

# 2025

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# PULMONARY Highlights

WITH CARDIOLOGY Spotlight



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# THE TUCHMAN FAMILY

DIVISION OF PULMONARY,  
CRITICAL CARE AND SLEEP MEDICINE



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**National Jewish Health acknowledges The Tuchman Family Foundation and Debra and Ken Tuchman for their generous gift to establish The Tuchman Family Division of Pulmonary, Critical Care and Sleep Medicine. For more than 20 years, Debra and Ken Tuchman and the Tuchman Family have been committed to National Jewish Health through board service and as outstanding advocates for the institution.**



Dear Colleague,

As we reflect on the many strides made in medicine over the past year, it's impossible not to be inspired by the groundbreaking advances achieved. From revolutionary developments in gene therapy and biologics to the introduction of cutting-edge diagnostic tools powered by artificial intelligence, these breakthroughs are transforming patient care and offering new hope for previously untreatable conditions. This past year has reaffirmed the power of knowledge in health care, and we're excited about how these advancements are shaping the future of medicine and improving lives worldwide.

At the heart of National Jewish Health is our commitment to innovation. As the leading respiratory hospital in the nation, we drive groundbreaking research to uncover new treatments and therapies for complex conditions such as asthma, COPD and pulmonary fibrosis. By fostering a culture of discovery, we not only advance medical knowledge, but also translate these findings into real-world solutions that improve patient outcomes.

A patient-centered focus is another fundamental element of our approach to patient care. We provide personalized plans tailored to each individual's unique needs. Our multidisciplinary teams of experts collaborate on cases, offering an unparalleled level of expertise and attention. Patients from across the country and around the world seek care here, knowing they will receive the best possible treatment in a supportive and compassionate environment.

We are also deeply committed to education and community outreach. As we train the next generation of health care providers and raise awareness about chronic illnesses, our impact reaches far beyond our Denver campus, touching lives everywhere. We embody the highest standards of science, compassion and service, and continue to inspire hope for a healthier future.

Thank you for taking a few moments to read about National Jewish Health and how we are advancing pulmonary medicine. We look forward to serving you and your patients.

A handwritten signature in black ink, appearing to read "Kevin K. Brown".

**Kevin K. Brown, MD**  
Chair, Department of Medicine  
National Jewish Health

A handwritten signature in black ink, appearing to read "Irina Petrache".

**Irina Petrache, MD**  
Chief, Division of Pulmonary,  
Critical Care and Sleep Medicine  
National Jewish Health

# Insights: The State of Medicine

Quality health care requires collaboration at every level, which is why leaders at National Jewish Health find themselves sharing their unique perspectives and ideas.



Recently, **Irina Petrache, MD**, (*left*) chief of the Division of Pulmonary, Critical Care and Sleep Medicine; **Glenn Hirsch, MD**, chief of the Division of Cardiology; and **Kevin Brown, MD**, (*right*) chair of the Department of Medicine sat down to discuss the many advancements and achievements in health care during the past year, as well as the challenges, all while looking toward the future.

## What advancements in medicine stood out in 2024?

**Dr. Petrache:** Pertinent to what we do, we saw progress in the continued refinement of individualized therapies for asthma and COPD. It's important to think about each individual and their own phenotype in approaching their treatments. We have interest in diagnosing which type of asthma a patient has with a simple nasal swab, which builds on research showing common characteristics from the nose to deep in the lungs. We have seen great progress in severe asthma by coupling less invasive diagnostic tools and treatment with biologics.

**Dr. Brown:** Biologics are an example of new therapies that benefit multiple and distinct diseases. We've said for the entire history of National Jewish

Health that many conditions are interrelated and have emphasized that multidisciplinary care is a necessary part of any treatment approach.

The GLP-1 agonists are another prime example that are making a difference. Beyond weight loss, we're seeing downstream impacts in asthma and obstructive sleep apnea.

**Dr. Hirsch:** In regards to the GLP-1 medications, we've seen reduced future cardiovascular events even before the onset of weight loss. I would anticipate the FDA approving GLP-1 for heart failure with preserved ejection fraction in the near future.

Progress is being made through the use of genetics in identifying people who are at cardiovascular risk before they have a problem, allowing us to modify

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and, with gene editing, even lower that risk. This past year, we saw the early use of microaxial flow pump (Impella®) result in a reduction in mortality in cardiogenic shock.

So, a lot of exciting advances, but to echo Dr. Brown's point, for many patients there are unifying health implications, whether it's inflammation or a hemodynamic issue, and optimal treatments require an approach across multiple disciplines.

### How has the explosion of artificial intelligence (AI) impacted medicine?

**Dr. Brown:** There are places where we're finding AI beneficial, but I'm not sure it's been as dramatic as we thought it would be. In health care, there are two important areas to discuss with AI — direct care and operations. AI has been great in chest imaging, CT scanning in particular. There is a lot of progress in that space from research and clinical perspectives in identifying lung nodules. AI is helpful in defining patterns of disease and the diffusing of disease.

**Dr. Hirsch:** We're using imaging algorithms to quantify coronary calcium on routine, non-gated chest CTs. I think we'll also be using AI to analyze patient charts to come up with cardiac risk prediction scores for patients and easy clinician review. But there are some pitfalls, because patient charts can be loaded with what we call "chart lore." A lot of data go into charts, and there's always the risk of accidental note dictation errors. So it's important to be aware of the limitations.

**Dr. Petrache:** One area where we're seeing the benefits of AI is with wearables. Using technology to better ensure that health care and respiratory care are becoming more integrated into people's smart devices is important. We launched a chronic care management program this past year that takes advantage of those technologies to identify a patient's potential disease exacerbation. AI technology can then enable us to help patients with multiple chronic illnesses manage their conditions.

### What has a formalized chronic care management program provided for clinicians and patients?

**Dr. Petrache:** We're still in the early stages of implementation, but so far what we're hearing from patients is that they're extremely happy with the approach. We have set it up so our most vulnerable

patients regularly check in electronically between clinic visits and provide real-time information on their vital signs and how they're feeling. The technology platform we're using scores those responses and assesses their health in the moment, allowing us to intervene earlier if we see red flags.

**Dr. Hirsch:** As specialists, we tend to have a model of episodic visits and then in between, there's radio silence. By asking those patients to check in with us regularly, we're hopefully improving outcomes by catching problems earlier. We're also saving the doctor time by streamlining responses to dozens of patient messages, while letting other members of the care team work to the highest scope of their license, which is also more rewarding for them.

**Dr. Brown:** There are only so many hours in the day, and for many physicians it's gotten to the point where it's difficult to manage that workload when you include the ever-growing patient communication inbox. So anything that decreases this time burden is helpful, and this is a constructive way to do that.

### What's grabbed your attention in the medical field for 2025?

**Dr. Brown:** There have been new genetic identifiers in primary ciliary disease that will help clarify and categorize forms of bronchiectasis in ways that we've not been able to do in the past. Also, there is likely to be a new drug for pulmonary fibrosis coming out this year for which our group participated in the research.

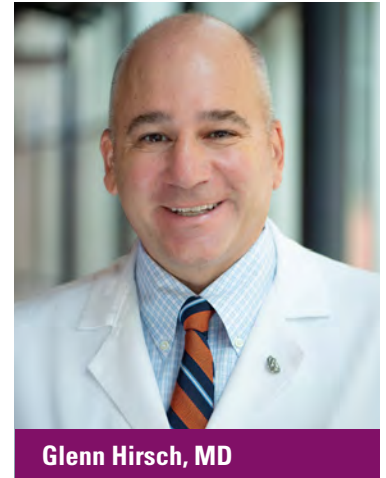
**Dr. Petrache:** There is a lot to be excited about, but I think we need to keep a close eye on the potential of avian flu becoming a threat. I am also concerned we are running the risk of previously treatable or almost eradicated conditions reemerging, such as polio. They are likely to come back because of individuals who do not take scientific truth seriously and refuse to vaccinate themselves and their families.

**Dr. Hirsch:** Exactly. There is misinformation and mistrust out there. You no longer have to disprove the science; you just have to create doubt.

On the positive side, I do look forward to more technology improving efficiencies in health care. We can use it intelligently to help us free up time and restore the joy in medicine and delivering excellent care.

# Advances in Cardiology Promote Patient Success

At National Jewish Health, expert cardiologists are key in delivering integrated care for patients with heart disorders, as well as those with multiple disorders that may involve the heart, the lungs and other systems. Chief of the Division of Cardiology **Glenn Hirsch, MD**, leads a broad team of heart specialists who have made National Jewish Health a top-tier destination for cardiovascular health. "It's really about this approach we've built among our colleagues across disciplines, including pulmonary, radiology, oncology, etc.," said Dr. Hirsch. "Along with our expanding imaging capabilities, this approach of weaving specialties together into one comprehensive system has improved the way we approach patients' cardiovascular issues." While these improvements can be seen throughout the Division of Cardiology, Dr. Hirsch mentioned five categories of care that are excelling this year.



Glenn Hirsch, MD

## General Cardiology

Doctors at National Jewish Health regularly treat coronary artery disease, valve disease and other conditions related to general cardiology. They also bring their specialized expertise to collaborate with pulmonologists to determine if there are any cardiac contributors to patients' respiratory symptoms. "We work in partnership with pulmonologists to tease out if a patient's symptoms are the result of an issue with the heart, the lungs or both," said Dr. Hirsch. "Sometimes it's even the muscles in the periphery, the skeletal muscles. We work together with pulmonologists using baseline and functional exercise testing to figure out what's contributing to the patient's symptoms."

## Electrophysiology



Raphael Sung, MD

Electrophysiology specialists at National Jewish Health can detect abnormalities in heart rhythm and provide a treatment pathway for patients with conditions such as atrial fibrillation and ventricular tachycardia. An important new technology in this area is pulsed-field ablation (PFA), which

applies tissue-specific electrical pulses, enabling doctors to treat cardiac arrhythmia more efficiently than ever. "PFA causes less collateral damage. It's very selective for heart muscle," said cardiologist **Raphael Sung, MD**. "With other ablations, you have to take care not to damage the esophagus and other structures, but with PFA, it's much safer and faster. And we're one of the first few sites using it."

## Cardiac Sarcoidosis

National Jewish Health is one of just a small number of facilities in the world to earn recognition as a World Association for Sarcoidosis and Other Granulomatous Diseases Sarcoidosis Center of Excellence. According to Dr. Sung, it's our unique multidisciplinary approach that allows doctors to excel in treating this condition. "Each member of our team is very familiar with sarcoidosis," said Dr. Sung. "Whereas some institutions may see one cardiac sarcoidosis patient come through in a year, I probably see anywhere between five to seven in a week." Because National Jewish Health receives more cardiac sarcoidosis cases, specialists have a deeper, richer pool of data. This high level of experience, combined with state-of-the-art cardiac MRI and nuclear imaging technology, means that doctors can identify cardiac sarcoidosis manifestations earlier than before, allowing for more informed and appropriate treatments.

## Heart Failure



Ankie Amos, MD

Heart failure treatment is also essential to the cardiology practice at National Jewish Health. Doctors approach the care of patients through various non-invasive to advanced methods such as CardioMEMS, a remote, implanted sensor within the pulmonary artery used to monitor the intravascular pressure within a

patient's cardiovascular system. "We deploy it into the pulmonary artery. It's about the size of a dime. The patient has a special pillow at home that they lie on, and it will send us their systolic and diastolic pressure. It's low risk to deploy and easy to manage," said cardiologist **Ankie Amos, MD**. "It's basically a gold standard way of letting us know a patient's fluid status." The goal of this technology, and of heart failure treatment in general, is to help patients feel well and out of the hospital by providing cutting-edge tools and management systems to keep them on track. This strategy of incorporating new technologies, while collaborating across disciplines, is giving heart failure specialists at National Jewish Health a unique advantage.

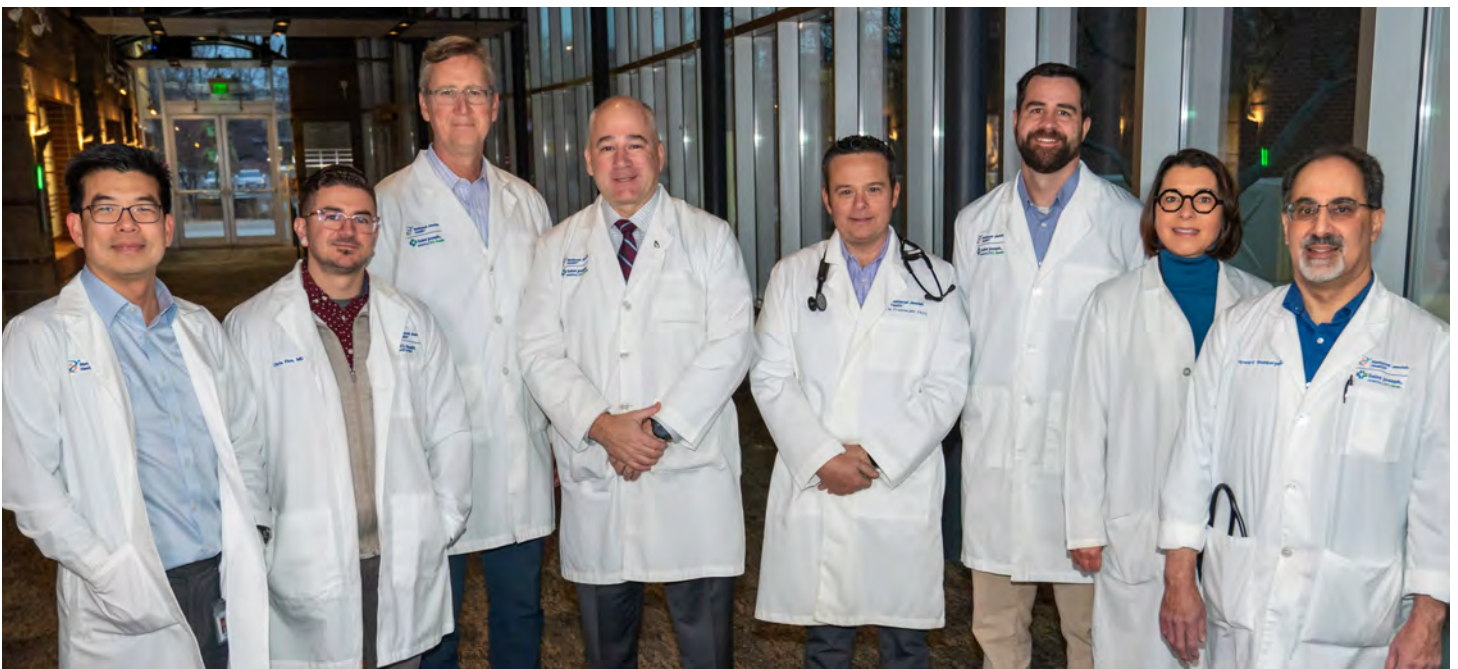
## Women's Cardiology



Minisha Kochar, MD

Risk factors and heart disease symptoms are often different for women, and according to cardiologist **Minisha Kochar, MD**, who specializes in treating women, those who are pregnant or postpartum are particularly vulnerable to changes in heart health.

"These women are going through a critical time in their lives when their heart is working overtime," explained Dr. Kochar. "They have a lot of cardiac stress, and heart conditions often develop in otherwise healthy, young women, who may be so focused on the health of their baby that being proactive about their own heart health is not top of mind." While these issues can sometimes go undetected, provider experience with women's cardiology ensures access to procedures that can lead to accurate diagnoses and effective treatment, vastly improving longevity as well as quality of life.



From left: **Raphael Sung, MD; Chris Fine, MD; Christopher Dyke, MD; Glenn Hirsch, MD; Andrew Freeman, MD; Daniel Groves, MD; Ankie Amos, MD; Howard Weinberger, MD.** Not Pictured: **Darlene Kim, MD, and Minisha Kochar, MD.**

# CLINICAL EXPERTISE

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Patients from across the nation and around the world come to National Jewish Health for comprehensive evaluations, diagnoses and treatment plans. Our pulmonologists collaborate with their colleagues in cardiology, gastroenterology, oncology, immunology, rheumatology and radiology to provide a unique, comprehensive approach to care for every patient.

## Advanced Diagnostic Laboratories

We provide unparalleled expertise in immune and respiratory disease to our clinical, biotech, pharmaceutical, public health and diagnostic partners. Our CLIA- and CAP15189<sup>SM</sup>-certified laboratories have decades of experience developing immunology, complement, infectious disease and therapeutic drug monitoring tests.

## Allergy and Immunology

Our nationally recognized experts use the latest testing and treatments to diagnose and manage allergies and other immune disorders, which can impact respiratory health. Our patients have access to allergy and immunology clinical trials.

## Asthma

Thorough upper and lower airway evaluations in our multiday adult and pediatric asthma programs help us phenotype patients and understand complicating factors, from aspiration to allergies, vocal cord dysfunctions and inhaler techniques. Our faculty members lead numerous National Institutes of Health studies and industry-sponsored clinical trials.

## Behavioral Health

Teaching patients to manage behavioral health issues, such as anxiety and depression, that often accompany chronic respiratory diseases is an integral part of our whole-patient approach. We also have cessation programs that help adults and young people quit using tobacco and vaping.

## Bronchiectasis

National Jewish Health doctors have evaluated and treated bronchiectasis for decades. With innovative anti-inflammatory agents entering the pipeline, our scientists are constantly investigating new ways to improve outcomes. Doctors also are pursuing aggressive treatment programs designed to minimize or prevent the occurrence of bronchiectasis.

## Cardiology

Our cardiologists treat all forms of heart disease and are experts in the heart-lung connection. They work closely with pulmonologists to treat the cardiac causes and consequences of lung disease, including cardiac sarcoidosis and other rare conditions. We also have expertise in cardio-oncology, which balances heart care with cancer treatment, along with advanced cardiac imaging capabilities, including a state-of-the-art photon counting CT scanner.

## Chronic Beryllium Disease

National Jewish Health has more experience with the diagnosis and treatment of chronic beryllium disease than any other health care organization in the world. We developed the first diagnostic blood test for beryllium sensitization, which continues to be the gold standard diagnostic tool, and we emphasize early detection, monitoring and intervention.

## Chronic Obstructive Pulmonary Disease (COPD)

We are advancing pulmonary medicine with COPDGene<sup>®</sup> and other studies to diagnose and phenotype COPD, striving to individualize therapies for chronic bronchitis, bronchiolitis, emphysema and bronchiectasis. In addition, we are a leading center for the diagnosis and management of alpha-1 antitrypsin deficiency and offer clinical trials for those with this condition.

## Cystic Fibrosis

The largest and most experienced adult cystic fibrosis program in the nation is based at National Jewish Health. Our team of pulmonologists, nurse coordinators, respiratory therapists, registered dietitians, psychologists and social workers provides treatment for more than 600 adults annually. We offer ongoing clinical trials to evaluate new cystic fibrosis therapies.



## Mycobacterial Infections: TB and NTM

National Jewish Health began as a hospital for destitute tuberculosis (TB) patients more than 125 years ago, and we provide consultations and manage nontuberculous mycobacterial (NTM) infections, which are on the rise in the U.S.



Charles Daley, MD

Working with colleagues last year, **Charles Daley, MD**, head of our Division of Mycobacterial and Respiratory Infections, identified a potential outbreak of a highly drug-resistant mycobacterium after U.S. patients who traveled to Mexico for stem cell injections became ill. As we operate at the forefront of infectious disease treatment and prevention, our unprecedented experience with thousands of complex mycobacterial infections gives us a deep knowledge of personalized antibiotic regimens and surgical options.

## Exercise and Breathing Performance

We evaluate exercise intolerance and treat exercise-related respiratory problems in a state-of-the-art exercise physiology lab. Innovative, on-site therapists aid in treating specific problems and guide using exercise as medicine.

## Gastroenterology

We have special expertise in GI motility disorders, pulmonary-related GI conditions, GI cancer screening and malignancies. We diagnose and treat the entire range of GI illnesses, including liver disease, biliary disorders, inflammatory bowel disease, GERD and esophageal disorders, pancreatic disease and functional disorders of the gut.

## Imaging

The National Jewish Health Institute for Advanced Biomedical Imaging is recognized around the world for thoracic imaging expertise. Our highly experienced team of radiologists and technicians performs imaging studies on more lungs than any other facility. Patients have access to state-of-the-art imaging equipment, including new photon counting CT technology. Our experts provide interpretations of imaging test results and consultations to help doctors nationwide make accurate and timely diagnoses.

## Interventional Pulmonology

Our interventional pulmonologists offer a wide spectrum of minimally invasive diagnostic, therapeutic and palliative airway procedures for pulmonary nodules, lung cancer, airway obstruction and more. We also insert airway stents and perform bronchial thermoplasty for severe asthma. Our specialists work closely with thoracic surgeons to individualize therapeutic options for those with severe emphysema, employing bronchoscopic lung-volume reduction and intrabronchial valve placement.

## Neurology

With a focused and integrated approach, we diagnose and treat complex neuromuscular diseases and related metabolic and respiratory disorders, as well as neuropsychological disorders. We see patients with conditions such as amyotrophic lateral sclerosis, myasthenia gravis, neuropathy and sarcoidosis. We test for abnormalities that might otherwise be dismissed and work with specialists in cardiology, speech and cognitive therapy as needed to address symptoms.

## Occupational Health

We provide comprehensive diagnosis and evaluation for work-related diseases, while delivering nationally renowned programs for beryllium workers and miners. Our team works regularly with employers, unions, industry, state and local governments, and others to provide occupational health and safety programs that reduce and prevent work-related lung diseases. We also have nationally renowned experts in metal allergy testing.

### Mehrnaz Maleki Fischbach Named Chief of Division of Rheumatology



Mehrnaz Maleki Fischbach, MD

This past year, **Mehrnaz Maleki Fischbach, MD**, was named chief of the Division of Rheumatology. Dr. Maleki Fischbach first came to National Jewish Health in 2010 and has since served as rheumatology clinic director and interim chief of the Division.

In her leadership role, Dr. Maleki Fischbach has recruited new rheumatologists and advanced practice providers while developing the research program within the Division. A multidisciplinary approach brings together specialists in rheumatology, interstitial lung disease, cardiology, pulmonary hypertension and more to ensure patients are receiving comprehensive care. This approach has led to National Jewish Health being designated as one of only a handful of Centers of Excellence for sarcoidosis and as a national treatment and research center for scleroderma.

“We’re committed to excellence in clinical care, education and research that benefit patients with systemic autoimmune and musculoskeletal disorders,” said Dr. Maleki Fischbach. “We collaborate with basic scientists and lead groundbreaking clinical trials that allow us to try new clinical approaches and introduce the latest therapeutic efforts.”

#### Oncology

Our expert medical oncologists, hematologists, pulmonologists, thoracic radiologists, gastroenterologists and surgeons work together to diagnose and treat cancers of the lungs, head and neck, blood, and digestive system. Our lung cancer screening and our tumor registry programs help us assess and monitor patients at high risk for lung cancer. Our cardio-oncologist helps prevent and improve cardiovascular issues related to cancer treatment.

#### Pediatrics

National Jewish Health *for Kids* physicians are nationally recognized leaders in the diagnosis and treatment of asthma, vocal cord dysfunction and other pediatric pulmonary

diseases. Our COVID Assessment Program and Pediatric Day Program offer multiday evaluations, education and management plans for children with severe pulmonary, atopic and immune diseases.

#### Pulmonary Hypertension

Cardiologists, pulmonologists, rheumatologists, physical therapists and other specialists on our pulmonary hypertension team collaborate to provide comprehensive and sophisticated outpatient and inpatient services. Detailed diagnostic procedures, such as right-heart catheterization with cardiopulmonary exercise testing, allow precise phenotyping and treatment of complex patients.

#### Pulmonary Palliative Care

We improve the quality of life for individuals suffering from diverse respiratory conditions and help manage symptoms by integrating interventions with existing clinical care plans.

#### Pulmonary Pathology

Our vast pathology experience examining lung tissue and recognizing respiratory diseases contributes to our unparalleled diagnostic capabilities, which generate consultation requests from around the country.

#### Pulmonary Physiological Services

Our state-of-the-art pulmonary physiology laboratory is one of the oldest and largest in the country. We offer many unique tests, including cardiopulmonary exercise tests with full metabolic

testing, along with arterial line, lactate levels and cardiac data. Our lab is able to perform continuous laryngoscopy with exercise tolerance tests to evaluate exercise-induced respiratory distress.

## Pulmonary Vascular Biology

From basic to clinical research, our team provides key information for many of the diseases we treat. Primary research areas include investigation of pulmonary vascular and right heart function in chronic lung disease, nutritional and exercise interventions in pulmonary hypertension, and gender differences in lung disease. We perform deep phenotyping by collecting lung, heart and skeletal muscle tissues and using new, cutting-edge approaches, such as genomics and proteomics, to study pulmonary, vascular and right heart function in great detail.

## Rare Lung Disease

As a national pulmonary referral center, we have extensive experience diagnosing and managing a variety of rare lung diseases, including

pulmonary alveolar proteinosis, lymphangiomyomatosis and eosinophilic syndromes that most pulmonologists rarely see.

## Sarcoidosis

Our experience with thousands of sarcoidosis patients has helped us better define and address the multi-organ nature of the disease. We are one of 73 centers named by the Foundation for Sarcoidosis Research and World Association for Sarcoidosis and other Granulomatous Diseases as a Sarcoidosis Center of Excellence. This designation provides formal recognition of our team's commitment to meet the needs of sarcoidosis patients and of our efforts to keep abreast of advances and findings in the field.

## Scleroderma

Our Scleroderma Program is designated a Scleroderma Foundation Research Treatment Center. Our multidisciplinary team of specialists in rheumatology, interstitial lung disease, pulmonary hypertension, cardiology, gastroenterology and nephrology ensures that our patients receive comprehensive care, advanced diagnostic and treatment options, and access

to scleroderma clinical trials, nutritional counseling, and specialized pulmonary and physical rehabilitation programs.

## Sleep Medicine

Our comprehensive Sleep Center is one of the oldest in Colorado and is accredited by the American Academy of Sleep Medicine. A multidisciplinary team of pulmonologists, psychologists, respiratory therapists and polysomnographic technologists collaborates to address clinical, educational and research activities for a wide spectrum of sleep disorders.

## Wellness and Prevention

Our Wellness and Prevention Clinics focus on a proactive approach to prevention in a primary care setting. We offer Concierge Medicine, which is a membership-based primary care program that delivers patient health holistically using evidence-based medicine. In early 2025, we are adding an Executive Health Program designed for busy people who want a comprehensive preventive health exam tailored to their specific wellness goals.

## How to Refer

National Jewish Health specialists welcome the opportunity to work with physicians throughout the country and around the globe. To refer a patient, please use the numbers below or fill out the referral form on our website.



 800.652.9555

 303.270.2153

 [njhealth.org/referrals](https://www.njhealth.org/referrals)

## Accessing Patient Records

National Jewish Health has made it easier for referring providers to access patient records electronically. If your organization is on Epic, you can get patient records through Care Everywhere. Organizations on another EMR can request to set up a **HealthLink** account that will allow them to view patient records. To receive instructions on how to request a HealthLink account, please email [physicianrelations@njhealth.org](mailto:physicianrelations@njhealth.org).

# SPECTRUM OF SUPPORT

## Advanced Practice Providers Enhance Patient Access and Care

For nearly 40 years, nurse practitioners, physician assistants and other advanced practice providers (APPs) have been fundamental to patient care and research at National Jewish Health. Integrating APPs into medical practice has not only increased patient access to specialty care, but also expanded knowledge and resources on multispecialty care teams with efficiencies that help move patient care forward.

“APPs provide patients with a valuable entry point to the care team,” said **Stacey Wall, DNP**, executive director of Advanced Practice at National Jewish Health. “Patients are generally able to be scheduled sooner, and advanced practice providers enhance the patient workup, evaluation and treatment with a filter of chronic care education and management that’s based in their nursing, science and other backgrounds.”

APPs work independently and collaboratively with pulmonologists and other specialists to help diagnose and treat patients with chronic and rare diseases. They actively participate in weekly case conferences and are integrated with physicians in workrooms allowing for real-time collaboration with their physician colleagues.

APPs are held to the same standards as all practitioners. “With the goal of increasing knowledge and skills to practice independently and at top of scope, we invest heavily in time and resources to mentor APPs within our multispecialty teams,” explained **Rebecca Keith, MD**,



From left: Rebecca Keith, MD; Stacey Wall, DNP; and Cori Fratelli, FNP-C

pulmonologist on the interstitial lung disease (ILD) team. “The combination of seeing unique pulmonary patients daily and developing subspecialty knowledge gives our APPs an unequalled depth and breadth of expertise.”

“I like to tell patients that they are getting two great minds for the price of one,” explained **Cori Fratelli, MSN, FNP-C**, a nurse practitioner on the ILD

team. “Physicians have decades of specialty education and training in diagnosis and disease management. As an APP, I have learned the nuances of disease management through an intensive and ongoing education and mentoring process. In addition to collaborating on diagnosis, treatment and follow-up care, my institutional knowledge helps keep patient care moving forward.”

# SPECTRUM OF SUPPORT

## Taking the Fight to Tobacco

In spite of significant inroads over the past several decades, cigarette smoking remains the leading cause of preventable death in the United States, with commercial tobacco killing approximately 480,000 Americans annually. The health care cost is estimated at more than \$240 billion per year.

National Jewish Health offers personalized cessation programs; researches the biological and behavioral impacts of smoking and vaping; and advocates for policy changes at the local and national level. Since 2002, the National Jewish Health tobacco cessation program has managed quitlines and initiatives that have helped more than 2.5 million people with their quit attempt. The program here is now the largest provider of quitline services in the U.S., operating in 26 states. By developing individualized quit plans and providing person-to-person connections, the program achieves one of the highest quit rates in the nation.



Smoking is a major risk factor for developing lung cancer, and lung cancer screening education is incorporated with the quit counseling provided in the program. It is estimated that 56% of callers to smoking quitlines are eligible for lung cancer

screening based on age and smoking history. Screening is recommended and free for people 50 to 80 years old, current or former smokers with at least a 20-pack-year history of smoking and those who currently smoke or who quit in the last 15 years.

The youth-tailored **My Life, My Quit** program combines phone coaching with live text messaging and online chat, making it a national leader in providing tobacco

and vaping cessation for teens ages 13 to 17 who want to quit. Since launching in 2019, the program now serves 26 states and will introduce updated protocols, with youth input, in the next year to increase engagement.



Stephen Frankel, MD

## Chronic Care Management

Earlier this year, the **National Jewish Health Chronic Care Management™** program was launched with the goal of improving patient management of complex conditions and achieving better outcomes. The program acts as an early warning system to know when patients require medical attention by using real-time data to connect, monitor and respond to patient-provided insights into their well-being between clinic visits.

“National Jewish Health has always focused on comprehensive and coordinated care, and this new program enhances those efforts. Knowing when patients need intervention earlier is key to preventing exacerbations and hospitalizations,” said **Stephen Frankel, MD**, executive vice president of Clinical Affairs.

# RESEARCH LEADERSHIP

## Asthma and the Biologics Revolution

Within the past decade, the use of biologic therapies has revolutionized the management of severe asthma, offering personalized treatment and significant improvements in quality of life for patients. By targeting the specific pathways responsible for inflammation and airway hyperresponsiveness, biologics are preventing exacerbations and improving lung function.

“We’re in the next frontier of asthma treatment. Asthma hasn’t been cured, but, by matching the right patient with the right biologic, we are achieving full remission of symptoms for many severe asthmatics,” said **Rohit Katial, MD**, director of the Center of Clinical Immunology at National Jewish Health.

National Jewish Health has been at the forefront of asthma biologics research, clinical guidance and patient care, serving as a center for clinical trials for all six of the currently

approved biologics for asthma and participating in primary journal manuscripts. Research is now focusing on expanding the use of biologics to broader patient populations, identifying asthma subtypes through biomarkers, exploring the efficacy of biologics in early-stage asthma, and further researching non-T2 high inflammatory pathways for patients who don't respond to current biologics.

“There’s excitement about our ongoing research in examining oral and inhaled therapies, which would make biologics more palatable to more patients,” said **Michael Wechsler, MD**, director of the Cohen Family Asthma Institute. “We’re also busy working to identify predictors of asthma remission for patients most likely to benefit from these biologics.”

Biologics also have proven to be a treatment option for children with moderate to severe asthma, along with other allergic diseases that don't respond to other treatments. **Ronina Covar, MD**, associate co-director of the Cohen Family Asthma Institute, is involved in ongoing research looking into a biologic for asthmatic children that is effective when administered every six months as opposed to every 4-8 weeks.

“Biologics have been impactful in getting many kids off steroids and tapering their medications. We’ve seen dramatic improvements in their quality of life,” said Dr. Covar.

The advances in biologic therapies represent a paradigm shift in the management of severe asthma. As research continues, the next generation of biologics promises to further enhance outcomes, bringing us closer to a future where severe asthma is no longer a life-altering condition.



From left: Rohit Katial, MD; Ronina Covar, MD; and Michael Wechsler, MD

# RESEARCH LEADERSHIP

## Illuminating the Role of Macrophages in Fibrosis

Researchers at National Jewish Health and colleagues completed the first study comparing lung macrophages in multiple models of lung injury. The research indicates that macrophages previously described as “pro-fibrotic” are insufficient to cause fibrosis on their own, opening the door for research to advance the understanding of how macrophage programming can help or hinder lung repair.

“We now know the role of macrophages has been misunderstood,” said **William Janssen, MD**, section head of Critical Care Medicine at National Jewish Health and senior co-author of the research. “This research helps advance the goal of the pulmonary community to harness macrophages to achieve lung repair.”

Researchers compared macrophage activity in two disease models — one known to follow a healthy repair path and one that resulted in fibrosis — to identify differences in the macrophage populations. Initial findings identified populations of responder macrophages that were recruited to the lungs in all types of lung injury. The researchers then analyzed transcribed genes in these macrophage populations to better understand their differences.

They found that macrophages expressing GPNMB genes, which have historically been described as “pro-fibrotic,” were found in both types of lung injury, indicating that they may not be as closely linked to fibrosis as previously thought. Further analysis found these macrophages in lung tissue samples from multiple diseases, including asthma and COVID, with a wide range of recovery outcomes. This finding prompted follow-up investigations into what led to dysfunctional healing and fibrosis in some lung diseases and not in others.



“When you take a step back and look at clinical data differently, you start to see something new,” said **Alexandra McCubbrey, PhD**, researcher at National Jewish Health and senior co-author of the study. Further research into injury models at different time points showed that the microenvironment of the lung caused subtle changes in protein expression and macrophage survival. These changes in the fibrotic injury model caused distinct pathways to be activated that led the cells toward less effective repair in response to the environment and external signals.

Having identified a population of macrophages that appear in all types of lung injury and several distinct pathways that contribute to both fibrosis and healthy repair, the researchers plan to continue investigating what triggers these differences in expression and if it is possible to redirect macrophages from contributing to fibrosis to assisting with healthy repair instead.

From left: Alexandra McCubbrey, PhD, and William Janssen, MD

# CLINICAL RESEARCH – OPEN CLINICAL TRIALS

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## Allergy

### Evaluating Skin Barrier Changes in Food Allergy

*Principal Investigator:*  
*Donald Leung, MD, PhD*

Food allergies are complex, and researchers are studying new ways to predict who might develop allergies in the future. In this study, researchers are trying to determine if skin reactions during an oral food challenge can predict food allergies. They also are evaluating if a biologic called omalizumab, which is currently approved to treat asthma, can help people with food allergies.

## Asthma

### VALIANT Study: A Potential New Treatment for Severe Asthma

*Principal Investigator:*  
*Michael Wechsler, MD*

Some people with asthma experience frequent exacerbations, involving swelling or narrowing of the airways, which causes shortness of breath, wheezing and cough. In the national study called VALIANT, researchers are evaluating a new investigational treatment called verekitug to see if it is safe and can effectively reduce inflammation to help asthma patients breathe easier.

### Medication for Uncontrolled Asthma

*Principal Investigator:*  
*Michael Wechsler, MD*

In severe asthma, some of the exacerbations that cause difficulty breathing are the result of inflammation in the lung. Researchers are testing a class of anti-inflammatory drugs called a JAK1 inhibitor that has worked to treat other inflammatory conditions like eczema to see if it can help people with severe asthma.

### Treating Deployment-Related Asthma with Supplements

*Principal Investigator:*  
*Cecile S. Rose, MD*

Many people returning from military deployment have developed asthma as a result of inhaling hazardous materials. Exposures to diesel, burn pits, biomass smoke and sandstorms during deployment likely play a role. In this study, researchers are investigating whether a supplement, L-citrulline, will help improve asthma symptoms and lung function for veterans with deployment-related asthma.

## Atopic Dermatitis (Eczema)

### Potential Treatment for Dry Skin in Pediatric Eczema Patients

*Principal Investigators:*  
*Donald Leung, MD, PhD, Mark Boguniewicz, MD*

Many people with eczema (also known as atopic dermatitis) have dry skin, in addition to their other symptoms, which can worsen itching, scratching and skin pain. Researchers are investigating if dupilumab, a current immune system treatment for eczema, could have a long-term impact on dry skin in children with eczema.

## Cardiology

### Effects of Keto Diet in People with HFpEF

*Principal Investigator:*  
*M. Patricia George, MD*

More than half of people with heart failure have a condition called heart failure with preserved ejection fraction (HFpEF). Researchers in this clinical trial are comparing the use of a low-carb, high-fat ketogenic diet and a diet with balanced nutrient levels in participants with HFpEF to investigate if the keto diet can benefit this condition.

## COPD

### Aerify3: A Potential New Treatment for Airway Inflammation in COPD

*Principal Investigator:*  
*Steven E. Lommatzsch, MD*

Researchers in the Aerify3 study are investigating a medication called itepekimab, which has shown some potential in earlier clinical trials to improve symptoms in those with COPD. The study is evaluating changes in gene expression in those treated with the medication to analyze if their lung inflammation has been reduced.

## Cystic Fibrosis

### Determining How Parenthood Affects Cystic Fibrosis Patients

*Principal Investigator:*  
*Jennifer Taylor-Cousar, MD*

Surveys have shown that a growing number of cystic fibrosis (CF) patients are considering parenthood. Researchers are collecting data on CF patients who have become first time parents to provide additional insight into parental health and help better support their needs.

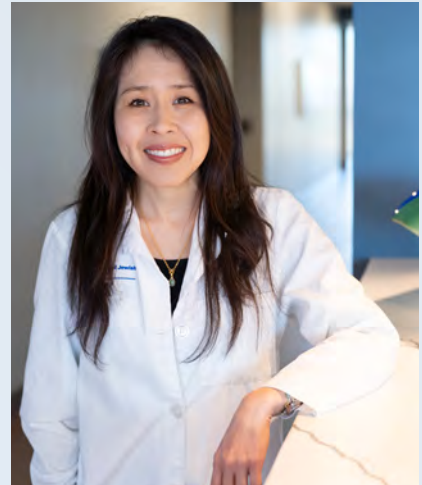


## Investigating Treatment for Post-COVID POTS

*Principal Investigator:*  
*Jinny Tavee, MD*

Postural orthostatic tachycardia syndrome, or POTS, is a chronic condition that involves sudden, rapid increases in heart rate when sitting or standing. This condition can disrupt daily life and trigger other symptoms such as fatigue, dizziness or vertigo. Research has linked the appearance of POTS symptoms to long-haul COVID-19 infections, but the connection between these conditions is still being studied.

The primary objective of this study is to determine if a medication called IgPro20 can help improve symptoms of this condition in post-COVID patients, a population that doesn't currently have access to effective treatments for these symptoms.



**Neurologist Jinny Tavee, MD, is evaluating a medication to treat the symptoms of Post-COVID POTS.**

## Lung Cancer

### Extensive Stage Small Cell Lung Cancer Combination Treatment

*Principal Investigator:*  
*Laurie Carr, MD*

Extensive stage small cell lung cancer (ES-SCLC) is an aggressive type of cancer that can rapidly spread to other areas of the body. This type of cancer currently has limited treatment options. The purpose of this study is to determine the efficacy and safety of lurbinectedin (a type of chemotherapy) when combined with atezolizumab (an immunotherapy treatment) as a maintenance treatment for those with ES-SCLC.

## Pulmonary Fibrosis

### BEACON IPF: Bexotegrast as a Potential Treatment for IPF

*Principal Investigator:*  
*Evans Fernandez, MD*

As part of the BEACON IPF study, researchers are evaluating a new molecule called bexotegrast, which may provide another effective way to treat IPF symptoms. This clinical trial is comparing two different doses of bexotegrast to a placebo to see if they have a positive effect on lung function over time. The goal of the trial is to determine what effects different doses have, if they are safe, and if they cause side effects.

## Differences in the Pulmonary Artery of People with PH

*Principal Investigator:*  
*Tim Lahm, MD*

Pulmonary hypertension (PH) and pulmonary arterial hypertension (PAH) are two conditions that can cause increased blood pressure within the lungs. The differences between the two conditions on a cellular level are not well understood, and researchers are evaluating cell samples from people who are undergoing a right heart catheterization to learn more about these two diseases and improve future care.

## Sarcoidosis

### XTMAB-16: A New Drug to Reduce Steroid Use in Sarcoidosis

*Principal Investigator:*  
*Clara Restrepo, MD*

Sarcoidosis is a chronic inflammatory condition that affects many of the organ systems in the body. While corticosteroid treatments can help people with this condition manage their symptoms, treatments usually involve high doses or a long maintenance period where the steroids are administered for up to a year or more. Researchers are investigating the safety of a new study drug called XTMAB-16 to see if it can help reduce corticosteroid use while treating the disease.

# FRONTIERS OF PULMONARY SCIENCE

National Jewish Health researchers conduct basic, translational and clinical research that advances the frontiers of science and medicine. This year alone, we published more than 480 peer-reviewed scientific journal articles. Here is some of the groundbreaking research being done at National Jewish Health.

## **Benralizumab versus Mepolizumab for Eosinophilic Granulomatosis with Polyangiitis**

**Michael Wechsler, MD**, and colleagues showed that the drug benralizumab is as effective and safe as mepolizumab for inducing remission in patients with eosinophilic granulomatosis with polyangiitis (EGPA). Showing that benralizumab has comparable results to mepolizumab in the safe treatment of EGPA adds another potential option in the arsenal to help patients with this rare disease. Both drugs showed similar disease remission, relapse and safety impacts. Researchers observed that benralizumab did a better job in reducing the need of oral glucocorticoids, while lowering blood eosinophil counts. This result was achieved using fewer injections of benralizumab, which also could be a benefit to the patient.

*New England Journal of Medicine. 2024 Mar 7;390(10):911-921.*

## **Longitudinal quality of life after sublobar resection and stereotactic body radiation therapy for early-stage non-small cell lung cancer**

**Jeffrey Kern, MD**, and colleagues found that sublobar resection and stereotactic body radiation therapy (SBRT) have a similar impact on the quality of life of patients with early-stage lung cancer deemed ineligible for lobectomy. Subjects with stage I-IIA non-small cell lung cancer at high risk for lobectomy who underwent treatment with sublobar resection or SBRT were recruited from five medical centers and evaluated at different intervals for physical and mental health. SBRT was associated with better quality of life immediately posttreatment compared with sublobar resection. However, both treatment groups reported similar quality of life at later time points, with a return to baseline quality of life.

*Cancer. 2024 Jul 15;130(14):2515-2527.*

## **Irina Petrache, MD, Named President of ATS**

In May of 2024, National Jewish Health Chief of the Division of Pulmonary, Critical Care and Sleep Medicine, **Irina Petrache, MD**, was named to serve as president of the American Thoracic Society (ATS). First elected to the ATS board in 2021, Dr. Petrache served as ATS president-elect in 2023-2024.

“I look forward to spearheading the implementation of the Society’s strategy to accelerate the exchange of research ideas, address the educational and career development needs of members and deliver robust advocacy to enhance global respiratory health,” said Dr. Petrache.

Dr. Petrache’s goals include modernizing some aspects of governance and aligning the international conference with ATS membership needs and demographics.



**Irina Petrache, MD, Chief, Division of Pulmonary Critical Care and Sleep Medicine**

## Particle Morphology and Elemental Analysis of Lung Tissue from Post-9/11 Military Personnel with Biopsy-Proven Lung Disease

**Cecile Rose, MD, and Lauren Zell-Baran, PhD, MPH,** working with scientists at the U.S. Geological Survey showed that levels of silica and other silicates were significantly higher in the lungs of people who have had past military deployments in Southwest Asia, Iraq, Afghanistan and the Horn of Africa compared to normal lung tissue. Researchers examined the content of different elements — silica, titanium, lead and other metals in lung tissue samples from veterans who have deployed since 2001 — and used a cutting-edge approach combining the tools of geological science and pulmonary medicine to answer questions about what causes lung inflammation and disease.

*International Journal of Environmental Research and Public Health.* 2024 Jan 12;21(1):91.

## A Common Polymorphism in the Intelectin-1 Gene Influences Mucus Plugging in Severe Asthma

**Max Seibold, PhD, and Jamie Everman, PhD,** led research identifying a mechanism involved in the formation of mucus plugs in asthma. For the study, investigators initially used lung airway cells from the National Jewish Health Live Cell Core, a biorepository of lung tissue for use in research studies. These lung cells were used to create a cellular model of T2 inflammation and explore the role of intelectin-1 in airway mucus formation. They found intelectin-1 was a key component of mucus produced by airway cells under the influence of T2 inflammation. The knowledge of this protein provides researchers with a potential new drug target for mucus obstruction in asthma patients.

*Nature Communications.* 2024 May 9;15(1):3900.

## MHC Heterozygosity Limits T Cell Receptor Variability in CD4 T Cells

**Pippa Marrack, PhD, Alexander Brown, PhD,** and colleagues compared the T cell receptor (TCR) repertoires of naïve CD4 T cells from major histocompatibility complex (MHC) homozygous and heterozygous mice. They found MHC heterozygotes surprisingly expressed a less diverse TCR repertoire than expected compared with their MHC homozygous relatives, likely because of increased rates of negative selection (the process by which T cells that could harm the body's own cells are eliminated within the thymus). The findings suggest the number of MHC alleles expressed in an individual animal is likely a balance that has been evolutionarily optimized to minimize gaps in the TCR repertoire.

*Science Immunology.* 2024 Jul 12;9(97):eado5295.

## Deep Learning Classification of Usual Interstitial Pneumonia Predicts Outcomes

National Jewish Health researchers led by **Stephen Humphries, PhD, and David Lynch, MB,** demonstrated that using CT imaging with greater sensitivity settings does a better job of detecting usual interstitial pneumonia (UIP) patterns than visual assessment. UIP is associated with idiopathic pulmonary fibrosis (IPF). The presence of a UIP pattern on CT has a high positive value for IPF and is prioritized in current diagnostic guidelines. Researchers believe the use of CT assessments could improve confidence in radiologic assessment of patients with ILD, potentially enabling earlier and more precise diagnosis.

*American Journal of Respiratory and Critical Care Medicine.* 2024 May 1;209(9):1121-1131.

## Noteworthy New Research Awards

National Jewish Health has a long history of groundbreaking scientific discovery. Today, we lead research and discovery that changes the way the world identifies the mechanisms, diagnosis and treatment of respiratory, cardiovascular, rheumatologic, autoimmune, inflammatory and immunologic diseases. Here are the new National Institutes of Health projects funded in 2024:

### R01 Projects and Primary Investigators

*Mast cell lineage commitment and function.* **Hua Huang, MD**

*Reparative functions of human airspace macrophage subsets.*

**Kara Mould, MD, MPH**

*Activation of matrix metalloproteinase-9 is essential to overcome failed fibrosis resolution.*

**Elizabeth Redente, PhD**

### K-Awards and Primary Investigators

*Transcriptional control of T cell function during type 1 diabetes.*

**Laura Shaw, PhD**

*Bcl-2 dependent fibroblast resistance to apoptosis occurs through persistent IL-6 signaling.*

**Joseph Cooley, DO**

## EDUCATION – Academic Training

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Our physicians and scientists are thought leaders in their fields who elevate the standard of patient care while teaching the next generation of health care professionals through fellowships, training and continuing medical education. National Jewish Health is an accredited teaching affiliate of the University of Colorado School of Medicine, where our physicians and scientists have faculty appointments. Residents from the nearby Saint Joseph Hospital are also regularly welcomed on our campus.

### Clinical Fellowships

#### Based at National Jewish Health:

- Adult Allergy and Immunology
- Adult and Pediatric Sleep Medicine
- Mycobacterial Disease
- Pediatric Allergy and Immunology

#### Based at University of Colorado School of Medicine with rotations at National Jewish Health:

- Adult Pulmonary and Critical Care Medicine
- Cardiothoracic Radiology
- Infectious Disease
- Pediatric Pulmonary Medicine
- Rheumatology

#### In collaboration with the Colorado School of Public Health, National Jewish Health also offers fellowships in:

- Occupational and Environmental Medicine
  - Offered as a one-year fellowship or a two-year residency

### Postdoctoral Fellowships

Numerous opportunities exist for postdoctoral training in laboratories in the Department of Biomedical Research, the Division of Cell Biology and the Department of Medicine. National Jewish Health

has a robust discovery and translational research enterprise, placing it in the top 6% of institutions funded by the National Institutes of Health.

### Graduate Education

Students enrolled in one of the PhD programs offered by the Graduate School of the University of Colorado School of Medicine have the opportunity to perform their thesis research in the laboratories of the faculty at National Jewish Health.

### Residents and Medical Students

Residents and medical students at the University of Colorado School of Medicine have rotations at National Jewish Health in a variety of specialties, including pulmonology, cardiology, allergy and gastroenterology. In addition, our faculty train residents in internal medicine and family medicine at locations across our system.

### National and International Visiting Fellows

National Jewish Health hosts visiting fellows from pulmonary and critical care training programs throughout the country and around the world for rotations in various subspecialty areas of pulmonary medicine and exercise physiology.

## Department of Medicine Grand Rounds

The Department of Medicine (DOM) Grand Rounds at National Jewish Health offers weekly presentations covering the latest in research, clinical care and other pertinent topics. Each seminar is presented by either an expert from the institution or from around the world and has featured speakers from the National Institutes of Health.

DOM Grand Rounds are open to researchers, clinicians, advanced practice providers, nurses and alumni, along with all other health care workers and non-clinical staff members at National Jewish Health, including affiliates and interested community members. Continuing medical education credits are offered to health care professionals.

To learn more or request enrollment in DOM Grand Rounds, please email [johnsona@njhealth.org](mailto:johnsona@njhealth.org).

# EDUCATION – Continuing Medical Education

Building on the expertise of the world-renowned faculty at National Jewish Health, our Office of Professional Education creates innovative educational opportunities for physicians, pharmacists, nurses and other health care providers to develop and enhance their knowledge and competency related to the diseases that we treat and research. Accredited with commendation from the Accreditation Council for Continuing Medical Education, our commitment to excellence in education translates directly into improved patient care.

## Upcoming Live Events:

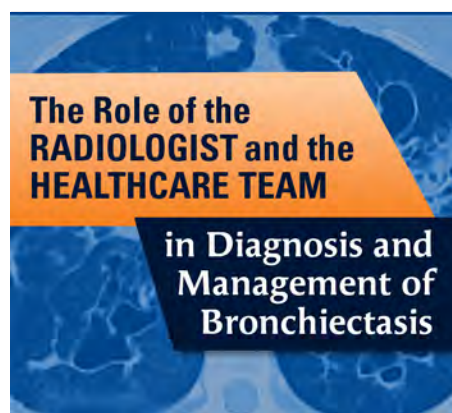
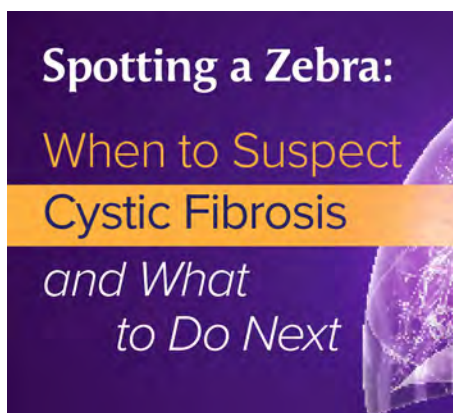
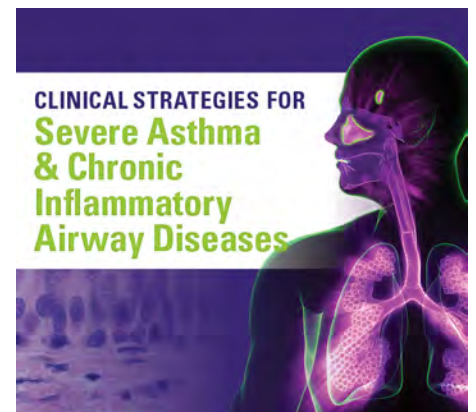
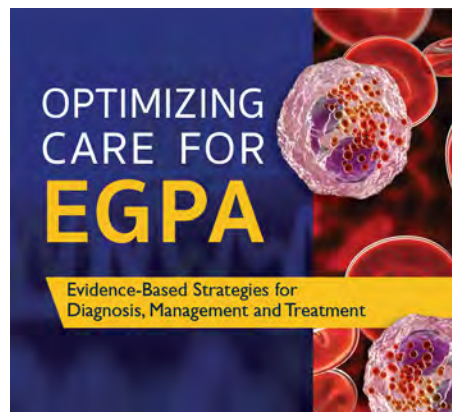
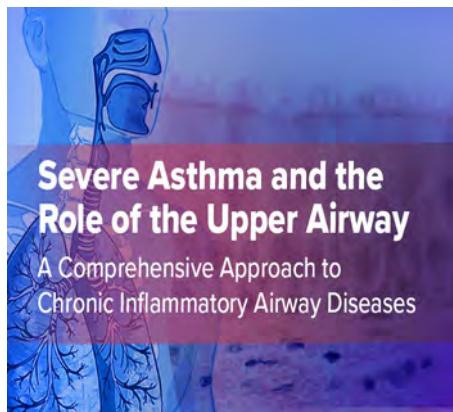
**61<sup>st</sup> Annual Denver TB Course** – April 2-4, 2025 (Hybrid Event)

**NTM & Bronchiectasis Conference for Health Care Providers** – September 10-12, 2025 (Hybrid Event)

**NTM & Bronchiectasis Patient and Family Conference** – September 13, 2025 (Hybrid Event)

**21<sup>st</sup> Annual Respiratory Disease Young Investigators' Forum** – October 9-12, 2025 | Denver, CO

**Online Courses:** Ongoing registration



To register for upcoming events, view our online courses and learn more about the National Jewish Health Office of Professional Education, visit [njhealth.org/CME](https://njhealth.org/CME), call 800.844.2305 or email [proed@njhealth.org](mailto:proed@njhealth.org).

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Pamela L. Zeitlin, MD, PhD



Philippa Marrack, PhD

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Mehrnaz Maleki Fischbach, MD



Nir Goldstein, MD, FCCP

# STRONG ALLIES IN RESEARCH AND CARE

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National Jewish Health works to advance care and science through unique collaborations with medical and research partners across the nation. National Jewish Health continues its long relationship as an academic partner with the University of Colorado School of Medicine and UHealth in Denver. In addition, our unique Respiratory Institute® model continues to bring our multidisciplinary, team-based model of care to patients, while providing a shared platform for expanded research.

## Collaboration and Partnerships to Advance Research and Care

National Jewish Health has a long-standing relationship with the University of Colorado and UHealth that encompasses opportunities for joint research, collaborative care and education programs, along with training for medical students. UHealth and National Jewish Health collaborate to improve patient health through clinical innovation. The organizations offer regular interaction through Grand Rounds and other medical and research programs.



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## Respiratory Institutes

In 2014, National Jewish Health formed its first Respiratory Institute with Mount Sinai in New York City. The goal was to provide state-of-the-art, multidisciplinary, outcomes-driven care in a network dedicated to elevating respiratory care and research and in an environment of collaboration. That idea was later continued with the addition of Jefferson Health in Philadelphia for a second Respiratory Institute. The institutions have worked together on a variety of projects, including developing protocols for the treatment of patients with respiratory disease and launching programs together to further research in a variety of areas. In addition, a respiratory therapy training program is in its second year, operating in both Philadelphia and Denver. The program was developed and launched in 2023 as a collaboration between National Jewish Health and Thomas Jefferson University.

MOUNT SINAI - NATIONAL JEWISH HEALTH  
**Respiratory Institute**



JANE AND LEONARD KORMAN  
**Respiratory Institute**



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## Partner Relationships

Our collaboration with Denver-based Saint Joseph Hospital, a part of Intermountain Health, includes an inpatient Respiratory Institute that contains a dedicated 36-bed unit and offers expanded research opportunities between the institutions. In addition to the focus on respiratory care, the partnership launched an innovative program for lung cancer screening, diagnosis and treatment, along with the expansion of the cardiac critical care program.



with Intermountain Health  
**Saint Joseph Hospital**



# SELECTED 2024 PUBLICATIONS

In 2024, National Jewish Health faculty published more than 480 articles in peer-reviewed scientific and medical journals. Included below is a selection of noteworthy articles.

## ASTHMA

### Long-term dupilumab efficacy in type 2 asthma regardless of baseline characteristics.

Wechsler ME, Rogers L, Canonica GW, Bourdin A, Altincatal A, Hardin M, Soler X, Rowe PJ, Deniz Y, Sacks H, Jacob-Nara JA. *ERJ Open Res*. 2024 Dec 16;10(6):00188-2024.

### Stability of Fractional Exhaled Nitric Oxide and its Relationship with Exacerbation in Patients Aged 6 Years or Older with Uncontrolled, Moderate-to-Severe Asthma.

Busse WW, Pavord ID, Wechsler ME, Davila IJ, Altincatal A, de Prado Gomez L, Soler X, Sacks H, Jacob-Nara JA, Deniz Y, Rowe PJ. *Chest*. 2024 Dec 2:S0012-3692(24)05601-0.

### Precision medicine and choosing a biologic in asthma: understanding the current state of knowledge for predictors of response and clinical remission.

Balasubramanyam S, George EK, Wang E. *Curr Opin Allergy Clin Immunol*. 2024 Dec 2.

### Association Between T2-related Comorbidities and Effectiveness of Biologics in Severe Asthma.

Wechsler ME, Scelo G, Larenas-Linnemann DES, Torres-Duque CA, Maspero J, Tran TN, Murray RB, Martin N, Menzies-Gow AN, Hew M, Peters MJ, Gibson PG, Christoff GC, Popov TA, Côté A, Bergeron C, Dorscheid D, FitzGerald JM, Chapman KR, Boulet LP, Bhutani M, Sadatsafavi M, Jiménez-Maldonado L, Duran-Silva M, Rodriguez B, Celis-Preciado CA, Cano-Rosales DJ, Solarte I, Fernandez-Sanchez MJ, Parada-Tovar P, von Bülow A, Bjerrum AS, Ulrik CS, Assing KD, Rasmussen LM, Hansen S, Altraja A, Bourdin A, Taille C, Charriot J, Roche N, Papaioannou AI, Kostikas K, Papadopoulos NG, Salvi S, Long D, Mitchell PD, Costello R, Sirena C, Cardini C, Heffler E, Puggioni F, Canonica GW, Guida G, Iwanaga T, Al-Ahmad M, García U, Kuna P, Fonseca JA, Al-Lehebi R, Koh MS, Rhee CK, Cosio BG, Perez de Llano L, Perng DS, Huang EW, Wang HC, Tsai MJ, Mahboub B, Salameh LIJ, Jackson DJ, Busby J, Heaney LG, Pfeffer PE, Goddard AG, Wang E, Hoyte FCL, Chapman NM, Katial R, Carter V, Bulathsinhala L, Eleangovan N, Ariti C, Lyu J, Porsbjerg C, Price DB. *Am J Respir Crit Care Med*. 2024 Feb 1;209(3):262-272.

### Type 1 Immune Responses Related to Viral Infection Influence Corticosteroid Response in Asthma.

Fahy JV, Jackson ND, Sajuthi SP, Pruesse E, Moore CM, Everman JL, Rios C, Tang M, Gauthier M, Wenzel SE, Bleecker ER, Castro M, Comhair SA, Erzurum SC, Hastie AT, Moore W, Israel E, Levy BD, Denlinger L, Jarjour NN, Johansson MW, Mauger DT, Phillips BR, Sumino K, Woodruff PG, Peters MC, Seibold MA; National Heart, Lung, and Blood Institute Severe Asthma Research Program-3. *Am J Respir Crit Care Med*. 2024 Nov 27.

### Surfactant Protein A Inhibits Human Rhinovirus C Binding and Infection of Airway Epithelial Cells from Pediatric Asthma.

Tanyaratsrisakul S, Bochkov YA, White V, Lee H, Loeffler J, Everman J, Schiltz AM, Freeman KL, Hamlington KL, Secor EA, Jackson ND, Chu HW, Liu AH, Ledford JG, Kraft M, Seibold MA, Voelker DR, Numata M. *Viruses*. 2024 Oct 30;16(11):1709.

### Impact of biologics on the immune response to mRNA COVID-19 vaccination in patients with asthma.

Liao SY, Make B, Wechsler ME. *J Allergy Clin Immunol*. 2024 Nov 8:S0091-6749(24)01059-5.

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### Viral Determinants of Childhood Asthma Exacerbation Severity and Treatment Response.

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### Twice-Yearly Depemokimab in Severe Asthma with an Eosinophilic Phenotype.

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### Choosing the Right Biologic for the Right Patient With Severe Asthma.

Couillard S, Jackson DJ, Pavord ID, Wechsler ME. *Chest*. 2024 Sep 6:S0012-3692(24)05139-0.

### Feasibility of remote spirometry monitoring of asthma in pregnancy.

Wharton R, Mathis N, Wang JG, Meislin R, Liu B, Abdurrahman N, Le V, Rurak K, Hanson C, Que LG, Shaz D, Bose S. *Respir Med*. 2024 Nov;233:107782.

### Airway Smooth Muscle Dysfunction in Asthma: Releasing the Anchor.

Gerber AN. *Am J Respir Cell Mol Biol*. 2024 Aug 22.

### Reducing asthma attacks in disadvantaged school children with asthma: study protocol for a type 2 hybrid implementation-effectiveness trial (Better Asthma Control for Kids, BACK).

Huebschmann AG, Wagner NM, Gleason M, Brinton JT, Brtnikova M, Brewer SE, Begum A, Armstrong R, DeCamp LR, McFarlane A, DeKeyser H, Coleman H, Federico MJ, Szeffler SJ, Cicutto LC. *Implement Sci*. 2024 Aug 15;19(1):60.

### Oral and inhaled corticosteroid dose reductions with tezepelumab versus placebo in patients with severe, uncontrolled asthma from DESTINATION.

Wechsler ME, Stolz D, Lugogo NL, Caveney S, Almqvist G, Bednarczyk A, Kotalik A, Chandarana S, Ambrose CS. *J Allergy Clin Immunol Pract*. 2024 Nov;12(11):3128-3131.e2.

(Names in bold indicate National Jewish Health authors.)

**Highly Cited Paper:** performed in the top 1% of citations received when compared to other papers published in the same field in the same year.

## SELECTED 2024 PUBLICATIONS (Continued)

### A common polymorphism in the Intelectin-1 gene influences mucus plugging in severe asthma.

Everman JL, Sajuthi SP, Liegeois MA, Jackson ND, Collet EH, Peters MC, Chioccioli M, Moore CM, Patel BB, Dyjack N, Powell R, Rios C, Montgomery MT, Eng C, Elhawary JR, Mak ACY, Hu D, Huntsman S, Salazar S, Feriani L, Fairbanks-Mahnke A, Zinnen GL, Michel CR, Gomez J, Zhang X, Medina V, Chu HW, Cicuta P, Gordon ED, Zeitlin P, Ortega VE, Reisdorph N, Dunican EM, Tang M, Elicker BM, Henry TS, Bleecker ER, Castro M, Erzurum SC, Israel E, Levy BD, Mauger DT, Meyers DA, Sumino K, Gierada DS, Hastie AT, Moore WC, Denlinger LC, Jarjour NN, Schiebler ML, Wenzel SE, Woodruff PG, Rodriguez-Santana J, Pearson CG, Burchard EG, Fahy JV, Seibold MA. *Nat Commun*. 2024 May 9;15(1):3900.

### Childhood asthma exacerbations on the Navajo Nation.

Bender BG, Crooks J, Gerald JK, Hudson B, King DK, Kobernick A, Liu AH, Lowe AA, Morgan W, Nez P, Phan H, Wightman P, Gerald LB. *J Allergy Clin Immunol Pract*. 2024 Aug;12(8):2173-2175.e1.

### Mitochondrial Dysfunction and Metabolic Reprogramming in Obesity and Asthma.

Hartsoe P, Holguin F, Chu HW. *Int J Mol Sci*. 2024 Mar 3;25(5):2944.

### Benralizumab versus Mepolizumab for Eosinophilic Granulomatosis with Polyangiitis.

Wechsler ME, Nair P, Terrier B, Walz B, Bourdin A, Jayne DRW, Jackson DJ, Roufosse F, Börjesson Sjö L, Fan Y, Jison M, McCrae C, Necander S, Shavit A, Walton C, Merkel PA; MANDARA Study Group. *N Engl J Med*. 2024 Mar 7;390(10):911-921.

### Association of Sputum Eosinophilia With Easily Measured Type-2 Inflammatory Biomarkers in Untreated Mild Persistent Asthma.

Covar R, Lazarus SC, Krishnan JA, Blake KV, Sorkness CA, Dyer AM, Lang JE, Lugogo NL, Mauger DT, Wechsler ME, Wenzel SE, Cardet JC, Castro M, Israel E, Phipatanakul W, King TS; National Heart, Lung, and Blood Institute AsthmaNet. *J Allergy Clin Immunol Pract*. 2024 Apr;12(4):960-969.e6.

## CARDIOLOGY

### Cardiovascular disease in adults with osteogenesis imperfecta: Clinical characteristics, care recommendations and research priorities identified using a modified Delphi technique.

Folkestad L, Prakash SK, Nagamani SCS, Andersen NH, Carter E, Hald JD, Johnson RJ, Langdahl B, Peretto EM, Raggio C, Ralston S, Sandhaus RA, Semler O, Tosi L, Orwoll E. *J Bone Miner Res*. 2024 Dec 12;zjae197.

### Nutrition Education in Cardiology Training: Unmet Needs and Impactful Opportunities.

Devries S, Aggarwal M, Freeman AM, Ostfeld RJ, Reddy KR, Williams K, Aspry KE. *Am J Med*. 2024 Dec 2:S0002-9343(24)00776-9.

### Proposed Mechanisms and Associations of COVID-19 with Cardiometabolic Risk Factors.

Reddy KR, Faridi KF, Aggarwal M, Tirumalai AA, Singh T, Tejtel KS, Williams K, Litwin SE, Dastmalchi LN, White BA, Barnard N, Ornish D, Batts T, Ajene G, Aspry K, Kris Etherton P, Hull SC, Freeman AM. *Am J Lifestyle Med*. 2024 Sep 2:15598276241269532.

### Extrapulmonary manifestations of pulmonary arterial hypertension.

Singh N, Al-Naamani N, Brown MB, Long GM, Thenappan T, Umar S, Ventetuolo CE, Lahm T. *Expert Rev Respir Med*. 2024 Mar-Apr;18(3-4):189-205.

### Effect of estrogen receptor $\alpha$ on cardiopulmonary adaptation to chronic developmental hypoxia in a rat model.

Severyn NT, Esparza P, Gao H, Mickler EA, Albrecht ME, Fisher AJ, Yakubov B, Cook TG, Slaven JE, Walts AD, Tepper RS, Lahm T. *Am J Physiol Lung Cell Mol Physiol*. 2024 Jun 1;326(6):L786-L795.

## CHRONIC OBSTRUCTIVE PULMONARY DISEASE

### Association between automatic AI-based quantification of airway-occlusive mucus plugs and all-cause mortality in patients with COPD.

Wan E, Yen A, Elalami R, Grumley S, Nath HP, Wang W, Brouha S, Manapragada PP, Abozeed M, Aziz MU, Zahid M, Ahmed AN, Terry NL, Nardelli P, Ross JC, Kim V, Sonavane S, Kligerman SJ, Vestbo J, Agusti A, Kim K, San José Estépar R, Silverman EK, Cho MH, Diaz AA. *Am J Respir Crit Care Med*. 2024 Oct 29.

### Airway Mucus Plugs on Chest Computed Tomography Are Associated with Exacerbations in COPD.

Wan E, Yen A, Elalami R, Grumley S, Nath HP, Wang W, Brouha S, Manapragada PP, Abozeed M, Aziz MU, Zahid M, Ahmed AN, Terry NL, Nardelli P, Ross JC, Kim V, Sonavane S, Kligerman SJ, Vestbo J, Agusti A, Kim K, San José Estépar R, Silverman EK, Cho MH, Diaz AA. *Am J Respir Crit Care Med*. 2024 Oct 29.

### Physical and mental health trajectories: A longitudinal SF-36 analysis in Alpha-1 antitrypsin deficiency-associated COPD.

Choate R, Holm KE, Sandhaus RA, Mannino DM, Strange C. *Respir Med*. 2024 Nov-Dec;234:107838.

### What every clinician should know about inflammation in COPD.

Wechsler ME, Wells JM. *ERJ Open Res*. 2024 Sep 23;10(5):00177-2024.

### MMPs as potential molecular targets in epithelial-to-mesenchymal transition driven COPD progression.

Agraval H, Kandhari K, Yadav UCS. *Life Sci*. 2024 Sep 1;352:122874.

### Clinical trial attitudes among individuals with Alpha-1 antitrypsin deficiency.

Holm KE, Sandhaus RA, Allison S, Strange C. *Respir Med*. 2024 May 23;229:107676.

### Reduced Bik expression drives low-grade airway inflammation and increased risk for COPD in females.

Petrache I, Riches DW. *J Clin Invest*. 2024 Feb 15;134(4):e177753.

### Identification of Alpha-1 Antitrypsin-Deficient Subjects with Normal Spirometry Who May Benefit from Alpha-1 Antitrypsin Replacement.

Chan ED. *Am J Respir Crit Care Med*. 2024 Apr 15;209(8):1033-1034.

### Early Evidence of Chronic Obstructive Pulmonary Disease Obscured by Race-Specific Prediction Equations.

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## COVID/SARS-COV-2

### Caregiver worry about COVID-19 as a predictor of social mitigation behaviours and SARS-CoV-2 infection in a 12-city U.S. surveillance study of households with children.

Brunwasser SM, Gebretsadik T, Satish A, Cole JC, Dupont WD, Joseph C, Bendixsen CG, Calatroni A, Arbes SJ Jr, Fulkerson PC, Sanders J, Bacharier LB, Camargo CA Jr, Johnson CC, Furuta GT, Gruchalla RS, Gupta RS, Khurana Hershey GK, Jackson DJ, Kattan M, Liu A, O'Connor GT, Rivera-Spoljaric K, Phipatanakul W, Rothenberg ME, Seibold MA, Seroogy CM, Teach SJ, Zoratti EM, Togias A, Hartert TV; HEROS study group. *Prev Med Rep*. 2024 Nov 27;49:102936.

### Post-pandemic, long COVID persists.

Leung DYM. *Ann Allergy Asthma Immunol*. 2024 Nov;133(5):489-490.

### Current concepts in long COVID-19 brain fog and postural orthostatic tachycardia syndrome.

Tavee J. *Ann Allergy Asthma Immunol*. 2024 Nov;133(5):522-530.

### Long COVID in pediatric patients with chronic health issues: How to assess and support.

Goldberg J, Rabinovitch N, Bender B. *Ann Allergy Asthma Immunol*. 2024 Nov;133(5):491-492.

### Instructional approach, sleep, and perceived academic well-being in adolescents during COVID-19: Evidence from the NESTED study.

Saletin JM, Wolfson AR, Wahlstrom KL, Honaker SM, Owens JA, Seixas AA, Wong P, Carskadon MA, Meltzer LJ. *Sleep Health*. 2024 Aug;10(4):485-492.

### Demographic and Clinical Factors Associated With SARS-CoV-2 Spike 1 Antibody Response Among Vaccinated US Adults: the C4R Study.

Kim JS, Sun Y, Balte P, Cushman M, Boyle R, Tracy RP, Styer LM, Bell TD, Anderson MR, Allen NB, Schreiner PJ, Bowler RP, Schwartz DA, Lee JS, Xanthakis V, Doyle MF, Regan EA, Make BJ, Kanaya AM, Wenzel SE, Coresh J, Isasi CR, Raffield LM, Elkind MSV, Howard VJ, Ortega VE, Woodruff P, Cole SA, Henderson JM, Mantis NJ, Parker MM, Demmer RT, Oelsner EC. *Nat Commun*. 2024 Feb 19;15(1):1492.

### Chronic Lung Injury after COVID-19 Pneumonia: Clinical, Radiologic, and Histopathologic Perspectives.

Cha MJ, Solomon JJ, Lee JE, Choi H, Chae KJ, Lee KS, Lynch DA. *Radiology*. 2024 Jan;310(1):e231643.

## CYSTIC FIBROSIS

### Modeling cystic fibrosis patient prognosis: Nomograms to predict lung transplantation and survival prior to highly effective modular therapy.

Piccorelli AV, Nick JA. *PLoS One*. 2024 Dec 5;19(12):e0292568.

### The Functional Impact of VX-770 on the Cystic Fibrosis Transmembrane Conductance Regulator Is Enduring and Increases the Constitutive Activity of This Channel in Primary Airway Epithelia Generated from Healthy Donors.

Nick HJ, Christeson SE, Bratcher PE. *Biomolecules*. 2024 Oct 29;14(11):1378

### Ellexacaftor/Tezacaftor/Ivacaftor Treatment and Depression-related Events.

Ramsey, B., Correll, C. U., DeMaso, D. R., McKone, E., Tullis, E., Taylor-Cousar, JL, Chu, C., Volkova, N., Ahluwalia, N., Waltz, D., Tian, S., & Mall, M. A. (2024). *Am J Respir Crit Care Med*. 209(3), 299-306.

### Ellexacaftor/tezacaftor/ivacaftor and mental health: A workshop report from the Cystic Fibrosis Foundation's Prioritizing Research in Mental Health working group.

Bathgate CJ, Fedele DA, Tillman EM, He J, Everhart RS, Reznikov LR, Liu FF, Kirby K, Raffensperger K, Traver K, Riekert KA, Powers SW, Georgiopoulos AM. *J Cyst Fibros*. 2024 Nov 26;S1569-1993(24)01814-9.

### Coping and learning to Manage Stress with cystic fibrosis (CALM): A multisite telehealth randomized controlled trial to reduce depression and anxiety symptoms in adults with cystic fibrosis.

Bathgate CJ, Smith ED, Murphy NH, Quittner AL, Riekert KA, Goralski JL, Holm KE. *J Cyst Fibros*. 2024 Nov 24;S1569-1993(24)01810-1.

### Until it's done for everyone: the role of CFTR modulator label expansion.

Britto CJ, Taylor-Cousar JL. *Eur Respir J*. 2024 Nov 14;64(5):2401898.

### Impact of Cystic Fibrosis Transmembrane Conductance Regulator Modulators on Maternal Outcomes During and After Pregnancy.

Jain R, Peng G, Lee M, Keller A, Cosmich S, Reddy S, West NE, Kazmerski TM, Goralski JL, Flume PA, Roe AH, Hadjiiladis D, Uluer A, Mody S, Ladores S, Taylor-Cousar JL. *Chest*. 2024 Sep 27;S0012-3692(24)05275-9.

### Impact of sinus surgery in people with cystic fibrosis and chronic rhinosinusitis in the era of highly effective modulator therapy: Protocol for a prospective observational study.

Liu CM, Fischer JL, Alt JA, Bodner TE, Chowdhury NI, Getz AE, Hwang PH, Kimple AJ, Mace JC, Smith TL, Soler ZM, Goss CH, Taylor-Cousar JL, Saavedra MT, Beswick DM. *PLoS One*. 2024 Sep 26;19(9):e0310986.

### Pregnancy and fertility in people with cystic fibrosis following lung transplantation.

Taylor-Cousar JL, Sole A, Jain R. *Curr Opin Pulm Med*. 2024 Nov 1;30(6):652-659.

### Compassionate use trials and equitable access to variant-specific treatment for cystic fibrosis.

Odem-Davis K, Taylor-Cousar JL. *Lancet Respir Med*. 2024 Nov;12(11):842-844.

(Names in bold indicate National Jewish Health authors.)

**Highly Cited Paper:** performed in the top 1% of citations received when compared to other papers published in the same field in the same year.

### Prospective Analysis of urine LAM to Eliminate NTM Sputum Screening (PAINLESS) study: Rationale and trial design for testing urine lipoarabinomannan as a marker of NTM lung infection in cystic fibrosis.

Calhoun KM, Armantrout E, Poch K, Caceres S, Lovell VK, Jones M, Malcolm KC, Vestal B, Wheeler E, Rysavy N, Manzer J, Aboellail I, Chatterjee D, Nick JA. *medRxiv*. 2024 Aug 9:2024.08.08.24311698.

### Genomic epidemiology of Mycobacterium abscessus at an adult cystic fibrosis programme reveals low potential for healthcare-associated transmission.

Gross JE, Finklea JD, Caceres SM, Poch KR, Hasan NA, Jia F, Epperson LE, Lipner EM, Vang CK, Honda JR, Strand MJ, Nogueira de Moura VC, Daley CL, Strong M, Nick JA. *ERJ Open Res*. 2024 Jul 8;10(4):00165-2024.

### A provider survey assessing fetal impact of CFTR modulator use in males with CF during assisted and unassisted reproduction and partner pregnancy.

Taylor-Cousar JL, Janney R, Middleton PG, Jain R, Nightingale J, West NE, Shteinberg M, Velez D, Kazmerski TM. *J Cyst Fibros*. 2024 May;23(3):412-416.

## EXPERT GUIDELINES

### Tuberculosis Infection Prevalence and Treatment Completion among Refugees in the United States.

Shen D, Ayala A, Reves R, Haas M, Khurana R; Tuberculosis Epidemiologic Studies Consortium. *Int J Infect Dis*. 2024 Dec 11:107361.

### The Affordable Care Act's Call for Nondiscrimination: Addressing the Role of Pulse Oximetry in Racial Disparities.

Saft HL, Bhakta NR, Wong AI, Crowder SJ, Sweet SC, Gurubhagavatula I. *Ann Am Thorac Soc*. 2024 Dec 3.

### Diagnostic Testing in Exercise-Induced Bronchoconstriction.

Mohning MP, Meneses-Tamayo E, Rodríguez Flores C. *Immunol Allergy Clin North Am*. 2025 Feb;45(1):89-99.

### The next 5 years at the Interface of Exercise and the Airway.

Olin JT, Gochicoa-Rangel L. *Immunol Allergy Clin North Am*. 2025 Feb;45(1):133-140.

### Integrating Patient Advocacy Groups in the Development of Clinical Practice Guidelines.

Gupta N, Carsons SE, Carteron NL, Scofield RH, Lee AS, Thomas DE, Moua T, Ussavarungsi K, Clair EWS, Meehan R, Dunleavy K, Makara M, Hammitt KM. *Arthritis Care Res (Hoboken)*. 2024 Nov 28.

### Nontuberculous Mycobacterial Pulmonary Disease: Patients, Principles, and Prospects.

Nguyen MH, Haas MK, Kasperbauer SH, Calado Nogueira de Moura V, Eddy JJ, Mitchell JD, Khare R, Griffith DE, Chan ED, Daley CL. *Clin Infect Dis*. 2024 Oct 15;79(4):e27-e47.

### Guidelines of care for the management of atopic dermatitis in adults with phototherapy and systemic therapies.

Davis DMR, Drucker AM, Alikhan A, Bercovitch L, Cohen DE, Darr JM, Eichenfield LF, Frazer-Green L, Paller AS, Schwarzenberger K, Silverberg JI, Singh AM, Wu PA, Sidbury R. *J Am Acad Dermatol*. 2024 Feb;90(2):e43-e56.

### The American Cancer Society National Lung Cancer Roundtable strategic plan: Optimizing strategies for lung nodule evaluation and management.

Barta JA, Farjah F, Thomson CC, Dyer DS, Wiener RS, Slatore CG, Smith-Bindman R, Rosenthal LS, Silvestri GA, Smith RA, Gould MK. *Cancer*. 2024 Dec 15;130(24):4177-4187.

### Evaluation of the GenoType NTM-DR line probe assay for nontuberculous mycobacteria using whole genome sequences as reference standard.

Epperson LE, Davidson RM, Kammlade SM, Hasan NA, Nick SE, Machado IMP, Rodriguez VH, Appleman A, Helstrom NK, Strong M. *Diagn Microbiol Infect Dis*. 2024 Dec;110(4):116526.

## SELECTED 2024 PUBLICATIONS (Continued)

### INTERSTITIAL LUNG DISEASE

#### Transforming Growth Factor-Beta is Increased in Sputum from Individuals with Rheumatoid Arthritis-Associated Pulmonary Fibrosis.

Wilson TM, Bolt M, Stahly A, Lee JS, Bang TJ, Sachs PB, Deane KD, Humphries SM, Solomon JJ, Demoruelle MK. *Rheumatology (Oxford)*. 2024 Dec 18;kea697.

#### Proteomic profiling of bronchoalveolar lavage fluid uncovers protein clusters linked to survival in idiopathic forms of interstitial lung disease.

Ngo LT, Rekowski MJ, Koestler DC, Yorozuya T, Saito A, Azeem I, Harrison A, Demoruelle MK, Boomer J, England BR, Wolters P, Molyneaux PL, Castro M, Lee JS, Solomon JJ, Koronuma K, Washburn MP, Matson SM. *ERJ Open Res*. 2024 Dec 16;10(6):00192-2024.

#### Meaningful Endpoints for Idiopathic Pulmonary Fibrosis (IPF) Clinical Trials: Emphasis on 'Feels, Functions, Survives'. Report of a Collaborative Discussion in a Symposium with Direct Engagement from Representatives of Patients, Investigators, the National Institutes of Health, a Patient Advocacy Organization, and a Regulatory Agency.

Raghu G, Ghazipura M, Fleming TR, Aronson KI, Behr J, Brown KK, Flaherty KR, Kazerooni EA, Maher TM, Richeldi L, Lasky JA, Swigris JJ, Busch R, Garrard L, Ahn DH, Li J, Puthawala K, Rodal G, Seymour S, Weir N, Danoff SK, Ettinger N, Goldin J, Glassberg MK, Kawano-Dourado L, Khalil N, Lancaster L, Lynch DA, Mageto Y, Noth I, Shore JE, Wijsenbeek M, Brown R, Grogan D, Ivey D, Golinska P, Karimi-Shah B, Martinez FJ. *Am J Respir Crit Care Med*. 2024 Mar 15;209(6):647-669.

#### A digital therapy targeting anxiety in pulmonary fibrosis: A decentralized randomized controlled trial.

Solomon JJ, Hallowell RW, Ganslandt C, Shull JG, Bengtsson T, Ganslandt J, Horton MR. *Respirology*. 2024 Dec 3. doi: 10.1111/resp.14859.

#### MUC5B Genotype and Other Common Variants are Associated with Computational Imaging Features of UIP.

Blumhagen RZ, Humphries SM, Peljto AL, Lynch DA, Cardwell J, Bang TJ, Teague SD, Sigakis C, Walts AD, Puthenvedu D, Wolters PJ, Blackwell TS, Kroposki JA, Brown KK, Schwarz MI, Yang IV, Steele MP, Schwartz DA, Lee JS. *Ann Am Thorac Soc*. 2024 Nov 26.

#### Quantification of Interstitial Lung Diseases, From the AJR Special Series on Quantitative Imaging.

Humphries SM, Chung A, Swigris JJ, Oh AS, Walsh SLF, Lynch DA, Goldin JG, Kim GH. *AJR Am J Roentgenol*. 2024 Nov 20.

#### Worsening dyspnoea as a predictor of progression of pulmonary fibrosis.

Wijsenbeek MS, Swigris JJ, Spagnolo P, Kolb M, Kreuter M, Nunes H, Stansen W, Rohr KB, Inoue Y; INBUILD trial investigators. *Eur Respir J*. 2024 Oct 31;64(4):2302211.

#### Approach to diagnosing and managing granulomatous-lymphocytic interstitial lung disease.

Galant-Swofford J, Catanzaro J, Achcar RD, Cool C, Koelsch T, Bang TJ, Lynch DA, Alam R, Katial RK, Fernández Pérez ER. *EclinicalMedicine*. 2024 Jul 26;75:102749.

#### Deep Learning-based Fibrosis Extent on Computed Tomography Predicts Outcome of Fibrosing Interstitial Lung Disease Independent of Visually Assessed Computed Tomography Pattern.

Oh AS, Lynch DA, Swigris JJ, Baraghoshi D, Dyer DS, Hale VA, Koelsch TL, Marroccchio C, Parker KN, Teague SD, Flaherty KR, Humphries SM. *Ann Am Thorac Soc*. 2024 Feb;21(2):218-227.

#### Interstitial Lung Disease Patients' Global Impressions of Symptoms, Severity Ratings, and Meaningfulness of Changes Over Time.

Swigris JJ, Pryor JB, Aronson KI, Guess TA, Solomon JJ. *Ann Am Thorac Soc*. 2024 Dec;21(12):1670-1677.

#### Using a Single-Cell Atlas of Peripheral Blood Mononuclear Cells to Understand Disease Trajectories in Idiopathic Pulmonary Fibrosis.

McCubbrey AL, Janssen WJ. *Am J Respir Crit Care Med*. 2024 Aug 15;210(4):385-387.

#### Cough in Fibrotic Interstitial Lung Disease: Effects and Implications.

Channick JE, Swigris J. *Am J Respir Crit Care Med*. 2024 Oct 15;210(8):975-976.

#### Estimating the effect of nintedanib on forced vital capacity in children and adolescents with fibrosing interstitial lung disease using a Bayesian dynamic borrowing approach.

Maher TM, Brown KK, Cunningham S, DeBoer EM, Deterding R, Fiorino EK, Griese M, Schwerk N, Warburton D, Young LR, Gahlemann M, Voss F, Stock C; InPedILD trial investigators. *Pediatr Pulmonol*. 2024 Apr;59(4):1038-1046.

#### Getting the Timing Right: Controlling BCL-2 Inhibition as an Antifibrotic Therapy.

Coolley JC, Redente EF. *Am J Respir Cell Mol Biol*. 2024 Apr;70(4):231-232.

### LUNG INJURY

#### Computational deconvolution of cell type-specific gene expression in COPD and IPF lungs reveals disease severity associations.

Ryu MH, Yun JH, Kim K, Gentili M, Ghosh A, Sciorba F, Barwick L, Limper A, Criner G, Brown KK, Wise R, Martinez FJ, Flaherty KR, Cho MH, Castaldi PJ, DeMeo DL, Silverman EK, Hersh CP, Morrow JD. *BMC Genomics*. 2024 Dec 18;25(1):1192.

#### Excessive Dynamic Airway Collapse: Large Airway Function During Exercise.

Williams ZJ, Hull JH, Manka LA. *Immunol Allergy Clin North Am*. 2025 Feb;45(1):39-52.

#### A Murine Model of Mycobacterium abscessus Infection Mimics Pathology of Chronic Human Lung Disease.

Malcolm KC, Ochoa AE, Congel JH, Hume PS, Corley JM, Wheeler EA, Bai X, Nick JA, Janssen WJ, Chan ED, Cool CD, Hisert KB. *Am J Respir Cell Mol Biol*. 2024 Nov 26.

#### Cigarette smoke alters calcium flux to induce PP2A membrane trafficking and endothelial cell permeability.

Dabo AJ, Raghavan S, Ezeibunam W, Thankachen J, Evgrafov O, Majka S, Geraghty P, Foronjy RF. *Sci Rep*. 2024 Nov 14;14(1):28012.

#### Estimating effects of aging and disease progression in current and former smokers using longitudinal models.

Strand M, Bhatt S, Moll M, Baraghoshi D. *Glob Epidemiol*. 2024 Sep 29;8:100165.

#### Requirement for Fucosyltransferase 2 in Allergic Airway Hyperreactivity and Mucus Obstruction.

Hara N, Raclawska DS, Morgan LE, NeeDell JC, Dao L, Kato A, Jaramillo AM, Hume PS, Holguin F, Janssen WJ, Vladar EK, Evans CM. *Am J Respir Cell Mol Biol*. 2024 Oct 24.

#### The bronchoalveolar lavage dilution conundrum: an updated view on a long-standing problem.

Haeger S, Moore CM, McManus SA, Moore PK, Janssen WJ, Mould KJ. *Am J Physiol Lung Cell Mol Physiol*. 2024 Nov 1;327(5):L807-L813.

#### The Effect of a TLR3 Agonist on Airway Allergic Inflammation and Viral Infection in Immunoproteasome-Deficient Mice.

Schaunaman N, Nichols T, Cervantes D, Hartsoe P, Ferrington DA, Chu HW. *Viruses*. 2024 Aug 29;16(9):1384.

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**Highly Cited Paper:** performed in the top 1% of citations received when compared to other papers published in the same field in the same year.

# RECOGNITION

National Jewish Health is the leading respiratory hospital in the nation and the only health care organization to be focused on respiratory and related illnesses.

Since our founding in 1899, our core mission has remained the same – to heal, to discover and to educate as a preeminent health care institution. We deliver on that mission every day. We have unparalleled pulmonary expertise and internationally recognized physician-scientists who bring their extensive experience and knowledge to the most challenging cases from around the world.

In any given week, we see patients with rare conditions that many pulmonologists encounter only a few times in their careers. Our pulmonologists work closely with their colleagues, who are leaders in cardiology, gastroenterology, allergy, immunology, oncology, neurology and radiology. Together, we strive to understand the whole person and find solutions for our patients.

Dedication to excellence has earned National Jewish Health a well-deserved reputation as the leader in pulmonary medicine. We embody the highest standards of science, compassion and service, and we continue to inspire hope for a healthier future.



For the 28<sup>th</sup> consecutive year, National Jewish Health was named a top respiratory hospital in the nation by *U.S. News & World Report* in its 2024-25 ranking of best hospitals in the nation and has earned recognition on many other external listings.

National Jewish Health is in the top 6% of institutions funded by the National Institutes of Health, in terms of absolute dollars. This is a tremendous achievement for a specialty hospital.

## Breakthroughs in Research

National Jewish Health is responsible for many of the important scientific advances that have shaped the landscape of pulmonary science today, including:

**IgE**, the molecule responsible for allergic reactions. This discovery has become the basis for many new treatments for asthma and allergies.

**The T cell receptor gene**, which plays a crucial role in recognizing foreign invaders and orchestrating an immune response. Identifying this gene opened the door to understanding how bodies fight viruses, bacteria and cancer.

**Superantigens**, extremely powerful bacterial toxins associated with particularly virulent diseases such as toxic shock syndrome and Legionnaires' disease.

**Combined chemotherapy for tuberculosis**, a crucial tool for fighting tuberculosis. National Jewish Health physicians were among the nation's thought leaders to develop it.

**Mechanisms of apoptosis**, which help us understand how the body effectively removes and recycles up to two billion cells a day and resolves inflammation in the lungs, was helped by the pioneering efforts of our faculty.

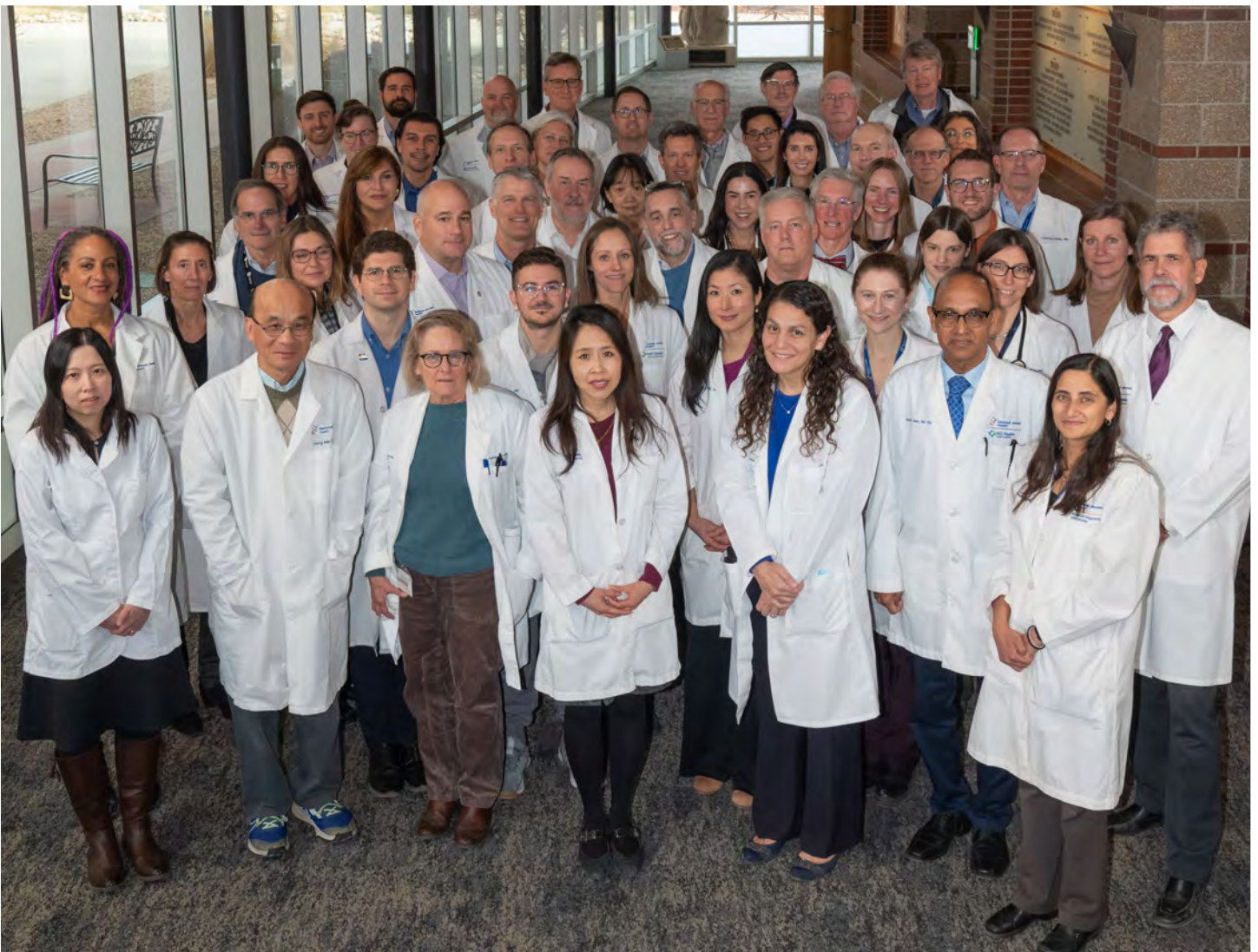
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