

# Idiopathic Pulmonary Fibrosis: Defining the Role of the Primary Care Clinician in Diagnosis and Therapy



## Final Outcomes Report

April 5, 2018

Boehringer Ingelheim Grant: ME201621746

# Executive Summary

## Participants

**2,301**

Total Learners

**1,602**

Learners participated in  
Live Meetings

**699**

Learners participated in  
the Simulcasts

## Pre to Post Test Results By Learning Objective

- ❖ **361.53% Improvement:** Discuss and contrast the available nonpharmacotherapeutic options for patients with IPF
- ❖ **73.55% Improvement:** Discuss and contrast the available pharmacotherapeutic options for patients with IPF
- ❖ **32.38% Improvement:** Discuss the diagnostic approach to a patient with suspected IPF

## Impact

**Performance:** Statistically significant 39% increase in Participant RealIndex Performance scores (with similar gains between Simulcast and Live learners)

Identified Persistent Learning Gaps for Future Education

1. Diagnostic testing for IPF
2. Selecting optimal therapy for IPF

# Curriculum Overview

- ❖ **Unaccredited Pre-symposia Self Assessment Activity**, Launch Date: March 15, 2017  
End Date: August 19, 2017
  - Results were utilized by faculty to emphasize education in areas that address local practice gaps and barriers.
  
- ❖ **Accredited Live Regional Symposia**, Launch Date: April 29, 2017 through August 19, 2017
  - The live symposia was held in 10 cities.
  
- ❖ **Unaccredited “Clinical Highlights eMonograph”**
  - Emailed to all live activity participants within one week of each live activity.
  - Provide clinical pearls from the lecture that may be implemented in practice immediately.
  
- ❖ **Online Enduring Symposium Webcast** - Launch Date: November 1, 2017    End Date: October 31, 2018
  - [http://naceonline.com/CME-Courses/course\\_info.php?course\\_id=926](http://naceonline.com/CME-Courses/course_info.php?course_id=926)

# Outcomes Metrics Used

Outcomes Metric	Definition	Application
<b>Percentage change</b>	This is how the score changes resulting from the education are measured. The change is analyzed as a relative percentage differences by taking into account the magnitude of the Pre-Test average.	Differences between Pre-Test, Post-Test, and PCA score averages
<b>P value (p)</b>	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
<b>Effect size (d)</b>	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
<b>Power</b>	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
<b>Percentage non-overlap</b>	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

# Outcomes Assessment Methodology

This curriculum consisted of 10 live meetings and 3 simulcast events focused on the identification and treatment of Idiopathic Pulmonary Fibrosis (IPF) within the primary care setting.

<b>Activity Outcomes Protocol</b> Measures Moore's Levels 1-4	<b>Curriculum Outcomes Protocol</b> Measures Moore's Levels 1-5
<p>Learning Domain Question Types</p> <ul style="list-style-type: none"><li>• Knowledge</li><li>• Competence</li><li>• Confidence</li><li>• Practice Strategy</li></ul>	<p>ReallIndex® Question</p> <ul style="list-style-type: none"><li>• Prior to activity</li><li>• Post activity</li><li>• Post Curriculum Assessment (PCA)</li></ul>



**Level 1:**  
Participation &  
Demographics



# Emerging Challenges in Primary Care

Update 2017

## Level 1 (Participation)



**2301**

Total Attendees



**10 Cities**



**1602**

On Site, 10 Cities



**699**

3 Remote Simulcasts

# Participation

2017 Meeting/Simulcast Location (Date)	Attendees	Assessment Participants
Miami Live Meeting (04/29/17)	190	138
Baltimore Live Meeting (05/06/17)	186	80
St. Louis Live Meeting (05/13/17)	114	61
Birmingham Live Meeting (05/20/17)	150	75
Birmingham Simulcast (05/20/17)	222	105
Atlanta Live Meeting (06/03/17)	240	188
Raleigh Live Meeting (06/10/17)	130	102
Raleigh Simulcast (06/10/17)	322	80
Cleveland Live Meeting (06/17/17)	66	51
Tampa Live Meeting (06/24/17)	267	204
Anaheim Live Meeting (08/12/17)	175	140
Anaheim Simulcast (08/12/17)	155	52
San Francisco Live Meeting (08/19/17)	84	72

**Attendees:** Registrants

**Assessment Participants:** Answered at least one question

**2,301**

**1,348**





# Emerging Challenges in Primary Care

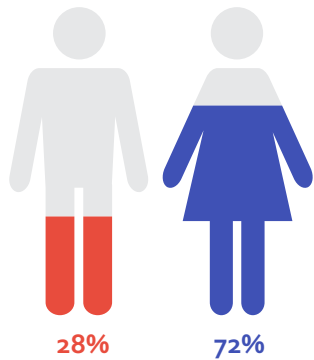
Update 2017

## Level 1: Demographics

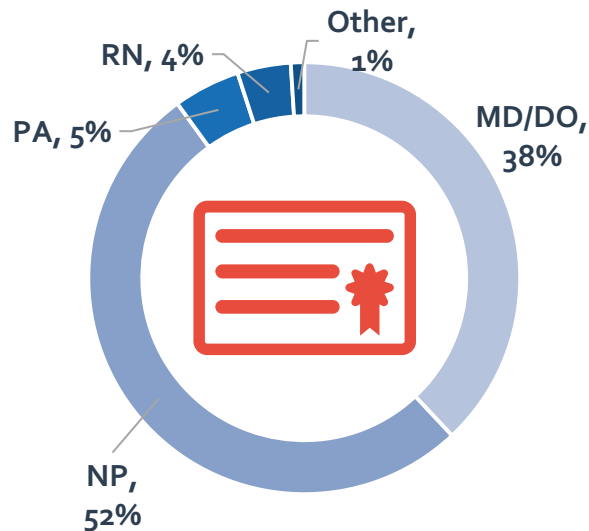
**Patient Care Focus – Yes: 92%**

**No: 8%**

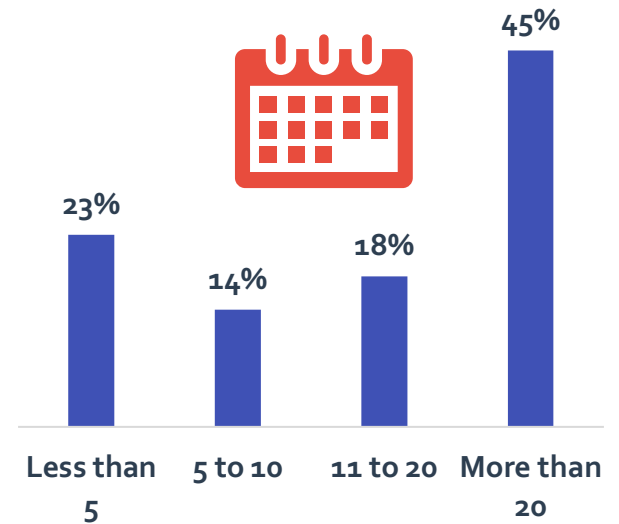
### Gender



### Profession



### Years in Practice



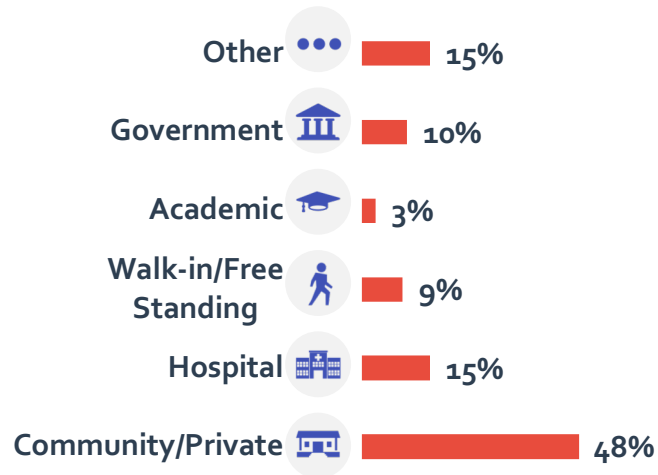


# Emerging Challenges in Primary Care

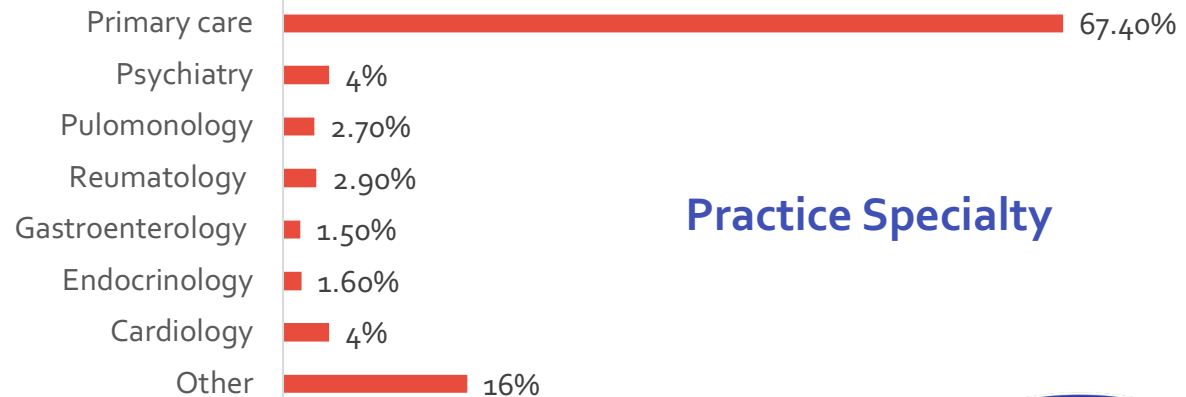
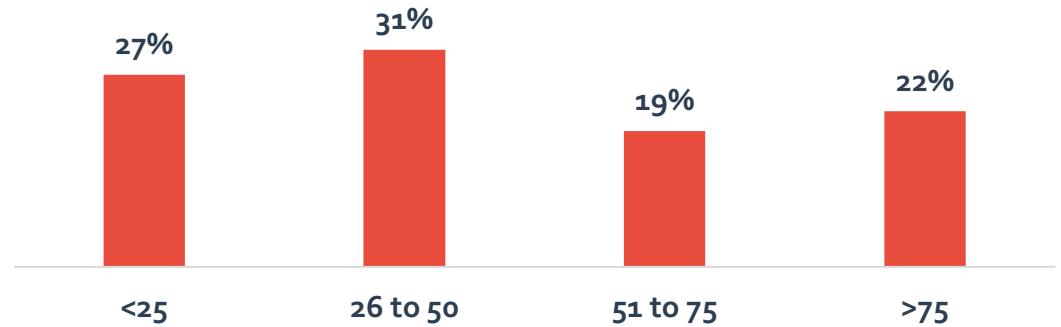
Update 2017

## Level 1: Demographics

### Type of Practice








### Number of Patients Seen Each Week





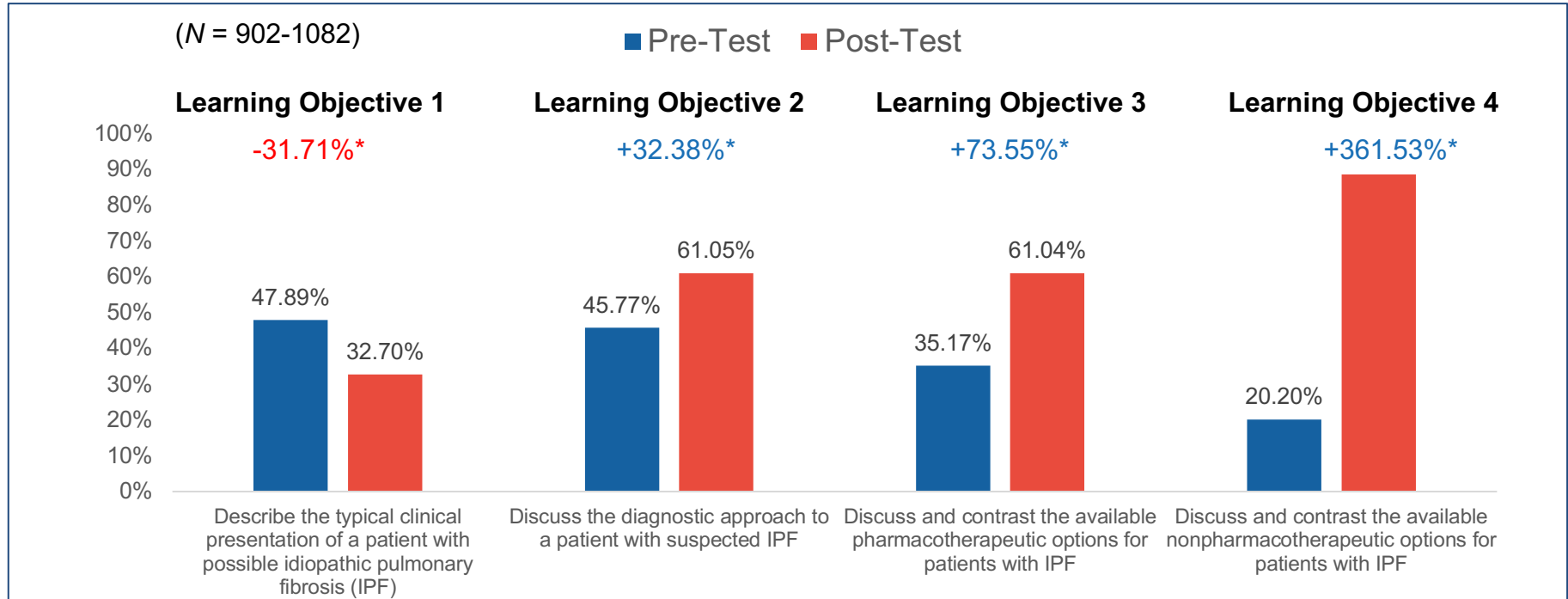
## Level 2: Satisfaction

-  **99%** rated the activity as excellent
-  **99%** indicated the activity improved their knowledge
-  **97%** stated that they learned new and useful strategies for patient care
-  **90%** said they would implement new strategies that they learned
-  **99%** said the program was fair-balanced and unbiased



**Level 3-5:**  
Outcomes Metrics

# Quantitative Analyses (Learning Objectives)



*\*significant at the p≤.05 level*

- ❖ Low Pre-Test scores were measured on all Learning Objectives\
- ❖ Significant gains (ranging from 32%-361%) were demonstrated on Learning Objectives 2, 3, & 4.
- ❖ The greatest gains from a low Pre-Test average were observed on Learning Objective 4
- ❖ Learners' Post-Test scores decreased on Learning Objective 1, S as a result of learner performance one Competence question that addressed the need for chest radiography and pulse oximetry in the evaluation of a 68-year old patient with previous smoking history presenting with progressive dyspnea on exertion and dry cough.

# Learning Objectives (Live vs. Simulcast Audience)

Learning Objective	Live Meeting (N = 1,111)			Simulcast (N = 237)		
	Pre-Test	Post-Test	% Change	Pre-Test	Post-Test	% Change
1. Describe the typical clinical presentation of a patient with possible idiopathic pulmonary fibrosis (IPF)	49.60%	30.47%	<b>-41.05*</b>	43.37%	28.28%	<b>-34.79*</b>
2. Discuss the diagnostic approach to a patient with suspected IPF	45.30%	60.70%	<b>+33.99*</b>	44.12%	59.15%	<b>+34.06*</b>
3. Discuss and contrast the available pharmacotherapeutic options for patients with IPF	35.79%	60.95%	<b>+70.30*</b>	32.78%	55.76%	<b>+70.10*</b>
4. Discuss and contrast the available nonpharmacotherapeutic options for patients with IPF	19.92%	95.12%	<b>+377.51*</b>	21.51%	85.20%	<b>+296.09*</b>

- ❖ Live Meeting and Simulcast Attendees achieved comparable Pre-Test & Post-Test scores,
- ❖ On Learning Objective 4, Live Meeting learners scored 9.92% higher than Simulcast learners at Post-Test.
- ❖ Both learner groups demonstrated a decrease from Pre-Test to Post-Test in Learning Objective 1.

# Learning Domains and Question-Level Analysis

## Learner Performance Insights

- Significant and substantial gains were achieved in Knowledge, Confidence, and the RealIndex Performance metric; a significant decrease was measured in Competence.
- High Post-Test scores (>93%) were observed on both Knowledge questions.
- The significant 39% gain measured on the RealIndex resulted in a high final score (86%).
  - High scores (>91%) were demonstrated on 3 (of 4) RealIndex statements.
  - Learners were challenged (65% final score) by the statement related to prescribing empiric bronchodilator therapy.
- Learners were especially challenged by the one Competence case question, which demonstrated a 32% decrease from Pre-Test to Post-Test, and was also responsible for the decrease in Learning Objective 1.
- Learners significantly increased their reported Confidence in their ability to recognize a patient presenting with IPF.

# Persistent Gaps to be Addressed in Future CME Activities

An evaluation of learner proficiency on all curriculum questions and statement revealed two areas of challenge at Post-Test:

## ❖ Diagnosis Testing of IPF

- The Competence question on assessing patients who present with symptoms of IPF was the lowest scoring item in the curriculum.
- A challenge question relating to diagnosis also showed a low score.

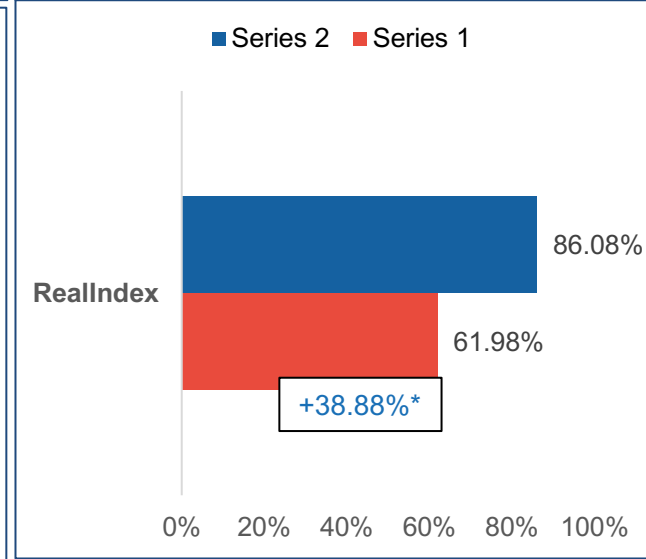
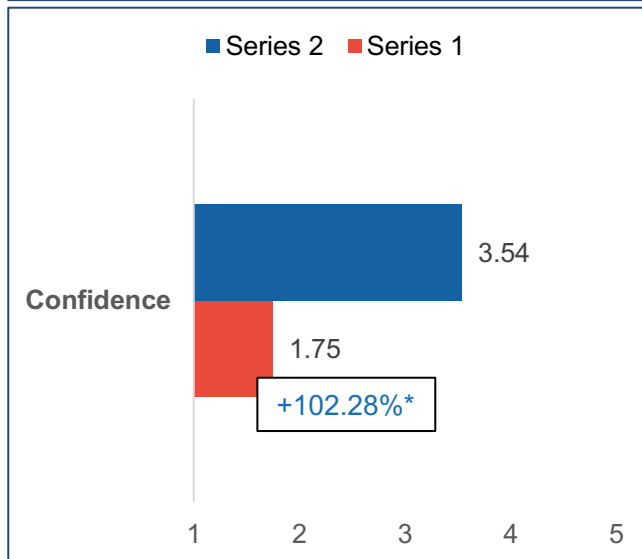
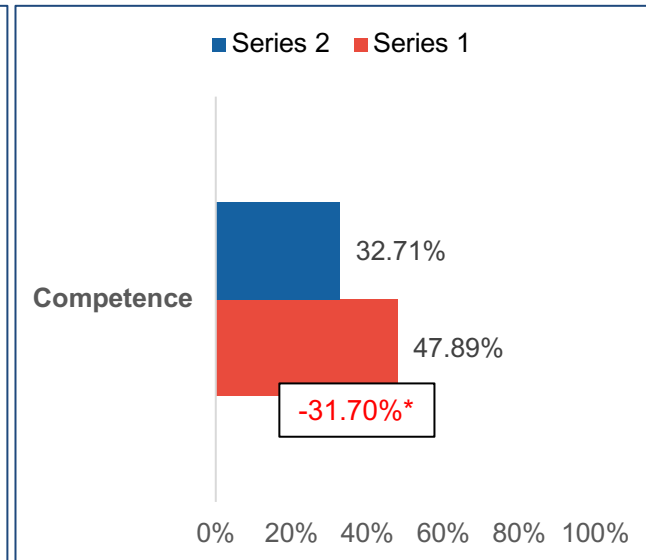
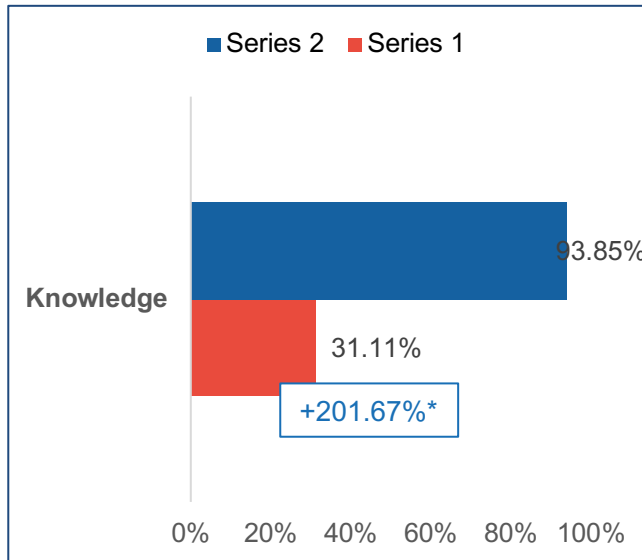
## ❖ Selecting optimal therapy options for IPF

- Additional low scoring areas included a RealIndex statement and challenge question addressing therapy options for patients with a history of smoking-related symptoms.



# Learning Domain Analysis

(N = 1258-902)



\*significant at the  $p \leq .05$  level, matched data

# Curriculum/Activity Intervention Effect

Learning Domain	Effect Size*	% Non-Overlap (PND)
		<b>Activity Intervention</b>
Knowledge	1.85	78.18%
Competence	0.37	21.25%
		<b>Curriculum Intervention</b>
RealIndex (Performance)	.94	53.22%

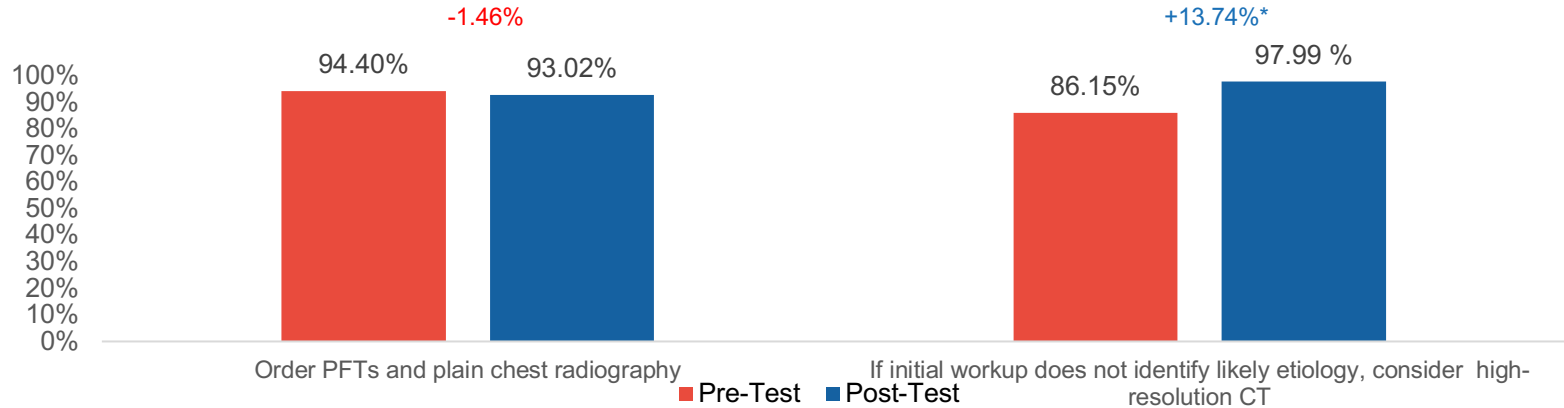
- ❖ Highlighting the magnitude of the score differences at Pre-Test and Post-Test, the activity had a large effect on learners' Knowledge with 78% of Post-Test averages exceeding the highest Pre-Test scores.
- ❖ There was also a strong effect on the RealIndex (Performance) with over half of learners' final score surpassing the highest baseline values.

Effect Size Definition: 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.

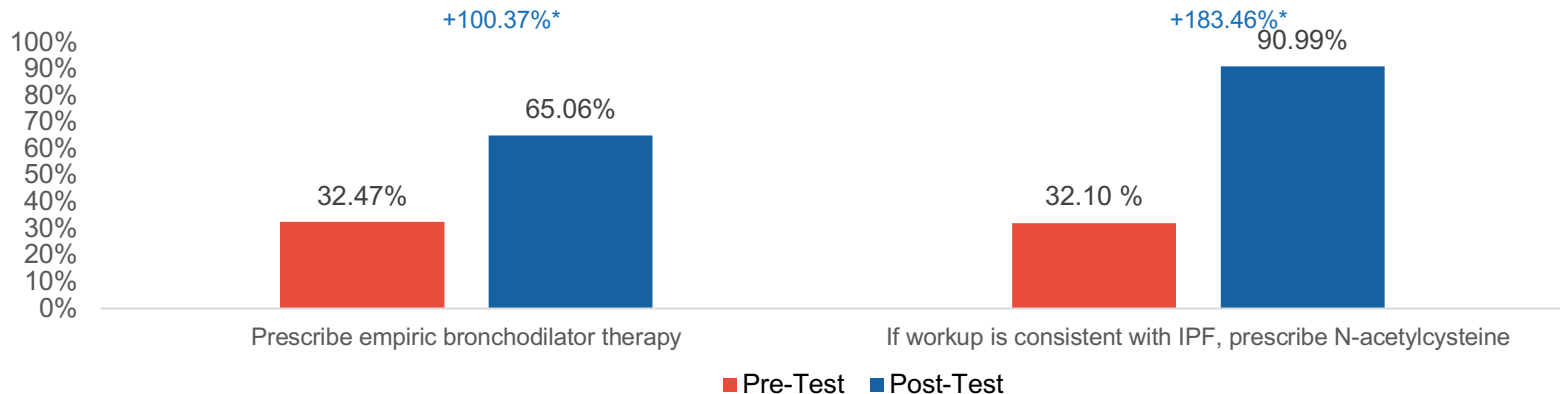
# Curriculum Real Index Statements

A 63-year-old man presents with a 6-month history of progressive dry cough and dyspnea on exertion. He is a former smoker (30 pack-years, quit 12 years ago) and has a history of chronic low back pain (10 years) and GERD (7 years). Examination identifies bibasilar crackles, but no other findings. Current medications include naproxen prn and omeprazole 20 mg qd.

## Consistent with Clinical Practice



## Not Consistent with Clinical Practice

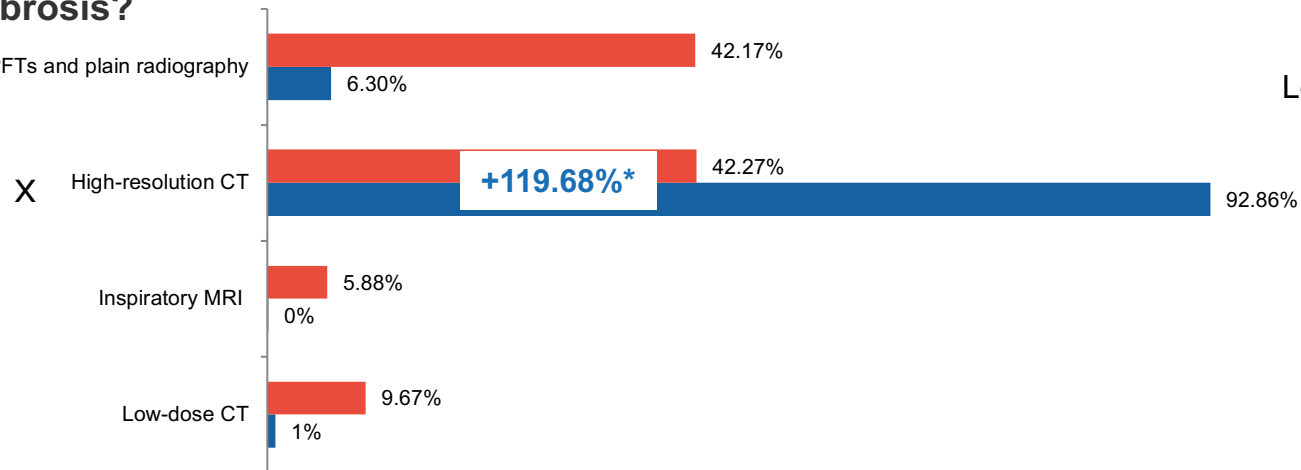


# Knowledge Questions

N = 983-1191

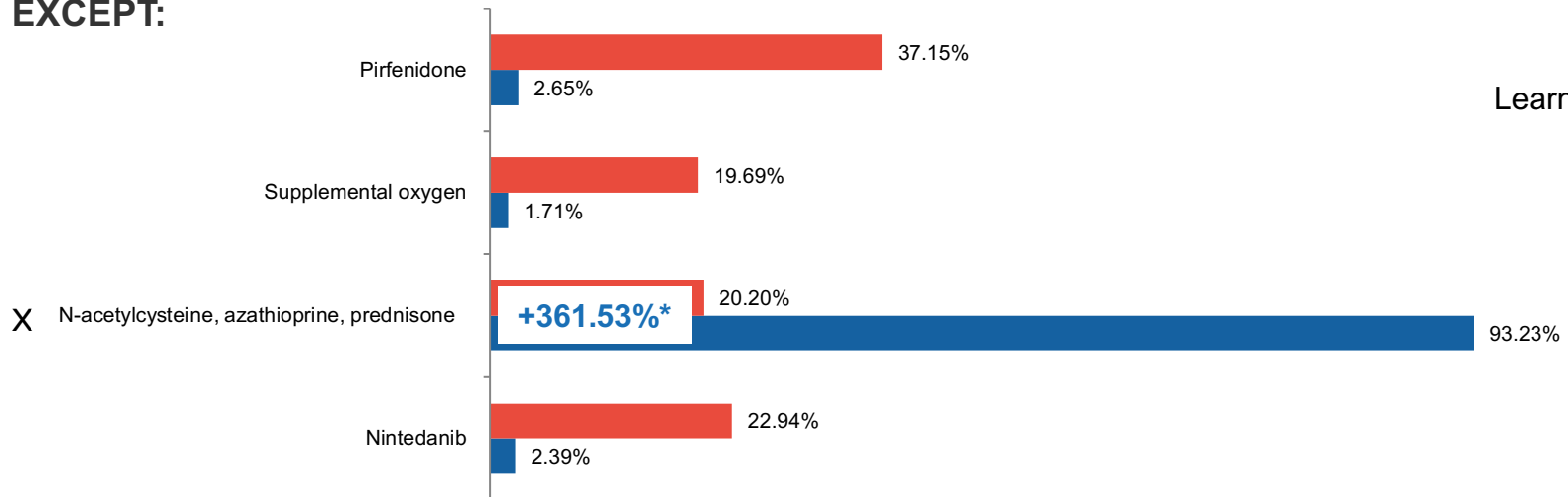
Which of the following tests is considered a key imaging study for the diagnosis of idiopathic pulmonary fibrosis?

Learning Objective 2



Any of the following may be an appropriate therapy for a patient with idiopathic pulmonary fibrosis, EXCEPT:

Learning Objective 3



Pre-Test

Post-Test

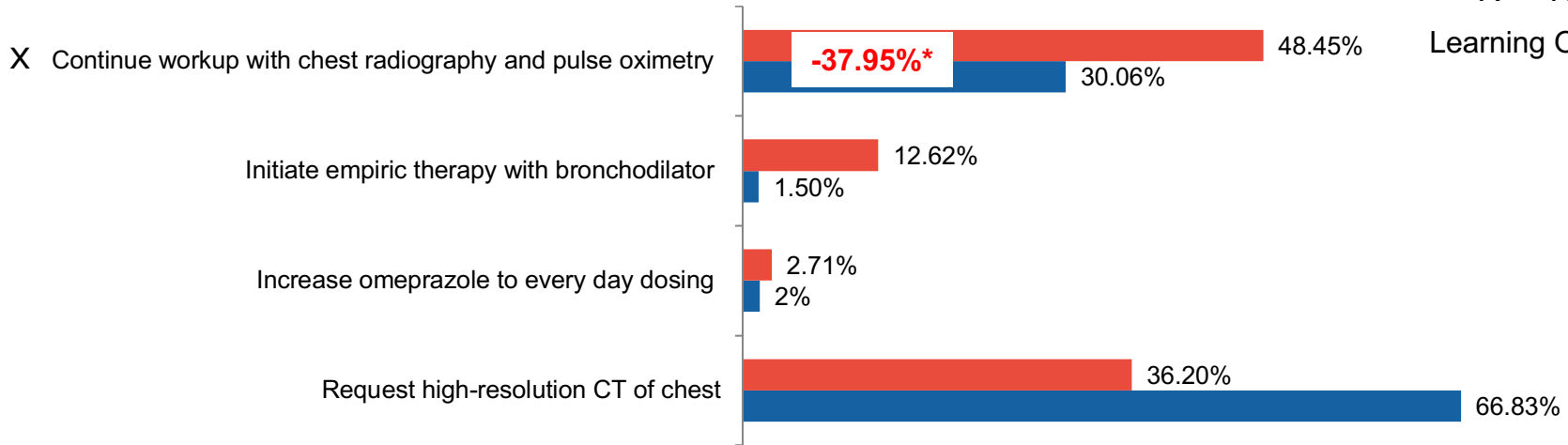
\*significant at the  $p \leq .05$  level

# Competence Question

A 68-year-old man with a 12-month history of progressive dyspnea on exertion and dry cough presents for evaluation. He is a former smoker (25 pack-years, quit 10 years ago) and has a history of hypertension and GERD. Workup identifies bibasilar crackles, BP 118/78 mmHg, normal sinus rhythm, and no fever. Spirometry identifies a restrictive pattern with no reversibility. Current medications include hydrochlorothiazide 25 mg qd and omeprazole 20 mg as needed. What should his primary care provider do at this time?

N = 1069-1194

Learning Objective 1,2,3



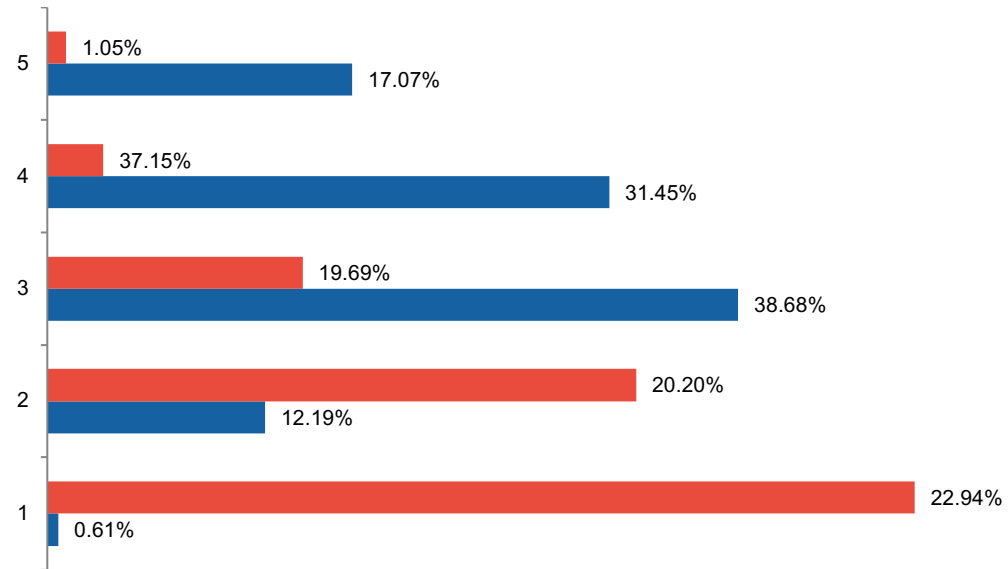
Pre-Test

Post-Test

\*significant at the  $p \leq .05$  level

# Confidence Question

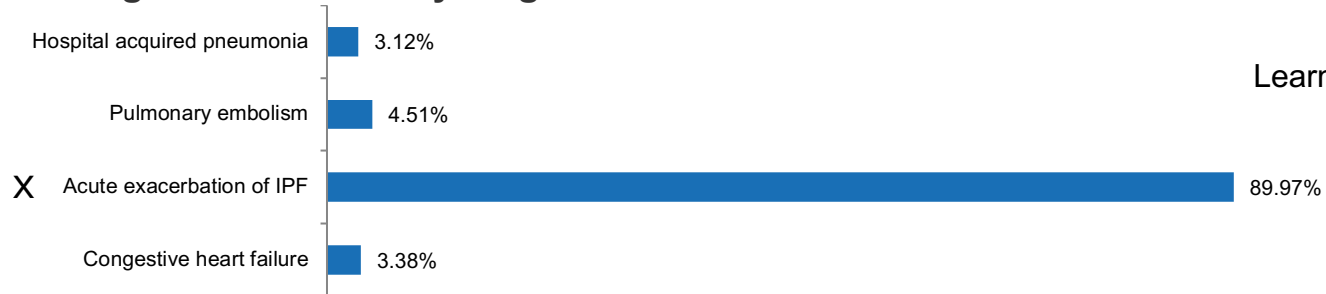
Rate your Confidence in your ability to recognize features c5=completely confident) N = 1147-1189



# Intra-Lecture Questions

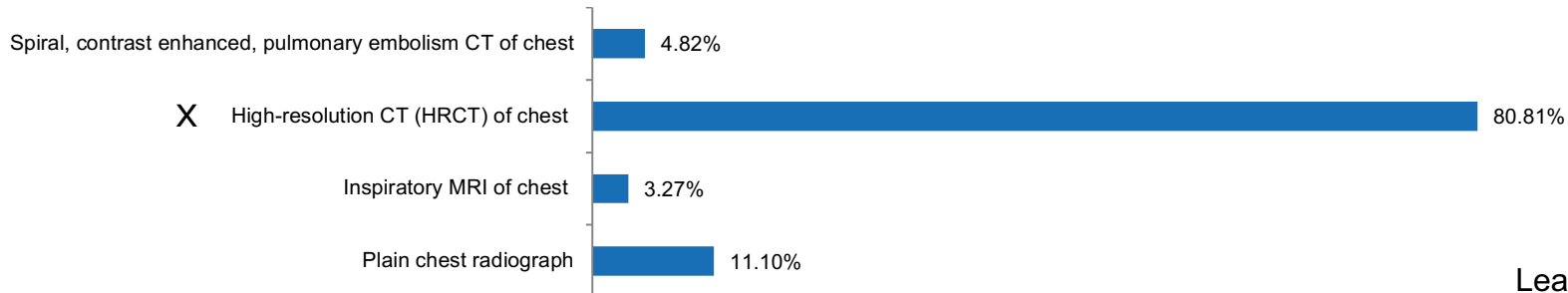
N = 1152-1178

Which of the following is the most likely diagnosis?



Learning Objective 1

In this 70-year-old man with 1-year history of progressive dyspnea and cough, which imaging study is most likely to be diagnostic?



Learning Objective 2

In this 70-year-old man with 1-year history of progressive dyspnea and cough, the differential diagnosis includes:

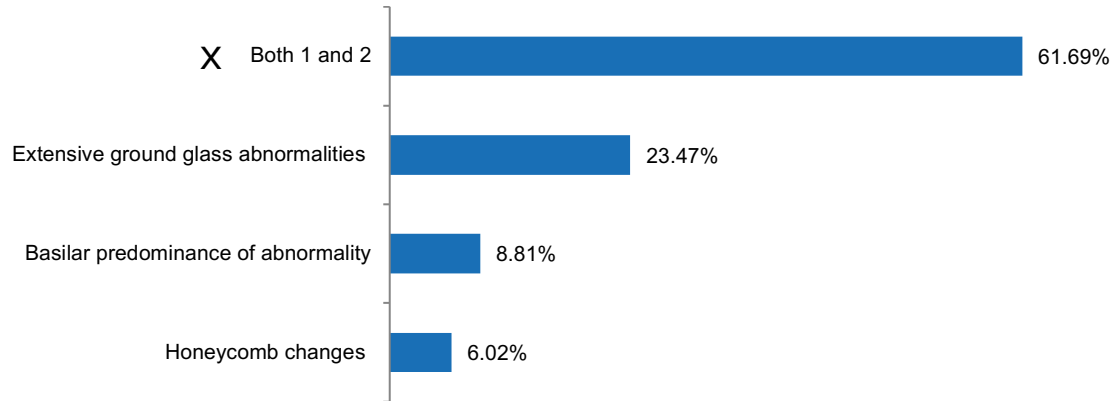


Learning Objective 1

# Intra-Lecture Questions

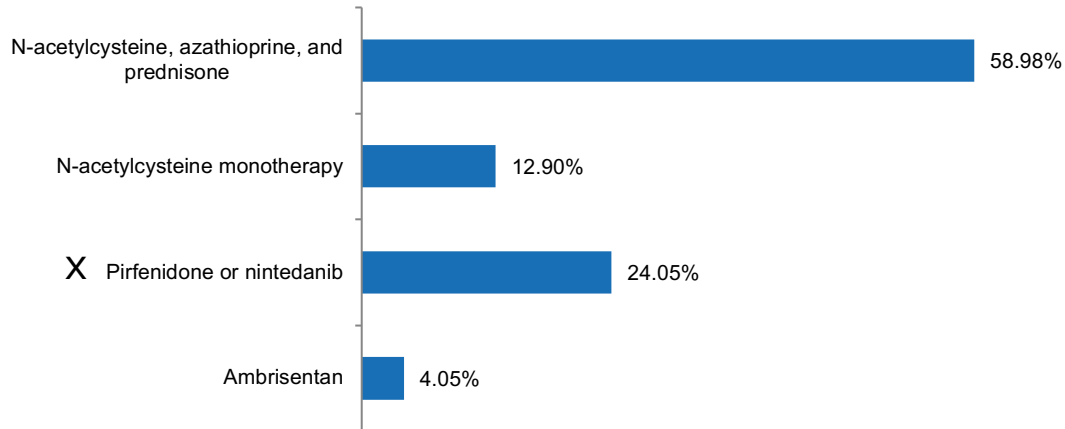
N = 1085-1146

In our 70-year-old man with 1 year of cough and dyspnea, which imaging features on his HRCT will ensure a diagnosis of usual interstitial pneumonia (UIP)?



Learning Objective 2

For this 70-year-old man with a confirmed diagnosis of IPF, which of the following therapies should be considered?

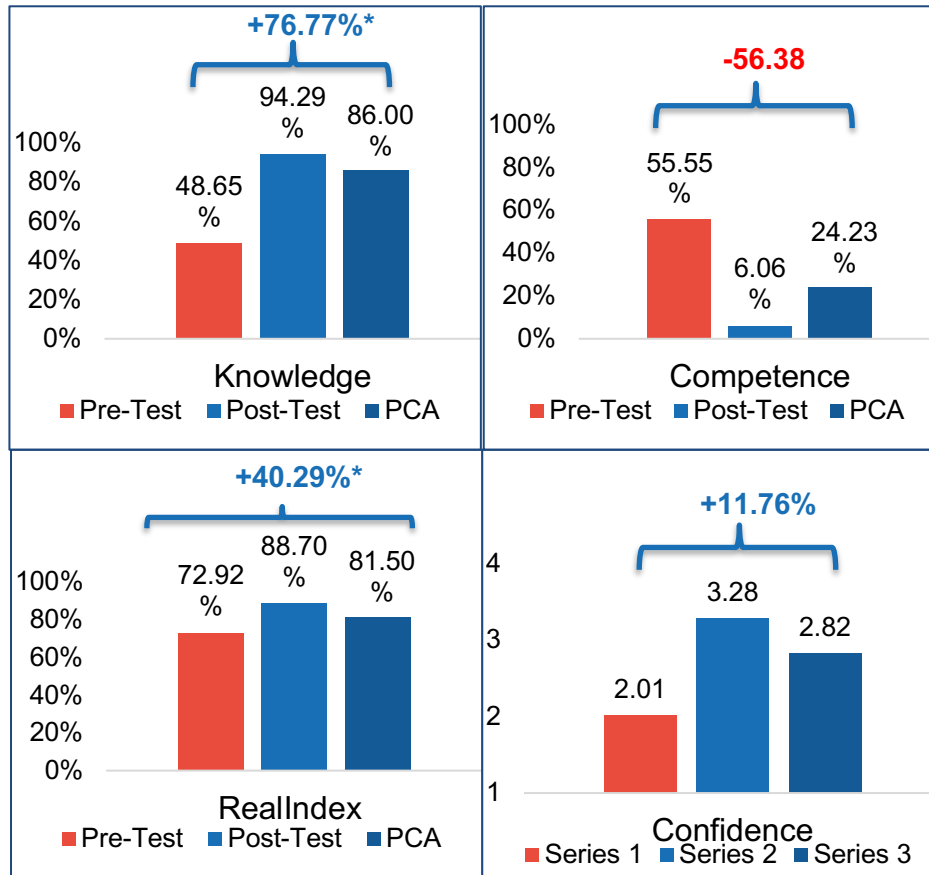


Learning Objective 3



# Quantitative Analyses (Retention)

(N=75– 95)



*\*significant at the  $p \leq .05$  level*

## At follow-up:

- There were net gains from Pre-Test to the PCA in all domains except for Competence.
- There was an especially noteworthy net gain in Knowledge where most of the score increases achieved across the curriculum were retained.
- In Competence, the same score decrease demonstrated across the curriculum was also observed at follow-up.

# Identified Learning Gap: Diagnostic Testing of IPF

The most noteworthy low scoring question in the curriculum was a Competence question that addressed the assessment of a patient with IPF, in which a score decrease was observed. A low scoring Challenge Question also related to choice of therapy.

**Competence Question:** *A 68-year-old man with a 12-month history of progressive dyspnea on exertion and dry cough presents for evaluation. He is a former smoker (25 pack-years, quit 10 years ago) and has a history of hypertension and GERD. Workup identifies bibasilar crackles, BP 118/78 mmHg, normal sinus rhythm, and no fever. Spirometry identifies a restrictive pattern with no reversibility. Current medications include hydrochlorothiazide 25 mg qd and omeprazole 20 mg as needed. What should his primary care provider do at this time?*

- ❖ At Post-Test, 30% of learners correctly answered: “Continue workup with chest radiography and pulse oximetry”
- ❖ 67% of learners incorrectly thought “a high resolution CT of chest” was the appropriate next step.

**Intra-Lecture Question:** *In our 70-year-old man with 1 year of cough and dyspnea, which imaging features on his HRCT will ensure a diagnosis of usual interstitial pneumonia (UIP)?*

- ❖ 62% of learners correctly answered: “Both 1 and 2” (Honeycomb changes and Basilar predominance of abnormality)

# Identified Learning Gap: Selecting Optimal Therapy for IPF

Additional low scoring questions were ReallIndex statements and a Challenge Question that addressed the selection of therapy for patients with IPF.

**ReallIndex Question:** *A 63-year-old man presents with a 6-month history of progressive dry cough and dyspnea on exertion. He is a former smoker (30 pack-years, quit 12 years ago) and has a history of chronic low back pain (10 years) and GERD (7 years). Examination identifies bibasilar crackles, but no other findings. Current medications include naproxen prn and omeprazole 20 mg qd.*

- At Post-Test, 65% of learners correctly categorized as “Not Consistent”: Prescribe empiric bronchodilator therapy ”

**Intra-Lecture Question:** *For this 70-year-old man with a confirmed diagnosis of IPF, which of the following therapies should be considered?*

- 24% of learners correctly answered “Pirfenidone or nintedanib”.
- 59% of learners incorrectly chose “N-acetylcysteine, azathioprine, and prednisone” as the best treatment option.

# Executive Summary: Overall Educational Impact

- ❖ This curriculum focused on proper assessment and management of IPF in the primary care setting.
- ❖ The analyses of the Knowledge, Competence, and Performance domains identified two persistent learning gaps within the primary care setting:

## 1. Diagnostic Testing of IPF

## 2. Selecting optimal therapy for IPF

- ❖ Improvements across all Learning Objectives were seen with the exception of Learning Objective 1 (Describing the typical clinical presentation of a patient with possible IPF)
  - Both the Competence domain and Learning Objective 1 were pulled down by the same Competence question, relating to a 68 year-old man in which IPF was part of the differential diagnosis. Learners chose to order a high-resolution CT of the chest, instead of first checking a pulse oximetry and chest radiography to complete the evaluation which was the correct next step.
  - Improvements were significant and substantial for Learning Objectives 2 (32%), 3 (74%) & 4 (361%). However, Post Test averages remained below the benchmark goal of 70% on Learning Objectives 1, 2 & 3.
- ❖ Improvements in Knowledge, Performance, and Confidence were significant and substantial (gains ranging from 39%-202%).
  - Highlighting the magnitude of the gains in Knowledge and Performance, large effect sizes were measured. Over 50% of Post-Test/final scores exceeded the highest Pre-Test/baseline scores.
- ❖ Competence was the only domain where learners' scores decreased from Pre-Test to Post-Test.
- ❖ When comparing cohorts (NP vs physician and live meeting vs simulcast participants):
  - NPs demonstrated the lowest Pre-Test averages; however, their greater gains minimized Post-Test score differences with physicians.
  - Live Meeting participants demonstrated greater gains which resulted in higher Post-Test averages.
  - All cohorts showed the same decrease on the one Competence question.