Pathways for Navigating ILD and IPF:
The Journey to Early Recognition, Diagnosis, and Patient-Centered Disease Management

Final Report
Live Educational Initiative

A free CME/CNE evening symposium

National Jewish Health
Breathing Science is Life
Background

The **online enduring case-based simulations** was developed first and then **(4) live evening symposia** employed structure of the cases developed for the online simulation. Images and video components from the simulation engaged learners in the multimedia live presentations to include Audience Response System (ARS) and provision of an **infographic clinical reference aid**. Learners will step through decisions in **(3) case simulations** to test and reinforce their skills in diagnosis, treatment, and management of ILD/IPF as well as effective patient communication strategies.
Accreditation Details: In support of improving patient care, NJH is accredited by the Accreditation Council for Continuing Medical Education (ACCME) to provide continuing medical education for physicians. NJH is also accredited by the Accreditation Council for Pharmacy Education (ACPE) and the California Board of Registered Nursing (CBRN) to provide continuing education for the healthcare team. NJH designated the online program for 2.5 AMA PRA Category 1 Credits and the live evening symposia for a maximum of 2.5 AMA PRA Category 1 Credits™ and 3.0 nursing contact hours.

Target Audience: Pulmonologists, Radiologists, Pathologists along with Primary Care Physicians, Nurse Practitioners, and Physician Assistants who treat patients with Interstitial Lung Disease. Registered Nurses will be targeted for the live activities.

Educational Outcomes Strategy: Outcomes will be measured via participation totals, specialty, designation, pre-test, post-test, clinically-based decisions in case simulations, interactive polling questions, and evaluations. The metrics will demonstrate participation, satisfaction, engagement, and change in knowledge, competency, and performance to achieve Moore’s Level 5 outcomes.
Program Faculty

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Enterprise Division Chief, Pulmonary, Allergy & Critical Care Medicine
Jefferson Health
Philadelphia, PA
**Objectives**

- Describe best practices for diagnosing IPF based on the most recent evidence-based guidelines.
- Differentiate IPF from other interstitial lung diseases through comprehensive assessment, diagnosis, and/or referral to ILD specialty centers.
- Apply recent clinical data and guidelines to the management and treatment selection of IPF.
- Determine appropriate communication strategies for addressing quality of life issues in patients with ILD.

**Target Audience**

Pulmonologists, Radiologists, Pathologists, Primary Care Physicians, Nurse Practitioners, Physician Assistants and Nurses who treat patients with Idiopathic Pulmonary Fibrosis

**Format**

- 4 live meetings consisting of interactive, case-based presentations and breakout workshops
- Online enduring activity featuring 3 patient cases

**Reach (as of 10-18-19)**

<table>
<thead>
<tr>
<th>Format</th>
<th>LIVE</th>
<th>ONLINE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Proposed</td>
<td>Participants (Page Views)</td>
</tr>
<tr>
<td></td>
<td>Actual</td>
<td>110-140</td>
</tr>
<tr>
<td></td>
<td>Proposed</td>
<td>3500</td>
</tr>
<tr>
<td></td>
<td>Actual</td>
<td>9415</td>
</tr>
</tbody>
</table>
93% of respondents intend to make changes in practice as a result of the activity.

98% of learners report activity met their educational needs.

98% of learners report activity addressed overcoming barriers to optimal patient care.

70% of learners were prescribers:
- MD/DO = 39% (N=47)
- NP/PA = 31% (N=38)
- RN = 20% (N=25)
- Other = 10% (N=11)

60% Overall relative knowledge gain from pre-to post-test for live series.
Final Report: Online Program Dashboard

**Participation**

<table>
<thead>
<tr>
<th>ONLINE</th>
<th>Proposed</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participants (Page Views)</td>
<td>3500</td>
<td>9415</td>
</tr>
<tr>
<td>Completers (Test Takers)</td>
<td>1000</td>
<td>1147</td>
</tr>
</tbody>
</table>

**Learner Impact**

**116%** overall relative gain in knowledge from pre to post test for live meetings

**Satisfaction**

I loved this activity! First one of its kind. Very interactive, very informative, and fun!

I enjoyed the interactive format!

This course covered an important type of subject that is very common in the community.

**Performance**

**71%** of prescribers could identify antifibrotic therapy as an appropriate IPF treatment option immediately after the initial education or upon remediation.

<table>
<thead>
<tr>
<th>To order either IPF med</th>
<th>53</th>
<th>18</th>
<th>29</th>
</tr>
</thead>
<tbody>
<tr>
<td>Correct</td>
<td>Corrected</td>
<td>Failed</td>
<td></td>
</tr>
</tbody>
</table>

**Persistent Gaps/Needs**

**Identified by traditional pre-post assessment:**

- Variable understanding existed related to making a diagnosis based on HRCT images

**Identified in case-simulation platform performance:**

- Diagnosing IPF based on HRCT images
- Distinguishing IPF from other ILD's

- Other: Anesthesiology, Cardiology, Emergency and Surgery
## Level 1 Outcomes (Live)

### Level 1 Outcomes: Participation & Satisfaction

<table>
<thead>
<tr>
<th>Participation by City</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Minneapolis, MN: 11/8/2018</td>
<td>14</td>
</tr>
<tr>
<td>Kansas City, MO: 11/13/2018</td>
<td>28</td>
</tr>
<tr>
<td>Philadelphia, PA: 2/27/2019</td>
<td>49</td>
</tr>
<tr>
<td>Los Angeles, CA: 3/14/2019</td>
<td>30</td>
</tr>
<tr>
<td><strong>Total Live Participation</strong></td>
<td><strong>121</strong></td>
</tr>
</tbody>
</table>

*Other: MA, CRT, Urgent Care, Occupational Medicine, Public Health, Pediatric, Oncology, Pain Management, Respiratory Therapy

- A majority of attendees were representative of the target audience
- 71% of attendees were prescribers

*Other: MA, CRT, Urgent Care, Occupational Medicine, Public Health, Pediatric, Oncology, Pain Management, Respiratory Therapy
Level 2 Outcomes (Live)

Level 2 Outcomes: Learning & Satisfaction  N=69

Participants report the activity was “Good” to “Excellent” at:

- Improving your ability to treat or manage your patients: 89%
- Enhancing your ability to apply the LOs to practice: 94%
- Reinforcing and/or improving your current skills: 99%
- Meeting your educational needs: 98%

“Enjoyed this educational activity. Looking forward to more in the future.”

“There is a need for more programs like this to reach healthcare teams (not just physicians) in the community.”

“Wonderful speakers. Made information easy to understand.”
Level 3 and 4 outcomes were measured by comparing pre-and post-test answers. Attendees’ responses to these questions demonstrated that participants gained knowledge as a result of the activity.
Level 3 Outcomes: Knowledge

Learning Objective: Apply recent clinical data and guidelines to the management and treatment selection of IPF

Q1: When should a patient with IPF be referred for lung transplant evaluation?

A. After first exacerbation
B. When the patient has shown a significant decline in FVC
C. Lung transplant is not beneficial in IPF
D. At time of diagnosis
E. After they have failed anti-fibrotic therapy

Average Pre-Test N=23
Average Post-Test N=17
**Level 3 Outcomes: Knowledge**

**Learning Objective:** Describe best practices for diagnosing IPF based on the most recent evidence-based guidelines

**Q4:** Which histologic pattern is seen in the setting of idiopathic pulmonary fibrosis?

A. Usual interstitial pneumonia  
B. Non-specific interstitial pneumonia  
C. Lymphocytic interstitial pneumonia  
D. Desquamative interstitial pneumonia  
E. Diffuse alveolar damage

**Pre/Post Comparison (Live)**

Average Pre-Test N=23  
Average Post-Test N=17
Level 3 Outcomes: Knowledge

Learning Objective: Determine appropriate communication strategies for addressing quality of life issues in patients with ILD.

Q10: What is the best approach to discussing IPF disease management with patients and caregivers?

A. Carefully review with patients and caregivers the data that shows IPF prognosis is approximately 2.5 years
B. Recommend antifibrotics and pulmonary rehabilitation
C. Ask patients and caregivers to conduct research online
D. Explain to patients that while IPF is an incurable disease, there are strategies that can be employed to enhance overall QOL

Pre/Post Comparison (Live)

<table>
<thead>
<tr>
<th>City</th>
<th>Pre-Test</th>
<th>Post-Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minneapolis</td>
<td>78%</td>
<td>83%</td>
</tr>
<tr>
<td>Kansas City</td>
<td>86%</td>
<td>100%</td>
</tr>
<tr>
<td>Philadelphia</td>
<td>88%</td>
<td>100%</td>
</tr>
<tr>
<td>Los Angeles</td>
<td></td>
<td>67%</td>
</tr>
</tbody>
</table>

Average Pre-Test N=23
Average Post-Test N=17
Level 4 Outcomes: Competence

Learning Objectives: Apply recent clinical data and guidelines to the management and treatment selection of IPF and Differentiate IPF from other interstitial lung diseases through comprehensive assessment, diagnosis, and/or referral to ILD specialty centers.

Q2: A 50 year old female presents with progressive shortness of breath and dry cough. She also notes arthralgias and joint swelling. On exam you note crackles in the bases bilaterally and she has ambulatory oxygen desaturation. A HRCT scan is done which reveals bibasilar reticulation and ground glass opacities. Lab testing reveals a positive anti-CCP antibody and hand x-rays reveal erosive arthritis. What is the next step in evaluation and management?

A. Start patient on anti-fibrotic medication  
B. Refer for surgical lung biopsy  
C. Perform bronchoscopy  
D. Start immunosuppression for treatment of CTD-ILD  
E. Close monitoring with serial CT imaging

Pre/Post Comparison (Live)

Average Pre-Test N=23  
Average Post-Test N=17
Level 4 Outcomes: Evaluation Data

- 93% of respondents report that they intend to make changes in practice as a result of the activity.
- 100% of respondents report that the material was presented in an objective manner and free of commercial bias.
- 98% of respondents report that the activity addressed strategies for overcoming barriers to optimal patient care.
- 99% of respondents report that the content presented was evidence-based and clinically relevant.
88% of those in practice report that the activity provided new ideas or information they have used in practice.

76% report one or more of their patients have already benefitted from the information learned.

75% report that the infographic associated with this activity is a helpful guide for diagnosing IPF.

“The information was immediately used. The next day at work I spoke to 1 nurse and 3 patients diagnosed with ILD.”
The four live meetings featured interactive case-based polling questions using Poll Everywhere. These questions are in addition to the pre/post-test and are asked throughout the lecture in a test and teach format. Patient charts and films were shown to answer the questions. The data allowed the presenter to understand the baseline knowledge, as well as to get more data from participants to help elucidate some of the findings in our preliminary analysis of the online enduring program data.

Which study would you like to order?

<table>
<thead>
<tr>
<th>Response options</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Resolution CT Scan</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>MRI Chest</td>
<td>2</td>
<td>9%</td>
</tr>
<tr>
<td><strong>High resolution CT (HRCT)</strong></td>
<td><strong>20</strong></td>
<td><strong>91%</strong></td>
</tr>
<tr>
<td>Full complement of chest X-rays (PA, expiratory, decubitus, lordotic)</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>PET scan</td>
<td>0</td>
<td>0%</td>
</tr>
</tbody>
</table>
Case Study #1 (JACOB):
49 y.o. Caucasian male, married; Mild pulmonary hypertension (diagnosed 3 years ago); Progressive dyspnea; Raynaud’s phenomenon; Hashimoto’s thyroiditis; Hypertension; GERD

Given the HRCT findings (shown in presentation) what is your diagnosis?

A. Idiopathic Pulmonary Fibrosis (IPF)  
B. Connective tissue disease (CTD)-ILD  
C. Need more information*  
D. Non-specific interstitial pneumonia  
E. Cryptogenic organization pneumonia

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A. Idiopathic Pulmonary Fibrosis (IPF)  
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C. Need more information*  
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A. Idiopathic Pulmonary Fibrosis (IPF)  
B. Connective tissue disease (CTD)-ILD  
C. Need more information*  
D. Non-specific interstitial pneumonia  
E. Cryptogenic organization pneumonia

N=62
Case Study #1 (JACOB):
49 y.o. Caucasian male, married; Mild pulmonary hypertension (diagnosed 3 years ago);
Progressive dyspnea; Raynaud’s phenomenon; Hashimoto’s thyroiditis; Hypertension; GERD

What is your diagnosis?
A. Idiopathic pulmonary fibrosis (IPF)
B. Need more information
C. Connective tissue disease (CTD)-ILD
D. Idiopathic non-specific interstitial pneumonia
E. Cryptogenic organization pneumonia

N=62
Case Study #1 (JACOB):
49 y.o. Caucasian male, married; Mild pulmonary hypertension (diagnosed 3 years ago);
Progressive dyspnea; Raynaud’s phenomenon; Hashimoto’s thyroiditis; Hypertension; GERD

What medication will you order?
A. Nintedanib (over pirfenidone)
B. Pirfenidone (over nintedanib)
C. Either nintedanib or pirfenidone
D. **Prednisone and mycophenolate mofetil**
E. Warfarin

N=62
Case Study #2 (RAYMOND):
74 y.o. Caucasian male; coronary artery disease; myocardial infarction 26 years ago; COPD; obstructive sleep apnea; GERD; Surgery (3-vessel CABG 20 years ago)

Which of the following studies should be performed next?

A. Bronchoscopy with bronchoalveolar lavage
B. Lung biopsy
C. High Resolution CT Scan (HRCT)
D. Exhaled Nitric Oxide
E. Standard CT without contrast

Audience Response System (Live)

N=62

Which of the following studies should be performed next?

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>%</td>
<td>5</td>
<td>2</td>
<td>92</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>
Case Study #2 (RAYMOND):
74 y.o. Caucasian male; coronary artery disease; myocardial infarction 26 years ago; COPD; obstructive sleep apnea; GERD; Surgery (3-vessel CABG 20 years ago)

What is Raymond’s diagnosis?
A. Connective tissue disease ILD
B. Idiopathic pulmonary fibrosis
C. Desquamative interstitial pneumonia
D. Acute interstitial pneumonia
E. Cryptogenic organization pneumonia

Audience Response System (Live)
Case Study #3 (WILMA):
68 y.o. African American female; chronic cough for past 12 months; post nasal drainage; GERD; Hypertension; Hypothyroidism

What is the best approach to discussing IPF disease management with patients and caregivers?

A. Carefully review with patients and caregivers the data that shows IPF prognosis is approximately 2.5 years
B. Recommend antifibrotics and pulmonary rehabilitation
C. Ask patients and caregivers to conduct research online
D. Explain to patients that while IPF is an incurable disease, there are strategies that can be employed to enhance overall QOL

[Bar chart showing audience response with N=62]
Launched October 19, 2018:
https://learning.freecme.com/a/30328PAgeVqR

Pathways for Navigating ILD and IPF: The Journey to Early Recognition, Diagnosis, and Patient-Centered Disease Management
The online activity uses ProDoctor’s innovative simulation platform to highlight three patient cases (1 CTD-ILD and 2 IPF) each with accompanying HRCT images, HRCT reconstructions, 3D animations and radiology impression. Learners are challenged to make decisions regarding the workup, tests, and differential diagnosis of ILD in all three cases. Key learning points were reinforced with an infographic clinical reference aid developed for the use in both the live and online activity.
# Final Report: Online Program Dashboard

## Participation

<table>
<thead>
<tr>
<th>Proposed</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>3500</td>
<td>9415</td>
</tr>
<tr>
<td>1000</td>
<td>1147</td>
</tr>
</tbody>
</table>

**Completer goal exceeded by 15%**

## Learner Impact

**116%** overall relative gain in knowledge from pre to post test for live meetings

**92%** of learners indicated that they planned to make changes to practice as a result of the education provided.

## Persistent Gaps/Needs

- Variable understanding existed related to making a diagnosis based on HRCT images

## Performance

**71%** of prescribers could identify antifibrotic therapy as an appropriate IPF treatment option immediately after the initial education or upon remediation.

### Diagnosing IPF based on HRCT images
- Identified by traditional pre-post assessment:
  - Variable understanding existed related to making a diagnosis based on HRCT images

### Distinguishing IPF from other ILD’s
- Identified in case-simulation platform performance:
  - Diagnosing IPF based on HRCT images
  - Distinguishing IPF from other ILD’s

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**Satisfaction**

*I loved this activity! First one of it’s kind. Very interactive, very informative, and fun!*

*I enjoyed the interactive format!*

*This course covered an important type of subject that is very common in the community.*
Users make decisions on therapy choices, disease management, and many other competencies.

If they make a correct decision on the first attempt then they are in the blue section of the heatmap.

If they make a correct choice after mentoring they are in the yellow section of the heatmap.

If they make an incorrect choice they receive mentoring by Dr. Grey.

If they make an incorrect choice after mentoring they are in the red section of the heatmap.

Blue and orange represent learning or reinforcement. Analyze red as ongoing gaps.
Learning Objective 1: Describe best practices for diagnosing IPF based on the most recent evidence-based guidelines.

ProDoctor Heatmap Data:

Learner performance after viewing simulation:

Correct on 1st attempt

Remediated by activity

Potential gap

Sees UIP pattern in HRCT

Diagnoses Raymond with IPF

*Numbers represent percentages
Learning Objective 2: Differentiate IPF from other interstitial lung diseases through comprehensive assessment, diagnosis, and/or referral to ILD specialty centers.

ProDoctor Heatmap Data:

Learner performance after viewing simulation:

- Correct on 1st attempt
- Remediated by activity
- Potential gap

*Numbers represent percentages
Learning Objective 3: Apply recent clinical data and guidelines to the management and treatment selection of IPF.

ProDoctor Heatmap Data:

<table>
<thead>
<tr>
<th>Metrics Barcharts - OC Kn to order study and transplant consult</th>
<th>Total Correct/Remediated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sleep study and long transplant consultation</td>
<td>200</td>
</tr>
<tr>
<td>Transplant consultation only</td>
<td>99</td>
</tr>
<tr>
<td>Rheumatology</td>
<td>84</td>
</tr>
<tr>
<td>Sleep study only</td>
<td>73</td>
</tr>
<tr>
<td>No consultations are needed at this time</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Metrics Barcharts - OC Kn to order either IPF med</th>
<th>Total Correct/Remediated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Either nintedanb or pirfenone after considering patient preference</td>
<td>169</td>
</tr>
<tr>
<td>Pirfenone (over nintedanb)</td>
<td>168</td>
</tr>
<tr>
<td>Nintedanb (over pirfenone)</td>
<td>130</td>
</tr>
<tr>
<td>Both nintedanb and pirfenone</td>
<td>128</td>
</tr>
</tbody>
</table>

70% of learners recognized antifibrotics as a treatment option for IPF

Learner performance after viewing simulation:

Correct on 1st attempt
Remediated by activity
Potential gap

Ks to order sleep study and transplant consult
OC Kn to order either IPF med

*Numbers represent percentages
Level 5 Performance by Learning Objective

**Learning Objective 4:** Determine appropriate communication strategies for addressing quality of life issues in patients with ILD.

**ProDoctor Heatmap Data:**

Learner performance after viewing simulation:

- **Correct on 1st attempt:**
  - Learners incorporated appropriate communication strategies.

- **Remediated by activity:**

- **Potential gap:**

*Numbers represent percentages*
12% of pulmonary prescribers were correct on first attempt after the education. The remainder were effectively remediated by the education on 86% of topics.

Both groups had difficulty with this question in Jacob’s case.
Online Enduring Metrics

Gain in Knowledge
Participants demonstrated a 116% relative gain in knowledge and competence as a result of this activity.

In addition to questions posed in the online simulations, a set of standard pre/post questions were presented to learners upon entry into the activity via FreeCME and after completion of the ProDoctor simulation.
Level 3: Outcomes: Knowledge

Learning Objective: Determine appropriate communication strategies for addressing quality of life issues in patients with ILD.

When should a patient with IPF be referred for lung transplant evaluation?

- After first exacerbation: 26% (Pre-Test), 8% (Post-Test)
- When the patient has shown a significant decline in FVC: 32% (Pre-Test), 8% (Post-Test)
- Lung transplant is not beneficial in IPF: 7% (Pre-Test), 5% (Post-Test)
- After they have failed anti-fibrotic therapy: 20% (Pre-Test), 8% (Post-Test)
- At time of diagnosis: 71% (Pre-Test), 14% (Post-Test)

Pre N=1887
Post N=1151
Level 3 Outcomes: Knowledge

Learning Objective: Apply recent clinical data and guidelines to the management and treatment selection of IPF.

Which medications have been shown to slow the progression of IPF?

- Prednisone: Pre N=1887, 1%; Post N=1151, 32%
- Nintedanib: Pre N=1887, 3%; Post N=1151, 9%
- Cyclophosphamide: Pre N=1887, 3%; Post N=1151, 13%
- Pirfenidone: Pre N=1887, 8%; Post N=1151, 16%
- Both Nintedanib and Pirfenidone: Pre N=1887, 39%; Post N=1151, 77%
Online Enduring Evaluation Results

Level 4 Outcomes: Competence (Evaluation Results)

As a result of what I learned, I intend to make changes in my practice:

- Extremely Likely: 52%
- Somewhat Likely: 40%
- Not At All Likely: 8%

As a result of what I learned, I intend to make the following changes in my practice:

- Modify treatment plans: 20%
- Use alternative communication methodologies with patients: 25%
- Incorporate different diagnostic strategies into patient evaluation: 25%
- Change my screening/prevention practice: 29%

Note: 92% of Participants reported that they were somewhat or extremely likely to make a change in their practice

N=1122
Online Enduring Evaluation Results

Participants report the activity was “Excellent” to “Good” at:

- Improving your ability to treat or manage patients: 95.0%
- Enhancing your ability to apply the LOs to practice: 95.0%
- Reinforcing/Improving Your Current Skills: 96.0%
- Meeting your educational needs: 96.0%
- Meeting the LOs: 96.0%

Evaluation:
- 94% reported the material was presented without commercial bias
- 97% reported the content presented was evidence-based and clinically relevant

N=1122
Key Take-Aways

Four overarching themes emerged from live/online data:

1) Early intervention and diagnosis
   • “Early intervention is key”
   • “Differentiating IPF from other ILD’s”

2) Communicating with patients
   • “Discussing long term disease management”
   • “Being upfront with patients”

3) Appropriate referrals
   • “Refer to lung transplant early”
   • “Refer to specialty centers”

4) Selecting the appropriate treatment
   • “Multidisciplinary approach to treatment”
   • “When to start treatment”
Recommendations for Future Education

- Asthma Management
- Pulmonary Hypertension
- Lung Transplant
- More details on the anti-fibrotic meds and how they low the progression of IDF
- Management of difficult to treat patients
- Targets of investigational agents