CHEST®

State of Practice: Evaluation and Management of Interstitial Lung Disease

VOLUME 1, ISSUE 4

CHEST Clinical Perspectives™

Introduction

The diagnosis and treatment of the various types of interstitial lung disease (ILD) are clinically challenging. From environmentally induced ILD to idiopathic forms of this condition such as usual interstitial pattern (UIP) pulmonary fibrosis, the signs and symptoms mimic a range of other medical conditions and comprise more than 130 disorders.

It is, therefore, not surprising that upwards of 55% of patients with ILD are misdiagnosed and that almost half carry an incorrect diagnosis for up to 10 years.[1] High-resolution CT (HRCT) scanning of the thorax is generally a key component of the diagnostic evaluation.[2] A correct diagnosis is critical in order to potentially avoid invasive testing, to provide useful prognostic information, and to formulate an individualized management plan that reduces the symptom burden and improves quality of life.[2] For the purposes of the study, we focused on patients with pulmonary fibrosis rather than all patients with ILD.

Common characteristics of ILD are scarring (pulmonary fibrosis) and/or inflammation of the lungs. Treatment of ILD entities that are characterized by lung inflammation in the absence of extensive fibrosis can be quite successful when anti-inflammatory immunosuppressive agents are administered. However, ILD with extensive fibrosis can be difficult to treat, and these therapies may have little or no impact on disease progression, especially in patients with IPF.[2] The current American Thoracic Society/European Respiratory Society/Japanese Respiratory Society/Latin American Thoracic Association (ATS/ERS/JRS/LATA) guidelines conditionally recommend for classic "idiopathic pulmonary fibrosis" use of nintedanib, a tyrosine kinase inhibitor,[3] and pirfenidone, a pyridone whose mechanism of action has not been established,[4] for patients with IPF.[5]

Patients with advanced, progressive disease that does not respond to therapy may be candidates for lung transplantation; if that is not an option, they should be encouraged to enroll in clinical trials, if available. Treating clinicians should focus on optimizing quality of life and symptom palliation for patients with advanced, progressive disease.[2,5]

BACKGROUND AND PURPOSE

In this *CHEST Clinical Perspectives*™ white paper, CHEST is undertaking primary research with pulmonologists to understand their approach to evaluation and management of patients suspected of having interstitial lung disease (ILD) with fibrotic change. Specifically, this issue focuses on diagnostic processes and treatment approaches related to patients with idiopathic pulmonary fibrosis (IPF). The objectives of this research are to:

- Understand diagnostic approaches used with patients suspected of having some form of ILD, with a specific focus on IPF;
- Understand the frequency and consistency of employing different diagnostic tools as part of the evaluation process;
- Gauge perspectives regarding interpretation of CT scans;
- Identify the extent to which invasive and/or surgical procedures are employed to confirm diagnosis;
- Assess approaches to symptom control; and
- Identify the extent to which adjunctive therapies and patient support are components of patient management.

METHODOLOGY

CHEST conducted an online survey with a sample of n=105 pulmonologists randomly selected from the CHEST member database. Respondents were screened to ensure that they diagnosed and managed patients with ILD. Respondents were sent a link to the survey from CHEST, and data were collected during December 7-10, 2017.

Stratified random sampling was employed to ensure an even mix of pulmonologists practicing in academic and nonacademic settings. This stratification was established in order to provide a minimum sample for viewing responses by practice setting (academic vs community-based pulmonologists). To ensure that responses across the entire data set are representative of the pulmonology community as a whole, the data were weighted according to the actual distribution of pulmonologists observed in the CHEST membership.

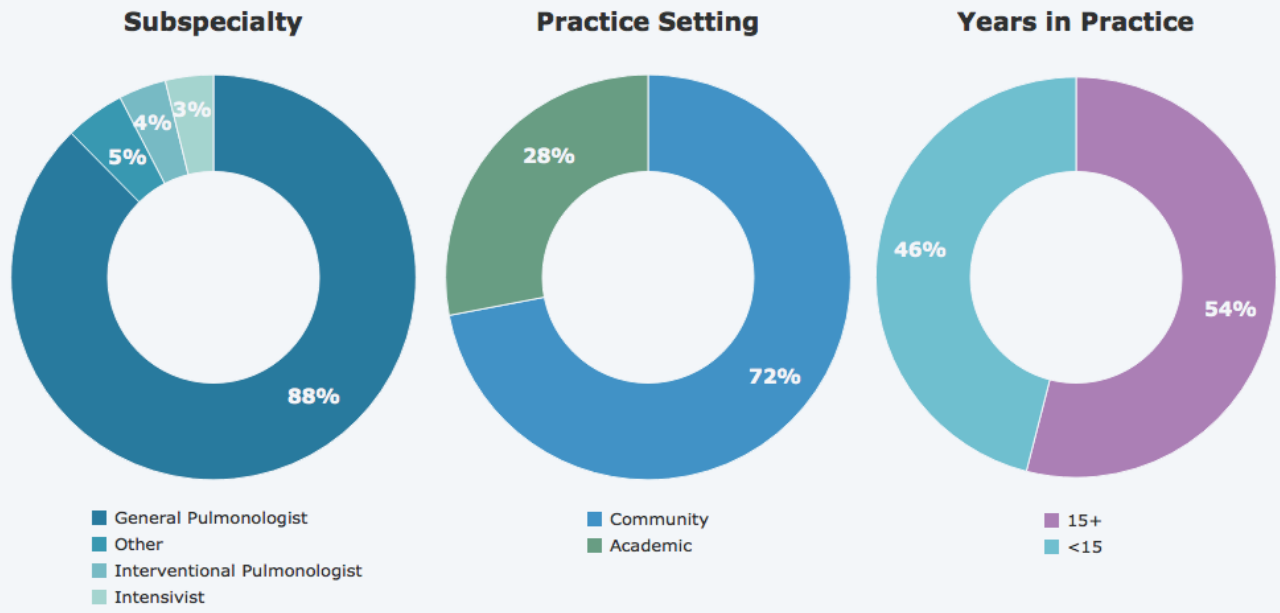
Descriptive statistics were used to assess distributions of the data across important behavioral variables. Inferential statistics were used to assess differences in descriptive and behavioral measures, which were cross-tabulated with patient volume and practice setting data. Depending on data type, a two-tailed independent samples t-test and a chi-square test were used to test for statistical significance ($P < .1$ considered statistically significant).

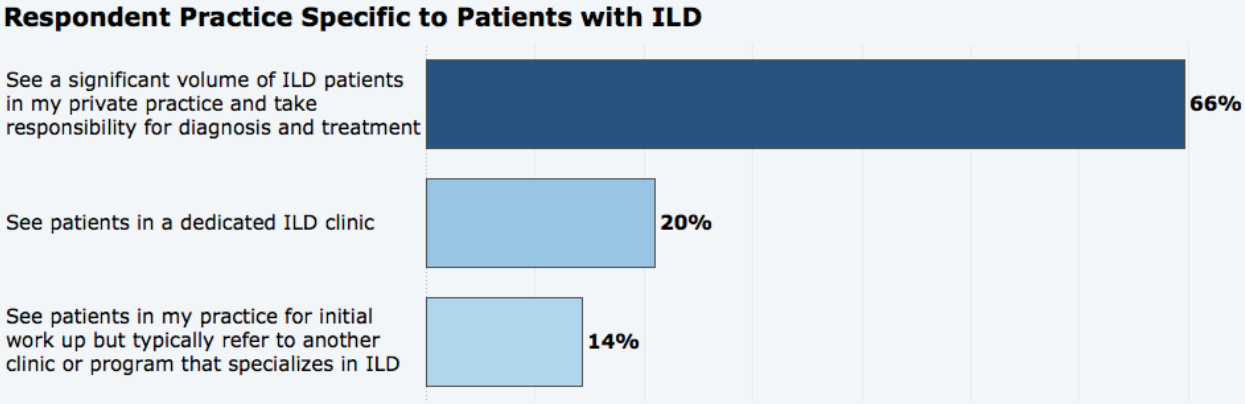
RESPONDENT PROFILE

The majority of respondents were general pulmonologists (88%) practicing in community-based settings (72%). With respect to years in practice, roughly the same percentage reported being in practice more and less than 15 years, 54% vs 46%, respectively.

Most pulmonologists see patients with ILD in their practices and are responsible for diagnosis and treatment; however, the volume is small.

Most respondents see patients with ILD in their private practice and take responsibility for diagnosis and treatment (66%). A much smaller percentage of respondents work out of a dedicated ILD clinic (20%) or refer to one (14%).





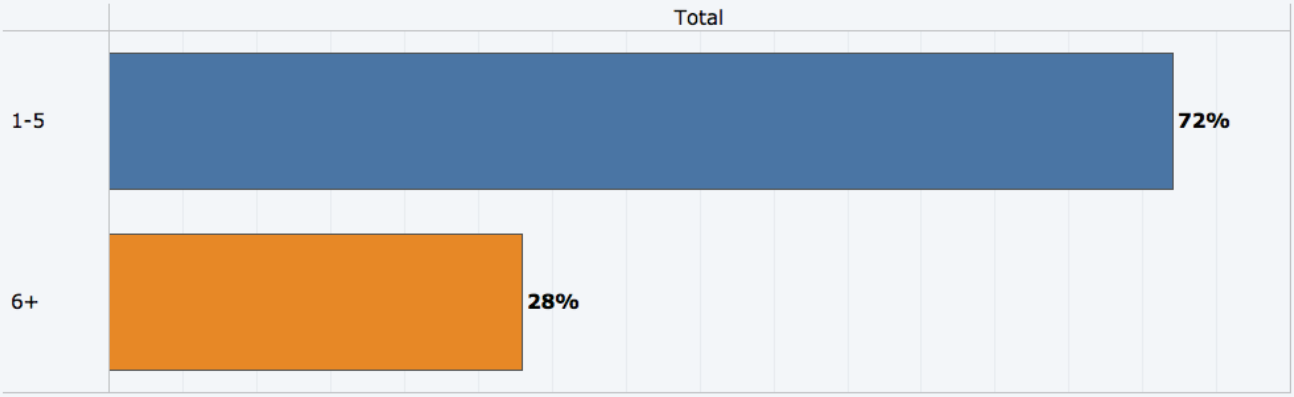
Q: Which of the following best describes your practice as it relates to patients suspected of or having a confirmed diagnosis of interstitial lung disease (ILD)?

PATIENT PROFILE

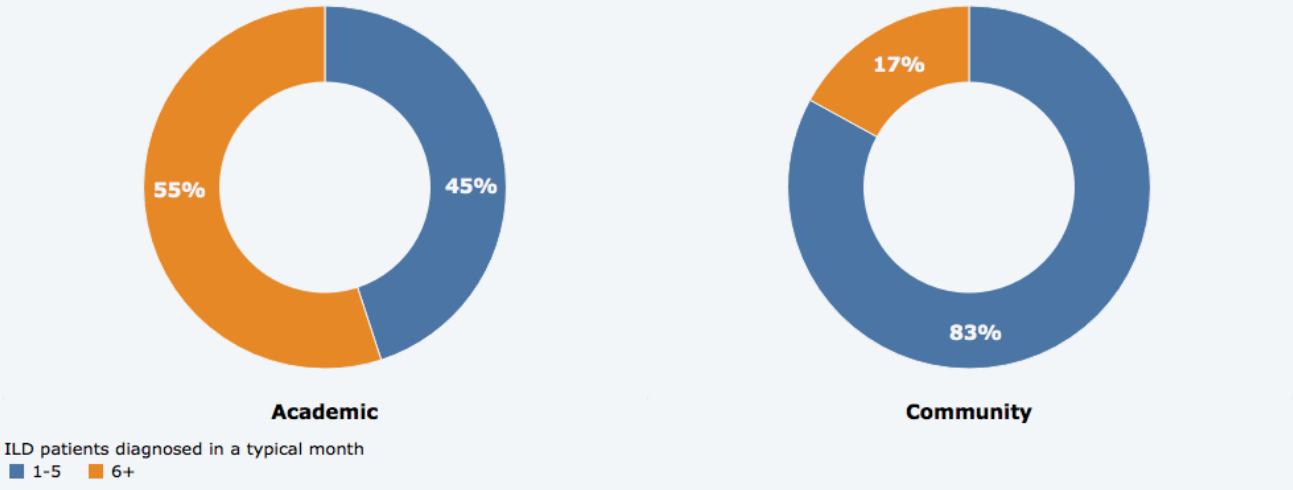
While most pulmonologists diagnose five or fewer patients with ILD in a typical month, academic pulmonologists diagnose a larger number of patients with ILD than community-based pulmonologists.

The largest share of respondents (72%) reports diagnosing five or fewer patients with ILD in a typical month, but community-based pulmonologists are more likely to be in low-volume practice (83% vs 45%). Respondents practicing in academic settings (55%) are more likely to diagnose higher volumes (>5 per month) of patients with ILD in comparison to their community-based colleagues (17%).

New ILD Cases Each Month



New ILD Cases Each Month by Practice Setting



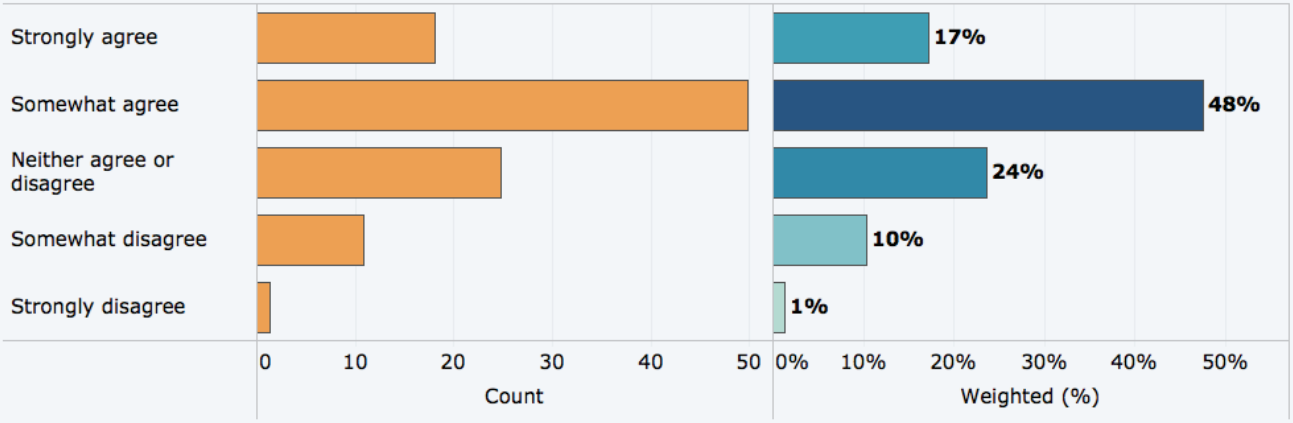
Q: In a typical month, how many new cases of interstitial lung disease (ILD) do you diagnose?

A majority of pulmonologists agree that many patients with ILD have been previously misdiagnosed.

There is a general level of agreement (63%) across respondents—regardless of practice setting, ILD patient volume, or clinical tenure—that most patients they see for ILD diagnosis have been previously misdiagnosed and treated for some other pulmonary condition.

Possible ILD Misdiagnosis

Most patients that I see for ILD diagnosis have been previously misdiagnosed and treated for some other pulmonary condition.



Q: Please rate your level of agreement with the following statement:
Most patients that I see for ILD diagnosis have been previously misdiagnosed and treated for some other pulmonary condition.

APPROACH TO ILD EVALUATION

Pulmonologists consider HRCT scanning the most important diagnostic tool for establishing a confirmed ILD diagnosis, by a wide margin, regardless of setting.

Respondents were asked to rank a series of different diagnostic tools in terms of their importance in establishing a confirmed diagnosis of a specific type of ILD. High-resolution CT scanning is ranked the highest by a significant margin (mean rank 1.9), followed by a detailed environmental/occupational history (mean rank 3.2), and pulmonary function testing (mean rank 3.8). While rank order of the importance of these tools does not vary substantially by different subgroups of pulmonologists, community-based pulmonologists (mean rank 1.7) are more likely to rank high-resolution CT scanning as the top tool in comparison to their academic colleagues (mean rank 2.7). Alternatively, academic pulmonologists rated assessment of comorbidities (4.8) and peripheral blood testing (5.5) as more important in comparison to their community-based colleagues.

Rank of Importance - Diagnostic Tools for ILD

	Total	Academic	Community
High-resolution CT	1.9	2.7	1.7
Environmental/occupational history	3.2	3.4	3.2
Pulmonary function testing	3.8	4.1	3.7
History of prescription medication	4.6	5.0	4.5
Presence of comorbidities	5.0	4.4	5.3
Peripheral blood testing	5.5	4.8	5.7
Family history	5.8	5.5	5.9
Chest radiography	6.2	6.2	6.1

Mean ranking scores (1 = highest, 8 = lowest)

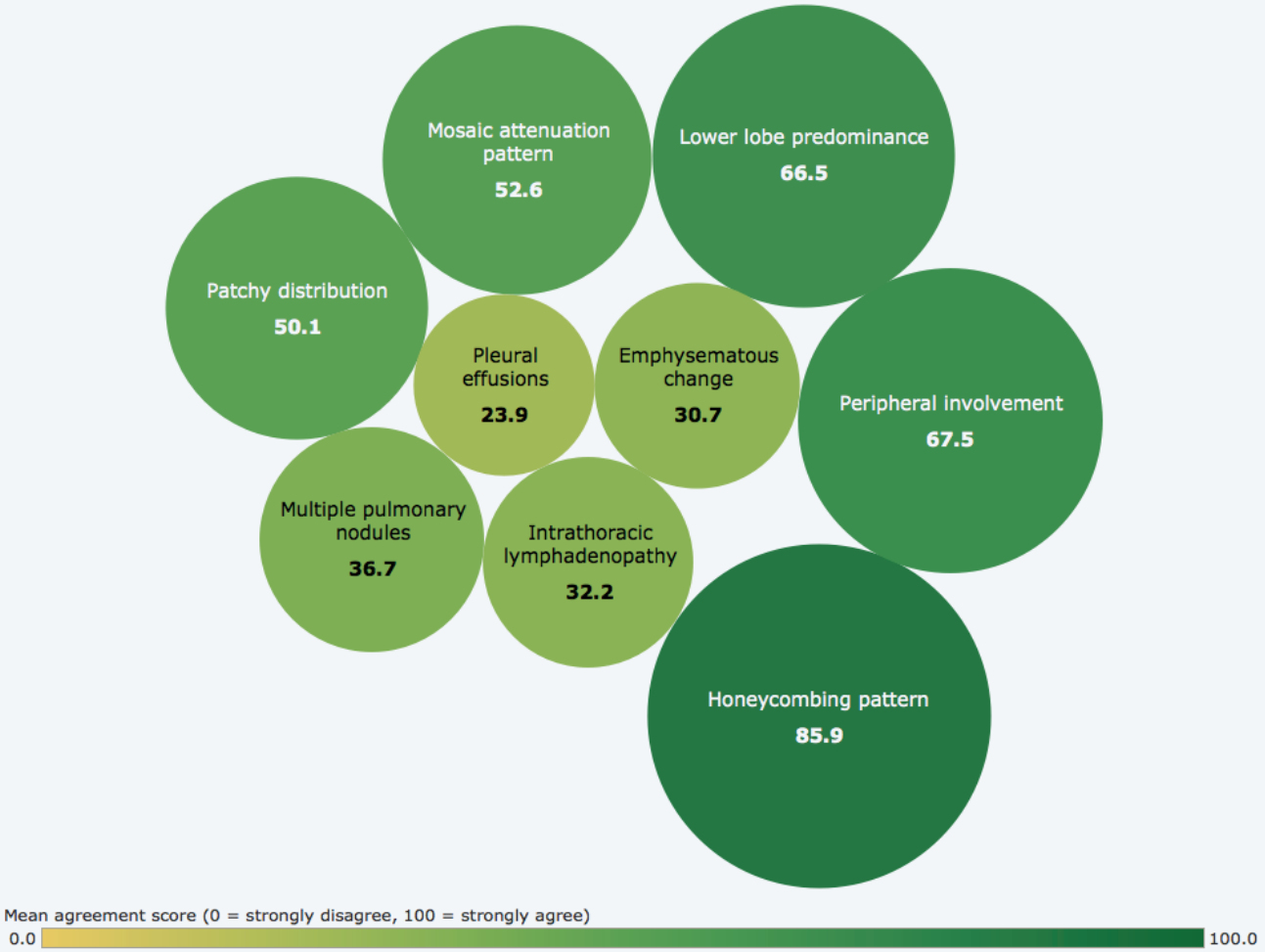
1.0 — 8.0

Q: Please **RANK** order the importance of the following diagnostic tools in helping you establish a confirmed diagnosis of a specific type of interstitial lung disease. 1=Most important and 8=Least important.

A majority of pulmonologists agree that a honeycombing pattern on HRCT scan confirms a specific ILD diagnosis.

Respondents were asked to rate their level of agreement that the following findings from an HRCT scan would confirm a diagnosis of a specific ILD. Honeycombing pattern (85.9) generates the highest level of agreement in confirming the diagnosis. It is followed closely by peripheral involvement (67.5) and lower lobe predominance (66.5). Respondents are more mixed/uncertain as to whether a mosaic attenuation pattern or patchy distribution is confirmatory. They generally agree that other findings (multiple pulmonary nodules, intrathoracic lymphadenopathy, emphysematous change, and pleural effusions) are not confirmatory. There are no statistically significant differences in mean agreement scores between different subgroups.

Presence of Findings That Confirm Diagnosis of ILD

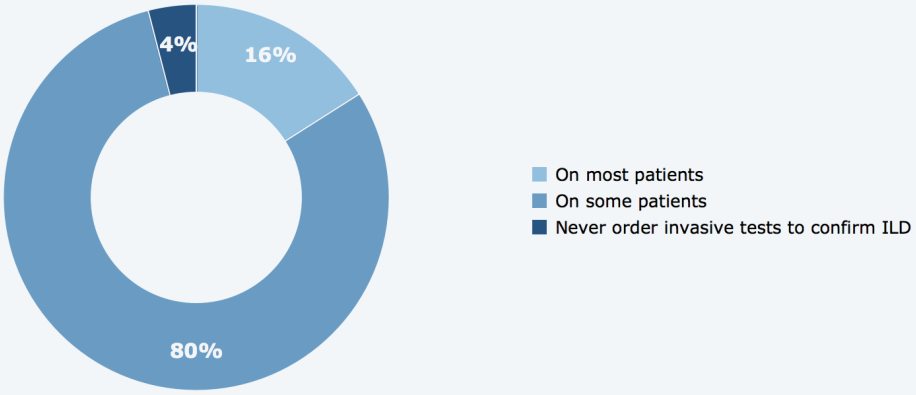


Q: When reviewing high-resolution CT scans of patients suspected of some form of ILD, how strongly do you agree or disagree that the presence of the following findings confirms a diagnosis of a specific type of ILD?

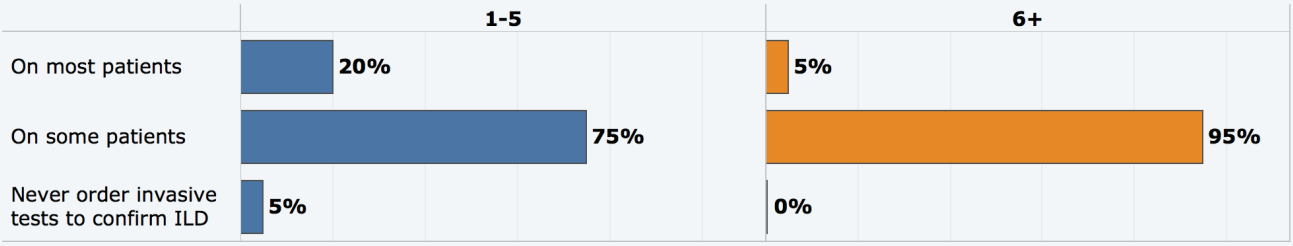
Pulmonologists who diagnose lower volumes of patients with ILD and those in community settings are somewhat more likely to order an invasive technique or refer for biopsy to confirm an ILD diagnosis.

Respondents tend to agree that tissue sampling is not required to confirm a diagnosis of pulmonary fibrosis. While nearly all respondents indicate that they utilize tissue sampling on only some of their patients, differences are observed between subgroups of pulmonologists. When asked how frequently they order bronchoscopy, bronchoalveolar lavage, or refer for lung biopsy to confirm a specific diagnosis of ILD, pulmonologists who diagnose lower volumes of patients with ILD, as well as pulmonologists who practice in community-based settings, are somewhat more likely to order an invasive technique or refer for biopsy to confirm a diagnosis.

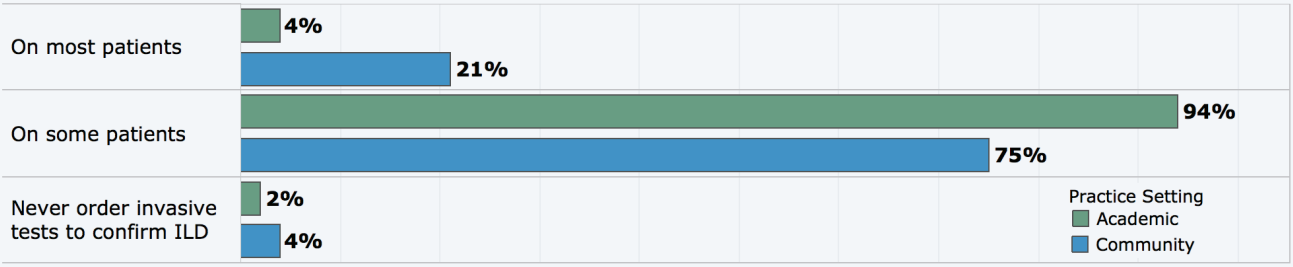
Frequency of Referral for Surgical Biopsy



Frequency of Referral for Surgical Biopsy by Patient Volume



Frequency of Referral for Surgical Biopsy by Practice Setting



Q: How frequently do you refer for surgical lung biopsy to establish or confirm a specific diagnosis of ILD?

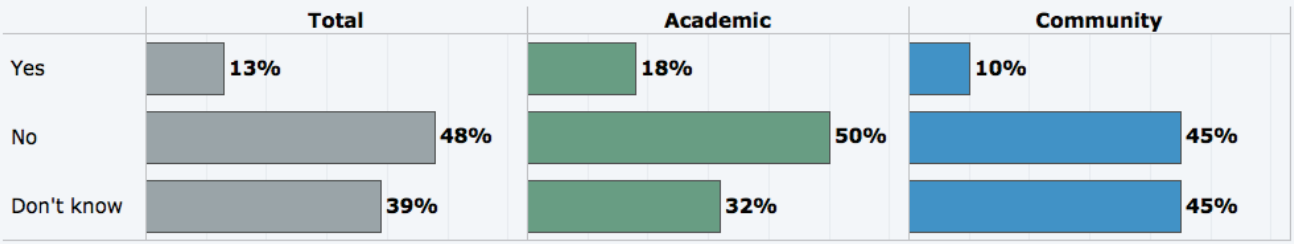
While most pulmonologists do not order genetic testing as part of an ILD diagnostic workup, academic pulmonologists are more likely to do so.

Overall, only a minority of respondents report ordering genetic testing as part of their diagnostic workup for ILD. However, there is a distinct difference between academic and community-based pulmonologists when it comes to genetic testing. Community-based pulmonologists (79%) are considerably less likely to order genetic testing in comparison to their academic colleagues (47%).

Among those who do test, TERC and TERT are ordered most frequently. Respondents indicate that they are most likely to order testing to determine if screening of family members is recommended (79%) or to identify forms of ILD that have been linked to genetic abnormalities (62%).

Genetic testing is not reimbursed in roughly half of practices, regardless of setting.

Roughly half of respondents who order genetic testing (48%) say their practice is not reimbursed for the tests, and an additional 39% say they don't know about reimbursement for this testing.

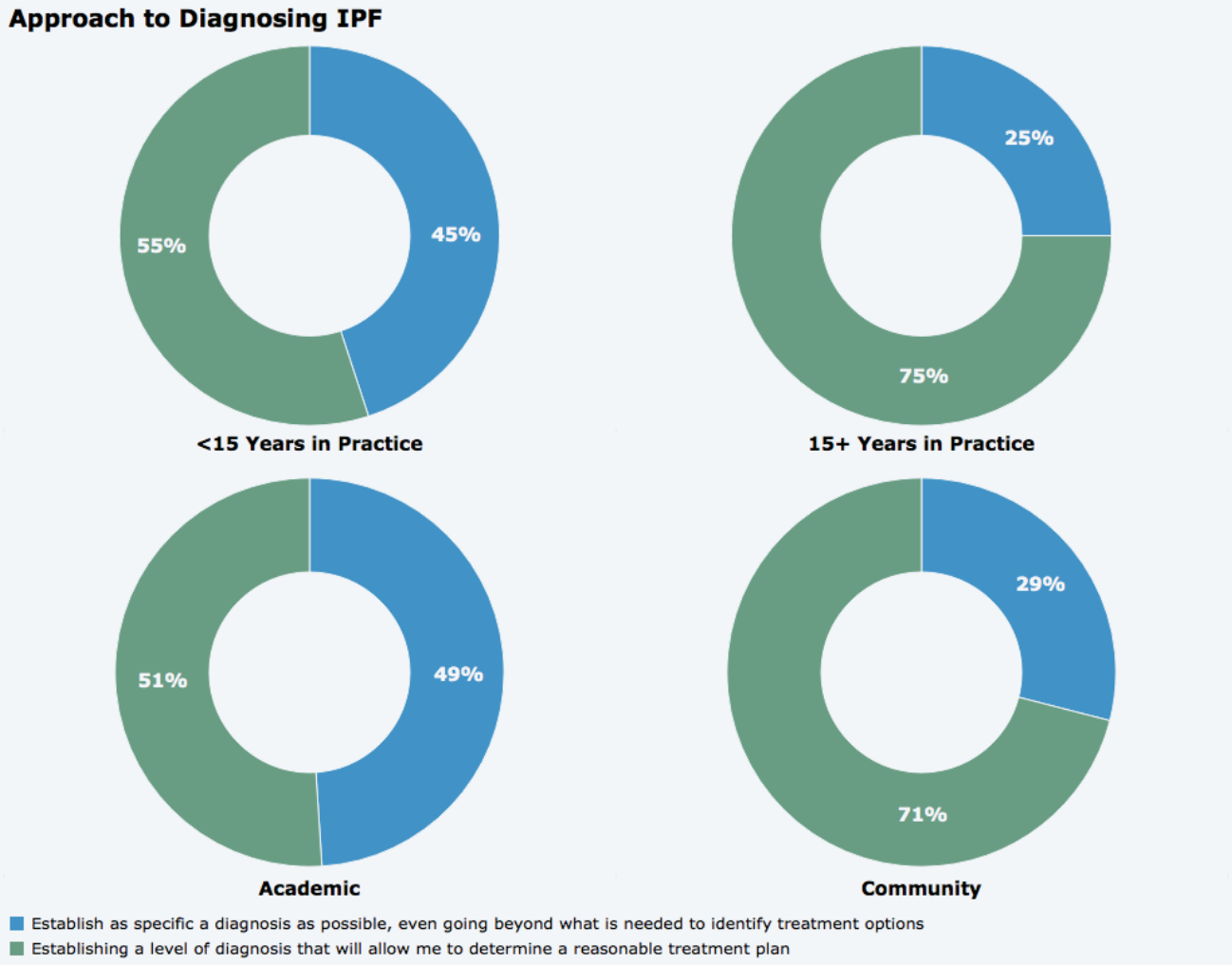


Q: Does your practice get reimbursed for ordering genetic tests?

Almost two-thirds of pulmonologists seek to establish a level of diagnosis that will allow them to determine a reasonable treatment plan, rather than establish a specific diagnosis.

Respondents were asked to self-identify themselves into one of two categories as it relates to their approach to diagnosing IPF: "splitters," who seek to establish as specific a diagnosis as possible; or "lumpers," who seek to establish a level of diagnosis that will allow them to determine a reasonable treatment plan. Two-thirds of respondents (65%) categorize themselves as "lumpers," while the balance (35%) self-identify as "splitters." These groups vary by both practice setting and clinical tenure. Academic pulmonologists are more likely to be evenly divided between these two categories, while community-based pulmonologists are much more likely to self-identify as "lumpers" (71%). Similarly, clinicians who have been in practice for 15 years or longer are much more likely to self-identify as "lumpers" (75%).

Despite the differences in mindset, there are few practical differences in terms of knowledge, attitudes, and behaviors between these two groups of clinicians. "Lumpers" are less likely than "splitters" to agree that tissue sampling is required in order to confirm an ILD diagnosis. They are also more likely to prioritize HRCT scanning and less likely to put a high emphasis on pulmonary function testing.



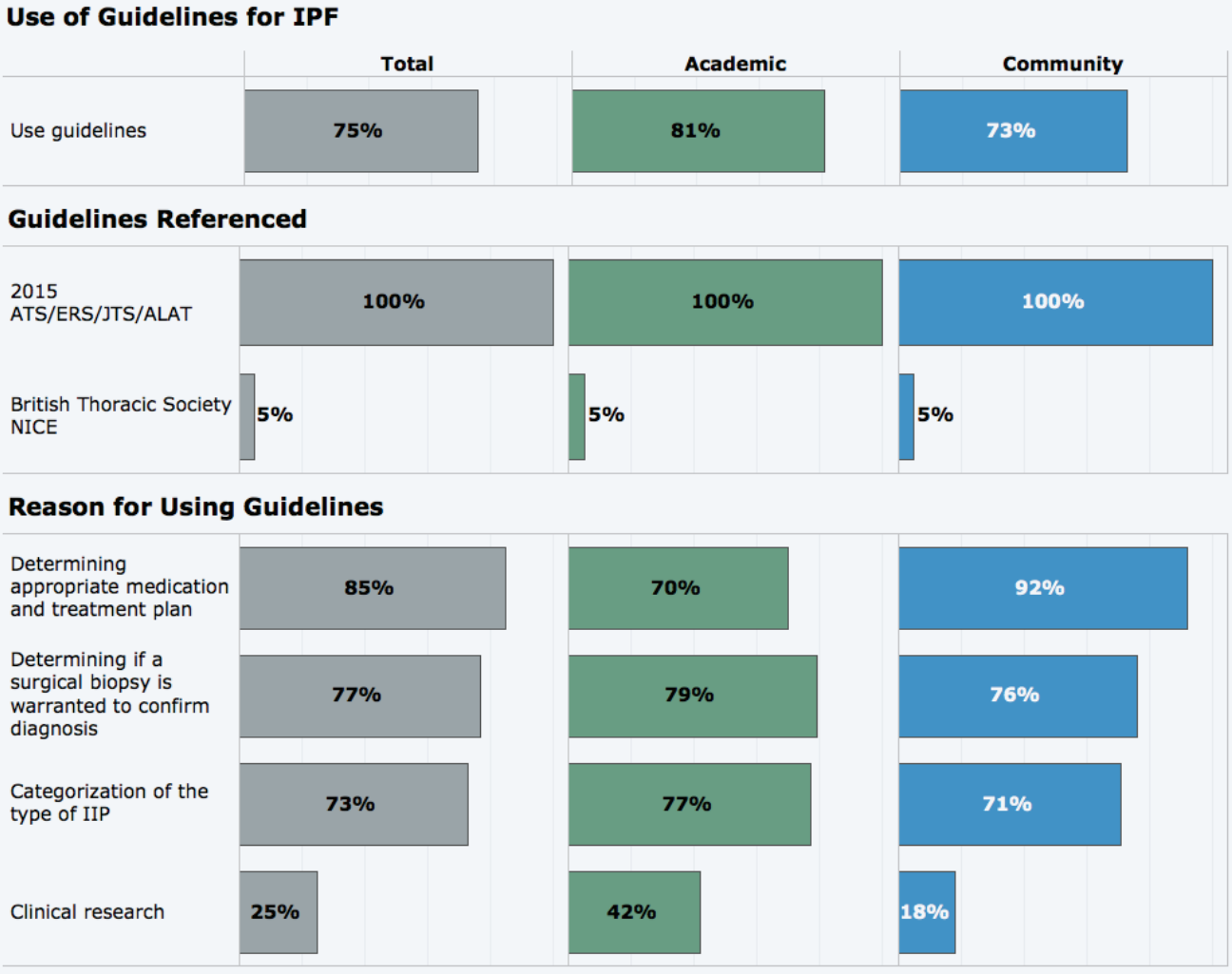
Q: Which of the following statements best describes your approach to diagnosing idiopathic pulmonary fibrosis?

APPROACH TO ILD TREATMENT

The majority of pulmonologists utilize ATS/ERS/JTS/ALAT guidelines for diagnosis and treatment of IPF.

Most respondents (70%) indicate they utilize guidelines for diagnosis and treatment of IPF. Use of guidelines is nearly universal among academic pulmonologists (90%). The 2015 ATS/ERS/JTS/ALAT guidelines are used by all respondents; a small minority (5%) also report using the BTS NICE guidelines.

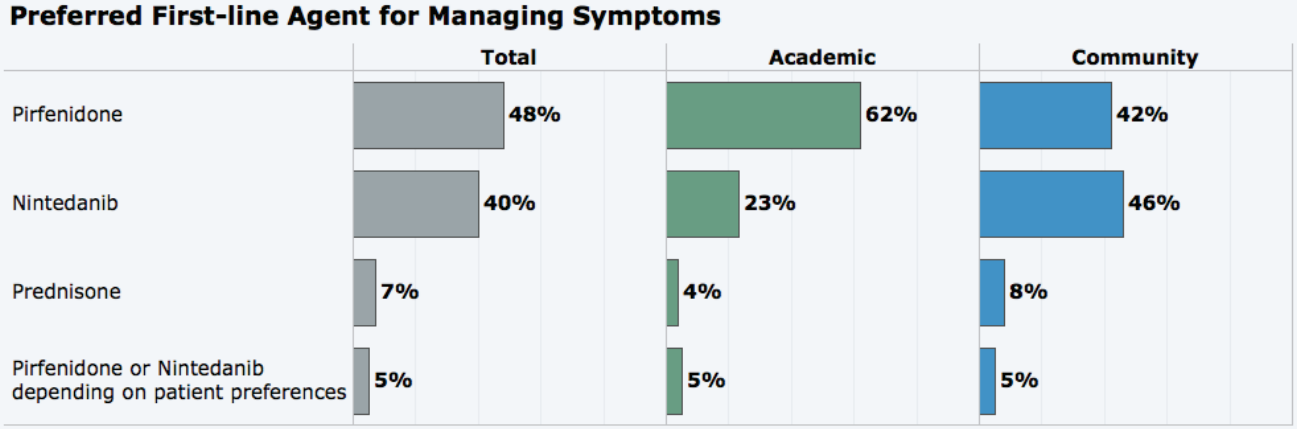
Respondents are most likely to use guidelines to determine appropriate medication and treatment plans (85% overall; 92% in community settings and 70% in academic settings), to determine if the surgical biopsy is warranted to confirm diagnosis (77% overall), and to categorize the type of idiopathic interstitial pneumonia (IIP) (73% overall).



Q: Do you utilize any particular set of diagnostic and treatment guidelines for IPF?
Which guidelines do you use for reference?
Do you use these guidelines for...

Pulmonologists are just as likely to use pirfenidone as nintedanib as first-line therapy for UIP-pattern pulmonary fibrosis.

Respondents are fairly evenly divided in terms of medications they turn to as first-line agents to help manage the symptoms of UIP-pattern pulmonary fibrosis. Half (48%) use pirfenidone and nearly half (40%) use nintedanib. Academic-based pulmonologists demonstrated significant preference for pirfenidone, while their community-based colleagues are slightly more likely to identify nintedanib as their preferred first-line agent. Few (7%) use prednisone as a first-line agent to manage symptoms.



Q: For your patients diagnosed with UIP-pattern pulmonary fibrosis, which medication are you most likely to prescribe as a first-line agent to help manage their symptoms?

Ease-of-use is identified most frequently as the reason for preference of first-line agent for IPF. Respondents who prefer nintedanib are much more likely to cite ease-of-use as their rationale. Other directional differences are observed based on first-line agent preference. Respondents who prefer pirfenidone are more likely to identify fewer side effects and reduced mortality as reasons for their preference.

Reasoning Behind Preference for First-line Agent

	Total	Nintedanib	Pirfenidone
Ease-of-use for patient	51%	76%	30%
Fewer side effects/interactions	49%	38%	57%
Reduced mortality	34%	26%	40%
Improved lung function	28%	28%	27%
Better exercise tolerance	12%	14%	11%
Limited out-of-pocket cost for the patient	12%	17%	7%
Slows progression of condition/reduction in lung function decline	8%	6%	10%
Familiarity	3%	3%	2%

Total percentage of respondents
0% 100%

Q: Why do you prefer to use that medication? Please check all that apply.

Most pulmonologists do not use triple therapy.

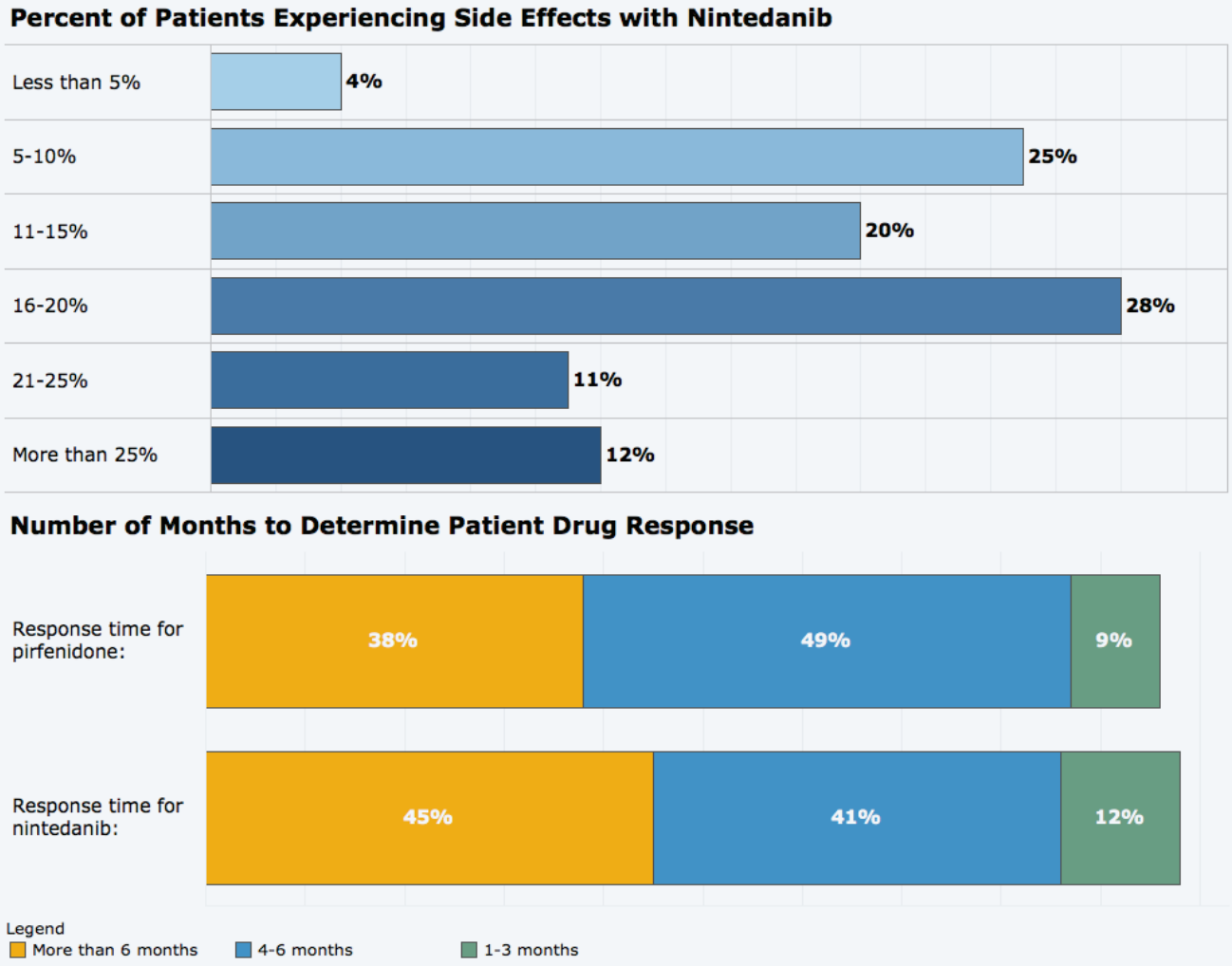
If the patient does not show improvement with corticosteroid or other first-line therapy, most turn to either pirfenidone (46%) or nintedanib (37%) based on what was initially prescribed. Virtually no one uses triple therapy, which was contraindicated in 2011 based on findings of the PANTHER study.

Pulmonologists generally wait 6 months or longer to determine a patient's response to pirfenidone or nintedanib.

Respondents who report prescribing pirfenidone or nintedanib for managing symptoms of IPF were asked how long they wait before determining patient response, and, in the case of nintedanib, what their experience has been with side effects. In the case of both medications, the vast majority of respondents indicate that they wait at least 4 to 6 months or longer in order to determine patient response. Nearly half (45%) who prescribe nintedanib and better than a third (38%) who prescribe pirfenidone say they typically wait longer than 6 months to determine response. Respondents who have longer tenure in clinical practice are more likely to wait longer than 6 months to determine patient response to nintedanib.

The majority of pulmonologists report the likelihood of experiencing side effects with nintedanib ranges from 5% to 20%.

Respondents report a range of experiences with side effects when prescribing nintedanib. Better than a fourth (29%) say that 10% or fewer of their patients experience side effects when receiving the medication, while more than half (56%) say that 11% to 20% of their patients receiving the therapy experience side effects. A fourth report that more than 20% of their patients experience side effects.



Q: Approximately what percentage of your IPF patients on nintedanib develop side effects that require you to reduce the dose?

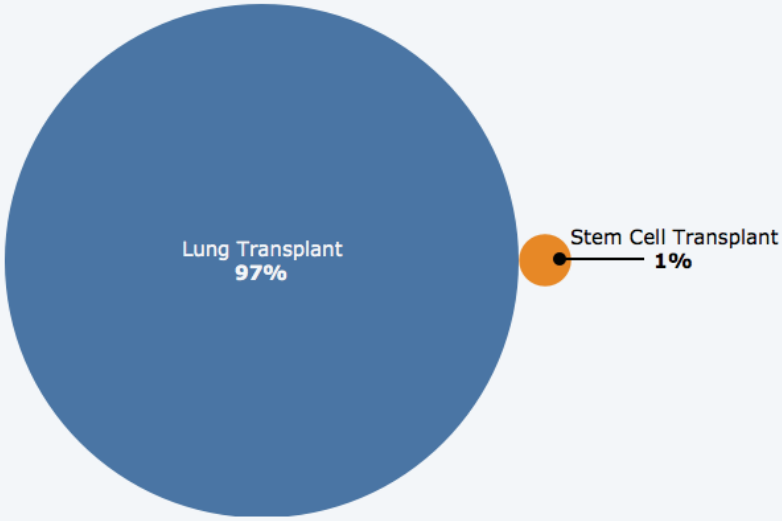
How long do you typically wait before determining whether or not your patient is responding to pirfenidone or nintedanib?

Almost all pulmonologists have referred patients with advanced IPF for lung transplantation.

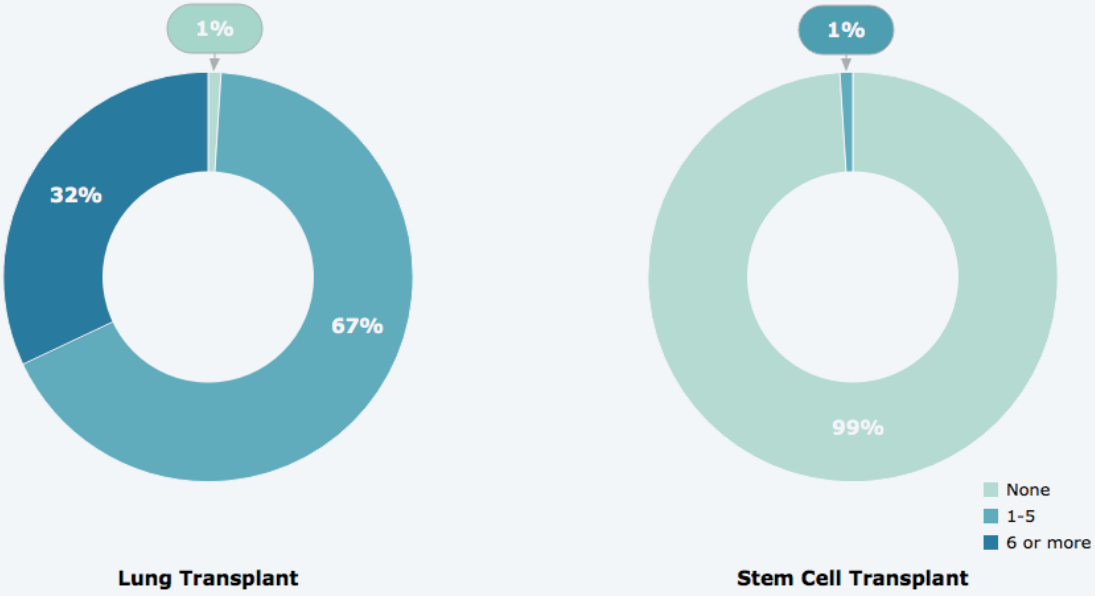
Respondents were asked about referral activity for patients with advanced IPF, specifically for lung and stem cell transplantation. Lung transplantation is a far more common route, with nearly all respondents (97%) saying they have referred patients with advanced IPF for lung transplantation. Among these respondents, 67% say they have referred one to five patients in the past 3 years, and 32% say they have referred six or more patients. Referrals for stem cell transplantation are negligible at this point. There were no variations in referrals by tenure or practice setting.

Referrals for Lung Transplantation and/or Stem Cell Infusion

Referred patients (ever):



Number of patients referred in past 3 years:



Q: Have you referred any of your advanced IPF patients for consultation for lung transplantation and/or stem cell infusion or transplantation. Approximately how many of your patients with advanced IPF have you referred for lung transplantation in the past 3 years?

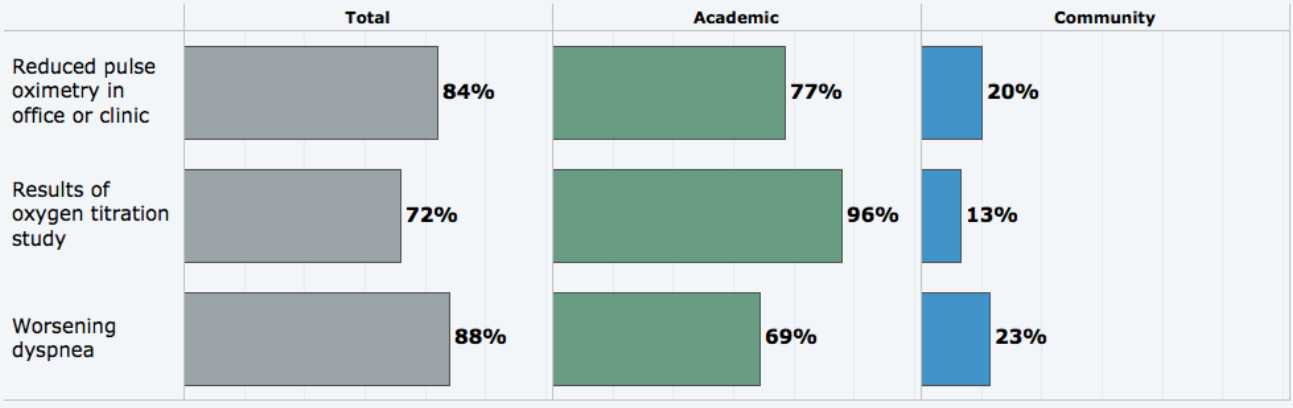
The vast majority of pulmonologists prescribe pulmonary rehabilitation and supplemental oxygen for patients with IPF.

Respondents were asked about the use of adjunctive therapies—including pulmonary rehabilitation, supplemental oxygen therapy, and nutrition counseling—for their patients with IPF. The vast majority of respondents prescribe pulmonary rehabilitation (88%) and supplemental oxygen therapy (82%) for most or all of their patients. Only a minority (19%) prescribe nutrition counseling. No variations are observed by practice setting, patient volume, or clinical tenure.

Most pulmonologists rely upon pulse oximetry alone or oxygen titration studies, rather than dyspnea, to determine whether to initiate supplemental oxygen therapy.

Most respondents indicate that reduced pulse oximetry or the results of oxygen titration studies drive their parameters for starting supplemental oxygen therapy for patients with IPF. There is some variation by practice setting, with community-based pulmonologists more likely to rely on pulse oximetry alone (88%), while academic-based pulmonologists are more influenced by the results of oxygen titration studies (96%). Only 13% of academic pulmonologists and 23% of community practitioners used worsening dyspnea as a parameter for starting supplemental oxygen therapy.

Parameters for Starting Supplemental Oxygen Therapy



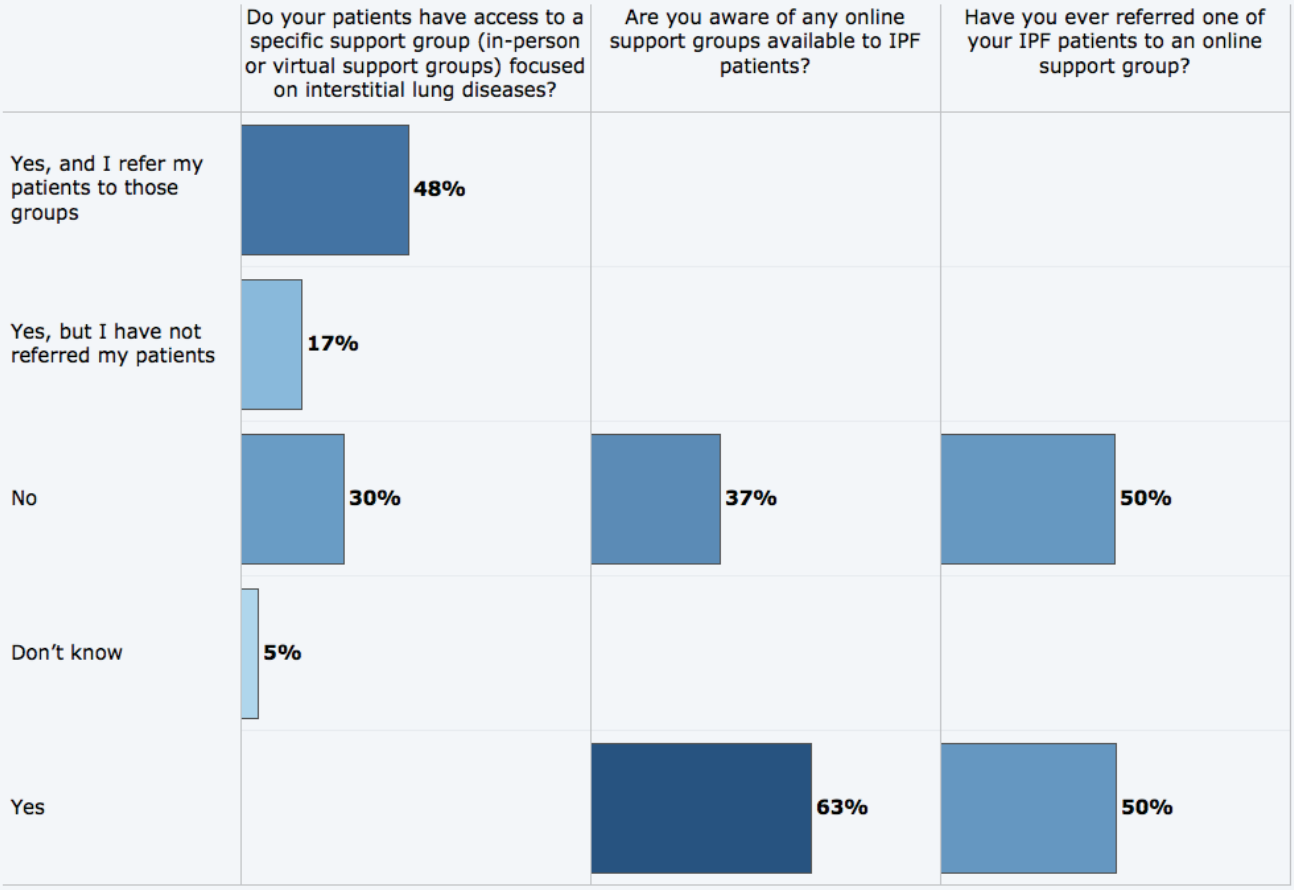
Q: What parameters do you use for determining when to start supplemental oxygen therapy?

Pulmonologists in academic settings and those who see more patients with ILD and IPF are more familiar with lung support groups and online resources and more likely to refer patients to them.

Roughly half of respondents make use of support group resources for their patients with ILD, with 47% being aware of such resources and actively referring their patients. Respondents practicing in academic settings (77%), as well as those who see greater volumes of patients with ILD (74%), are more likely to be aware of and refer patients to these resources.

Awareness of online support resources for patients with IPF is also relatively high, with 63% of respondents saying they know about such resources. Half (51%) of respondents who are aware of these resources actively refer their patients to them. Again, respondents who see greater volumes of patients are more likely to be aware of these resources.

Awareness and Use of Lung Support Groups



Q: Do your patients have access to a specific support group (in-person or virtual support groups) focused on interstitial lung diseases?

Are you aware of any online support groups available to IPF patients?

Have you ever referred one of your IPF patients to an online support group?

Pulmonologists are in agreement about which patients should be referred for palliative care.

Respondents were asked to profile the types of patients with ILD who they typically refer for palliative care. Almost unanimously, respondents agree that patients who are receiving maximal therapy and continue to decline are candidates for hospice care (96%). Similarly, patients who are considered "appropriate" for hospice referral (89%) or who are actively dying (80%) are also profiled as strong candidates for hospice care. Other factors also contribute to a potential hospice referral, including: marked limitation in activity due to symptoms (72%); high doses of narcotics for control of breathlessness (70%); high levels of supplemental oxygen (68%); and recurrent hospitalizations (66%). No differences are observed in these profiles based on practice setting, patient volume, or clinical tenure.

KEY TAKEAWAYS

- Most patients with ILD or IPF are managed by general pulmonologists in community settings.
- While pulmonologists in academic settings may be better informed than their community colleagues on some issues, there are relatively few differences in the way in which academic and community pulmonologists approach diagnostic workups for ILD and interpret findings, though community-based pulmonologists are more likely to order invasive tests.
- Genetic testing is becoming more accessible in clinical practice; however, reimbursement may be a barrier to uptake.
- There are few differences in the way that "splitters" and "lumpers" approach patient workups or treatment planning.
- Most pulmonologists appear to be putting ATS/ERS/JRS/ALAT guidelines into practice with respect to treatment decisions; however, use of guidelines by community-based pulmonologists is somewhat lower.

DISCUSSION

Despite the rarity and complexity of many ILD conditions, most patients who are being evaluated for ILD or IPF are seen in community-based general pulmonology settings, where clinicians are pursuing diagnosis and treatment. These are typically low volume settings where individual clinicians are seeing limited numbers of patients for ILD evaluation and even fewer specifically for IPF.

This is not to suggest the community-based general pulmonologists are less knowledgeable than their academic colleagues about how to diagnose and manage these patients. In fact, guideline use is very high in both settings and is applied to both diagnostic and patient management processes. Both groups place a high value on high-resolution CT scanning as the highest priority diagnostic tool and were aligned on the relative ranking of other diagnostic tools. Further, there are no variances between community-based and academic-based pulmonologists when it comes to interpreting findings that confirm an ILD diagnosis. Another positive, as far as knowledge and attitudes of community-based pulmonologists, is the fact that they are as likely as their academic colleagues to agree with the statement that tissue sampling is not required to confirm a diagnosis. On the negative side, however, this attitude does not always translate into practice. Based on these results, it appears that community-based pulmonologists are more likely to order invasive tests, such as surgical lung biopsy to confirm diagnosis.

While most pulmonologists recognize that HRCT scanning is the gold standard for diagnosis, there is no one “magic bullet” that confirms a diagnosis. It’s encouraging to see the prevalence of environmental and occupational history that is a routine part of workup, but an accurate diagnosis needs to be a combination of appropriate imaging and patient history.

“Splitters” and “lumpers” represent two different approaches to establishing a diagnosis for the purpose of developing treatment; however, there are few practical differences in knowledge attitudes and behaviors between these two groups when it comes to patient workups and treatment planning.

Access to genetic testing does not seem to be a barrier, but reimbursement might be. There is a need for a large sample study of the effectiveness of genetic testing in order to advance the use of this tool as a routine part of the diagnostic process.

Most pulmonologists appear to be putting ATS/ERS/JTS/ALAT guidelines into practice with respect to treatment decisions; however, use of guidelines by community-based pulmonologists is somewhat lower (73%) than what is observed among academic pulmonologists. Nonetheless, community-based pulmonologists are using this resource. Regardless of setting, more than 80% of pulmonologists use either nintedanib or pirfenidone in patients with IPF, both of which are suggested as first-line options in the 2015 ATS/ERS/JTS/ALAT guidelines. Additionally, they almost universally avoid triple therapy, which the ATS/ERS/JTS/ALAT has deemed "harmful," although it is unknown which specific component or combination and what doses of the individual components cause harm.[5] Use of adjunctive and support therapies is relatively high. While the respondents identified similar clinical drivers of their decisions, the ATS/ERS/JTS/ALAT guidelines do not provide guidance in this area but will be developing a future guideline that addresses support therapy.[5] The groups align on referral for lung transplantation and palliative care.

EDUCATIONAL OPPORTUNITIES

This survey identified a number of educational opportunities:

- Education around interpretation of imaging findings and the degree of confidence that can be assigned in confirming a diagnosis. While community-based pulmonologists are the primary target, there are some academic-based pulmonologists who also are somewhat more likely to agree that this is a necessary step. Additionally, surgical biopsy is not always needed to confirm a diagnosis. A comprehensive history, combined with appropriate radiographic imaging, may be sufficient.
- Education around use of genetic testing. Community-based pulmonologists may be a target of opportunity because they are conducting this testing less than their academic counterparts. However, this might also reflect access to these tests in a community setting.
- Greater education around the role nutrition can play in managing the symptoms.
- There is an opportunity to educate about the availability of support groups, particularly in community-based settings where referral to such programs (including online ones where barriers to access should be reduced) is lower.

ABOUT *CHEST CLINICAL PERSPECTIVES™*

CHEST is the global leader in advancing best patient outcomes through innovative chest medicine education, clinical research, and team-based care. This includes connecting health-care professionals to cutting-edge original research and a wide array of evidence-based guidelines through the journal *CHEST*, while also serving as a resource for clinicians through year-round meetings, live courses, books, white papers, and mobile apps delivering content in the areas of pulmonary, critical care, and sleep medicine.

We've launched this series of *CHEST Clinical Perspectives* studies to cover compelling issues in chest medicine, on topics ranging from the use of biologics in treatment of patients with severe asthma, to the state of practice in tissue sampling and testing for NSCLC. An expert panel of thought leaders from the Mayo Clinic, Baylor College of Medicine, Medical University of South Carolina, Walter Reed Army Medical Center, and Emory University helps to guide the content of each study and lends rich expertise and perspectives in interpreting the results. Each year, a capstone report is issued, incorporating findings from the studies conducted that year.

REFERENCES

1. Lederer DA, Bianchi P, Loboda J, Danese S, Cosgrove GP. AB017. Interstitial lung disease patient diagnostic journey (intensity). *J Thorac Dis.* 2016; 8(Suppl 5): AB017.
2. Meyer KC. Diagnosis and management of interstitial lung disease. *Trans Resp Med.* 2014;2(4):1-13.
3. OFEV® (nintedanib) Prescribing Information. Boehringer Ingelheim Pharmaceuticals, Inc.
   i. Ridgefield, CT. 2018
4. Esbriet® (pirfenidone) Prescribing Information. Genentech, Inc. San Francisco, CA. 2016.
5. Raghu G, Collard HR, Egan JJ, Martinez FJ, Behr J, Brown KK, et al. An official ATS/ERS/JRS/ALAT statement: idiopathic pulmonary fibrosis: evidence-based guidelines for diagnosis and management. *Am J Respir Crit Care Med*. 2011;183(6):788-824.

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