



# IPF Formative Assessment

Authors: Brittany Puster, Natasha Mitchner PhD, Katlyn Cooper & Ritesh Kothari  
Academy for Continued Healthcare Learning

## Abstract

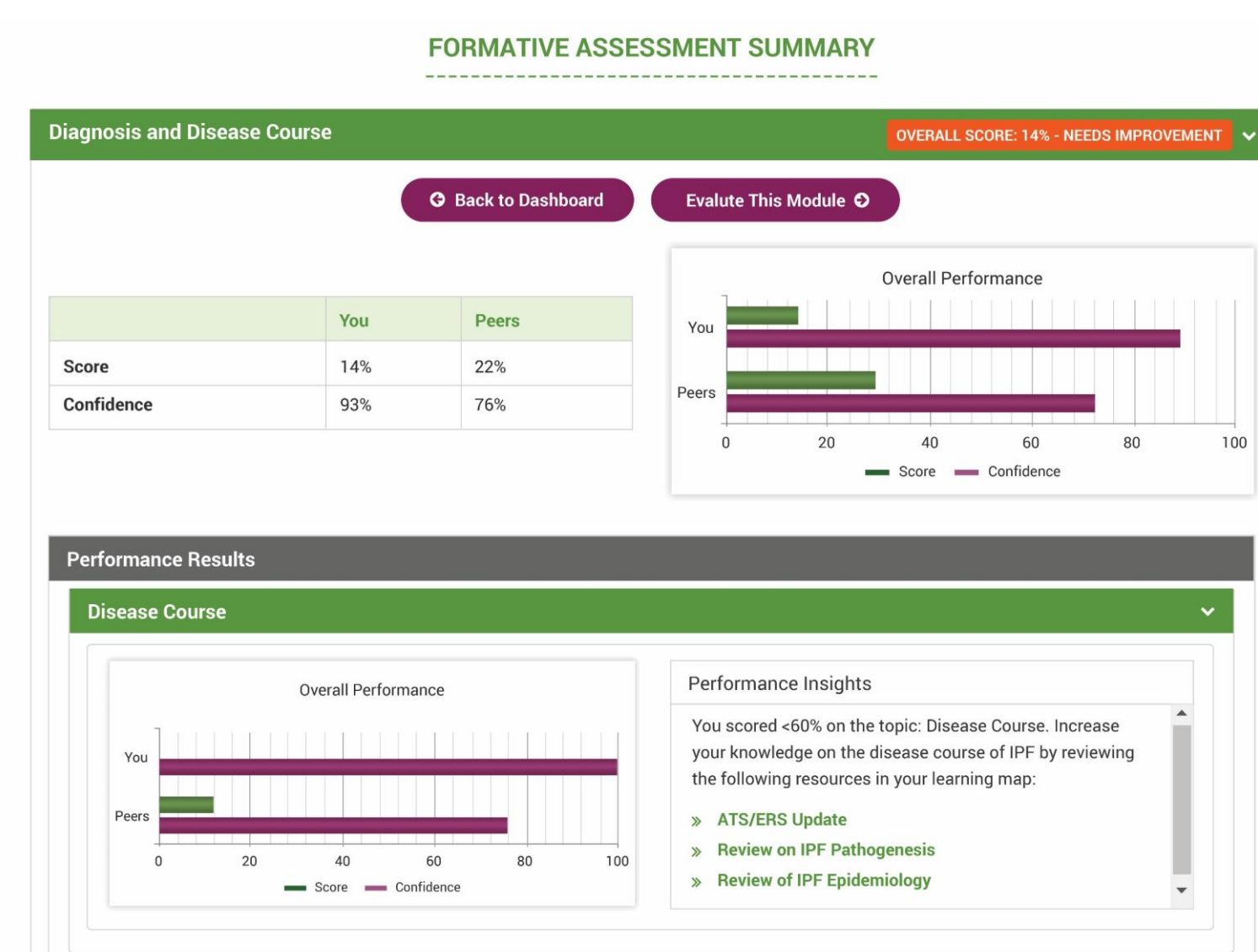
Conceptualizing the aims of adaptive learning is easy. Developing and implementing an effective program, however, proves more challenging divorced from the deep pockets of the technology sector. Yet, while large scale efforts to profile learners and direct every aspect of their continuing education may not yet be feasible, CME/CE providers can introduce foundational elements that support personalized learning, providing returns for learners, providers and patients. Our IPF Formative Assessment™ demonstrated that adaptive learning can be scaled cost effectively and still offer measurable returns on education. These returns are realized by learners, for whom clear insight on their individualized needs informs where their educational time should be focused; for providers, who create a means to continually compile and analyze needs assessment data as well as demonstrate educational effectiveness and value to commercial supporters; and to patients, who realize improved outcomes through targeted clinical education.

## Introduction

Fundamental to adaptive learning is the ability to leverage technology to create a learning environment where educational content is provided to service the unique needs of the learner. This type of pedagogy is critical to effectively improve outcomes for patients with idiopathic pulmonary fibrosis (IPF), where patients often experience symptoms for more than one year prior to receiving their diagnosis with considerable pulmonary impairment and a high burden of comorbid conditions. Even with advances in IPF management and despite ongoing education in this area, clinical competency and performance are subpar resulting in poor patient prognosis.

To achieve these endpoints—i.e., a scalable and replicable adaptive learning platform effective in overcoming the varied professional practice gaps unique to IPF—ACHL solicited insights from various stakeholders to develop the IPF Formative Assessment™.

This testing-based platform offered learners real time insight on their knowledge and competency levels compared to those of their peers, and delineated learner expectations between what is required of specialists versus that of referring or supportive care clinicians. It also effectively combated the Dunning-Kruger effect by presenting each learner's knowledge and competency gaps in the context of their self-reported confidence levels. In learners for whom high reported confidence levels are refuted by low educational performance, the effect is profound.



To improve patient outcomes, the educational design needed to simultaneously address deficiencies in disease knowledge, suboptimal timing to diagnosis and treatment, inconsistent guideline adherence (specifically failure to engage the multidisciplinary team) and inadequate shared decision making (performing precision medicine) considerate of these complex patients. An adaptive learning platform was chosen given the opportunity to pinpoint and address areas of greatest learner need based on their primary area of focus within the compendium of care.

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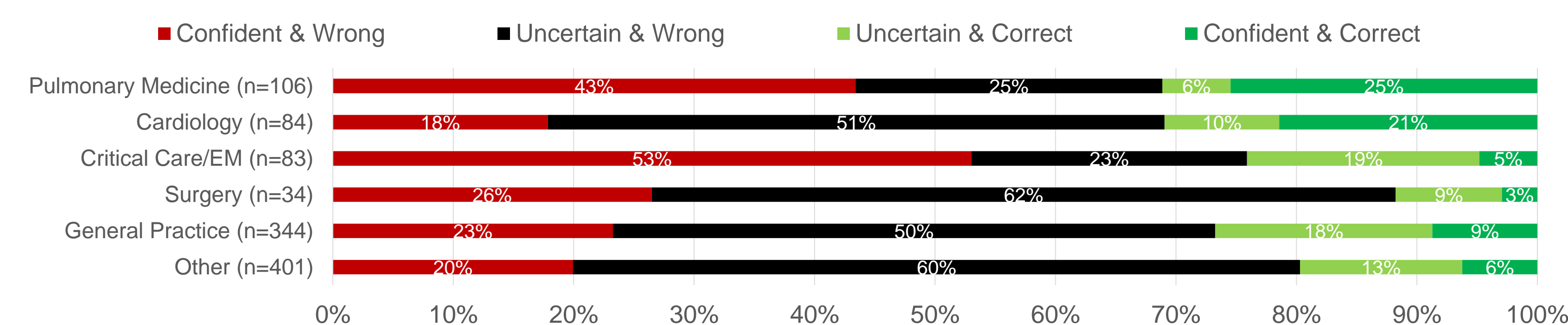
## Methods

Each question within the IPF Formative Assessment™ was indexed to measure difficulty, breadth and depth and then aligned to corresponding learner profiles ranging from needs improvement to expert. For each question, we assigned an expected performance level for a clinician based on discipline, specialty or practice setting. Using this algorithm, as learners progress through the testing platform, a “learning roadmap” dynamically populates to highlight areas of learning need and compiles recommendations for supporting education to address that need. This supplemental education included CME/CE developed by a variety of providers and available in the public domain. To evolve the IPF Formative Assessment™ beyond simply a testing platform for profiling, we simultaneously promoted reinforcement and reflection by developing rationales for each question with links to supporting evidence and/or embedded micro presentations by expert faculty. Upon answering each question, learners are shown if they are correct or incorrect, a peer comparison, their corresponding confidence assessment and provided evidence to support the correct answer as reinforcement or reflection.

## Results

Educational Domain	Results (N=507)	Practice Change Reported
Diagnosis & Disease Course	Measures of learner knowledge improved three-fold compared to baseline at time of post intervention assessment.	Post activity, 37% indicated they intended to order HRCT earlier in the diagnostic process; in a follow up survey, 18% reported implementing this change in their practice.
Multidisciplinary Consultation	Poor recognition of disease prompted the inclusion of a practice change question on intent to consult the multidisciplinary team to mitigate delays in diagnosis.	Post activity, 41% of learners indicated they would consult the multidisciplinary team to inform a Dx while 46% reported they would refer patients to ILD centers earlier in the process. In a 60 day follow up, 46% of learners indicated they implemented one or both practices.
Efficacy	At post intervention assessment, learners improved knowledge of efficacy of therapies by 48 percentage points.	22% of learners indicated they would counsel patients differently on therapy selection with 14% reporting actual implementation on a practice level.
Initiating Therapy	Practice change questions were surveyed at evaluation and in a follow up survey to identify learner changes to practice.	60% of learners post activity indicated they would recommend treatment earlier with 29% reporting in a follow up survey that they implemented this change to their practice.
Supportive Care	Learners demonstrated improved knowledge and competency in ordering supportive care therapies with an absolute increase of 23%.	29% of learners indicated they would refer patients to pulmonary rehabilitation as part of their care with 14% indicating they made this change.
Multidisciplinary Coordination of Care	Only 1/3 of learners correctly demonstrated competency in coordinating multidisciplinary care in the testing component so a practice question was included.	27% of learners post activity indicated their intention of implementing the SHARE approach with 14% reporting in the follow up that SDM was introduced.

One of the key outcomes from this program was confirming the Dunning-Kruger effect and using visibility of this phenomenon as a motivator for learners in committing to continuing education. An average difference of 40 percentage points was recorded between knowledge and confidence levels, but 30% of learners, noting this disconnect, engaged fully in the platform from start to finish. Additionally, 33% of learners continued to recommended supplemental learning. We attribute this high percentage to the effectiveness of the adaptive learning format and opportunity to see personal gaps quantified. When comparing levels of knowledge retention of the IPF Formative Assessment™ to those of an average of ACHL activities, we see a positive difference of 32 percentage points.



## Conclusion

Traditional education has proven ineffective in improving patient outcomes, where diverse needs across varied specialties, disciplines and practice settings challenge CEhp providers' ability to design wide sweeping, responsive education aligned to varied clinical domains and acumen, let alone patient needs and expectations. In this context, effective adaptive learning must not only create pathways to targeted education but increase learner awareness about their individual shortcomings, defined by their knowledge deficits as well as their inability to translate knowledge to practice and interpret patient needs.

