and right heart catheterization (RHC). | 1379 | 49.93% (40.26%) | 71.08% (32.71%) | +42.37%* | 471 | 47.16% (39.96%) | 62.10% (34.67%) | +31.69%* |
| Review current and emerging treatments for patients with PAH | 1423 | 51.93% (35.53%) | 70.64% (30.10%) | +36.03%* | 482 | 50.73% (34.98%) | 66.11% (29.94%) | +30.32%* |
| Describe how to monitor patients with PAH for disease progression | 1214 | 63.43% (48.16%) | 91.87% (27.34%) | +44.84%* | 391 | 66.50% (47.20%) | 78.02% (41.41%) | +17.33%* |

**significant at the $p \leq 0.05$ level*

- ❖ Onsite learners demonstrated both higher Post-Test averages and greater score increases (from comparable Pre-Test scores) on all Learning Objectives.

Learning Domain Analysis – Live Onsite vs. Live Online Audience

- “Live onsite learners” include only those attending in-person meetings.
- “Live online learners” include those from both the Simulcast and Virtual Symposium.

| Learning Domain | Live Onsite Learners | | | | Live Online Learners | | | |
|-----------------|----------------------|--------------------|--------------------|-----------------|----------------------|--------------------|--------------------|-----------------|
| | N | Pre-Test | Post-Test | % Change | N | Pre-Test | Post-Test | % Change |
| Knowledge | 1285 | 46.07% (41.92%) | 71.83% (38.71%) | +55.91%* | 403 | 48.76% (40.45%) | 72.46% (37.58%) | +48.60%* |
| Competence | 1363 | 55.92% (33.98%) | 80.34% (27.62%) | +43.67%* | 429 | 55.05% (34.47%) | 68.92% (30.66%) | +25.19%* |
| Confidence | 951 | 1.85 (0.84) | 3.06 (0.85) | +65.57%* | 303 | 1.75 (0.72) | 2.81 (0.72) | +60.08%* |
| Practice | 1000 | 3.05 (1.17) | 4.14 (0.87) | +35.86%* | 329 | 3.09 (1.07) | 4.13 (0.81) | +33.53%* |

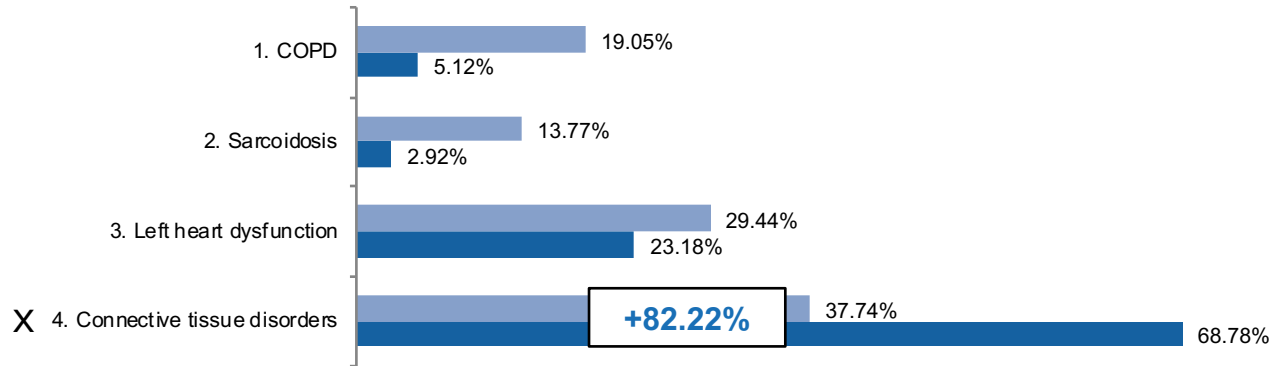
**significant at the $p \leq 0.05$ level*

- ❖ Live onsite learners demonstrated greater gains from comparable Pre-Test averages in Competence and Confidence, resulting in higher Post-Test averages in both areas.
- ❖ More comparable scores and improvements were observed in Knowledge and practice strategy.

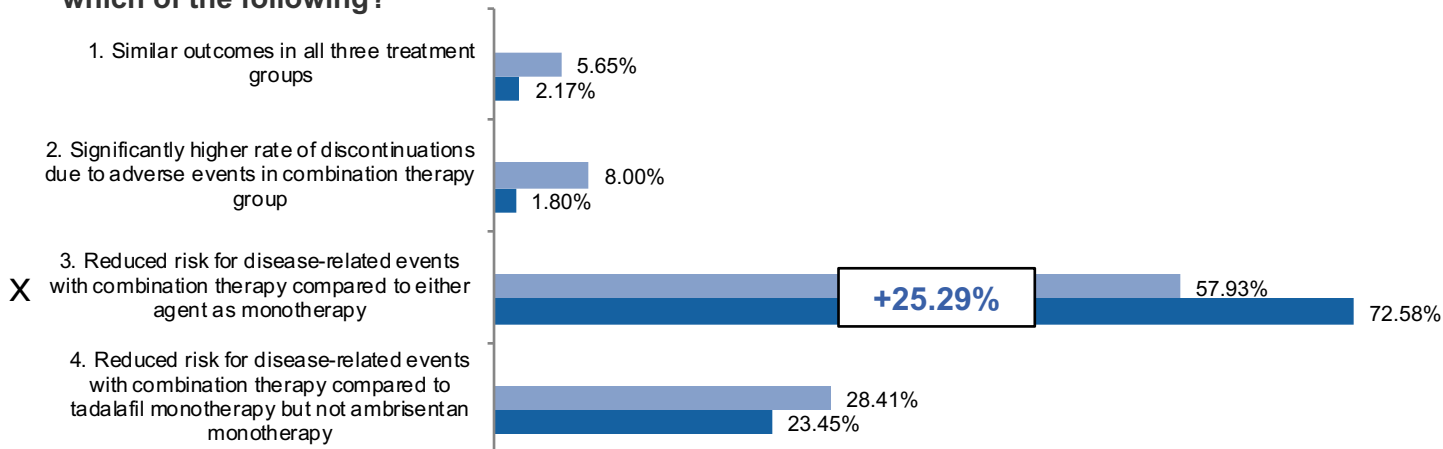
Knowledge Questions

N = (1362–1816)

Which of the following conditions is associated with risk of PAH?



A study in PAH comparing the combination of ambrisentan/tadalafil to either agent as monotherapy demonstrated which of the following?



Pre-Test Post-Test

Note: Data is unmatched

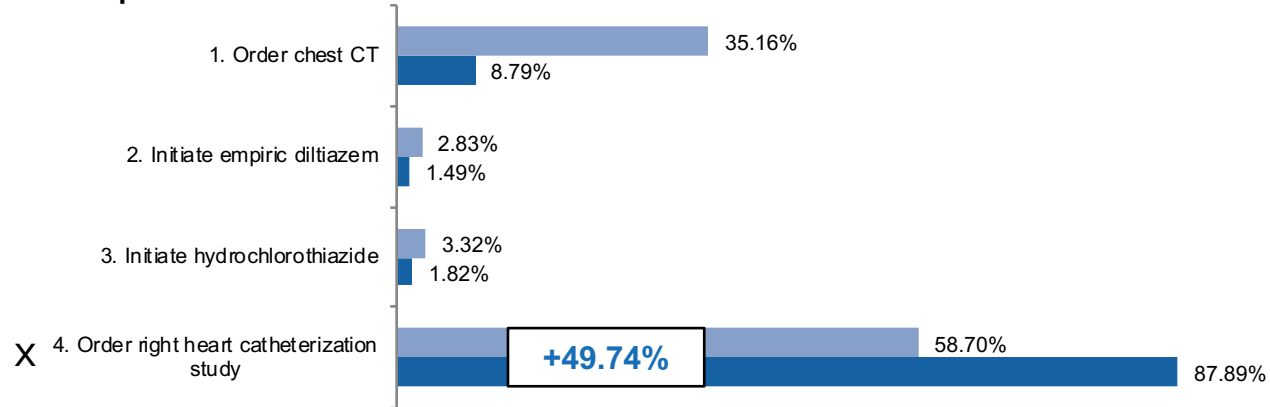


Competence Questions

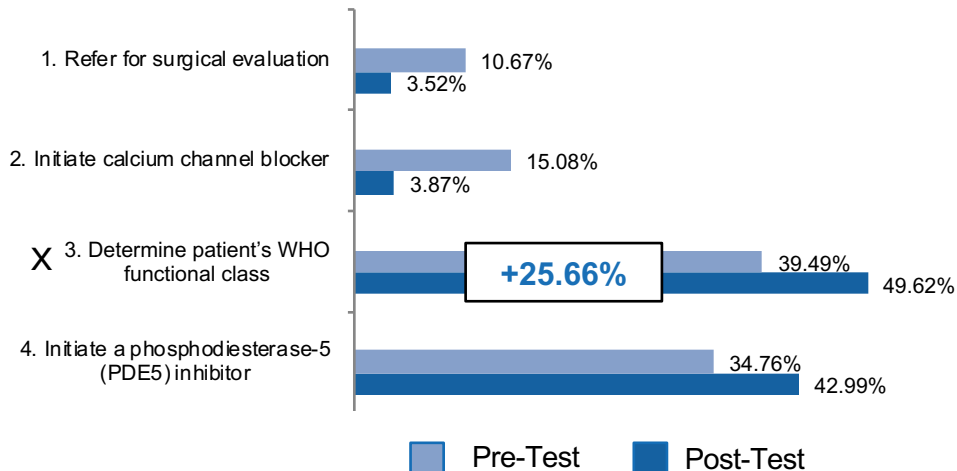
N = (1499–1809)

A 57-year-old overweight man presents with progressive dyspnea on exertion. History includes hypertension and dyslipidemia. He never smoked. Exam: BP 140/88 mmHg, lungs clear to auscultation, regular rate and rhythm, mild edema of lower extremities, and mild hepatomegaly. ECG normal except for right axis deviation. PFTs normal except for reduced DLCO (65%). Echocardiogram shows LVEF 65%, moderate Tricuspid Regurgitation, and calculated RVSP was 50mmHg...

...Current medications include lisinopril 10 mg qd, hydrochlorothiazide 25 mg qd, and atorvastatin 80mg qd. What is an appropriate next step for this patient?



...RHC findings are consistent with PAH, with no vasodilator response. Current medications include lisinopril, hydrochlorothiazide, and atorvastatin. What is an appropriate next step for this patient?



Pre-Test Post-Test

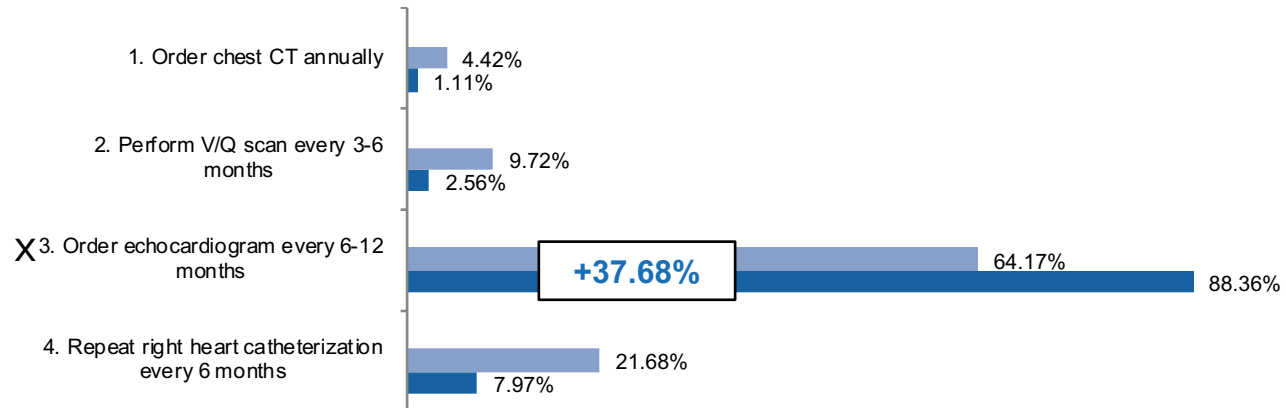
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Competence Questions

N = (1605–1795)

...Patient is diagnosed with PAH, WHO FC III, and treated with combination therapy. What monitoring is appropriate for this patient?



Pre-Test Post-Test

Note: Data is unmatched

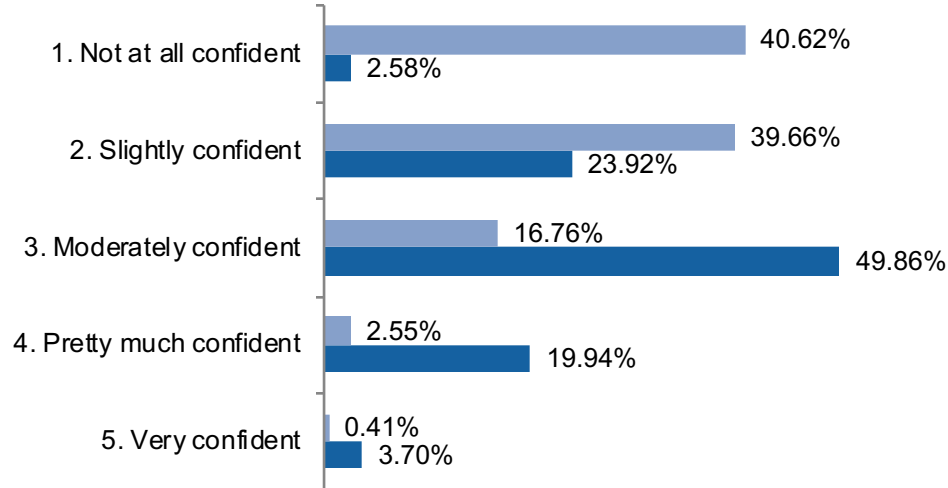


Confidence & Practice Questions

N = (1450–1830)

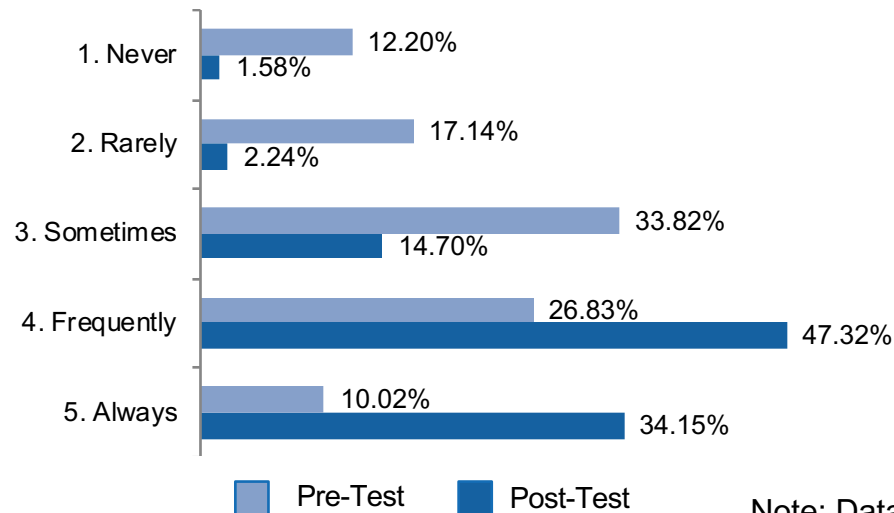
Confidence Question:

Please rate your confidence in your ability to recognize features that suggest PAH:



Practice Question:

How often do you order an echocardiogram for a patient with unexplained shortness of breath?



Note: Data is unmatched

