VOICE OF THE PATIENT REPORT

Autoimmune Pulmonary Alveolar Proteinosis

Externally-Led Patient-Focused Drug Development Meeting

Meeting Date: May 7, 2025

Report Date: May 15, 2026

HOSTED BY

National Organization for Rare Disorders (NORD) and PAP Foundation

NORD®
National Organization for Rare Disorders

PAP FOUNDATION

Submitted as patient experience data for consideration pursuant to section 569C of the Federal Food, Drug and Cosmetic Act to:

Center for Drug Evaluation and Research (CDER)
Center for Biologics Evaluation and Research (CBER)
U.S. Food and Drug Administration (FDA)

VOICE OF THE PATIENT REPORT – EXTERNALLY-LED PATIENT FOCUSED DRUG DEVELOPMENT MEETING ON AUTOIMMUNE PULMONARY ALVEOLAR PROTEINOSIS

Opening statement

This report represents the summary composed by the National Organization for Rare Disorders® (NORD) because of an externally-led Patient-Focused Drug Development meeting held virtually on May 7, 2025. This report reflects the host organizations' account of the perspectives of patients and caregivers who participated in the public meeting.

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Authors and collaborators:

Funding received: Funding for this meeting was provided by Savara Pharmaceuticals as an independent grant, with no input or influence on the content of the meeting or this report.

Version date: May 15, 2026

Revision statement: This document has not been revised and/or modified after the version date listed above.

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THE EL-PFDD MEETING ON AUTOIMMUNE PULMONARY ALVEOLAR PROTEINOSIS

EXECUTIVE SUMMARY

Brief Summary of Autoimmune Pulmonary Alveolar Proteinosis

Autoimmune pulmonary alveolar proteinosis (aPAP) affects 6–26 individuals per million across the globe. It is caused by granulocyte/macrophage-colony stimulating factor (GM-CSF) autoantibodies that lead to an abnormal build-up of surfactant in the lungs. This reduces the amount of oxygen that gets delivered to the rest of the body. Common symptoms include breathlessness, fatigue, cough and, in some patients, lung scarring. The disease typically gets worse over time and can be fatal. Testing done to help diagnose PAP includes a chest CT scan and bronchoscopy. Bronchoscopy is often performed to demostrate the increased accumulation of surfactant. Diagnosis of aPAP is made through a GM-CSF autoantibody test, but the availability of this test is not well known by health care professionals. The most common treatments are whole lung lavage and off-label use of inhaled GM-CSF.

Key Messages from the EL-PFDD Meeting

Patient and caregiver testimonies and commentary were collected during and after the meeting. The collected accounts emphasized the challenges of living with the symptoms of aPAP, and the difficulty and emotional anxiety associated with the process of getting diagnosed and treating this disease.

Experience with Symptoms and Diagnosis

- Breathlessness and fatigue are among the most common symptoms and can severely impact mobility, employment, relationships, and mental health.
- People with aPAP frequently suffer from anxiety, depression, and uncertainty about the future, because aPAP is a chronic and rare disease,
- aPAP is often misdiagnosed because its symptoms overlap with other more common conditions and healthcare providers are unfamiliar it.
- Healthcare providers are unaware that a non-invasive diagnostic test for aPAP exists.

Experience with Treatments

- Whole lung lavage (WLL) can be an effective treatment, but it is invasive, painful, time consuming, and requires hospitalization and a specialized medical team.
- WLL is not widely available, and some patients and families must travel long distances to receive WLL.
- WLL needs to be repeated on a regular basis, disrupting plans and daily living.
- GM-CSF therapy is promising, but the optimal dosage and duration of treatment have not been worked out.
- GM-CSF therapy is primarily available through clinical trials which require travel, commitment to the trial, and some level of risk.
- Off-label prescription use of GM-CSF therapy is expensive and requires health insurance coverage which is difficult to obtain.

Hopes for the Future

- There is a need to improve provider education and standardize diagnostic protocols to help patients get a diagnosis more quickly.
- Patients described the need for non-invasive, affordable, and accessible therapies and a need to address financial, insurance, resource, and geographic barriers to treatment options.
- Patients want stakeholders to prioritize the development of non-invasive and patient-friendly treatment options.
- Patients and families want to make sure their perspectives help shape research, drug development, and the pathway to new therapies.

BACKGROUND

Externally-Led Patient Focused Drug Development Meetings

To ensure that the perspectives, needs, and priorities of patients and families impacted by rare diseases are incorporated into the drug development and evaluation process, the U.S. Food and Drug Administration (FDA) has developed a systematic approach to capturing and sharing this information. FDA-led and Externally-led Patient Focused Drug Development (EL-PFDD) meetings provide patient organizations with an opportunity to share their expertise on living with the symptoms of a rare disease and their experiences with available treatments. The contributions from these meetings help the FDA and relevant stakeholders, such as researchers, medical product developers, and health care providers understand more about the needs of patients with rare diseases.

"Patient input from (these) meetings can support FDA staff as they conduct benefit-risk assessments for products under review or advise drug sponsors on the development programs. We also believe that patient input collected from these meetings can bring value to drug development more broadly." (Dr. Elisabeth Boulos, Clinical Team Leader, Div. of Pulmonology, Allergy, and Critical Care, FDA)

An important outcome of EL-PFDD meetings is a comprehensive "Voice of the Patient" report, a summary of the patient and caregiver perspectives on the symptoms, burdens, and treatment options. These reports become an added resource for the FDA when assessing benefit-risk profiles and advising sponsors on development These meetings and the summary reports allow patients to tell the FDA and drug developers what matters most to them regarding the benefit-risk balance of treatment options, the severity of their disease, and the urgency of their unmet medical needs.

Overview of the EL-PFDD Meeting on Autoimmune Pulmonary Alveolar Proteinosis

On May 7, 2025, an EL-PFDD meeting was held on aPAP, a rare, often unrecognized, disease that causes life-changing symptoms and introduces significant burdens to patients and their families. No FDA approved therapies currently exist for aPAP. NORD and the PAP Foundation held this meeting to pinpoint the unmet needs of patients with this condition, and to help identify a path forward for drug development.

The objective of this meeting was to give patients, families, and caregivers a forum to share how aPAP has affected their lives; to discuss the factors they consider when choosing treatments; and to provide the FDA, researchers, and other stakeholders a deeper understanding of their unmet medical needs.

The voices of people living with aPAP and their caregivers were heard through testimonies, polling of the audience, open discussions with meeting attendees and commentary, during and after the meeting.

Meeting Snapshot

The EL-PFDD meeting on aPAP was held virtually on May 7, 2025. It was co-hosted by Alli Ward, Director of Membership for NORD, and Dr. Bruce Trapnell, Scientific Director of the PAP Foundation. Over 200 people registered, including patients and their family members, patient advocates, pharmaceutical representatives, FDA staff, researchers, and health care providers. During the meeting, people with aPAP and their caregivers shared their stories and experiences through live testimony and via live chat.

Alli Ward started the meeting and Pamela Gavin, President and CEO of NORD, provided opening remarks. Ms. Gavin shared the vision and mission of NORD, and thanked FDA staff and the funders. She stressed the importance of the patient and caregiver testimony provided during the meeting.

The next speaker, Chris Hameetman, President of the PAP Foundation and an aPAP patient, spoke about forming the foundation with the goals of providing education, connection, and advocacy for patients and families affected by PAP. He discussed support and research efforts of the foundation and concluded by thanking the attendees for their commitment to making a difference in the lives of people with PAP.

Dr. Bruce Trapnell provided a clinical overview of aPAP, starting with a general description of the condition and the most common symptoms. He also reviewed the causes, prevalence, and the typical clinical course of the disease. He explained how the condition is diagnosed and the treatment options, including the status of current therapies under investigation.

Dr. Elisabeth Boulos, Clinical Team Leader, Division of Pulmonology, Allergy, and Critical Care at the FDA, reviewed the regulatory policies that shape the patient-focused drug development initiative; and shared how patients, as experts on their condition, can provide valuable insight into their unmet needs. She emphasized that PFDD meetings help strengthen the FDA's understanding of the needs of people with a rare disease and help the FDA craft a benefit-risk assessment for new therapies. This information helps the FDA define a path forward for the review and evaluation of new drug applications.

"These meetings are one of the most important and meaningful ways of informing the FDA on how the disease impacts your life and your preference of treatments." (Dr. Elisabeth Boulos, Clinical Team Leader, Div. of Pulmonology, Allergy, and Critical Care, FDA)

The agenda was organized around two main topics: the impact of the symptoms of aPAP on daily life of patients, their families and caregivers, and patient experience with the available treatment options. Each session started with a panel of patients and caregivers who provided testimony about their experiences followed by a panel discussion. Several live audience polls were conducted during the meeting to gather data on audience demographics, impact of symptoms on daily life, and treatment approaches. Additionally, attendee comments were collected during the meeting and for two weeks after its conclusion.

A recording of the entire EL-PFDD meeting for aPAP can be viewed at the website https://vimeo.com/1086485906/f2bfc0f7db?share=copy&fl=sv&fe=ci

AGENDA:

Opening Remarks:
Alli Ward -Director of Membership, NORD and Dr. Bruce Trapnell, Scientific Director of the PAP Foundation
Pamela Gavin, President and CEO of NORD
Christopher Hameetman, President of the PAP Foundation

Clinical Overview of aPAP:
Dr. Bruce Trapnell

Welcome Remarks:
Dr. Elisabeth Boulos, Division of Pulmonary, Allergy and Critical Care, FDA

Overview of meeting process

First Poll: Patient and caregiver demographics

Topic 1: Living with aPAP – Patient panel - Symptoms and impact on daily life

Second Poll: Symptoms impacting daily life

Break

Topic 2: Current management and future treatments

Third Poll: Treatment and management options

Closing Remarks:
Alli Ward and Dr. Bruce Trapnell

CLINICAL OVERVIEW OF AUTOIMMUNE PULMONARY ALVEOLAR PROTEINOSIS

Autoimmune PAP is an acquired disease occurring in 6-26 million men, women, and children worldwide. aPAP occurs most commonly in adults. The first symptom is usually shortness of breath. aPAP is characterized by the abnormal buildup of surfactant in the lungs, which reduces the ability of the lungs to move oxygen to the blood for delivery to the body. People with aPAP often have shortness of breath, fatigue, cough, chest congestion, and chest pain; symptoms that typically get worse over time. Some people develop serious infections, lung scarring, respiratory failure, and death. The most commonly used treatments include whole lung lavage (WLL) and inhaled granulocyte/macrophage-colony stimulating factor (GM-CSF), a recombinant form of a protein molecule normally present in healthy people. While pulmonary alveolar proteinosis (PAP) has many different causes, including genetic mutations, inhaled toxins, chronic infections and others, an autoimmune cause is the most common, and accounts for 90% of all patients with PAP.

Lung Function and aPAP

The lungs contain millions of tiny air sacs, called alveoli, where oxygen is transferred from the air we breathe into our bloodstream for delivery to the body. The walls of the alveoli are normally covered by a thin layer of an oily mixture of lipids and protein known as surfactant. The surfactant layer keeps the alveoli open and is normally thin enough for oxygen to easily pass through. The thickness of the surfactant layer is regulated by lung cells called alveolar macrophages, which remove the excess surfactant. A protein known as granulocyte/macrophage-colony stimulating factor (GM-CSF) stimulates the alveolar macrophages and enables them to remove excess surfactant.

In people with aPAP, the immune system makes antibodies that attach to GM-CSF and stop it from causing the maturation of alveolar macrophages. Without stimulation by GM-CSF, the alveolar macrophages are unable to remove excess surfactant, which then builds-up in the alveoli. Over time, the surfactant layer becomes thicker, and this gradually reduces how much oxygen is transferred into the blood. Excess surfactant also causes the lungs to be stiff, making it harder to breathe. Both lung stiffness and the reduced rate of oxygen delivery contribute to the symptoms of aPAP including breathlessness and fatigue.

Clinical Presentation and Course

For most patients, aPAP is a progressive disease that gets worse over time. The rate at which symptoms get worse depends on the rate of surfactant accumulation, and this varies from person to person. For most people with aPAP, breathlessness is the first symptom. As the amount of surfactant accumulates, the breathlessness and other symptoms get worse. Other symptoms resulting from increased surfactant accumulation include chest congestion, cough, expectoration of a white frothy phlegm, and in some, chest pain, and weight loss. As surfactant accumulation increases, oxygen delivery is severely reduced, and the lips and fingers can turn blue during exercise. When surfactant accumulation is very severe, the lips and fingers can turn blue even at rest.

In the absence of infection, the symptoms of aPAP are non-specific and are often misinterpreted as being due to other conditions. The symptoms develop slowly and gradually worsen over time. The timing of when an individual seeks medical attention depends on the rate of surfactant accumulation, as well as the lifestyle and activities the affected person engages in. All of this makes diagnosis and management of aPAP challenging.

Another complication of aPAP is an increased risk of serious infections. This is not due to the abnormal buildup of surfactant in the lungs, but due to a block of GM-CSF signals to immune cells that reduces the body's ability to protect against infection. Infections can occur at any time after the levels of GM-CSF autoantibodies begin to increase. They can be caused by a wide range of microorganisms in the lungs or other parts of the body. A lung infection can result in symptoms of chest pain, coughing up blood (hemoptysis), and fever. These symptoms can be severe and require medical attention.

The symptoms of aPAP can begin at any age but usually start in otherwise healthy adults between 30 and 50 years of age. About six percent of people become symptomatic before 18 years of age. The first symptoms are typically shortness of breath and fatigue. Most patients experience a relatively slow rate of disease progression, while others get worse very quickly. A small percentage of people will get better with time. Others may develop serious infections, lung scarring (pulmonary fibrosis), respiratory failure, and death. The rate of surfactant accumulation determines how fast symptoms will get worse and determines how often patients will need therapy.

Diagnosis and Treatment

Making the diagnosis of aPAP is difficult because it is rare and its symptoms resemble other, more common conditions. People with aPAP are often misdiagnosed as having pneumonia or asthma and are treated with the therapy effective for that diagnosis (antibiotics for pneumonia, bronchodilators for asthma), but ineffective for aPAP. When the initial treatment does not work, their health care providers consider different diagnoses and additional tests. Routine laboratory tests and procedures such as breathing tests and chest x-rays detect the nonspecific manifestations of aPAP but are not able to specifically diagnose aPAP. In addition, the symptoms of aPAP can look different from person to person making it even more difficult to get a diagnosis.

Other medical tests done to seek a diagnosis include a chest computed tomography (CT) scan, bronchoscopy, and a lung biopsy. A CT scan done on someone with aPAP will show a characteristic pattern, and although not diagnostic, may be useful in raising a suspicion of a diagnosis of aPAP. Bronchoscopy is helpful in demonstrating the presence of abnormal surfactant accumulation but cannot specifically identify aPAP from other types of PAP. A lung biopsy is invasive, and does not distinguish autoimmune PAP from other forms of PAP. A diagnostic test for aPAP does exist– a blood test for GM-CSF autoantibodies. This test is simple to do and is very accurate, however, many health care professionals are unaware of its availability.

Treatment options:

There is no cure for aPAP. Treatment is aimed at alleviating the symptoms and improving the quality of life for people with this condition.

Whole lung lavage (WLL) is currently the most widely used treatment of aPAP. This is an invasive procedure performed under general anesthesia in a hospital by a medical team with specialized expertise. During WLL, a tube is inserted into each lung. One lung is hooked up to a breathing machine. The other lung Is washed out by filling it with salt water (normal saline), shaking the chest to mix the surfactant with the salt water, and then draining out the fluid. This wash is done several times and results in removing a portion of the excess surfactant. One lung is washed at a time, with time between procedures to allow the patient to recover.

The results of WLL depend on the experience of the team performing the procedure, but in general it can be effective in partially removing excess surfactant. WLL does not correct the underlying pathological problem in aPAP or stop the abnormal accumulation of surfactant, and it must be repeated regularly in most patients. The average time between WLL procedures is around 1-2 years. Some patients who build up surfactant more quickly will require WLL more frequently.

Another treatment option is recombinant GM-CSF, in an inhaled or injected form. Recombinant GM-CSF is an experimental drug therapy under investigation for treating aPAP. GM-CSF appears to work by correcting the underlying pathologic defect in alveolar macrophages and stopping the accumulation of surfactant. Numerous studies using recombinant GM-CSF have been conducted in hundreds of people with aPAP, and these studies suggest that GM-CSF is safe and effective as a therapy for aPAP. The injectable form of recombinant GM-CSF (sargramostim) has been approved for aPAP in Japan but not elsewhere. An inhaled form of GM-CSF (molgramostim) has been shown in studies to be effective at improving pulmonary gas exchange and respiratory health quality of life in patients with aPAP but is currently not yet FDA approved for aPAP. Currently, pharmaceutical GM-CSF therapy is only available to patients with aPAP through off-label use.

A variety of other treatment approaches have been used by patients with aPAP. These include plasmapheresis to remove antibodies including GM-CSF autoantibodies, and immunotherapies, for example, rituximab, to eliminate the cells that produce antibodies including GM-CSF autoantibodies. Another treatment approach has been the use of statins to improve management of cholesterol by alveolar macrophages. These approaches differ in their effectiveness and insufficient data is currently available to recommend their use as therapy of aPAP.

Other supportive therapies for aPAP include home oxygen, bronchodilators and other various devices (nebulizers to deliver medications, flutter devices to help expectorate phlegm), speech therapy, and antibiotics. In patients with aPAP who have severe lung scarring, lung transplantation can be option.

PATIENT AND CAREGIVER DEMOGRAPHIC INFORMATION

The aPAP EL-PFDD meeting was conducted virtually via a livestream webcast, with about 200 participants. Several audience polls were conducted during the meeting, focused on the patient and caregiver attendees at the meeting. The first poll surveyed the demographics of the meeting attendees who were specifically impacted by aPAP.

- Seventy-five percent of the respondents were people who had been diagnosed with aPAP, and the rest were caregivers of someone with aPAP
- Two-thirds of respondents identified as female. Approximately 75% identified as white, non-Hispanic, and 12% each identified as either African American or Asian American.
- Most respondents lived across the United States, equally spread across most time zones. About 12% were from outside the U.S.
- Almost 50% of patients were diagnosed between the ages of 30 and 50, and less than ten percent were diagnosed before the age of 18.
- Most patients had lived with their disease for over 5 years. Only 3% had lived with aPAP for less than one year.

The detailed results of the poll can be found in the appendix.

SESSION 1: LIVING WITH APAP — SYMPTOMS AND BURDENS

The first session began with a panel of three patients and a caregiver, who each talked about how aPAP has impacted their quality of life and how aPAP symptoms affect daily living.

Each panel member shared a unique experience, but their accounts included a recurring theme. The diagnosis of aPAP impacted every area of life, not just their overall health, but also their social and mental well-being. For these patients and caregivers, the symptoms of aPAP influenced daily activities, career choices, relationships, sleep, and emotional health.

Challenges of Getting a Diagnosis

Panel members and members of the audience talked about the challenge of getting diagnosed with aPAP. Patients described how being misdiagnosed and treated for the wrong condition led to unnecessary treatments. They also discussed that many health care professionals are unfamiliar with aPAP. In addition, they described the anxiety, frustration and emotional stress of going through their diagnostic journeys.

The symptoms of aPAP resemble other conditions

The first symptoms of aPAP, such as shortness of breath and fatigue, are often mistaken for more common conditions, and were often initially dismissed by the patients themselves as being due to old age, being inactive or 'due to a cold.' For this reason, several people mentioned not seeking medical care until the symptoms became bad enough to impact work or family life. Once people did seek medical care, health care providers also mistook these symptoms for conditions, such as an upper respiratory infection or asthma. Several patients described the anxiety of not knowing what was wrong with them and the frustration associated with being treated for conditions they did not have.

"I felt trapped in my own body. I collected several misdiagnoses as I was bounced between several specialists who had no idea what was wrong or how to help me." (Karli, patient)

"It was so hard to bring Karli to so many doctors and not finding a diagnosis. She was misdiagnosed with asthma, (had) allergy testing and endoscopy, (was misdiagnosed with a) small esophagus." (Helen, parent)

"I had fatigue, brain fog, headache, shortness of breath. At first, I attributed these symptoms to just getting older and being out of shape." (Steve, patient)

"I left the hospital with no diagnosis on a massive amount of steroids." (Kelsea, patient)

Health care professionals are often unfamiliar with aPAP

Steve was diagnosed with aPAP at age 44. He shared his diagnostic journey, which was similar to several others. His initial symptoms were attributed to an upper respiratory infection that was treated (ineffectively) with antibiotics over several months. He went to see his primary care doctor when his symptoms progressed and began to affect his ability to do simple tasks. Upon viewing his chest x-ray, the physician's response highlights the challenges health care providers face when trying to diagnose this disease:

"What the heck is in your lungs and how did it get there?"

Mercedes, a caregiver, recalled that her adult son was hospitalized because of his severe respiratory symptoms and put into a medically induced coma. She described, "...weeks of seeing doctors, running every test they could think of in the medical book, and coming back...with no answer." Her son's diagnosis was made coincidentally, after one doctor who was treating her son happened to have a relative who was recently diagnosed with aPAP.

Kelsea, age 44, described being a cycle of being "diagnosed with aPAP, undiagnosed, diagnosed again. For almost 9 months, I went without a diagnosis, and the only treatment I was given was supplemental oxygen." She described going to eight pulmonologists, three hospitals, and a surgeon before finally receiving a diagnosis of aPAP.

Emotional impact of the diagnostic challenge

People with aPAP also talked about the anxiety of living without a diagnosis and the difficulty of living with the uncertainty of not knowing what was wrong or if it would get worse.

Karli, whose symptoms began in college, reported feeling 'mentally exhausted' by being given repeated failed treatments due to being misdiagnosed multiple times. She described feeling invisible. "No one seemed to feel the urgency that I did which is really scary when you can't breathe."

One mother talked about the stress of waiting for a diagnosis and watching her daughter's symptoms get worse. "It took about a year and a half of doctors' appointments. I think 32 office visits and doctors' appointments all together. She was misdiagnosed with asthma, exercise-induced asthma, anxiety, vocal cord dysfunction, pneumonia…"

Another patient commented, "It is very scary when your doctors cannot give you a diagnosis… I was told I had Covid for months and pneumonia for months"

The diagnosis is made using invasive procedures even though a non-invasive diagnostic test for aPAP exists

Although panel members were not directly asked about how they were diagnosed, an audience poll question showed that just over 40% of the participants had an invasive test such as a lung lavage or lung biopsy as part of their medical evaluation. The serum GM-CSF autoantibody test, a non-invasive blood test diagnostic for aPAP, was performed alongside other diagnostic medical tests in 80% of the survey participants; but seemed to be rarely used as a first-line diagnostic test.

Living With Symptoms and Diagnosis

While the severity of aPAP symptoms varies from person to person, all panel members reported breathlessness and fatigue as the most consequential and debilitating. Each panel member talked about how these symptoms touched every aspect of their daily lives. This included performing daily chores, attending family and social activities, working, studying, and even sleeping.

The second audience poll focused on the impact on symptoms and methods of diagnosis. Respondents reported experiencing a long list of symptoms, without any one symptom standing out. The most impactful symptoms on daily life were reported as breathlessness, fatigue, inability to perform daily activities, and emotional difficulties. The panel and audience members also discussed these symptoms.

"Most significant by far was the shortness of breath and the breathlessness. For me, the breathlessness felt like I was breathing in air that didn't have any oxygen in it, and it was really scary…along with the coughing. So, I really avoided doing just about anything that would trigger one of those things." (Karli, patient)

"I slowly lost aerobic capacity. Simple physical tasks left me breathless." (Steve, patient)

"I depended on my husband for nearly everything, help with laundry, cleaning, cooking, errands." (Kelsea, patient)

Karli, a patient, began having symptoms shortly after starting college. She reported how shortness of breath and fatigue affected her ability to attend class: "My 15-minute walk to class turned into 30 minutes and by the time I got to class I was exhausted and struggled to pay attention."

A caregiver described how her son had been an active person who went to the gym every day. As his symptoms got worse, she described how her son, "can now barely walk up the stairs in my house."

And although constant fatigue was a widespread problem, several panel members talked about being unable to sleep well. An audience member posted this comment, "I had trouble sleeping. I would gasp for air at 3 a.m. each night and be sleep deprived." Laying down was described as "feeling like drowning," and Karli summed up her fear of going to sleep with this, "I was afraid I wouldn't wake up."

The complexity of symptoms and unpredictability of the disease lead to anxiety, depression, and feelings of isolation

Another meaningful consequence of having aPAP is the uncertainty and anxiety that stems from having a rare disease with an uncertain course, no available cure, and no specific treatment regimen. Even those on treatment who were relatively symptom-free reported feeling anxiety related to not knowing if their symptoms would return or get worse.

"Not knowing if you are ever going to feel good in between being sick is mentally draining." (Karli, patient)

"My emotional state has changed dramatically; I suffer from depression and anxiety now." (Kelsea, patient)

"I signed up for therapy when I was diagnosed. I needed help coming to terms with my new normal." (Courtney, patient)

People with aPAP described feeling uncertain about how fast their symptoms would get worse or return after treatment. As one woman put it, "its draining to be constantly on edge, wondering if I'm ever going to feel that bad again." A man who has been symptom free for 10 years said, "Even though

I am symptom free now, I worry about aPAP coming back."

Adult caregivers had similar fears of symptoms recurring in their children and were afraid of not being around to help them if the symptoms returned.

"I still don't sleep very comfortable. I always have the fear that this is going to come back and that he's going to stop breathing again." (Mercedes, caregiver)

And Helen, who has a 15-year-old son, talked about her struggle:

"When I actually finally pass away, then who will finally look after him going forward?"

The diagnosis of aPAP changes career and life plans

While the symptoms of aPAP disrupt daily lives, being diagnosed with aPAP also changed how patients planned their future, especially their ambitions and career path. Several attendees talked about being stuck in their current jobs to maintain health insurance coverage and manage the financial aspects associated with having a rare disease.

"My original plan was to enjoy retirement. I started a few years back. But I guess the universe and God had different plans." (Mercedes, caregiver of an adult patient)

"I was planning on traveling to study culinary in Europe, and couldn't do that anymore..." (Nicole, patient)

Several people also talked about how the diagnosis and symptoms of aPAP changed their ambitions and career goals. Emily was diagnosed at age 15, after she collapsed in the middle of a golf tournament. She had dreamed of playing golf in college, but the diagnosis and her symptoms delayed her recruitment timeline. Another young woman talked about re-evaluating her career goals after being diagnosed in college because of the limited treatment options for aPAP.

"...making sure I can get sargramostim is really stressful and has also limited my career decisions and ambitions." (Karli, patient)

Several people talked about losing their jobs because the symptoms of aPAP made it too difficult for them to perform their job duties.

"I was a CRNA (Certified Registered Nurse Anesthetist) and am a mom. I was diagnosed with aPAP and I lost my job, (and I'm) on disability now." (LP, patient)

"At age 34, I was a police officer, I had a fantastic life. I was ready to have children, and after I was diagnosed, my world crashed." (Dieter, patient)

In addition to limiting career choices, people also discussed the fear of changing or losing jobs because of health insurance and the financial costs of medical care.

"If I left my job, I'd have a hard time affording care for PAP. My job hasn't been the best for my mental health over the years, but I've had to stay for the benefits." (Christine, patient)

"I'm fearful if I lose my job or healthcare, I won't be able to afford my medicine, let alone lung lavages." (Kim, patient)

People also talked about the benefits of remote work for someone with aPAP and the fear of having to change to an office job. People with aPAP often have fits of coughing, trouble breathing, and an increased risk for infections – making the option of remote work very appealing. One patient said, "I am fortunate to work from home, but the idea of having to go to an office to work in public is terrifying."

Another question from an audience poll reiterated that while patients have various concerns about living with aPAP, health insurance, finances, and access to care are their main priorities. The detailed results of this poll can be found in the appendix.

People with aPAP could no longer do their favorite activities due to their symptoms

Panel members were asked to list activities that were important to them that they can no longer do because of their condition. They were also asked to describe what a good day looks like and what a bad day looks like.

Parenting a child with aPAP

Caregivers on the panel and in the audience were asked to talk about how aPAP impacted their families or their loved ones.

Judith had a compelling story of how aPAP changed the course of her daughter's life. Her daughter, Emily, was a competitive high school athlete considering Division 1 colleges. Due to her diagnosis, Emily's dream of being recruited to play golf at the college level was delayed while her family navigated treatment options. Emily's family, including Emily's younger sister, had to travel extensively to find doctors willing to treat a pediatric patient with aPAP, disrupting everyone's work and school routines. Emily eventually received GM-CSF therapy and responded positively and was able to graduate from college and even compete in college sports.

Another parent, Kendra talked about the impact on her family of watching her daughter's symptoms slowly progress over time. She reiterated the expense and burden to her family of traveling to get available treatment and discussed the stress of waiting to get medication to see if it will help.

"It was very difficult to watch our daughter who was very active before the diagnosis. She was involved in track and middle school basketball and dance, just to all of a sudden see her slowly unable to climb stairs."

LP also explained how the diagnosis affected her role as a parent to a child with special needs. Her symptoms forced her to stop working, and due to the financial impact, she could no longer afford therapies for her 19-year-old child with high-functioning autism.

"Unfortunately, my health issues have caused him a great deal of stress."

The symptoms of aPAP affect relationships with family and friends

Panelists and the audience described how aPAP impacted their ability to develop and maintain relationships, affected family dynamics, and made it difficult to pursue social activities.

Quotes from the panel members and audience include:

"My condition consumed me mentally and physically. I became really isolated as I couldn't socialize much. Maintaining relationships became very challenging and making new ones was impossible." (Karli, patient)

"My parents are at the age where they need more help and care. I'm not able to give them as much care as I want, because I'm not well myself." (Kelsea, patient)

"It's difficult to make plans because I don't know if I'll be well enough to go out, and I often have to cancel." (Kelsea, patient)

"When I'm on oxygen, I rarely go out of the house for anything, except for doctor's appointments or to get more oxygen." (Kelsea, patient)

Family relationships were often disrupted by the diagnosis of a family member with aPAP. Karli talked about how her family initially didn't take her symptoms seriously. Another woman talked about feeling resentful of family members and friends who had 'normal' lives.

There was also discussion about the impact of a family member's diagnosis on siblings and parents.

"Just to see her (my daughter) deteriorate over time is very stressful on the family. She has a younger brother and that was hard for him to see as well." (Kendra, caregiver)

"My parents play a huge role in helping me access care. They take me to and from the hospital and help me during recovery. I am an otherwise independent person, but it still has a significant impact on my parents' lives." (Rory, patient)

"...a great impact from the parent side of it. My husband and I bore all the costs of it, and we have younger daughter who we couldn't leave behind when traveling to get medical care." (Judith, caregiver)

People with aPAP deal with difficult emotions and often seek support

Several people described the emotional impact of aPAP. One panel member talked candidly about his feelings of hopelessness at a time when his symptoms made him too sick to leave the house, work, or participate in family activities – "thoughts of suicide crept into my mind." Another patient talked about how her symptoms of fatigue forced her to give up some of the activities she loved to do leading to feelings of hopelessness. "It's all depressing and I don't want to live this way."

Other patients described how they coped with these feelings and fought to keep going.

"I just kept fighting. My family was my strong support system. I had my faith. And yet, there were tears shed and frustrations (even now) because the life I had imagined didn't pan out how I saw it." (Nicole, patient)

"So, when I was diagnosed, I had to get into therapy because it was a total mind shift." (Christine, patient)

"The mental health aspects are important. At worse, you don't want to live, when everyone around you doesn't want you to give up." (Trisha, patient)

The impact of education on uncertainty and anxiety

Dr. Trapnell asked the panel about the value of increasing education about aPAP as a way to relieve anxiety.

"For me, putting a name to it and knowing what it was and what to expect was a huge game changer in dealing with the anxiety that came with my symptoms." (Karli, patient)

Steve, a patient on the panel, talked about the value of sharing information and education with other patients, and how connecting with other people with aPAP helped him find treatment options.

A third panelist felt that although having a diagnosis helped with the anxiety of not knowing what caused her symptoms, there was inherent anxiety created by just having the disease itself.

"...being employed, having health care, having to rely on whole lung lavage to feel well, being able to afford my medication, things of that nature, that doesn't really ever go away. It's a constant part, educated or not." (Kelsea, patient)

A member of the audience, Kim, talked about educating her health care providers as an opportunity and a challenge. '... teaching her pulmonary team at this world-renowned institution about aPAP."

"You will always have to educate the medical teams because aPAP is so rare. You become the expert in most rooms you're in." (Kim, patient)

SESSION 2: CURRENT AND FUTURE TREATMENTS

The second session focused on how patients and their families feel about current treatment options, their perspective on gaps in treatment, and their hopes for the future.

During this session, it became apparent that there is a need for non-invasive treatments that can change the way aPAP is managed. Inhaled GM-CSF therapy is a promising option, offering a less invasive alternative to whole lung lavage. However, inhaled GM-CSF therapy is mainly accessible through clinical trials, which present barriers such as travel requirements and fears about safety and side effects. Off-label use of GM-CSF therapy is available but has its own barriers such as the cost and difficulty of obtaining health insurance coverage. In addition, using GM-CSF therapy has its own challenges, including the need for specialized medical equipment, storage requirements, and uncertainties regarding dosage and frequency.

Another significant concern was the variability in disease severity and treatment responses among patients. The need for more research and better clinical trials was emphasized, with hopes that future treatments will be more effective, easier to access, and less disruptive to patients' lives.

Overall, there was a strong desire for advancements in treatment options that not only relieve symptoms but also address the underlying causes of aPAP, providing a long term and manageable solution for patients and their families.

Treatment and Management Options

During the patient testimony, patients talked about their experiences with different treatment strategies, including WLL and inhaled GM-CSF, as well as participation in clinical trials.

The final audience poll covered treatment and management of aPAP. Nearly all patients were receiving some form of treatment, with WLL and GM-CSF therapy being the most common. About 75% of people who were treated with either WLL or GM-CSF therapy thought their therapy worked moderately or very well. The detailed results of the poll can be found in the appendix.

Whole lung lavage

Many found WLL significantly improved their aPAP symptoms. One young woman said that she had accepted the symptoms of aPAP as 'normal,' until she had her first WLL and was able to breathe freely and without coughing. However, patients also noted challenges such as intense pain, lengthy recovery, travel costs, and disruptions to daily routines.

One patient, Shona, shared this about her first WLL; "Little did I know this would be one of the most painful and exhausting experiences I've ever had."

One caregiver described WLL as, 'barbaric,' and said, "This was not a life we were willing to relinquish our daughter to."

Another panel member described living in a small town with a hospital that didn't have the resources to do a WLL as frequently as she needed. "It was a huge burden (in between procedures) being on oxygen full time, it made day-to-day activities almost impossible."

A parent talked about getting his son treated, "It was extremely stressful traveling to different states (to get treatment). We had to put our (medical) practice in the hands of someone else for quite some time."

GM-CSF therapy

Panel members also talked about inhaled GM-CSF therapy, and the advantages over WLL, participation in clinical trials, and access to obtaining inhaled GM-CSF therapy outside of clinical trials.

"I am on sargramostim and it's been wonderful. I've been able to breathe better, able to do things." (Gigi, patient)

"I am fortunate to say that GM-CSF inhalation also saved me. The lavages only bought me time." (Trisha, patient)

And a young woman who has been relatively symptom-free while taking inhaled GM-CSF for the last 10 years, stated this, "Whole lung lavages are invasive procedures I wouldn't wish on anyone."

After having a bad experience with a lung lavage at her local hospital, another patient asked her doctor to refer her to a specialty clinic "...where they did an aggressive lung lavage and they were able to get me the sargramostim, and this has help me and I am breathing better than I have in my whole life."

Accessing Care

Access

Access to treatment and regular medical care was also a repeatedly cited issue. Patients and family members reported trouble finding specialists, the expense and coordination of travel, and disruption to regular routines.

Several people talked about different challenges of being treated with whole lung lavage.

One woman described how each time she needed a WLL it required, "a minimum of three-and-a-half-hour drive and finding a place to stay a few nights before and a few nights after. It was very burdensome to my friends and my family."

Another patient described not being able to get regular lung lavage because of the medical resources the procedure requires.

"I probably could have avoided being on oxygen 24/7 if I had lavage as scheduled about every 3 months, but I was told by the hospital staff it's too resource intensive to have 4 anesthesiologists in the operating room with me." (Karli, patient)

Clinical Trial Participation

The final audience poll assessed the benefits and challenges of participating in aPAP research studies. Sixty percent of respondents said they had participated in research; some were currently involved while

others had participated in the past. Reasons for participating in clinical research were equally divided between helping others with aPAP, advancing knowledge of aPAP, getting access to treatment, and getting access to specialists. The two main reasons for not participating in clinical research included uncertainty about the commitment needed to participate in a clinical trial, and fear of the side effects of treatment.

One parent talked about her fears about putting her daughter in a clinical trial. "Putting her on a trial drug that's not proven out yet would be difficult for us."

Others talked about the benefits of being on a clinical trial "I feel like I'm finally getting some of my life back as a result of the Savara clinical trial." (She also stated that she is hopeful that she'll never have to have a lung lavage again.)

There was also some discussion about barriers to clinical trial participation, such as not being eligible for a trial and the fear of being put on a placebo. People also talked about the difficulty of getting to and from a clinical trial location. For example, one woman mentioned the difficult logistics; "traveling to another city to participate in a clinical trial carrying my medicine on ice and my portable oxygen concentrator through the airport."

Inhaled GM-CSF to treat aPAP is available primarily through clinical trials but also can be prescribed 'off-label' meaning a health care provider can prescribe it for a use that it has not been approved for. This presents both benefits and challenges to patients who are interested in this treatment option. Off-label use of inhaled GM-CSF allows patients access to this treatment, while avoiding the issues (commitment, travel, side effects) associated with participating in a clinical trial, but off-label use can be costly and requires buy-in from a health care provider and health insurance.

Health insurance

From the audience poll about treatment and management, the most crucial factor when deciding which therapy to use was evidence that the treatment reduces symptoms or slows disease progression. The next most important was cost or insurance coverage.

Several people talked about working with health insurance to get inhaled GM-CSF. This quote from a caregiver expresses the general sentiment.

"The task of going through insurance to obtain sargramostim is exhausting, especially when insurance plans change. I had to constantly contact my husband's pulmonologist to send information to the insurance company because prior authorization is necessary." (Sheena, caregiver)

Another caregiver stated about her daughter, "(there is) a lot of anxiety as she is having to get off of our insurance and we don't know if she will be able to get her inhaled GM-CSF on her own."

Other people described obtaining health insurance approval as a 'full-time job.' Many also discussed the anxiety of waiting to get the medication approved by their insurance company.

Perspectives on future research and ideal treatments

After all the testimony, the panel members and audience were asked a series of questions to get their perspective on ideal treatment strategies and hopes for the future. Patient responses included:

"It would be nice to have a medication that we could use once a week or once a day for a week, that would help us immensely and help with the expense too." (patient audience member)

"Something less expensive and fairly easy to use." (Shona, patient)

And several audience members expressed their desire to make inhaled GM-CSF therapy more accessible.

"It's so very challenging to receive the GM-CSF from insurance. I hope every day that we ALL will be able to have this treatment that we desperately need." (Niki, patient)

"We still look to the future; we do hope that we can get this drug approved." (Christine, patient)

"This drug may not eliminate the need for lung lavages but even getting to a point of only needing one every 10 years is better than what we have now." (Shane, caregiver to an adult patient)

The key takeaways from the final poll on treatment and management options included that most people with aPAP have received some kind of treatment, mainly WLL and inhaled GM-CSF, and these treatments work generally well for those who receive them. They are hopeful for ways to advance research about treatment. These responses and the testimony of meeting participants can help inform clinical trial design and a path forward through the drug approval process.

Dr. Trapnell shared that future research through clinical trials needs to address dosage requirements and the duration of treatment for individual patients. It is unclear how often someone should use inhaled GM-CSF and for how long they should continue to take it. During this discussion, several people expressed concerns over stopping the medication for fear their symptoms would return.

CONCLUSIONS

The co-hosts wrapped up the meeting by encouraging audience members to continue to share their stories and provide comments online. Dr. Trapnell concluded with this sentiment:

"What you shared today, will work to ensure the voices of people living with aPAP play a role in aPAP research, trial design, and drug development. When the FDA listens to these meeting results, it will help them understand what matters to you and how to balance the risks and benefits to you when looking for a new treatment."

The key takeaways from this meeting include:

- Patients with aPAP experience delays getting a diagnosis, causing them to suffer with symptoms of constant shortness of breath and fatigue without knowing what is wrong with them.
- Because aPAP is often diagnosed in adulthood, the lives of people with aPAP are disrupted, put on hold, or completely changed.
- The symptoms of aPAP affect every aspect of life – daily activities, physical and mental health, finances, careers, and relationships with friends and family.
- Many people with aPAP experience a period of depression and anxiety and would benefit from mental health care.
- Treatment and management for aPAP is expensive, invasive, and difficult to access. Whole lung lavage, while effective at relieving symptoms, is painful, time consuming and often requires repeated travel to specialized centers. GM-CSF therapy is primarily available through clinical trials and requires travel, commitment to the trial, and some level of risk. Off-label use of GM-CSF requires constant battles with health care professionals and health insurance companies.
- Patients with aPAP want treatments that are easy to access, reduce or eliminate the burden of symptoms, and are affordable and easy to use.
- The testimony and comments of patients with aPAP, and their caregivers, can provide groundwork for identifying new areas of clinical research and clinical trial design.

SAMPLE BENEFIT-RISK ASSESSMENT FRAMEWORK

The FDA's Benefit-Risk Assessment Framework includes factors such as the analysis of condition, current treatment options, benefits, risks, and risk management. These assessments capture the agency's evidence, uncertainties, and reasoning used to arrive at its final determination for specific regulatory decisions. In addition, they serve as a tool for communicating this information to those who wish to better understand the FDA's thinking.

The sample framework below is based on a summary of the May 7, 2025, EL-PFDD meeting on Autoimmune Pulmonary Alveolar Proteinosis. This is intended to provide an understanding of the benefit-risk aspects for two of the key decision-making elements that factor into the FDA's Benefit-Risk Assessment: analysis of the condition and current treatment options. This may enable a more comprehensive understanding of this unique condition for key reviewers when evaluating new treatments, and for drug developers when considering options for new treatment options.

DIMENSION	EVIDENCE AND UNCERTAINTIES	CONCLUSIONS AND REASONS
Analysis of Condition	As with many rare diseases, aPAP is usually misdiagnosed, and a correct diagnosis can take weeks, months, or years. This is especially scary for patients experiencing symptoms of breathlessness and fatigue with no identified cause. In addition, a diagnostic test is available for aPAP, but many health care providers are unaware of it. The most common symptoms are shortness of breath, fatigue, headache, and chronic cough. Symptoms often do not appear until adulthood, and usually slowly progress over time. The symptoms and course of the disease vary from person to person. The cause of aPAP is unknown, and few risk factors have been identified. The most common cause of death in people with aPAP in respiratory failure due to infection or pulmonary fibrosis.	Because aPAP is typically diagnosed later in life, it brings unique challenges to many people who already have established lives and career paths. The delay in getting diagnosed, along with the uncertain course of the disease, creates anxiety for patients and their families. The symptoms of aPAP affect all parts of life – physical health, mental health, and social relationships. People with this condition often need to stop or reduce daily activities and give up careers. The shortness of breath and fatigue impact relationships with friends and family. People with aPAP describe feeling hopeless, depressed, anxious, and socially isolated.
Current Treatment Options	The standard of care treatment is whole lung lavage, an invasive procedure, requiring specialized medical resources. Recovery times after the procedure vary but can take several weeks. Although this treatment works well for patients with aPAP, the procedure needs to be repeated, as surfactant continues to accumulate in the lungs. The frequency of having a WLL is unclear and needs to be established for each patient based on their individual disease course. Inhaled GM-CSF is currently under investigation and shows promise for treating many patients with aPAP. It is available through clinical studies or through off-label use. Dosage and duration of treatment have not been well worked out, but it seems to be well-tolerated by most patients. Treatment can be done at home using a nebulizer.	WLL is an invasive procedure disrupting patient and family routines. Because it requires special medical resources, it is not generally available, and patients often must travel to get their care. This can be logistically difficult for people on portable oxygen and financially prohibitive for others. Inhaled GM-CSF therapy is a promising treatment, although some patients experience side effects requiring them to stop treatment. The dosage and duration of treatment still need to be established. Access to GM-CSF therapy is limited by clinical trial eligibility and difficulties with health insurance coverage. Patients with aPAP want a treatment that will alleviate or reduce the severity of symptoms, especially shortness of breath and fatigue, as well as a treatment that is easy to access and can be used at home.

APPENDIX

Poll 1: Demographics of Meeting Attendees Impacted by aPAP

1. How does aPAP affect you?
    a. 75% of respondents were patients
    b. 25% caregivers
2. Where do you live?
    a. 27% Midwest (Central time zone)
    b. 27% West Coast/Hawaii/Alaska (Pacific time zone)
    c. 24% East Coast (Eastern time zone)
    d. 9% West (Mountain time zone)
    e. 9% Canada
    f. 3% Outside North America
3. Do you identify as:
    a. 78% Female
    b. 23% Male
4. Please select the response that best reflects your race and/or ethnicity
    a. 76% White (non-Hispanic)
    b. 12% Black or African American
    c. 12% Asian or Asian American
5. At what age did you or your loved one receive a diagnosis of aPAP?
    a. 35% 40-49 years
    b. 27% 19-29 years
    c. 14% 30-39 years
    d. 11% 50-59 years
    e. 8% 0-18 years
    f. 5% 60-69 years
    g. 0% 70 or older
6. How long have you lived with aPAP?
    a. 67% Over five years
    b. 31% One to five years
    c. 3% Less than one year

Poll 2: Symptoms and Burdens of aPAP

1. Has the patient experienced any of the following symptoms? (select all that apply)
    a. 12% Breathlessness
    b. 11% Emotional difficulties
    c. 11% Fatigue
    d. 10% Coughing up phlegm
    e. 11% Inability to perform daily activities
    f. 11% Low blood oxygen levels
    g. 8% Chest pain
    h. 8% Persistent cough
    i. 7% Social difficulties
    j. 5% Weight loss
    k. 5% Other (not listed)
    l. 3% Coughing up blood
2. Which of these symptoms most impact daily life? (Select the top three)
    a. 29% Breathlessness
    b. 23% Fatigue
    c. 11% Emotional difficulties
    d. 11% Inability to perform daily activities
    e. 8% Low blood oxygen levels
    f. 5% Chest pain
    g. 5% Persistent cough
    h. 4% Coughing up phlegm
    i. 2% Social difficulties
    j. 1% Weight loss
    k. 0% Coughing up blood
    l. 0% Other (not listed)
3. What tests were performed during your medical evaluation (Select all that apply)
    a. 26% CT scan
    b. 23% Pulmonary function tests
    c. 18% Bronchoscopy and lung lavage
    d. 18% Bronchoscopic lung biopsy
    e. 7% Surgical lung biopsy
    f. 6% Other

4. Was a serum GM-SCF Autoantibody test performed?
    a. 80% Yes
    b. 11% No
    c. 9% Unknown
5. What are the patient's biggest concerns about living with aPAP? (Select all that apply)
    a. 13% Health insurance coverage concerns
    b. 13% Progressive worsening of symptoms
    c. 12% Financial concerns
    d. 11% Limited treatment options
    e. 11% Mental health concerns, stress, trauma
    f. 10% Ability to complete the workday or have a job
    g. 10% Access to medical care (e.g., distance to care providers)
    h. 8% Impact on personal relationships and socializing
    i. 6% Ability to live independently
    j. 6% Intimacy or reproductive health
    k. 2% Other

Poll 3: Treatment Options

1. Has the patient received treatment for aPAP?
    a. 91% Yes
    b. 9% No
2. What therapies/treatments have you received?
    a. 43% Whole lung lavage
    b. 38% GM-CSF
    c. 9% Rituximab
    d. 7% Steroids (not recommended)
    e. 3% Plasmapheresis
3. If you've had whole lung lavage, on average, how well did/does the therapy work?
    a. 41% Moderately well
    b. 34% Very well
    c. 16% Poorly
    d. 6% Did not receive treatment
    e. 3% Not at all
4. If you've had GM-CSF, on average, how well did/does the therapy work?
    a. 53% Very well
    b. 22% Moderately well
    c. 19% Did not receive treatment
    d. 6% Poorly
    e. 0% Not at all
5. If you've had rituximab, on average, how well did/does the therapy work?
    a. 81% Did not receive treatment
    b. 6% Moderately well
    c. 6% Not at all
    d. 3% Poorly
    e. 3% Very well
6. Which factors are most important when deciding to select a treatment? (Select up to 3)
    a. 30% Evidence of reduction of symptoms or slows disease progression
    b. 23% Cost and/or coverage by insurance
    c. 17% How treatment is delivered (procedure, oral, inhaled or injection)
    d. 13% Presence or severity of side effects
    e. 9% Frequency of administration
    f. 8% Recommended by physician

7. Which of the following would you consider to be benefit(s) of a treatment? (Select all that apply)
    a. 27% Improves or prevents worsening of symptoms
    b. 26% Improves patient quality of life
    c. 25% Access and ease of receiving treatment
    d. 22% Allows for independent living

8. What is the patient's involvement in research? (e.g., natural history studies, registries, donating blood for a study, treatment trial)
    a. 40% Have participated in research and would do so again
    b. 20% Currently participating in some form of research
    c. 13% Have not participated in research because unaware of the opportunity
    d. 13% Have not participated in research because not eligible
    e. 10% Not sure
    f. 3% Have not participated in research although aware of the opportunity and eligibility
    g. 0% Have participated in research and would not do so again
    h. 0% Would never participate in clinical research

9. Which of the following factors would encourage participation in clinical research? (select all that apply)
    a. 28% Access to treatment
    b. 26% Helping others with aPAP
    c. 25% Advancing knowledge of aPAP
    d. 22% Access to aPAP specialists
    e. 0% Other

10. Which of the following factors might discourage participation in clinical research? (select all that apply)
    a. 21% Potential side effects of treatment
    b. 21% Unsure if I can make the commitment to participate (Distance, appointment frequency, study length, family, work, school)
    c. 18% Possible placebo treatment
    d. 12% Not enough information to make an informed decision to participate
    e. 11% Costs associated with research
    f. 8% Negative opinions of research
    g. 9% Effects of participation of ongoing treatment
    h. 0% Other
    i. 0% Questions may be personal

DEFINITIONS

Alveoli: Tiny air sacs in the lung where oxygen and carbon dioxide exchange between the lungs and the blood occurs

Autoimmune: A condition where the immune system mistakenly attacks the body's own tissues and organs

Autoantibody: An abnormal immune cell that damages the body instead of protecting it

Clinical trial: Medical research that studies people to help understand health and disease.

GM-CSF (Granulocyte/macrophage colony-stimulating factor): A molecule in the body that helps make more white blood cells, including the cells that help regulate the amount of surfactant found in the alveoli of the lungs.

Leukine®: The brand name for sargramostim, a man-made form of GM-CSF. Leukine® helps the body make more white blood cells and helps prevent infection in various conditions.

Plasmapheresis: A medical procedure in which the liquid part of the blood is separated from the blood cells. The liquid part of the blood may be replaced. This procedure is done to remove toxins and harmful substances from the liquid part of the blood.

Pulmonary alveolar proteinosis (PAP): A rare lung disease where a substance called surfactant builds up in the lungs and reduces the amount of oxygen that gets into the blood.

Autoimmune pulmonary alveolar proteinosis: The most common type of PAP, caused by an abnormal immune response (an elevated level of GM-CSF autoantibodies)

Pulmonary fibrosis: A condition where the lung tissue gets scarred and thickened making it difficult to breathe.

Rituximab: A medication used to treat certain autoimmune diseases and cancer. Rituximab targets a type of white blood cell

Surfactant: Mixture of lipids (oily molecules) and proteins that lines the surface of the alveoli in the lungs and aids in the exchange of oxygen and carbon dioxide in the lungs

Whole lung lavage: A procedure that involves using saline (salt water) to wash out the lungs. One lung is done at a time. Also known as 'lung washing.'

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NRD-2459