HOSTED BY FOUNDATION FOR SARCOIDOSIS RESEARCH (FSR)

Voice *of the* Patient

Externally Led Patient-Focused Drug Development Meeting

PUBLIC MEETING:
October 28, 2024

REPORT DATE:
October 2025

ACKNOWLEDGMENTS

Foundation for Sarcoidosis Research (FSR) would like to thank the entire sarcoidosis community for your feedback, the honest accounting of your lived experiences, and for your live participation in this event.

FSR would also like to thank all members of the FSR Governing Board of Directors, FSR Scientific Advisory Board (FSR SAB), FSR Global Sarcoidosis Clinic Alliance (FSR-GSCA), our non-profit partners, our industry partners, and the FDA for your commitment to the acceleration of research and drug development to improve therapies, treatment management, and outcomes for all impacted by sarcoidosis.

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Foundation for Sarcoidosis Research (FSR): Mary McGowan – President and CEO, Tricha Shivas – Chief of Staff and Strategy, Elise Hoover – VP of Research, Tim Legenzoff – Senior Research Manager

Partner Organizations: American Lung Association, Bernie Mac Foundation, Foundation for Organ Donation and Sarcoidosis Awareness (FODASA).

Executive Summary

On October 28, 2024, FSR hosted an Externally-Led Patient Focused Drug Development Meeting (EL-PFDD). This interactive, virtual public meeting provided a unique platform for patients with sarcoidosis and their caregivers to share their perspectives on the unmet needs associated with this disease, its impact on quality of life, and their preferences regarding symptom management and the development of new therapies.

Structure of the Meeting

Each component of the meeting—from the building blocks on the topics to its interactive sessions— was shaped by the voices of those directly affected. FSR conducted a pre-meeting survey of 401 individuals, whose stories and data provided a roadmap for discussion. The live meeting took place over 6 hours and invited participants to share their experiences through live surveys, polls, panel discussions, patient and caregiver testimonials, and call-in sessions.

Key Speakers and Overview of the Meeting Structure

The meeting was opened by Mary McGowan, FSR President and CEO, and John Carlin FSR Board of Directors Member, host of the *FSR Sarc Fighter Podcast* and individual living with sarcoidosis. Mary and John guided the audience through learnings from the pre-event survey, poll results, patient and caregiver testimonials, call-in comments, and panel discussions. Dr. Banu Karimi-Shah, Deputy Director in the Division of Pulmonology, Allergy, and Critical Care, in the Office of New Drugs, within the CDER at FDA framed the discussion by highlighting the challenges of rare disease drug development and providing an overview of the ways in which the FDA aims to learn from and support rare disease communities like those with sarcoidosis through the drug development process.

The meeting unfolded through two main topics, enriched by the expertise and passion of its speakers and moderators:

1. **Symptoms and Quality of Life Impacts Noted by Patients and Caregivers:** Stories of physical pain and limitations, emotional and physical fatigue, and resilience brought to life the daily struggles faced by those with sarcoidosis.

2. **Perspectives on Current Treatments and Preferences for Future Therapies:** Participant's stories about current treatment benefits and limitations, risk/benefit calculus patients use in considering new and innovative therapies, and patients' hopes for breakthroughs that address the disease and its symptoms.

Each of these sessions were opened by Dr. Lisa Maier, member of the FSR Scientific Advisory Board, FSR-GSCA Founding member, and a fellowship-trained pulmonologist from National Jewish Health. Dr. Maier framed the discussion providing an overview of the current state of the science and clinical knowledge in sarcoidosis care and management.

Key Learnings

Sarcoidosis is a rare inflammatory disease marked by the formation of granulomas that can impact any organ of the body. Sarcoidosis often presents as a complex and unpredictable array of symptoms and tends to mimic other diseases. For many patients, sarcoidosis impacts multiple organ systems and leads to significant emotional, financial, and social challenges. FSR is committed to advancing research, patient support, and to improving patient outcomes. In service of this mission, FSR engages patients, caregivers, and healthcare professionals from around the globe gathering firsthand accounts of the disease's multifaceted impact and identifies and implements innovative strategies to drive breakthroughs in disease understanding and clinical care.

Furthermore, FSR is committed to ensuring that all individuals impacted by sarcoidosis are fully represented in research. In the United States, African American patients have an increased risk of sarcoidosis and experience the worst outcomes of the disease. FSR works alongside clinical leaders and Black patients to ensure their voices are included in research and that sarcoidosis research seeks a better understanding of the clinical outcomes and risks for this and other communities, like veterans and Hispanics.

Overall, this discussion highlighted the need to better understand the causes of sarcoidosis, to improve diagnosis, and to underscore the urgent need for more effective and less burdensome treatment options for all patients impacted by sarcoidosis.

This discussion shined a spotlight on a number of key components of the experiences of those who are impacted by sarcoidosis:

- **Sarcoidosis manifests in a wide array of diverse and persistent symptoms.** Sarcoidosis is often referred to as a snowflake disease because no two patients experience the same symptoms or have the same disease journey. Currently, we have very little understanding as to why some patients go into remission, whereas other patients progress to more complicated forms of the disease.

- **Sarcoidosis has limited therapeutic options.** Corticosteroids remain the standard initial treatment; but, they often come with considerable side effects such as weight gain, cardiovascular risk, and bone deterioration, among others. Many patients rely on long-term steroids out of necessity, even though side effects may overshadow benefits.

  There is a scarcity of sarcoidosis-specific medications, so clinicians often adapt off-label therapies. Immunosuppressants (e.g., methotrexate, azathioprine, hydroxychloroquine) and biologics (e.g., infliximab) are used when steroids are insufficient or intolerable. Patients

report mixed effectiveness and tolerability of these therapies and expressed concerns that these therapies can cause severe liver or bone complications. Access to biologics can be challenging due to cost, insurance approvals, and restrictive eligibility criteria.

Patients often describe rotating through multiple regimens to find partial relief, underscoring the disease's heterogeneity and the need for more personalized treatment strategies.

- **Sarcoidosis comes with significant symptoms and challenges:** Fatigue is overwhelmingly noted by patients as the most debilitating physical symptom of sarcoidosis, followed closely by severe pain, cognitive difficulties such as brain fog, and respiratory issues. As a result of these symptoms, for many patients' physical activities can be exhausting and energy-draining. This often results in patients' inability to pursue desired career goals and can even result in job loss. Further, for many patients these symptoms may limit their inability to attend social engagements or pursue hobbies of interest.

- **Sarcoidosis impacts the psychosocial and emotional well-being of patient and family members.** Patients describe lives constrained by anxiety, depression, and mood swings, resulting from both underlying disease and medication side effects. Many patients describe a type of anticipatory grief marked by fear of flare and concerns that additional progression or changes in their disease will further reduce their quality of life. Sarcoidosis is a disease that impacts the entire family unit – increasing the responsibilities of caregivers and loved ones and redefining and often straining relationships.

- **Sarcoidosis impacts the overall financial well-being of patients and their larger family unit.** Job loss, wage reduction, and high costs of medical care and treatments have a cascading effect on patients and their families' finances. The onset of sarcoidosis typically takes place at the peak of the patient's career reducing their overall earning potential and resulting in a significant financial burden for their entire family. For many, social determinants of health, inadequate diagnostic tools, and limited access to expert care further exacerbate these financial burdens. Additionally, since the majority of therapies utilized by patients are off-label, patients have the added burden of high co-pays and limited access to doctor-recommended therapies.

- **Sarcoidosis clinical trial design and access have a number of challenges.** Attendees advocated for adaptive clinical trial designs that reflect representation of sarcoidosis across geographic and demographic differences that are needed to ensure access for all including those who are the most vulnerable and most severely impacted. Too often sarcoidosis-focused clinical trials limit eligibility to pulmonary sarcoidosis or single-organ involvement, omitting complex, real-world cases.

- **Trials often prioritize endpoints that do not align with patient-desired outcomes.** Lung function (forced with lung capacity or FVC) is often prioritized for ease of clinical measurement, but is not aligned nor does it clearly measure patient-desired outcomes such as ensuring stability of disease, slowing of disease progression, reduction of fatigue and pain, limiting of medication side effects including steroid and non-steroidal side effects. Furthermore, patients prioritize the development of treatments that control symptoms without undermining physical, emotional, or social well-being.

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Supplemental Materials (available at **stopsarcoidosis.org/pfdd** only)

Planning Survey Results

Additional Patient and Caregiver Quotes

SPONSORSHIPS, FUNDING SUPPORT AND DISCLOSURES

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Atyr Pharma, Boehringer Ingelheim, Kinevant Biosciences, Mallinckrodt Pharmaceuticals, and Xentria Inc.

** Pharmaceutical partners were not involved in design, planning, coordination, or execution of the meeting.*

Disclosures for Dr. Lisa Maier: *Dr. Maier has received funding from a variety of sources, although none of these were used for the purpose of organizing or participating in this session. Funding included grant funding to National Jewish from The National Heart Lung and Blood Institute (NHLBI at the National Institutes of Health) and Foundation for Sarcoidosis Research to conduct sarcoidosis research and from Atyr Pharmaceuticals and Xentria to support clinical trials. Dr. Maier has also served on an advisory board for Boehringer Ingelheim.*

REVISIONS AND MODIFICATIONS

This document has not been revised and/or modified in any way after the version date listed above and on the cover page. The submitters have all necessary permissions to submit this external resource and linking from the FDA website will not violate the proprietary rights of others.

Contact FSR at **info@stopsarcoidosis.org** or visit **www.stopsarcoidosis.org** for more information.

Introduction

On October 28, 2024, the Foundation for Sarcoidosis Research (FSR) hosted an Externally-Led Patient Focused Drug Development Meeting (EL-PFDD). This EL-PFDD was a follow-on to an **FDA Patient Listening Session on Pulmonary Sarcoidosis** hosted by FSR in 2022. The EL-PFDD was an interactive, virtual public meeting which provided a unique platform for patients with sarcoidosis and their caregivers to share their perspectives on the unmet needs associated with this disease, its impact on quality of life, and their preferences regarding symptom management and the development of new therapies.

This report is essential to amplify the voices of patients and caregivers, offering a deeper understanding of the real-world impact of sarcoidosis on their daily lives. By highlighting these lived experiences, the report provides critical insights for healthcare providers, researchers, and drug developers to prioritize what matters most to patients living with sarcoidosis. It also empowers patients and caregivers by ensuring their needs and priorities are at the center of therapeutic advancements.

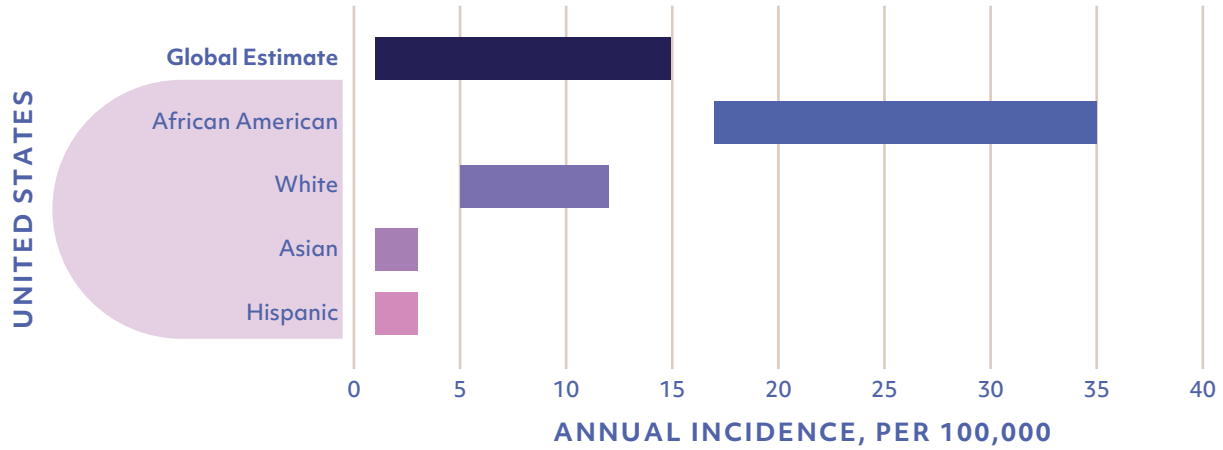
As part of the FDA's Patient-Focused Drug Development (PFDD) initiative, the EL-PFDD meeting aims to bring the patient voice to the forefront of the drug development process. More information about the Patient-Focused Drug Development initiative is available on the FDA's website at **https://www.fda.gov/drugs/development-approval-process-drugs/fda-patient-focused-drug-development-guidance-series-enhancing-incorporation-patients-voice-medical.**

Clinical Overview of Sarcoidosis

Sarcoidosis is a rare, complex, multi-system inflammatory disease characterized by the formation of granulomas—small clusters of immune cells—in various organs of the body. Sarcoidosis is often referred to as the "great mimicker" because it shares symptoms with many other conditions, and no two individuals are impacted by sarcoidosis in the same way.

Sarcoidosis primarily affects the lungs, observed in more than 90%[1] of individuals diagnosed with the condition. However, sarcoidosis has the potential for manifestations or symptoms in virtually any organ of the body. Approximately 60%[2] of patients do not require treatment or experience remission after a short course of treatments. For the EL-PFFD the focus was on the approximately 40% of patients that are living with more chronic or complex forms of the disease.

ANNUAL INCIDENCE



**Global incidence estimate includes average of all affected populations.*
The breakdown in the U.S. reflects the true burden of sarcoidosis by racial background.

Approximately 1.2 million individuals are affected with sarcoidosis worldwide.[4] Global estimates suggest an annual incidence of 1 to 15 cases per 100,000 people.[3] This likely underrepresents the true burden of sarcoidosis. In the US, the highest incidence is observed among African Americans, followed by White populations. In contrast, the lowest incidence is reported among Asians and Hispanics.[5]

The cause of sarcoidosis is unknown, but it is believed to arise from a combination of genetic predisposition and environmental exposures. This interaction likely triggers an immune response involving macrophages and T-cells, potentially leading to granulomatous inflammation and, in some cases, fibrosis of the organs.

Sarcoidosis is heterogeneous in its presentation. Some individuals experience a mild, self-limiting disease, while others suffer from severe, chronic progression. This variability complicates both diagnosis and management. Patients may experience organ-specific symptoms, as well as non-organ specific systems like fatigue, nerve pain and fibrosing that can appear in multiple organs. Additionally, sarcoidosis can result in substantial morbidity, particularly among those with multi-organ involvement, and carries a risk of mortality, primarily related to complications like pulmonary fibrosis and cardiac involvement.

Sarcoidosis as a Systemic Disease of Disparities

Sarcoidosis disproportionately affects certain populations based on race, gender, and socioeconomic factors. Research shows that individuals from lower socioeconomic backgrounds are more likely to be present with severe disease at the time of diagnosis. Social determinants of health—including income, education, and access to healthcare—likely contribute to both the progression of sarcoidosis and resources available to manage the disease. Those with fewer resources often experience worse lung function, higher rates of hospitalization, and greater need for oxygen therapy. Economic disadvantages also correlate with higher morbidity, higher hospitalization rates and greater treatment costs.

Further, Black and African Americans are 2.5 times more likely to develop sarcoidosis than white Americans. They are also more than twice as likely to have a family member with sarcoidosis. Their hospitalization rate—driven by chronic and severe symptoms—can be nine times higher than that of white Americans. Additionally, Black and African Americans are 12 times more likely to die from sarcoidosis, often at younger ages, and they tend to receive higher cumulative doses of steroids, leading to detrimental effects on mental health, fatigue, and stress.[9]

Among African Americans, women bear the greatest burden, exhibiting the highest mortality rates at younger ages and frequently presenting with multi-organ involvement, notably in the lungs and heart. Their hospitalization rate is 10 to 18 times greater than that of white Americans and more than double that of African American men, while their mortality rate is 12 times higher compared to White Americans and 1.5 times higher than that of African American men.[4]

Multi-Organ Involvement in Sarcoidosis

Multi-organ involvement in sarcoidosis has been found to be common, with at least half of patients having more than one organ affected[10]—some patients having eight or more organs impacted. Current discussions suggest that single organ sarcoidosis may not be reflective of single organ impact, but lack of diagnosis or adequate testing.

A European-focused study suggests shared patterns of disease across ethnic groups. However, in the United States Blacks and African American patients more frequently presented with severe or debilitating involvement in organs such as the heart, nervous system, and eyes.[11]

Meeting Overview

The EL-PFDD aimed to further explore the unmet needs, quality-of-life impacts, and treatment preferences for future therapies. Nearly 350 attendees participated in the live meeting, including patients, caregivers, regulators, healthcare providers, industry partners, and advocates—all united by a mission to address the significant unmet needs and challenges faced by patients with sarcoidosis.

Opening Remarks and Disease Overview

To encourage broad community engagement, FSR invited sarcoidosis patients and caregivers to submit comments through December 2, 2024, ensuring a range of perspectives would be captured in this meeting's Voice of the Patient Report. This report documents the challenges, priorities, and urgent needs of the sarcoidosis community, with the hope of guiding future research and drug development efforts in sarcoidosis.

Dr. Banu Karimi-Shah, Deputy Division Director in the FDA's Division of Pulmonology, Allergy, and Critical Care, opened the event by highlighting how critical EL-PFDD meetings are in shaping the future of rare disease drug development. She pointed out the unique challenges of tackling a disease as varied as sarcoidosis—its symptoms, disease activity, and outcomes differ widely from person to person—making treatment development particularly complex. Her remarks underscored the FDA's commitment to supporting more robust research and approval pathways for new sarcoidosis therapies, especially given that current treatments primarily rely on steroids and off-label therapies—which often have serious side effects, lead to comorbidities like diabetes and heart disease and too often fall short of patient needs.

Next, Dr. Lisa Maier of National Jewish Health—an FSR Scientific Advisory Board member, a Founding Member of the FSR Global Sarcoidosis Clinic Alliance (FSR-GSCA), and fellowship-trained pulmonologist—provided a clinical perspective to frame the patient stories that would follow. She detailed sarcoidosis' wide-ranging impact across multiple organs and described how these manifestations can severely diminish a patient's quality of life. By offering this broader medical context, Dr. Maier set the stage for patients and caregivers to discuss their personal experiences, emphasizing why new, more targeted therapeutic options are urgently needed. Moderated by FSR President and CEO, Mary McGowan, and John Carlin, member of the FSR Board of Directors and host of the *FSR Sarc Fighter Podcast* and sarcoidosis patient, the meeting then transitioned into an interactive forum.

Patients and caregivers shared first-hand accounts of life with sarcoidosis, including the difficult side effects of existing treatments and the pressing gaps in care.

Addressing a Rare Disease and the Need for Urgent Action

Sarcoidosis is one of fewer than 100 rare diseases to be the focus of an EL-PFDD meeting, offering the FDA, clinicians, researchers, and industry a pathway for a deeper understanding of the lived experience of those impacted by sarcoidosis. Although sarcoidosis was identified over 150 years ago, only three therapies have been FDA-approved in sarcoidosis. Due to the immunological nature of the disease and its complexity, none of the current therapies work for every patient and face the risk of the patient's body adapting to the therapy making additional therapies essential for long term treatment and management strategies.

During the opening discussion FSR stressed the urgency of developing therapies that address sarcoidosis' complexity and prevalence in underrepresented communities. Further, FSR argued that robust data models and adaptive research frameworks are vital to reflecting the diverse experiences of sarcoidosis patients and ensuring that emerging treatments effectively address quality-of-life concerns.

Engagement and Participation

Attendees were encouraged to voice their concerns around two main topics:

1. The health effects and daily impacts of sarcoidosis

2. Patients' perspectives on current treatments and preferences for future therapies

Each topic began with scientific summaries by FSR SAB member and clinical expert, Dr. Lisa Maier, followed by pre-recorded statements from patients and caregivers, and facilitated panel discussions. This format allowed for a comprehensive exploration of sarcoidosis through patient perspectives that highlighted the broad variation in how patients experience the disease.

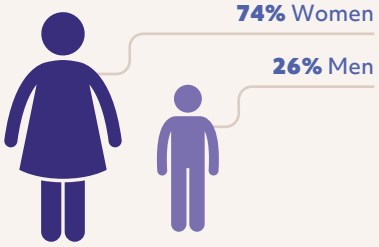
Pre-Meeting Survey

FSR circulated a pre-meeting survey that yielded additional insights into the demographics and experiences of the 401 respondents. The full results of this survey can be found on the FSR EL-PFDD website: **https://www.stopsarcoidosis.org/pfdd/**

The pre-meeting survey was distributed through the FSR-SARC Patient Registry, email distribution lists, social media channels, partner distribution lists, and social media ads. The survey was open July 26-September 6, 2024, to capture the widest possible array of patient experiences.

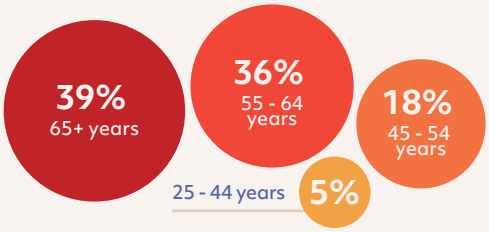
PRE-MEETING SURVEY DEMOGRAPHICS

GENDER



PRE-MEETING SURVEY DEMOGRAPHICS

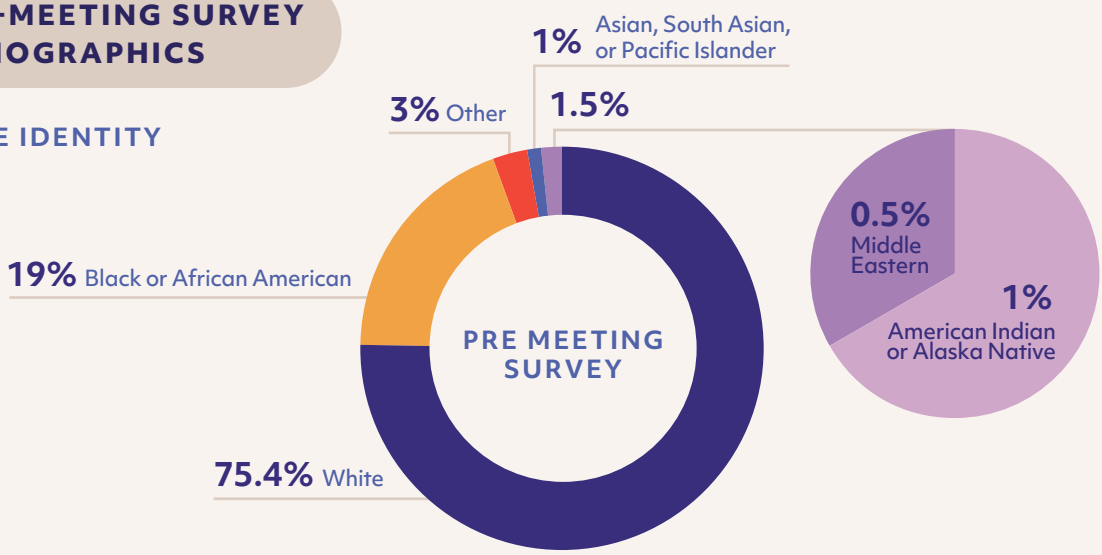
AGE



There were very few younger respondents, with only 1% between 25-34 and only 1 under 24.

PRE-MEETING SURVEY DEMOGRAPHICS

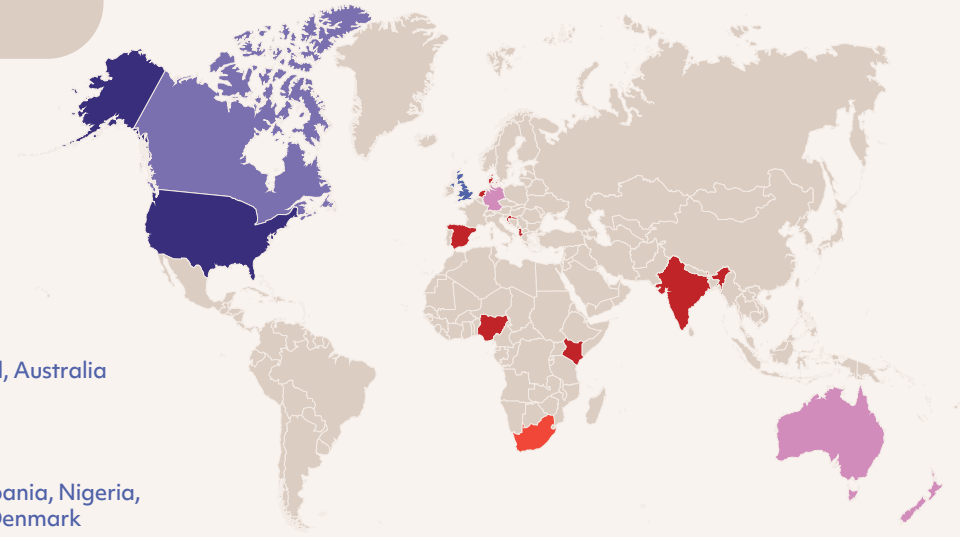
RACE IDENTITY



PRE-MEETING SURVEY DEMOGRAPHICS

GEOGRAPHIC DISTRIBUTION

- **334** United States
- **25** UK
- **20** Canada
- **3** Germany, New Zealand, Australia
- **2** South Africa
- **1** Kenya, Spain, India, Albania, Nigeria, Netherlands, Croatia, Denmark

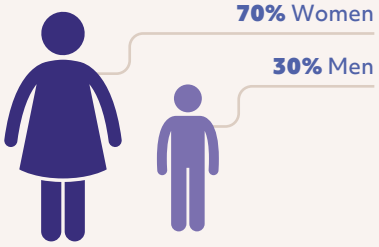


Interactive Polling and Demographics

A real-time poll during the live session was provided in order to characterize the demographics of the live audience of patients and caregivers. These data reflect the diversity within the live audience and emphasizes the varying levels of disease. The survey results are available in Appendix C.

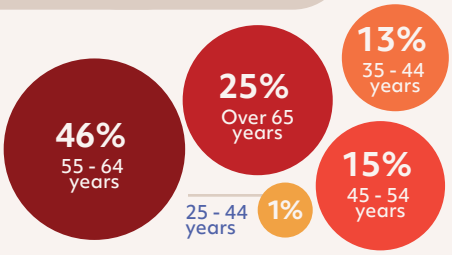
LIVE MEETING SURVEY DEMOGRAPHICS

GENDER



LIVE MEETING SURVEY DEMOGRAPHICS

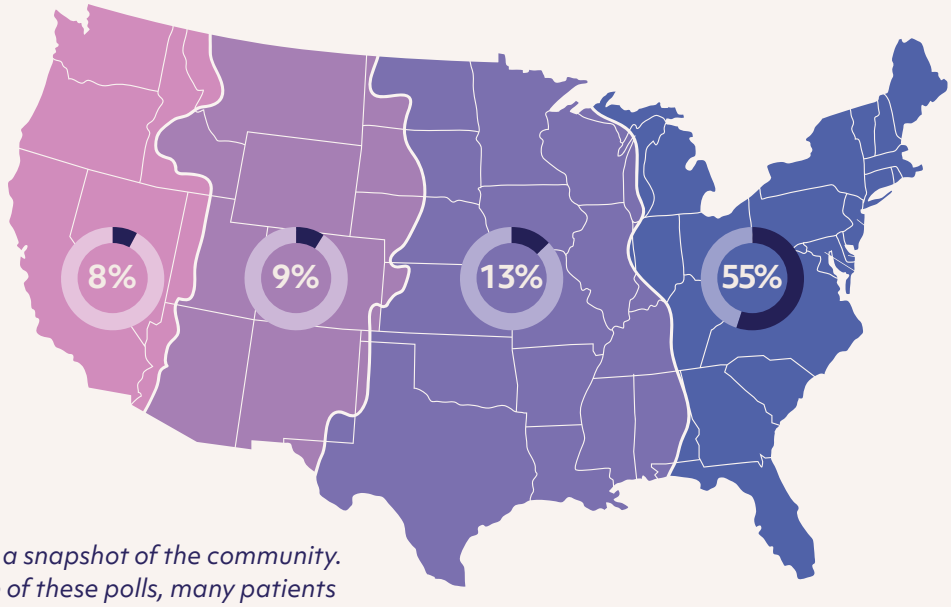
AGE



There were very few younger respondents, with only 1% between 25-34 and non under 24.

LIVE MEETING SURVEY DEMOGRAPHICS

GEOGRAPHIC DISTRIBUTION



Not represented on this graph: *3% from Alaska/ Hawaii, 7% from other parts of North America, and 3% each from Europe or other regions.*

** These polls represent a snapshot of the community. Due to the "live" nature of these polls, many patients may not have been able to participate due to time zones, work or personal conflicts.*

From the live poll, 88% identified as individuals living with sarcoidosis, while 12% were loved ones or caregivers of someone with the disease.

TOPIC 01

Symptoms & Quality of Life Impacts on the Lives of Patients & Caregivers

The first part of the meeting focused on the experiences of patients and caregivers living with sarcoidosis and highlighted the most impactful symptoms and the profound toll the condition has taken on their daily lives. Participants shared personal accounts providing powerful testimonies that highlighted the complex and far-reaching effects of sarcoidosis by participating in pre-recorded panels, live polls, a live panel discussion, or calling in to provide feedback live on the air. Additionally, pre-meeting, live survey results and comments collected for a few weeks following the meeting were included to gather further insights.

"It's more than just the physical toll. The emotional and psychological weight is heavy too. The disease has distanced me from the life I once had."

"Sarcoidosis fatigue is a constant exhaustion that is diffcult to explain to family, friends, and medical professionals. This is more than just tiring out after a day's work; it is a persistent draining exhaustion. I often must cancel social events or rely on my mom for everyday tasks."

The pain and tiredness is horrible. I used to work full time, now I am on disability. There are days that I can't even move with the pain and fatigue. I used to dance, jog, and work full-time. All of that is gone. So, psychologically it messes me up too.

"Every morning, I wake up and I say, 'How is my day going to be? Am I going to stay in bed today because of the fatigue? Or will I be able to do something?' "

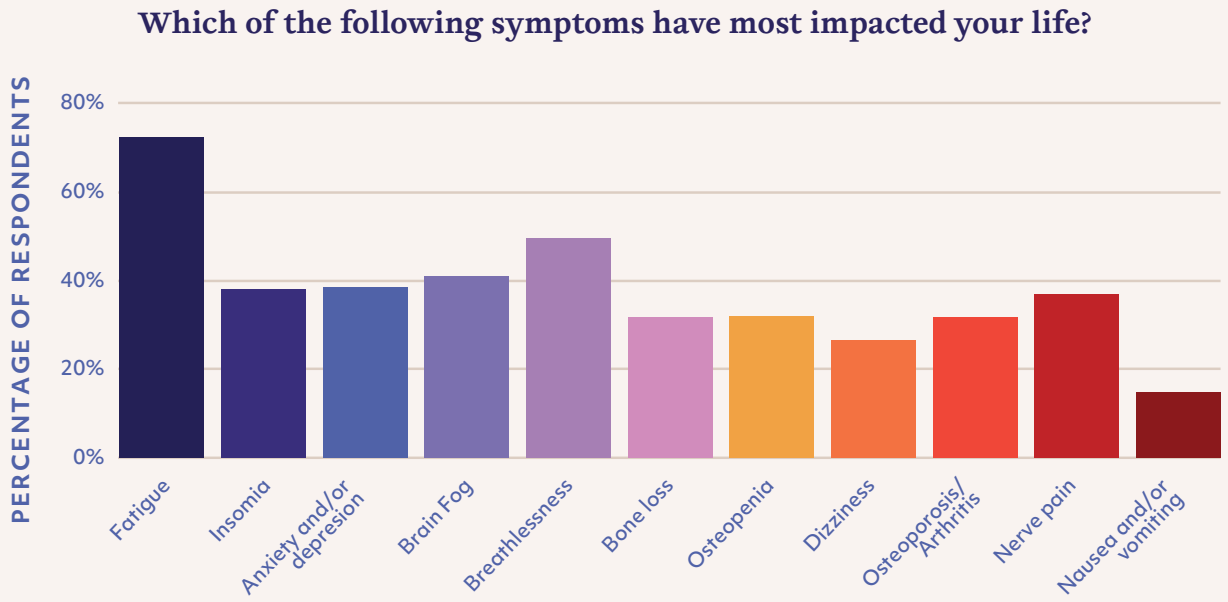
Sarcoidosis presents significant limitations, barriers, and obstacles for patients' daily lives and well-being. The impact on physical and mental health, paired with life limiting disabilities impact patients' identity, their financial stability, and their relationships.

Most Bothersome Symptoms

Sarcoidosis' reach goes beyond the individual – it impacts their loved ones, their employers, and their community.

The pre-meeting survey (**Appendix D**) and live polling asked patients and caregivers: *"What symptoms do you or your loved one find most bothersome?"* Fatigue was consistently noted as the most bothersome symptom that has most impacted their lives.

PRE-MEETING SURVEY



Patients and caregivers expressed that fatigue was the most impactful symptom, describing it as an overwhelming exhaustion that impacts their ability to engage in basic activities and maintain a consistent routine. For many, fatigue is as debilitating as other physical symptoms, fundamentally altering their routines, limiting their ability to work, and casting uncertainty over each day.

Pain—particularly in the joints and chest—was also noted as a significant barrier to maintaining a good quality of life. Finally, respiratory issues, such as shortness of breath and persistent coughing, was noted for limiting mobility and contributing to anxiety and lowering quality of life.

"This disease disrupted my life in ways I never imagined. Each morning, I wake up with an overwhelming sense of fatigue before I've even started the day. My body feels heavy, my joints stiff, and my skin burns. Getting out of bed feels like an impossible task."

For some, pain also contributes to isolation, social challenges, and emotional issues. Whether chronic or acute, pain—affecting the joints, skin, or even respiratory function—remains a constant challenge, severely limiting mobility and transforming everyday tasks into painful challenges.

"And just the pain, just to breathe sometimes, when I take a deep breath, that's really painful."

Other bothersome symptoms discussed in the meeting were breathlessness and other respiratory symptoms, particularly among those with pulmonary sarcoidosis. These respiratory symptoms restrict physical activity and lead to social isolation.

"I have to travel with oxygen because I can't even get on a plane without it. It would really impact my lungs."

"My mind feels foggy, and it's hard to concentrate. Sarcoidosis doesn't just attack my body. It clouds my mind, making even basic tasks feel insurmountable."

Furthermore, participants reported a number of cognitive and neurological impacts, such as brain fog and memory lapses, as part of their most bothersome symptoms.

Patients find these cognitive and neurological symptoms disrupt their ability to manage daily responsibilities and professional tasks. These symptoms also lead to feelings of frustration and despair, as tasks that were once routine become challenging and often overwhelming.

"...it is a daily thing, and it is disheartening when you're trying to gather your thoughts and you're unable to gather your thoughts when you've been articulate in your profession."

Responses to *"How have your symptoms and condition changed over time?"* revealed a shared desire for greater predictability and control over their health. Many participants noted that their symptoms have worsened over time, though some reported periods of remission. Progression is often unpredictable, with sudden flare-ups interrupting months of stability. These experiences highlight the need for treatments that address both acute symptoms and long-term management.

Day-to-Day Life Changes

When asked: *"Has your day-to-day life changed as a result of your sarcoidosis?"* responses overwhelmingly confirmed significant lifestyle changes. Simple activities like cooking, exercising, or spending time with family become arduous. The impact of sarcoidosis on daily life is profound.

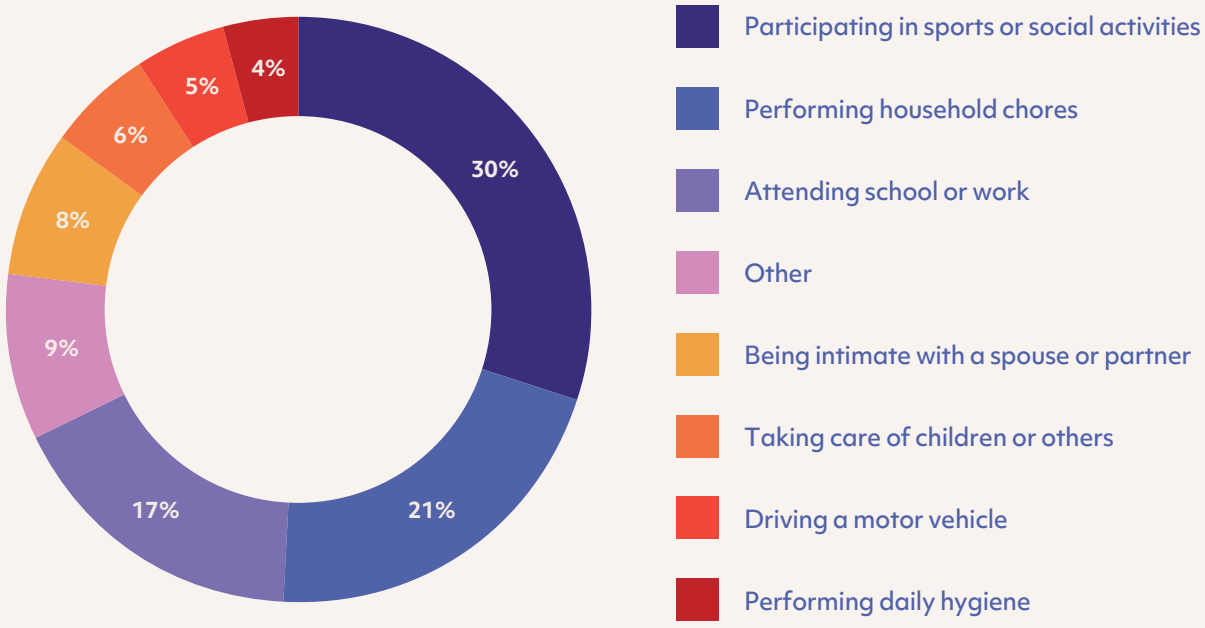
Patients and caregivers described not only the physical constraints but also the emotional, mental, and economic toll of the disease, along with the burden of accessing medical care.

Responses from the pre-meeting survey highlighted that most patients/caregivers have had their lives impacted by chronic sarcoidosis. Similarly, the live survey illustrated that most (62%) were somewhat affected, and 26% severely affected.

> "The bladder incontinence and bowel issues make it hard to be intimate with my partner."

LIVE MEETING SURVEY

What specific activities do you or your loved one struggle with, or are unable to do, because of sarcoidosis? Select TOP 3



These results highlight the significant impact of sarcoidosis on daily life, with the most affected activities being sports or social activities, household chores, and attending work or school. These results emphasize the widespread challenges sarcoidosis imposes on physical, social, and family dynamics. In the live survey, nearly a third had to leave their jobs due to health-related challenges and 45% experienced a moderate to significant impact on their finances, underscoring the economic strain that accompanied the disease.

During the meeting, patients and caregivers described a number of day-to-day challenges that illustrate the profound and multifaceted impacts of sarcoidosis on their lives. These include physical, emotional, social, and financial challenges that are faced daily.

"Sarcoidosis has taken my energy, my job, my social life, and my sense of control, but it hasn't taken my spirit."

"One of my biggest fears with sarcoidosis is the unpredictability. It's a disease with so many unknowns, and that makes planning for the future tough."

The profound impact of sarcoidosis on daily life extends into the workplace, where physical, cognitive, and emotional limitations often force patients to step back from their careers, adapt their roles, or leave the workforce entirely, compounding the disease's toll on their identity, stability, and financial well-being.

"I always say pre and post. Pre-sarcoidosis, I was very vibrant, very active. I worked in pediatrics. Post-sarcoidosis, I am unemployed, on disability, not being able to hang out."

"I was forced to quit my job. The chronic pain, fatigue and complexity of managing my doctor's visits and treatments make it impossible for me to work."

"I couldn't explain to my employer why some days my body simply refused to cooperate."

"I had to make the decision, to be honest, that I could not do it anymore. It was too debilitating. Just trying to get up in the morning to put my clothes on to make it to the office was overwhelming."

"Working became a challenge, and eventually I lost my job."

Patients expressed sadness and frustration over being unable to engage in activities they once loved. Gardening, playing sports, and even attending social events are often sacrificed due to exhaustion or pain. For some, these losses have led to feelings of isolation and depression.

Sarcoidosis not only takes away the ability to participate in physical activities, but patients' health declines are also compounded by their inability to engage in exercise, sports, and an active lifestyle. Sarcoidosis also reshapes the way patients navigate their daily lives, often forcing them to adapt in ways that come at great physical, emotional, and social expense.

"I used to be able to get around on two legs. Now, I have either three or six, Cleo, my cane, or big red, my mobility scooter."

"It was just exhausting even climbing in the vehicle (SUV). So, I had to do a trade in and to some that may seem something minor, but that greatly impacted the entire family."

"I was a very active person. I went to the gym, I traveled, I did a lot of community work, and it [sarcoidosis] just stopped me."

Good Days vs Bad Days

The question: *"What does a good day look like? What does a bad day look like?"* provided insight into the daily struggles and small victories experienced by those with sarcoidosis. During the pre-meeting survey and live polls, the majority of patients and caregivers noted experiencing symptoms that affect their daily functioning, underscoring the challenges of managing sarcoidosis even under optimal circumstances. This emphasizes that for many, a "good day" still comes with significant limitations.

"My friends have been amazing, but I think, at some point, they just give up on asking you to go to social events, because you can never promise that you're going to be there. Or even if you try to commit, sometimes, the day just gets away from you."

Participants described "good days" as those when their symptoms were manageable enough to enjoy basic activities, such as spending time outdoors or cooking a meal.

"Bad days feel like my body and mind are failing me all at once."

"Bad days," however, were marked by extreme fatigue, pain, and an overwhelming sense of hopelessness. These fluctuations make planning ahead difficult and contribute to a sense of instability.

Sarcoidosis Fears and Impact on Mental Health

Addressing the question: *"What do you fear most about sarcoidosis and its impact on your life?"*, the responses underscore the emotional toll of living with a chronic and unpredictable illness.

A frequent concern among participants was the fear of disease progression and the potential for long-term disability. Patients affected by sarcoidosis live in a constant state of anticipatory grief—worrying about when a new organ will be impacted and fearing the next big flair. Every decision patients make is tempered by whether it will trigger new symptoms and what the day-to-day consequences of those symptoms will be. Patients worry about their ability to remain independent and fear the impact of their condition on loved ones. Because of the nature of sarcoidosis, patients feel powerless and live in constant fear of the "other shoe dropping."

"Each day,
I face a choice, to fight
or to surrender."

"The mental health impact of being a burden to my family is also unbearable. Suicidal thoughts are common in my life. Separation from my colleagues I'd worked with and gone close to for 25 years, along with the loss of income, led to a loneliness and isolation that I was not prepared to deal with."

"I no longer photograph celebrations or smiling faces. Instead, I take pictures of the rashes, the flares, and the damage my body has endured. These images have become my map, a visual diary that marks my skin and the toll that illness takes. Each photo documents a chapter of discomfort where my body is breaking down rather than the moments of joy I once cherished."

Anticipatory grief,
that you may not even have it in the other organs yet, but there's this living with anticipation of, potentially, right, that it might, as was described here, might appear in another organ, or light up more in the PET scan. And that, from an emotional standpoint, is very challenging.

"I have a family that I need to be around for, and sarcoidosis has taken everything away from me. I am just a shell of a person because of sarcoidosis."

"I could write volumes about the trauma I've been enduring since this disease took over my life."

Access to Care

For patients with sarcoidosis, navigating the healthcare system is a complex and demanding journey. Financial strain, logistical hurdles, and the ongoing need for specialized treatments often limit access to care and add layers of stress to an already challenging condition. Additionally, the high costs of treatment, the limited insurance coverage of off-label therapies, the travel required to be seen at qualified health centers, and the need for physical accommodations place a heavy burden on patients and their families, with some forced to make drastic sacrifices, such as selling their homes, to afford care. The financial impact of sarcoidosis is complicated by the limited number of FDA approved therapies. More on-label treatments are required to limit the time and financial burden of trying to get off-label therapies approved.

"Living with neuro-sarcoidosis is hard enough without fighting for life-saving medications. We need access to more medication options and help with the financial and physical burdens."

"When I feel like I have energy, instead of spending my time doing the things I love, I feel like I spend countless hours a week managing my healthcare and my prescription drugs, such as refilling prescriptions, getting prior authorizations, changing doses, checking with the insurance company, the pharmacy benefit managers, and finding a specialty pharmacy that can ship needed medications and have them covered by insurance."

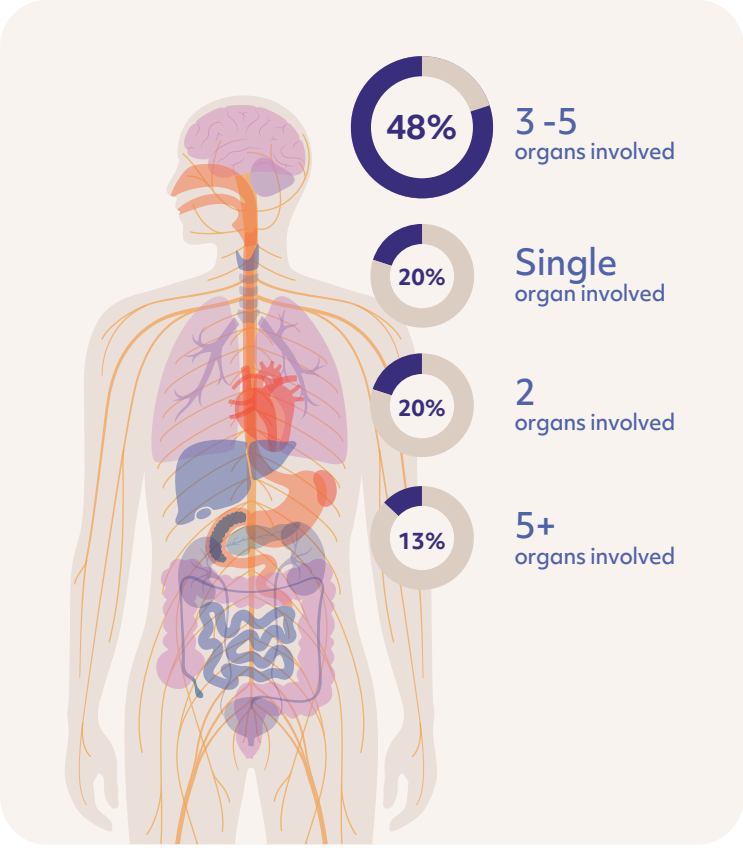
"Hearing those words from your doctors, (running out of options), is very scary."

"Medications to treat sarcoidosis are extremely expensive and cause a huge financial burden. My medical and prescription costs for this year so far are over $500,000. On occasions, my 15-year-old son has to help by paying household bills. In a month, I am selling my house."

Multi-Organ Involvement

The multi-organ nature of sarcoidosis often compounds the challenges patients face as their condition progresses, affecting critical systems like the heart, liver, and kidneys. Data from the pre-meeting survey underscores this complexity: 24% reported heart involvement, 21% peripheral nerves, and 15% liver.

When asked ***"How many of you or your loved one's organs are impacted by sarcoidosis?"*** The data from the live polling further underscored the multi-organ nature of sarcoidosis, with the majority of respondents having more than 3 organs involved. These findings emphasize the need for tailored treatments to address the diverse and evolving manifestations of the disease.



"My sarcoidosis is systemic, affecting my heart, lungs, nervous system, lymph nodes, eyes, ears, mouth, and skin."

"Mine is multi-organ as well. Liver, skin, lungs, central nervous system, sinuses, GI, intestines have all been affected and shown granulomas."

In addition to sarcoidosis often developing in multiple organs and creating new challenges, medication side effects also influence how symptoms evolve. As patients contend with both new manifestations of the disease and potential side effects from therapies, it becomes increasingly difficult to distinguish disease progression from treatment-related symptoms.

Summary: Burden of Disease

The voices of patients and caregivers highlight the profound impact of sarcoidosis on all aspects of life. From debilitating symptoms such as fatigue, pain, and respiratory issues to the far-reaching challenges of multi-organ involvement, treatment side effects, and systemic barriers to care, the lived experiences shared during the meeting highlight the urgent need for innovative and holistic solutions. Moving forward, these insights elevate the need for more advanced research, focused drug development, and better treatment options for all impacted by sarcoidosis.

As drug developers work to incorporate the wealth of insights shared during this session into actions that ease the burdens of clinical development, they should be mindful that the disease can impact virtually every organ and aspect of life; symptoms vary greatly from patient to patient; and the physical and emotional damage done by sarcoidosis should not be underestimated.

TOPIC 02

Current Treatments & Future Clinical Trial Design *for* Sarcoidosis

Introduction

Treatment for sarcoidosis typically follows a stepwise approach that is tailored around disease manifestation and severity.[1] Despite significant side effects such as increased cardiovascular risk, weight gain, and diminished quality of life, corticosteroids remain the first-line treatment.[2-4] Other agents like methotrexate and azathioprine, followed by biologics are utilized when the disease is unresponsive to first-line therapies.[5] Treatments designed to address mild or chronic disease and improve quality of life remain limited.

Trial designs often exclude patients with multi-organ involvement, despite evidence that such patients are more likely to utilize treatment once approved.[1] Inclusion criteria frequently inadvertently exclude underrepresented groups, such as African American patients and older individuals who tend to experience more aggressive forms of the disease.[6] Moreover, trials typically prioritize lung function (FVC) as an endpoint, which fails to capture the full scope of the patient's experience or the flaring nature of disease, making it an ineffective endpoint in this population.

To address these limitations, experts advocate for inclusive trials with multi-organ enrollment, diverse participant representation, and patient-centered outcomes that address fatigue and activities of daily living.[7-10] Emerging frameworks propose combining clinical, physiological, and quality-of-life metrics to better assess treatment efficacy. By rethinking trial design, the sarcoidosis research community can develop equitable and effective therapies that meet the complex needs of all patients.

This second part of the meeting addressed current treatments and future clinical trials, together tackling the unmet needs and limitations of existing therapies to improve outcomes for patients. Insights from the challenges of current treatments, such as debilitating side effects and incomplete symptom relief, directly inform patient priorities for clinical trial designs. Future trials must aim to develop therapies that are more effective, and better able to address systemic disease progression and multi-organ involvement. By aligning real-world patient experiences with research goals, clinical trials offer a pathway to therapies that bridge the gaps in current care and transform the management of sarcoidosis.

The discussion is structured around two key issues: Limitations of Current Treatments and Future Clinical Trial Design.

A key challenge is the scarcity of medications specifically designed for sarcoidosis, forcing doctors to rely on off-label treatments. Patients describe the constant need to experiment with different regimens, utilizing a "trial-and-error" approach to find some level of relief. Treatments to address mild disease and improve quality of life remain limited.

In respect to current therapies, a number of questions were raised for discussion:

- *"What therapies have worked for you, and what did you like about them (including non-drug therapies)?"*
- *"Has your treatment regimen changed? And why?"*
- *"What symptoms (if any) are the treatments addressing well?"*
- *"What are the biggest challenges with current therapies?"*

"All of these drugs come with their own side effects, so it is a constant balancing act of managing side effects such as headaches, mouth sores, stomach issues, weight gain, etc., and not to mention the risks that come from being immunocompromised."

The pre-meeting survey provided insight into the medications that patients with sarcoidosis have taken for the condition. Almost all respondents in the survey reported taking prednisone or methylprednisolone, highlighting the dominance of corticosteroids in sarcoidosis management. This high prevalence—estimated at 91% of the 376 respondents reporting medication use— reflects prednisone's role as a primary treatment.

Respondents reported a handful of treatment options, including oral corticosteroids, immunosuppressants, biologics such as infliximab and adalimumab, corticotrophin, and intravenous immunoglobulins (IVIG). This highlights the complex, multi-systemic nature of sarcoidosis, which often necessitates personalized treatment strategies. Approximately 25 unique medications were identified, reflecting the varied approaches taken to manage this condition.

"I was getting sick all the time because of these immunocompromising medications that I was getting, pneumonia, bronchitis, parvo. I was getting any illness that went around, because the goal was to shut down my immune system, which it did."

Many patients in the survey reported taking a combination of medications, including inhaled corticosteroids, hydroxychloroquine, methotrexate, and immunosuppressants (like azathioprine and mycophenolate mofetil). A smaller number of patients reported using more targeted treatments such as JAK inhibitors, IVIG, or thalidomide, which are generally used when other treatments have failed or specific symptoms are refractory to standard therapies.

For many patients with sarcoidosis, the side effects of medications—particularly steroids and immunosuppressants—present an additional challenge to navigate. The pre-meeting survey revealed that 56% of respondents experienced medication side effects, other illnesses, or permanent organ damage as a result of their medications, 87.5% of respondents that experienced side effects indicated that they had used steroids at the time side effects were noted. These experiences underscore how medication side effects, coupled with the disease's progression, complicate patients' ability to manage sarcoidosis effectively over time.

While medications like corticosteroids have been essential for symptom control, they come with significant side effects that further complicate patients' lives. Patient accounts underscore the delicate balance of managing the disease while navigating treatment impacts. The progression of sarcoidosis, marked by symptom worsening, multi-organ involvement, and the burdens of medication side effects, underscores the complex and multifaceted nature of this disease. These challenges highlight the critical need for innovative therapies, improved management strategies, and holistic support systems to enhance the quality of life for patients and caregivers alike.

Current Treatments

During the meeting, patients and caregivers were asked: ***"What therapies have worked for you or your loved ones, and what did you like about them?"*** Participants shared a variety of treatments that provided symptom relief or helped improve their quality of life. For some, corticosteroids like prednisone offered temporary relief from inflammation but came with significant side effects. Others noted success with immunosuppressants such as azathioprine or biologics like infliximab, though these too had varying levels of tolerability and effectiveness. Non-drug therapies, such as pulmonary rehab and daily exercise routines, were also mentioned as valuable complementary approaches.

Patients and caregivers provided detailed accounts of their experiences with their current treatments, which were further supported by live poll data:

Live polling data (**Appendix C**) revealed that corticosteroids are the most widely used treatment (24%), followed by vitamin supplements (18%), immunosuppressants (18%), and biologics (9%). Additional treatments included medical devices support such as defibrillators and pacemakers—further underscoring the complexity of sarcoidosis management and the need for personalized approaches based on disease severity and organ involvement.

Live polls highlighted the significant challenges posed by current treatment side effects, such as weight gain, insomnia and irritability.

"I take 15 pills daily,
and on Mondays,
I take an extra eight."

LIVE MEETING SURVEY

What have been the most challenging side effects of you or your loved one's current treatment? Select ALL that apply

RESPONSE OPTIONS	PERCENTAGE
Weight gain	21%
Insomnia	19%
Irritability	17%
Mobility challenges	16%
Damage to other organ (liver damage, heart disease, diabetes)	15%
Incontinence	10%
None or not applicable	2%

Sarcoidosis treatments often require adjustment based on the patient's responsiveness to the therapy. The heterogeneity of the disease and the individualized response of each patient makes it challenging to have a specific plan for determining the best treatment pathway. Patients report frustration with limited treatment options and significant side effects. Ultimately, patients and doctors need more options to try when addressing the complex symptoms and impact of the disease.

Current treatments often fail to address or exacerbate significant emotional and cognitive challenges.

"I have a lot of mood swings. And it seems like it's more anger, mainly towards your family. I can actually see myself getting angry at them before it hits, and I can't stop it. I also have insomnia, and that won't help either."

Prednisone

Corticosteroids, specifically prednisone, are a cornerstone of sarcoidosis treatment, but their side effects often lead to significant challenges. Side effects such as weight gain, bone deterioration, diabetes, and hypertension frequently undermine its benefits, leaving many patients struggling to balance symptom relief with the adverse impacts on their overall health. The ongoing reliance on prednisone underscores the urgent need for safer, more effective alternatives.

"Steroids, while necessary, wreak havoc on my body and mind. There's no easy solution, and I'm left grappling with the impact on my physical, mental, and emotional health."

"Living with sarcoidosis can be a roller coaster, and prednisone is a wild twist, and turn. While the treatment reduces inflammation, and gives me a temporary energy boost, the side effects are daunting."

Immunosuppressants and Immunomodulators

Immunosuppressants and immunomodulators like methotrexate, azathioprine, and hydroxychloroquine are often prescribed as part of the sarcoidosis treatment when corticosteroids are insufficient or cause severe side effects. Patients report varied experiences with these medications. Immunosuppressants are commonly used when corticosteroids are inadequate or intolerable.

While they can help manage sarcoidosis symptoms and reduce reliance on steroids, patients report highly variable experiences with these medications. Effectiveness varies from patient to patient and many face significant side effects, such as liver damage or bone vulnerability. These challenges highlight the need for more consistent and tolerable alternatives to support long-term management.

"Methotrexate caused my liver to decompensate, and I required hospital care including a liver biopsy. It took many months to get the symptoms under control."

I've been on methotrexate, which was fantastic for my lungs but left me vulnerable in the bones."

Biologics

Biologics like infliximab and adalimumab offer another option for patients with sarcoidosis, but their effectiveness can vary, and access can be challenging. Biologics provide an alternative treatment option for sarcoidosis, particularly in cases where other therapies are insufficient. While some patients experience significant symptom relief, the effectiveness of biologics can vary greatly. Some find these therapies unhelpful or ineffective.

"I receive infliximab infusions every four weeks, and they've been a godsend. When my infusion was delayed, my symptoms worsened—my neuropathy in my feet made it impossible to drive, and I experienced brain fog and depression."

Combination and Supportive Therapies

Many patients often use a combination of treatments and supportive therapies to manage specific symptoms and complications. Due to side effects and decreasing effectiveness of previously effective therapies, patients often need many different treatment options. Currently available treatments address inflammation, neurological symptoms, and organ-specific complications, often supplemented with physical therapy and nutritional support, but are not designed to address the underlying condition or to stop the development of multiple manifestations. While some patients report success in managing flares and specific symptoms, many highlight challenges such as persistent disease progression, significant side effects, and limited efficacy. These experiences underscore the complexity of managing sarcoidosis and the critical need for individualized, multi-faceted treatment approaches.

"I take amitriptyline, propranolol hydrochloride for my heart, arnica, which helps relieve the inflammation, medical marijuana at night, and supplements like Vitamin C and folic acid. A prescription combination drug containing alprostadil, papaverine, and phentolamine, triamcinolone paste for my oral, Fluticasone/vilanterol and Omeprazole. The newest one I'll start with is sirolimus."

"I've tried steroids, Adalimumab and methotrexate, but the sarcoid continues to spread. Treatments are not working for me, my lungs, liver and spleen are the worst out of all of my organs."

Management of Sarcoidosis

In response to *"Would you consider your condition well-managed?"*, many respondents indicated that their current approaches provide partial relief but fall short of restoring their quality of life. Regarding *"What are you currently doing to manage your or your loved one's sarcoidosis?"* responses varied widely, reflecting diverse needs and experiences.

> "They are trying to help. But sarcoidosis treatment is currently nothing more than trial, error, and hope."

Patients employ a range of strategies to manage their symptoms, from medication therapy to lifestyle adjustments. Breathing exercises, dietary changes, and support groups were frequently mentioned as helpful. However, participants noted that access to effective treatments and specialists remains a challenge.

> "My doctors tell me we are running out of options that they can all agree upon, so we are all hoping my latest drug regimen will be the answer."

A key challenge is the scarcity of medications specifically designed for sarcoidosis, forcing doctors to rely on off-label treatments. Patients describe the constant need to experiment with different regimens.

The management of sarcoidosis requires a multifaceted approach that combines medical treatments with lifestyle adjustments and emotional support. While participants highlighted the value of medications, support groups, and holistic practices, they also underscored the ongoing challenges, including limited access to knowledgeable healthcare providers and the burdens of treatment side effects.

> "It takes so much work and time and effort to find the right treatment that it puts a strain on every aspect of your life."

Non-Medication Strategies for Managing Sarcoidosis
Patients discussed the value of non-medication strategies as tools to improve their experience with sarcoidosis. Activities like daily stretching, deep breathing, and swimming help manage symptoms, strengthen respiratory function, and enhance overall well-being.

Pulmonary rehabilitation, respiratory exercises, and activities like daily stretching, deep breathing, and swimming were frequently highlighted for their role in strengthening lung function, managing symptoms, and enhancing physical health. These strategies reflect a proactive approach to care, where consistent effort and tailored routines complement medical treatments to improve quality of life. However, for too many patients these supplemental or alternative therapies are not available due to lack of expert facilities or insurance coverage.

"Pulmonary rehab is key! I participate in functional strength classes, daily stretching, breathing treatments, nebulizers, and spirometers. I also build in periodic rest breaks throughout the workday that have helped."

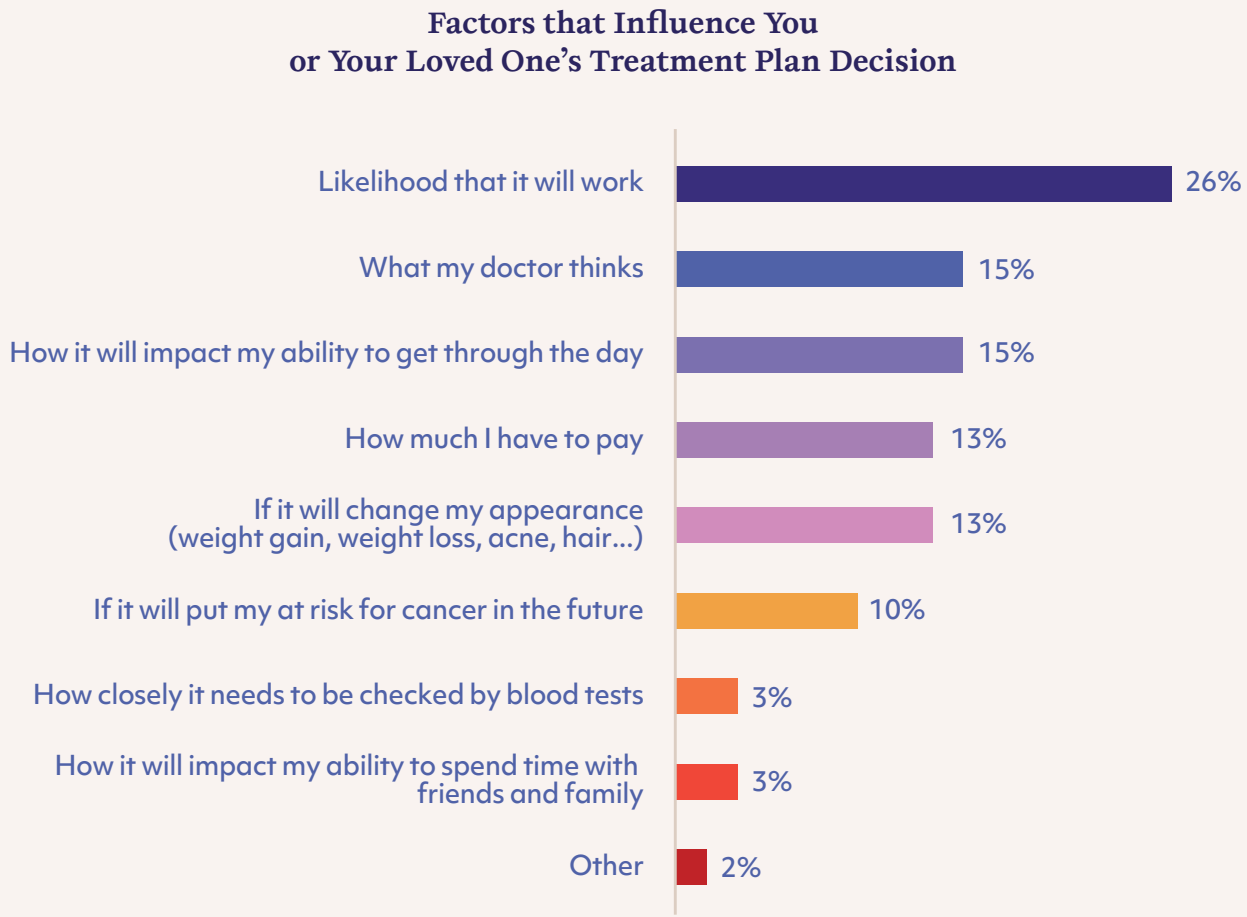
"I had to radically change my diet. I had to cut back on a lot of things that were just setting me up for flare. We all know that if you have a flare while you're on medication, that thing can take you down for about three days...There were a lot of things I needed to do if I want to just survive with sarcoidosis."

Patient Priority for a Future Treatment

When making treatment decisions, patients and caregivers consider a range of factors, as reflected in the live polling results. The likelihood of a treatment working emerged as the most influential factor (26%), highlighting the importance of therapies that deliver tangible improvements. Trust in medical expertise also plays a key role, with 15% of respondents prioritizing their doctor's recommendations. Additional considerations include the impact of treatments on daily life (15%) and their financial burden (13%), emphasizing the need for options that are both effective and practical. Patients also account for changes in appearance (13%) and potential long term cancer risks (10%), reflecting the multifaceted nature of their decision-making process.

These insights reinforce the importance of developing therapies that address both meaningful clinical outcomes and the broader implications of treatment on patients' lives.

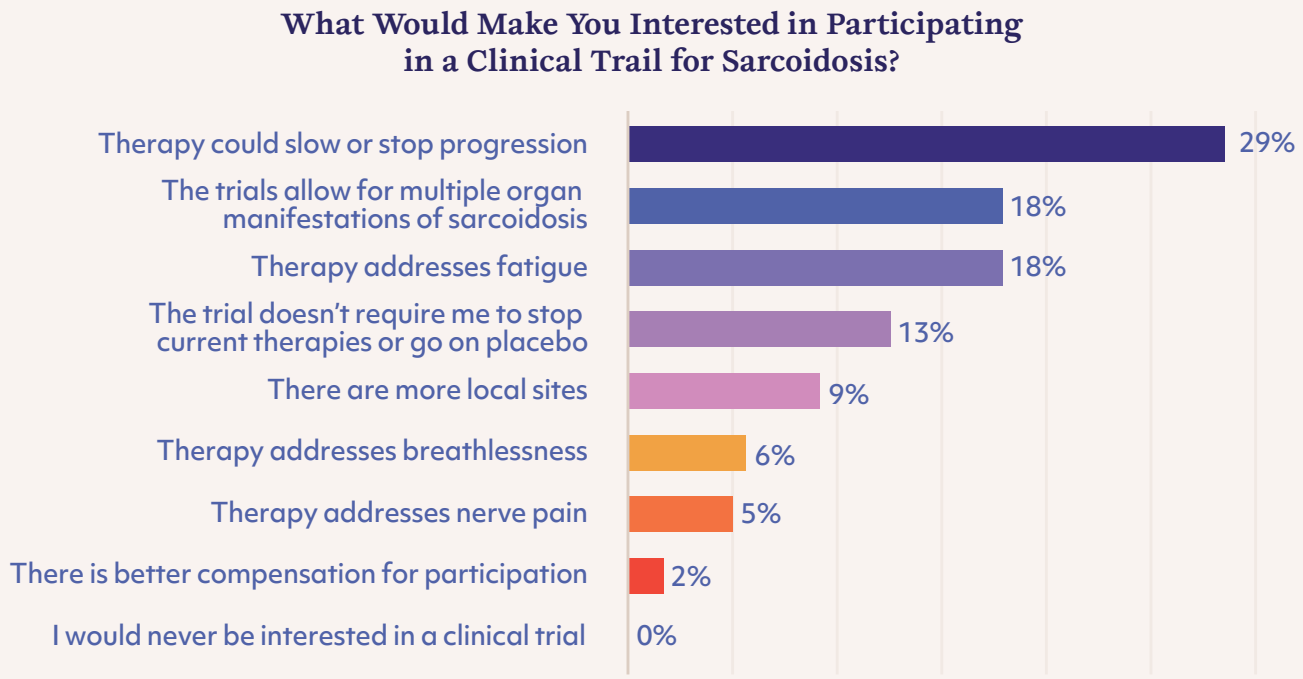
LIVE MEETING SURVEY



Clinical Trial Design

To address limitations of current treatments, future clinical trials should be designed to be more adaptive and inclusive. For patients and caregivers, this means clinical trials that allow patients with multi-organ involvement to enroll, diverse participant representation, and patient-centered outcomes that address fatigue and activities of daily living. Emerging frameworks propose combining clinical, physiological, and quality-of-life metrics to better assess treatment efficacy. By rethinking trial design, the sarcoidosis research community can develop equitable and effective therapies that meet the complex needs of all patients.

LIVE MEETING SURVEY



Future clinical trial design was considered in a number of ways:

- *"What are the main barriers when considering participating in clinical trials?"*
- *"What concerns do you have about clinical trials? What would make you more likely to participate in a trial?"*
- *"What are the patient priorities for future treatments?"*
- *"Short of a cure, what do you hope an ideal treatment would address and what would meaningful improvement look like?"*

Together, these discussions aimed to bridge the gaps between current treatments and future possibilities, fostering innovation that aligns with the real-world needs and hopes of sarcoidosis patients and caregivers.

Participation in clinical trials is critical for advancing sarcoidosis treatment options, but patients face significant barriers that prevent them from enrolling. Challenges include limited access to nearby trial sites, restrictive eligibility criteria often exclude those with multi-organ involvement, and insufficient communication from healthcare providers about available opportunities. Financial burdens, logistical hurdles, and concerns about safety further complicate participation, leaving patients with fewer opportunities to engage in transformative research. *

During the meeting, patients and caregivers were asked: ***"What Are The Main Barriers When Considering Participating in Clinical Trials?"*** When considering participation in clinical trials, patients with sarcoidosis face numerous barriers that limit their ability to engage in these critical opportunities for advancing treatment. From restrictive eligibility criteria and lack of trial accessibility to logistical challenges, these obstacles underscore the need for more patient-centered and inclusive trial designs. Many patients expressed a strong desire to participate but highlighted how practical concerns, such as travel expenses, job security, and caregiving responsibilities, complicate their decision-making process.

The results of the pre-meeting poll indicate that the most common barriers to clinical trial participation include a lack of accessible trial sites, restrictions on individuals with a certain type of sarcoidosis or multi-organ involvement and insufficient communication from healthcare providers regarding trial options. This highlights the need for more inclusive and patient-centered trial designs.

"Many sarcoid patients have multi-organ sarcoidosis, but trials don't necessarily address that, that needs to change."

Furthermore, the community asked for more inclusive and adaptive clinical trial designs. Trial design that does not account for the complexity of the disease will not capture the needs of the population most severely impacted, and with the most urgent need. Patients fear flare ups of their disease and double-blind clinical trial designs with placebo controls pose significant risks for the sickest patients, putting trials options out of reach. The ability to maintain current therapies without requiring placebo use was highlighted in the pre-event survey. Notably, no respondents to the pre-event survey indicated complete disinterest in clinical trials, underscoring the high level of engagement among patients when trials align with their needs and priorities Finally, patients desire clinical trials that move beyond the most common manifestation of the disease. Though the lungs may be the most involved organ in sarcoidosis, for many patients it is the not the organ that is causing the most issues for them.

"Because it was a double-blind single-site trial, there was a chance I could receive the placebo. Would my sarcoid get worse? That was a big concern."

** In November 2024, FSR received clarification of the Department of Labor that ensures that those who participate in clinical trials and their family caregivers are eligible for Family Medical Leave under the Family Medical Leave Act. Through this clarification those who participate in clinical trials have job security.*

https://www.stopsarcoidosis.org/fmla/

"My sarcoidosis impacts my brain, and spinal cord...We need more research, resources, and treatments beyond pulmonary sarcoidosis, [and open] clinical trials to more patients with varying levels of symptoms, and sarcoidosis impact. Currently, there are no trials for patients like me because the focus is only for pulmonary patients."

Addressing the question of *"What would make you interested in participating in a clinical trial?"* The live poll revealed key factors influencing patients' interest in participating in sarcoidosis research. The most significant motivator was the potential for therapy to slow or stop disease progression (29%). The patient speakers repeatedly identified a strong desire for therapies that stopped the progression of the disease or stabilizing of the disease.

"Stop the disease from progressing: Current medications are like firefighters spraying water at visible fires but not reaching the attic. We need treatments that target the hidden, underlying progression of sarcoidosis before significant damage occurs."

"I would like something that could make chronic sarcoidosis stable; so, I don't lose more parts of myself. That's the frustrating part for me, it started in one area, and then has taken different body parts, to where I'm having to use replacements. I feel like I'm losing pieces of myself as the years progress. I want something that could at least stop the progression."

Patients also emphasized the need for therapies that directly addressed their most bothersome symptoms, fatigue and pain.

"A therapy that addresses fatigue is incredibly important. It's one of the most debilitating aspects of this disease."

"I wish there was a medication to eliminate, again, the opportunities for experiencing fatigue. It's amazingly difficult. Daily activities, much less shop for appropriate food, cooking meals and so forth."

"Apart from a cure, I would also love to see something that better addresses my pain, weakness, and fatigue as a holistic approach."

Patient priorities for future treatments reflect the urgent need for therapies that go beyond symptom management to address the root causes and systemic nature of sarcoidosis. From slowing disease progression and targeting fatigue, to providing multi-organ coverage and reducing reliance on steroids, patients are calling for holistic approaches that improve quality of life and minimize comorbidities. These insights emphasize the importance of developing patient-centered treatments and clinical trial designs that reflect the complex realities of living with sarcoidosis, offering both hope and tangible improvements for those affected by this challenging disease.

Summary: Sarcoidosis Management and Patient Priorities for Future Care

Patients manage sarcoidosis through a combination of current treatments and supportive strategies such as pulmonary rehabilitation, respiratory exercises, daily stretching, deep breathing, and swimming, with some using steroid-sparing options like methotrexate to maintain disease stability. Access to these interventions is often limited by a lack of specialized facilities or insurance coverage. When evaluating treatment options, patients place the greatest weight on the likelihood of a therapy working, followed by trust in their clinician's recommendations, its impact on daily life, cost, changes in appearance, and long-term risks. These perspectives underscore the need for therapies that are both effective and accessible, and for clinical trials designed to reflect the priorities and realities of those living with sarcoidosis.

Conclusion

The Externally Led Patient-Focused Drug Development (EL-PFDD) meeting brought together hundreds of patients, caregivers, regulators, healthcare providers, industry leaders, and advocates, all focused on addressing the significant unmet needs of those living with sarcoidosis. Throughout the meeting, patients and caregivers shared powerful testimonies about the disease's impact on daily life, the challenges of current treatments, and their hopes for future therapies.

Sarcoidosis profoundly impacts patients' daily lives, with symptoms such as debilitating fatigue, chronic pain, and respiratory distress limiting their ability to work, engage socially, and maintain independence. Patients describe fatigue as an overwhelming exhaustion that persists despite rest, often forcing them to carefully ration their energy throughout the day. This relentless fatigue, compounded by chronic pain, respiratory issues, and cognitive impairment, significantly diminishes their quality of life. Financial burdens, social isolation, and the unpredictability of disease flares further add to their struggles. Despite their resilience, patients and caregivers continuously navigate the complex challenges of symptom management, adapting to a life dictated by an unpredictable and often relentless illness. Their experiences highlight the urgent need for therapies that not only alleviate symptoms but also restore a sense of stability and control over their lives.

Current treatments, particularly corticosteroids and immunosuppressants, often present as a double-edged sword—providing some symptom relief while introducing significant side effects and long-term health risks. Patients express frustration with the trial-and-error approach to finding effective treatments and the lack of therapies specifically designed for sarcoidosis. There is a clear call for more inclusive clinical trials that reflect the realities of multi-organ disease, minimize reliance on steroids, address fatigue and pain, and prioritize stabilizing the disease and providing meaningful improvements in quality of life. Moving forward, patient-centered research and treatment innovation must focus on holistic, effective, and accessible therapies that offer more than survival—allowing those affected by sarcoidosis to truly thrive.

Key Takeaways

1. Identifying better tools for early diagnosis of sarcoidosis. Inaccurate and imprecise diagnostic tools and the lack of biomarkers, translate to lost years of care and irreversible damage to organs.

2. Seeking better options than long-term, high-dose steroids as the primary pathway to treatment. Steroid use contributes to the development of serious comorbidities such as diabetes, osteoporosis, obesity, insomnia, depression and anxiety. Physicians have limited tools to aid patients in steroid reduction or weaning.

3. Growing the arsenal of therapies by developing new therapies that have different mechanisms to attack the inflammation and address the symptoms. We are hopeful that new incentives for manufacturers can be put in place to increase both access and options for patients.

4. Working together to create new models of acceptable data, trial requirements, and endpoint selection that are responsive to the patient's needs.

Sarcoidosis is often called the snowflake disease because "no two patients' disease progresses in the same way." For sarcoidosis trials, it is essential to have pathways to include those with complex disease in the trial, smaller numbers of participants, and more flexible endpoints. This is a multi-system disease. We need a multi-system/adaptive approach. Trial design that does not account for the complexity of the disease, will not capture the needs of the population most severely impacted, and with the most urgent need.

We believe we have a strong model for how to build responsive trial design in the face of complexity in the way that FDA has worked to make space for the complexities associated with increasing women's participation in clinical trials. At one time, the lived experience and the complexity of the female body were held up as barriers for women's participation in clinical trials. However, in recent years data models were adjusted to allow for female hormones and bodily changes. We must take a similar approach to allowing for more adaptive data models that account for complex diseases that impact multiple organs. We cannot ignore the complexity of the disease for the desire of "clean data," and it is imperative we evolve our definition of what is good data to encompass this complexity. Trial design that does not account for the complexity of the disease, will not capture the needs of the population most severely impacted.

We have developed an effective model for adaptive trial design, similar to how the FDA has addressed the complexities of including more women in clinical trials. Once viewed as obstacles, female physiological variations are now incorporated into data models, leading to outcomes that better reflect the challenges women face. Likewise, clinical trials should use flexible data models that reflect the complexity of diseases affecting multiple organs.

Prioritizing "clean data" over disease complexity is insufficient; our definition of good data must adapt. Trials that fail to account for this complexity will not serve those most affected.

Next Steps

The meeting concluded with a shared vision: advancing sarcoidosis care through collaboration, research, and innovation. Mary McGowan's closing remarks encapsulated the collective resolve:

> We are here not just to listen but to act. Together, we can transform the lives of those battling sarcoidosis.
>
> **MARY McGOWAN**

This call to action resonates beyond the meeting, inspiring stakeholders to prioritize patient-centric approaches in research and therapeutic development. These findings will serve as a catalyst for future clinical trials and the development of treatments that honor the voices and needs of the sarcoidosis community.

Appendix A: Meeting Agenda

Externally-Led Patient Focused Drug Development Meeting on Sarcoidosis

October 28, 2024, Virtual 10:00am – 3:00pm ET

10:00 – 10:10 am	**Welcome** *Mary McGowan, FSR CEO*
10:10 – 10:20 am	**Opening Remarks** *Dr. Banu Karimi-Shah, FDA*
10:20 – 10:35 am	**Overview of Sarcoidosis and Impact on Patient's Daily Lives** *Dr. Lisa Maier, FSR Scientific Advisory Board Member*
10:35 – 10:45am	**Overview of Discussion Format** *John Carlin, Host of the FSR Sarc Fighter Podcast (moderator) and Mary McGowan, FSR President and CEO (host)*
10:45 – 11:20am	**Topic 1: Symptoms and Impacts on Daily Living** *A panel of patients and care partners will provide comments to start the discussion on symptoms and impacts of sarcoidosis.*
11:20 – 12:30pm	**Large-Group Facilitated Discussion on Topic 1** *Patients or care partners in the audience are invited to add to the dialogue via call-ins and written comments in the chat.*
12:30 – 1:00 pm	**Break**
1:00 – 1:10pm	**Reconvene Meeting** *John Carlin (moderator) and Mary McGowan (host)*
1:10 – 1:20 pm	**Overview of Current Treatments, Limitations of Therapy in Disease and Symptom Management, and Considerations for Clinical Trials** *Dr. Lisa Maier, FSR Scientific Advisory Board Member*
1:20 – 1:50pm	**Topic 2: Current Approaches to Treatment** *A panel of patients and care partners will provide comments to start the discussion on current approaches to treatment in sarcoidosis.*
1:50 – 2:50pm	**Large-Group Facilitated Discussion on Topic 2** *Patients or care partners in the audience are invited to add to the dialogue via call-ins and written comments in the chat.*
2:50 – 3:00pm	**Closing Remarks** *Mary McGowan, FSR President and CEO*

Appendix B: Discussion Questions

1. What symptoms do you or your loved one find most bothersome?
2. Has your day-to-day life changed because of your sarcoidosis?
3. Are there specific activities that are important to you that you are no longer able to do?
4. What does a good day look like? What does a bad day look like?
5. What do you fear most about sarcoidosis and its impact on your life?
6. How have your symptoms and condition changed over time?
   a. Would you consider your condition well managed?
7. What are you currently doing to manage your or your loved one's sarcoidosis?
8. Do you have any therapies that have worked for you?
   a. What do you like about them (including non-drug therapies)?
9. Has your treatment regimen changed? And why?
10. What symptoms (if any) are the treatments addressing well?
11. What are the biggest challenges with current therapies?
12. What side effects do you wish you didn't have to deal with?
13. What concerns do you have about clinical trials? What would make you more likely to participate in a trial?
14. What in the treatments would you consider meaningful improvement of therapy?
15. When changing medicines, do you have fear of flares or other concerns?
16. Short of a cure, what do you hope an ideal treatment would address and what would meaningful improvement look like?

***The remainder of the discussion questions for the panel were reactive to comments and call-ins and not scripted in advance.*

Appendix C: Live Meeting Polling Results

Part 1

1. What best describes you or your loved one's sarcoidosis?

Active	43%
In remission/controlled	19%
Experiencing symptoms	23%
Anticipating my next flare	9%
Not well controlled by medication	6%

2. What specific activities do you or your loved one struggle with, or are unable to do, because of sarcoidosis? Select TOP 3

Attending school or work	18%
Performing daily hygiene	4%
Being intimate with a spouse or partner	8%
Driving a motor vehicle	5%
Participating in sports or social activities	30%
Performing household chores	21%
Taking care of children or others	6%
Other	9%

3. On a scale of 1-3, how do you or your loved one's sarcoidosis symptoms impact you/them on your/their best days?

1 – Minimal to none	13%
2 – Somewhat	62%
3 – Severely	25%

Part 2

1. What treatments or devices have you or your loved one used for sarcoidosis? Select ALL that apply

Steroids	24%
Vitamin supplements	8%
Immunosuppressants	18%
Other	9%
Biologics	9%
TNF Alpha Inhibitors	6%
Defibrillalor	4%
Pacemaker	4%
Gorticotrophin	2%
Antifibrotics	2%
JAK-InhiMors	2%
IVIG	2%

2. What have been the most challenging side effects of you or your loved one's current treatments? Select ALL that apply

Weight gain	21%
Insomnia	19%
Irritability	17%
Mobility challenges	17%
Damage to other organ *(liver damage, heart disease, diabetes)*	15%
Incontinence	10%
None or not applicable	2%

Appendix D: EL-PFDD Planning Survey

The EL-PFDD Planning Survey is in a separate document held in the FSR website

www.stopsarcoidosis.org/pfdd

Appendix E: Recording

October 28 2024 Link:

www.stopsarcoidosis.org/pfdd

Appendix F: Bibliography

Bibliography from INTRO

1. Valeyre, D.; Prasse, A.; Nunes, H.; Uzunhan, Y.; Brillet, P.Y.; Muller-Quernheim, J. Sarcoidosis. Lancet 2014, 383, 1155–1167. [**Google Scholar**] [CrossRef]

2. Baughman R, Field S, Costabel U, Crystal R, Culver DA, Drent M, Judson, Wolff G. (2016). Sarcoidosis in America. Analysis Based on Healthcare Use. Ann Am Thorac Soc. 2016;13(8):1244-1252. doi:10.1513/AnnalsATS.201511-760OC

3. Starshinova, A., Berg, E., Rubinstein, A., Kulpina, A., Kudryavtsev, I., & Kudlay, D. (2024). Chronic Sarcoidosis: Diagnostic Difficulties and Search for New Criteria of Inflammatory Activity (A Case Report and Literature Review). Journal of Clinical Medicine, 13(22), 6974. **https://doi.org/10.3390/jcm13226974**

4. Denning, D. W., Pleuvry, A., & Cole, D. C. (2012). Global burden of chronic pulmonary aspergillosis complicating sarcoidosis. European Respiratory Journal, 41(3), 621-626. **https://doi.org/10.1183/09031936.00226911**

5. Rossides, M., Darlington, P., Kullberg, S., & Arkema, E. V. (2023). Sarcoidosis: Epidemiology and clinical insights. Journal of Internal Medicine. Advance online publication. **https://doi.org/10.1111/joim.13629**

6. Swigris JJ, Olson AL, Huie TJ, Fernandez-Perez ER, Solomon J, Sprunger D, Brown KK. Sarcoidosis-related mortality in the United States from 1988 to 2007. Am J Respir Crit Care Med. 2011 Jun 1;183(11):1524-30. doi: 10.1164/rccm.201010-1679OC. Epub 2011 Feb 17. PMID: 21330454; PMCID: PMC3137141.

7. Gerke AK, Yang M, Tang F, Cavanaugh JE, Polgreen PM. Increased hospitalizations among sarcoidosis patients from 1998 to 2008: a population-based cohort study. BMC Pulm Med. 2012;12:19. Published 2012 Jul 9. doi:10.1186/1471-2466-12-19

8. Gullapalli D, Phillips LH., 2nd Neurologic manifestations of sarcoidosis. Neurol. Clin. 2002;20(1):59–83. doi: 10.1016/s0733-8619(03)00054-9

9. Foundation for Sarcoidosis Research. (n.d.). ACT Now. Retrieved March 11, 2025, from **https://www.stopsarcoidosis.org/ACTNow/?sf170965802=1**

10. Ba.ughman RP, Teirstein AS, Judson MA, et al. Clinical characteristics of patients in a case control study of sarcoidosis. Am J Respir Crit Care Med. 2001;164(10 Pt 1):1885-1889. doi:10.1164/ajrccm.164.10.2104046

11. Ra.smussen, A., Dawkins, B.A., Li, C. et al. Multiple Correspondence Analysis and HLA-Associations of Organ Involvement in a Large Cohort of African American and European American Patients with Sarcoidosis. Lung 201, 297–302 (2023). https://doi.org/10.1007/s00408-023-00626-6

Bibliography from TOPIC 2

1. Baughman RP, Teirstein AS, Judson MA, et al. Clinical characteristics of patients in a case control study of sarcoidosis. Am J Respir Crit Care Med. 2001;164(10 Pt 1):1885-1889. doi:10.1164/ajrccm.164.10.2104046

2. Saag, K. G., Criswell, L., Sems, K. M., Kolluri, S., & Koehnke, R. (1994). Low-dose long-term corticosteroid therapy in rheumatoid arthritis: An analysis of serious adverse events. The American Journal of Medicine, 96(2), 115-123.

3. Judson, M. A., Baughman, R. P., Costabel, U., Drent, M., Gibson, K. F., Raghu, G., & Valeyre, D. (2015). The WASOG Sarcoidosis Organ Assessment Instrument: An update of a previous clinical tool. Respiratory Medicine, 109(5), 647-656.

4. Rodríguez, M., Morgan, A. W., Cubbon, R. M., & Wu, J. (2020). Dose-dependent oral glucocorticoid cardiovascular risks in people with immune-mediated inflammatory diseases: A population-based cohort study. PLOS Medicine, 17(12), e1003432.

5. Sauer WH, Stern BJ, Baughman RP, Culver DA, Royal W. High-Risk Sarcoidosis. Current Concepts and Research Imperatives. Ann Am Thorac Soc. 2017;14(Supplement_6):S437-S444. doi:10.1513/AnnalsATS.201707-566

6. Zhou Y, Gerke AK, Lower EE, et al. The impact of demographic disparities in the presentation of sarcoidosis: A multicenter prospective study. Respir Med. 2021; 187:106564. doi:10.1016/j.rmed.2021.106564 47

7. Baughman, R. P., et al. (2006). Infliximab therapy in patients with chronic sarcoidosis and pulmonary involvement. American Journal of Respiratory and Critical Care Medicine, 174(7), 795–802.

8. Judson, M. A., et al. (2014). The WASOG Sarcoidosis Organ Assessment Instrument: An update of a previous clinical tool. European Respiratory Journal, 43(4), 1211–1218.

9. Moller, D. R., et al. (2014). Racial differences in sarcoidosis incidence: A 5-year study in a health maintenance organization. European Respiratory Journal, 45(1), 233–241.

10. Judson, M. A., et al. (2018). Organ assessment instrument development in sarcoidosis. Respiratory Medicine, 144S, S4–S10.

Appendix G: Medications Used for Sarcoidosis

Corticosteroids

- Prednisone
- Methylprednisolone (Medrol, Solumedrol)
- Dexamethasone (Decadron)
- Inhaled corticosteroids (e.g., Advair, Aerobid, Flovent, Pulmicort, Qvar, Symbicort)

Immunosuppressants

- Methotrexate (Rheumatrex, Trexall)
- Hydroxychloroquine (Plaquenil, Quinoprex) / Chloroquine (Aralen)
- Azathioprine (Azasan, Imuran)
- Mycophenolate mofetil (Cellcept, Myfortic)
- Cyclophosphamide (Cytoxan, Neosar)
- Leflunomide (Arava)

Biologics and Other Therapies

- TNF-alpha inhibitors: Infliximab (Remicade), Adalimumab (Humira), Certolizumab (Cimzia), Golimumab (Simponi), Etanercept (Enbrel)
- Rituximab (MabThera, Rituxan)
- JAK inhibitors (e.g., tofacitinib, baricitinib)
- IVIG (Intravenous Immunoglobulins)
- Carimune, Flebogamma, Gamunex, Gammagard, Octagam, Privigen
- Azathioprine (Imuran®) is a medication that treats diseases that have to do with your immune system
- Corticotrophin
- Anti-fifbrotics

FSR is committed to providing patients and caregivers with unique opportunities to share about their unmet needs, the quality of life impacts of sarcoidosis, and preferences in respect to symptom management and the development of new therapies.

www.stopsarcoidosis.org/pfdd

THERE ARE MANY WAYS TO ENGAGE WITH FSR:

- Sign up for the FSR Patient Registry
- Learn about research funding opportunities
- Jon the FSR Global Sarcoidosis Clinic Alliance
- Listen to the *FSR Sarc Fighter Podcast*

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