



2024
**PULMONARY
HIGHLIGHTS**

**CLINICAL EXPERTISE
RESEARCH
EDUCATION**



**National Jewish
Health®**

Breathing Science is Life.®

THE TUCHMAN FAMILY

DIVISION OF PULMONARY,
CRITICAL CARE AND SLEEP MEDICINE



**National Jewish
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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,

This past year, the medical community witnessed the development of exciting new opportunities to protect against disease. We saw the FDA approving CRISPR gene editing for the treatment of sickle cell; artificial intelligence boosting cancer detection rates; an Alzheimer's drug promising to slow disease progression; and new weight loss drugs becoming household names overnight. In the respiratory world, we saw the end of the COVID-19 public health emergency and learned new insights into long COVID. We also began seeing even more evidence of the effects climate change can have on health, particularly on vulnerable populations. Being at the forefront of pulmonary research and care, we are already working toward more advancements in each of these areas.

At National Jewish Health, we focus on a full range of respiratory and related illnesses. We bring together a multidisciplinary team of specialists who look at all aspects of pulmonary health. From asthma to COPD, cystic fibrosis and interstitial lung disease, we practice a multidisciplinary model of care with comprehensive evaluations by our experienced pulmonologists and other specialists who are at the top of their fields, including cardiologists and experts in gastroenterology, oncology, occupational lung disease, immunology, pediatrics and others. With this approach, we are able to evaluate each patient in a unique manner that gets to the right diagnosis early.

Basic and translational researchers work side-by-side with our clinicians to advance our management of respiratory disease. In the past year, National Jewish Health scientists have published more than 475 articles in peer-reviewed scientific and medical journals, growing our experience and knowledge.

Since our founding in 1899 as a hospital dedicated to helping those with what was then called "consumption" and later identified as tuberculosis, we have combined care, research and education to do our very best for all patients. In any given week, we see patients with rare conditions that many pulmonologists encounter only a few times in their careers. We are a resource for our patients and also for physicians around the country.

Thank you for taking the time to read about National Jewish Health and how we are advancing pulmonary medicine. We welcome your most challenging pulmonary cases and look forward to serving you and your patients.

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

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

Insights: The State of Medicine

Quality care demands collaboration at the highest level, which is why leaders at National Jewish Health often find themselves across the table — sharing their unique perspectives and ideas.



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

What advancements in medicine stood out in 2023?

Dr. Brown: I would start with recognizing the many breakthroughs for specific diseases, including seeing the longer term benefits of cystic fibrosis (CF) drugs. Initially, there was great enthusiasm and excitement, because the new medications showed short-term improvement in lung function and other quality of life metrics. What the past year has done is made it quite clear that those benefits last. The number of CF patients in the hospital is down dramatically, and patients are seeing improvements in quality of life and longevity.

Another area that has come on the scene in the past year is the expanded potential for the GLP-1 agonists, like Ozempic®.

Dr. Hirsch: There was a trial recently presented at the American Heart Association called SELECT that looked at obese and overweight patients on GLP-1 agonists, and the cardiovascular event rates diverged before patients even started losing weight. That's important, because we are seeing health benefits beyond the weight loss.

Dr. Brown: We recognize that curing disease is a key goal, though often an aspirational goal. But as we make advances, other benefits happen, too. The impacts and newly identified uses of these drugs are going to be far-ranging and overlap with everything we do in medicine.

Dr. Hirsch: Another of the more noteworthy items came toward the end of the year with the first FDA approval of gene editing with CRISPR for sickle cell. The ability to basically cure a disease by editing the gene. It feels a bit like science fiction, but it's going to explode in the next few years.

Dr. Petrache: We really saw a significant incorporation of climate change into medicine this past year. I think we're well positioned to make progress into that space through environmental health initiatives and research collaborations.

How do medicine and research intersect, and what is the importance of communication between the clinician and the researcher?

Dr. Petrache: It's absolutely crucial. At National Jewish Health, we have so many leaders in our field that are intimately involved with basic science research, because they either do it themselves or work closely with basic scientists. They hear firsthand about discoveries and what's next. So it's having that knowledge, along with the courage to apply innovation, that sometimes takes decades to permeate into community practice.

Dr. Hirsch: Right. I think here we have this continuum of implementation science, and people see that they can get their work translated even quicker.

Dr. Brown: Researchers being part of the mix here is actually critical because of how it changes the culture — that being a decent researcher, making advances, whether you're in the clinic or not, actually changes the culture around how we take care of patients. The researchers directly impact the doctors and vice versa. Because of that culture and interaction, our individual doctors can become better here than they would be someplace else.

How has the COVID-19 pandemic impacted medicine?

Dr. Brown: There's this weird separation of things that got better and things that got worse, right? Some diseases got better during COVID. For example, a lot of severe asthma patients didn't have exacerbations as frequently as before, but patients also put off screenings, which resulted in worse outcomes.

Dr. Petrache: From a professional standpoint, access to education got better. There has been a huge increase in the ability to access education virtually. Recorded hybrid sessions now mean you can tune in during your commute or not have to choose between two live sessions occurring at the same time.

Dr. Hirsch: The pandemic certainly accelerated the implementation of telehealth. It's now very convenient for established patients to have telehealth visits, and that has expanded care in many positive ways. However, we now need the government to facilitate the continuation of telehealth nationally. We have a lot of patients with unique diseases who come from out of state and right now, if you don't have a license in that state, you can't see them. We need that to change.

As we move forward, what medical improvements would you like to see?

Dr. Petrache: I think a faster process from bench to bedside and an application of personalized medicine. We also need to be more thoughtful about the future and work better as a medical society to prevent disastrous changes in climate. We need to be big contributors to not only healing the individual, but also through example in how we contribute to lessening our carbon footprint.

Dr. Hirsch: There are a lot of improvements to be had on the technology side. For example, correcting inefficiencies. Whether it's sharing knowledge with the patient or improving our workflows so that we have more time to do the tasks that are better for patient outcomes. Or, it may be in sharing our pathways of how we provide care with others. How can we leverage technology for telehealth, chronic disease management, remote patient monitoring and more?

Dr. Brown: We need to continue to grow programs that recognize the overlap of specialties, such as pulmonary hypertension, metabolic and wellness programs, and leverage these programs for the benefit of our patients. In many cases, patients would also benefit from earlier intervention with specialists. For example, we're recognized as a place where once you've exhausted all other resources, then you are sent here for one more try. And we're glad that patients come in these situations. However, we should be encouraging people to see experts sooner so that they get the benefit of the knowledge of a specialist environment. That's the real role of collaboration that can come between primary care providers and specialists.

Advances in Cardiology Promote Patient Success

The role of heart health for patients with pulmonary illnesses cannot be overstated. Each year, researchers learn more about the delicate interplay between the heart and the pulmonary system, affirming a whole body approach.



Glenn Hirsch, MD

When expert cardiologists work down the hall from specialized pulmonologists, open collaborations are easier, and patients with complex heart and lung diseases such as pulmonary hypertension experience a higher rate of success.

“Patients often can’t tell where their problems originate. They just know that they can’t do what they’re supposed to — from regular breathing to exercise,” said **Glenn Hirsch, MD**, chief of the Division of Cardiology at National Jewish Health. “So we try to figure out what’s the contribution from the lung side and what’s the contribution from the heart side. This multidisciplinary approach is critical. You can’t just be in your own echo chamber. You have to talk to other specialists to make big advances.”

The Division of Cardiology at National Jewish Health continues to grow, expanding into areas that benefit from pulmonologists and cardiologists working closely together. The following specialties highlight just a few of the ways our doctors are collaborating.



M. Patricia George, MD

Pulmonary Hypertension

Heart disease is one of the most common causes of pulmonary hypertension, and the condition itself very often affects both the heart and lungs of patients. Due to the overlap of symptoms, pulmonary hypertension is

sometimes mistaken for other diseases, leading to misdiagnoses that can delay or derail treatment.

“Making an accurate pulmonary hypertension diagnosis is extremely important,” according to **M. Patricia George, MD**, director of the Pulmonary Hypertension Program. “And the gold standard method to making the right diagnosis is a right heart catheterization.”

This is where the team of cardiologists and pulmonologists works together to provide the answers, applying advanced diagnostics such as echocardiography and cardiac MRI. From there, doctors can administer proven treatment plans, including oral and inhaled therapies, along with parenteral treatment.

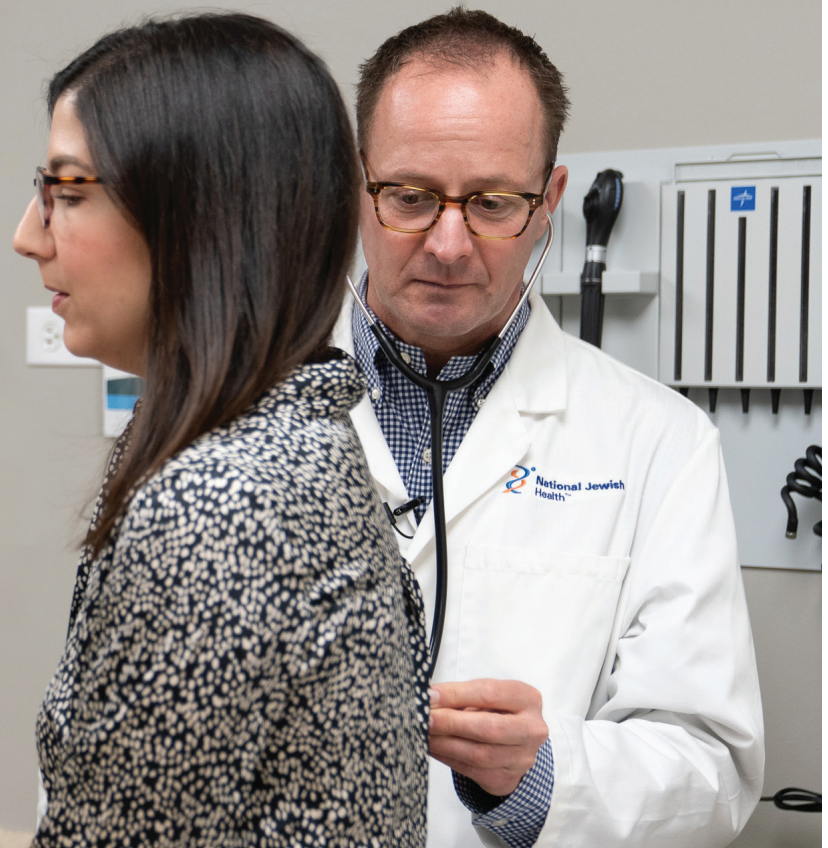
“I think what sets us apart is, number one, the fact that we have a very large pulmonary hypertension program that’s accredited as a center of excellence by the Pulmonary Hypertension Association,” said physician scientist **Tim Lahm, MD**. “And then we have a unique mix of pulmonologists, cardiologists, rheumatologists and radiologists, because it’s really a disease that requires input from multiple specialties. And we have all these specialties here onsite.”

Additionally, National Jewish Health doctors tend to be more engaged with the latest pulmonary hypertension research, as significant work in the field is constantly being conducted by scientists on campus. This tandem of research and care creates a spirit of ingenuity that allows cardiologists and pulmonologists to coordinate new treatments.

“We are able to ask specific questions based on what we see in the clinic and then take these questions to the lab and design experiments to answer them,” said Dr. Lahm. “And at the same time, we can take the discoveries that we make in the lab to the clinic and then apply them. So our patients will always be exposed to cutting-edge knowledge that they may not find elsewhere.”

"We are able to ask specific questions based on what we see in the clinic and then take these questions to the lab and design experiments to answer them."

— Tim Lahm, MD



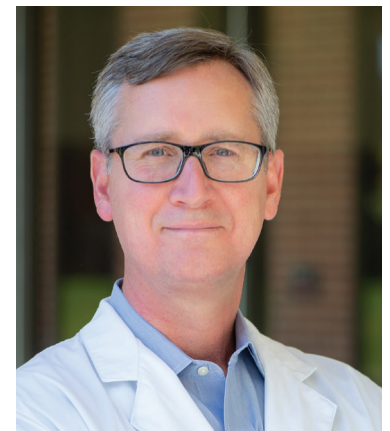
Cardiac Imaging

The expertise in imaging possessed by cardiologist **Christopher Dyke, MD**, has made his work an indispensable factor during critical examinations of the heart and lungs. According to Dr. Dyke, when it comes to advanced cardiac imaging, cutting-edge technology makes all the difference. Thanks to the state-of-the-art scanning resources at National Jewish Health, cardiologists are able to leverage sophisticated methods to produce lifesaving data.

"MRI and CT offer complementary information in the management of cardiac patients," explained Dr. Dyke. "Cardiac MRI has the unique ability to characterize tissue and is important in the diagnosis of various types of heart muscle injury, while cardiac CT can noninvasively diagnose coronary atherosclerosis. Advanced imaging is a game changer. Next generation photon-counting CT allows unparalleled resolution, and it's only available at a few select institutions across the country."

Pulmonary conditions that involve cardiac elements require the right combination of tools and expertise. However, by using CT, Dr. Dyke can also rule out heart-related reasons for symptoms like shortness of breath by examining coronary arteries for blockages.

The promise of these state-of-the-art technologies, along with the unique team-based approach at National Jewish Health, has physicians excited about the years to come. "It's a totally different construct for the future of how we're going to be looking at diagnosing and preventing heart disease, especially in our pulmonary patients," said Dr. Dyke.



Christopher K. Dyke, MD

CLINICAL EXPERTISE

National Jewish Health provides comprehensive evaluations, diagnoses and treatment plans for people from around the nation and the world. Our pulmonologists and their colleagues in cardiology, gastroenterology, oncology, immunology, rheumatology and radiology lead the way in providing this unique, comprehensive approach to care.

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 CAP15189SM-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 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 dysfunction and inhaler technique. Our faculty members lead numerous National Institutes of Health (NIH) studies and industry-sponsored clinical trials.

Behavioral Health

Teaching patients to manage behavioral health issues that often accompany chronic respiratory diseases is an integral part of our whole-patient approach. Additional prevention and wellness programs offer help with tobacco and vaping cessation for adults and young people.

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 invested resources into cardio-oncology, which balances heart care with cancer treatment, and our cardiac imaging equipment, which now includes a state-of-the-art photon counting CT scanner.

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.

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

Chronic Obstructive Pulmonary Disease (COPD)

We are advancing pulmonary medicine with COPDGene[®] and other studies to diagnose and phenotype COPD, and we are striving to individualize therapies for chronic bronchitis, bronchiolitis, emphysema and bronchiectasis. We also are working to develop better detection methods across the board. In a noteworthy study published earlier this year in the *Journal of General Internal Medicine*, **Elizabeth Regan, MD, PhD**, associate director of COPDGene, determined that standard fixed-ratio spirometry testing failed to lead to proper COPD diagnoses for a significant percentage of African Americans. “Now that we’ve revealed the gap, we can start to bridge it,” said Dr. Regan. “Better diagnostic tools will result in better care for all of our patients, regardless of background.”

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.



Elizabeth Regan, MD, PhD

be the gold standard diagnostic tool, and we emphasize early detection, monitoring and intervention.

Cystic Fibrosis

The largest and most experienced adult cystic fibrosis program in the nation is based at National Jewish Health. Our team of pulmonary specialists, 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.

Exercise and Breathing Performance

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

Gastroenterology

We have 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.

Mycobacterial Infections: TB and NTM

National Jewish Health began as a hospital for destitute tuberculosis (TB) patients more than 125 years ago, and we continue to provide consultations and manage nontuberculous mycobacterial (NTM) infections today. Our unprecedented experience with thousands of complex mycobacterial infections gives us a deep knowledge of personalized antibiotic regimens and surgical options.

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.

Refer Your Patients to National Jewish Health

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

Referrals

-  **800.652.9555**
-  **303.270.2153**
-  **[njhealth.org/referrals](https://www.njhealth.org/referrals)**



Main Campus: 1400 Jackson Street, Denver, CO 80206 | [njhealth.org](https://www.njhealth.org)

CLINICAL EXPERTISE (Continued)

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 and government regulators, and others to provide occupational health and safety programs that reduce and prevent work-related lung diseases.

Oncology

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

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 pulmonary, atopic and immune diseases.

Pulmonary Pathology

Our pathology team receives consultation requests from around the country due to our unparalleled diagnostic capabilities and vast experience in examining lung tissue and recognizing respiratory diseases. Very few centers see the large numbers of interstitial lung diseases that we do, which gives our team unique experience in classifying the variable patterns of lung inflammation and fibrosis.

"To be accurate, the classification requires the consensus of clinicians, radiologists and pathologists,"

said **Steve Groshong, MD**, chief of the Division of Pathology. Clinicians contribute a robust knowledge of patient histories, while radiologists apply high-resolution CT scan interpretations. Pulmonary pathologists round out this process with wedge biopsies. Hospitals rely on our accurate biopsies to guide their diagnoses.



Steve D. Groshong, MD

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 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 also 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 areas of research 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, lymphangioleiomyomatosis and eosinophilic syndromes that most pulmonologists rarely see.

Rheumatology

Our rheumatologists work to diagnose, manage and research a variety of rheumatologic disorders, with special expertise in interstitial lung diseases caused by systemic autoimmune diseases.

Scleroderma

Our Scleroderma Program is designated as a Scleroderma Foundation Research Treatment Center. Our multidisciplinary team of specialists in rheumatology, interstitial lung disease, pulmonary hypertension, cardiology, gastroenterology and nephrology ensures

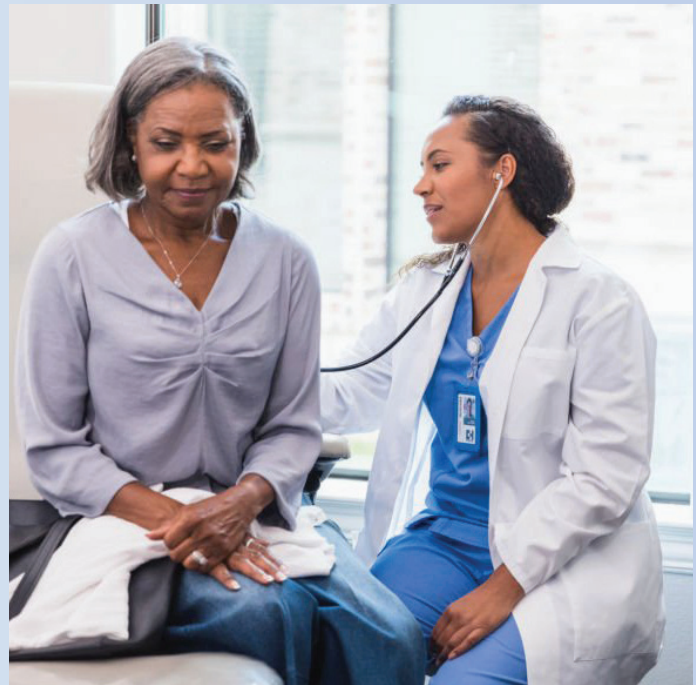
that our patients receive comprehensive care, advanced diagnostic and treatment options, and access to scleroderma clinical trials, nutritional counseling, and specialized pulmonary and physical rehabilitation programs.

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.

Sarcoidosis

Our experience with thousands of sarcoidosis patients has helped better define and address the multi-organ nature of the disease. Our Sarcoidosis Program is the largest in Colorado and the Rocky Mountain region. Our team of specialists works with patients to manage their condition and improve quality of life. Because our doctors are researchers too, patients have access to the latest clinical trials and most effective treatments. We are one of 15 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.



SPECTRUM OF SUPPORT



James Crooks, PhD, and Lisa Maier, MD, are leading research efforts around climate change.

Warming Up to Climate Research

Climate change represents a serious threat to wellness. And while this phenomenon can be felt globally, its heaviest tolls tend to fall on the most vulnerable communities. Numerous studies have revealed that low-income and minority housing areas are poised to bear the brunt of damage generated by climate change. Add to this the fact that poorer residents are already more likely to live closer to industrial or high-traffic zones and you have all the makings of a health care crisis.

It was against this backdrop that **Lisa Maier, MD**, chief of the Division of Occupational Health and Environmental Health Services, teamed up with researcher **James Crooks, PhD**, to form the Center for Climate, Environment and Health, which promises to confront these issues through groundbreaking, actionable research.

“Our physicians and researchers have long known the importance of a person’s environment,” said Dr. Maier, who also serves as chief of the Division of Occupational Health and Environmental Sciences at National Jewish Health. “But increased air pollution and extreme weather events such as droughts, floods and wildfires, among other

challenges, have researchers tirelessly working to better define the mechanisms and impacts of climate change on the body, health and disease.”

It’s a problem that hits close to home, according to Dr. Crooks, a researcher in the Division of Biostatistics and Bioinformatics. “Not only are these global issues that we’re examining, but also they are very local concerns,” he explained.

Low-income urban communities are often composed of people of color, along with those who have preexisting chronic conditions, according to Dr. Maier. Over the past year, researchers have published studies illustrating the impacts climate change and pollution can have on COPD, atopic dermatitis, asthma and heart rate. Without better health initiatives, these populations will continue to be beset by worsening conditions in the years to come, which is why Drs. Crooks and Maier are taking action to translate findings into public health and policy changes. The Center provides a perfect platform for this effort, offering researchers the chance to foster project ideas, collaborate and work toward preventing and treating the impacts of climate induced diseases.

SPECTRUM OF SUPPORT



Miners Clinic Celebrates 20 Years of Specialized Care

For 20 years, the Miners Clinic at National Jewish Health has worked with regulators, community hospitals and physicians to offer early disease detection for at-risk workers in the industry. Through spirometry, X-ray, oximetry and other tests, experts are able to maximize care and ensure proper follow-up treatment, while maintaining a strong connection with workers' local providers.

"In 20 years, we've screened nearly 2,500 miners," said **Richard Kraus**, certified physician assistant with the Miners Clinic. "We've built relationships with our patients. Most come back each year to be screened. They appreciate our discretion."

These early screenings are essential, but so is the Clinic's research, which seeks to create better safeguards against hazards like coal workers' pneumoconiosis (black lung disease).

For instance, in the past year National Jewish Health researchers conducted a study in which they compared lung tissue from coal miners involved in various mining job duties to see which ones were more at risk for severe black lung disease. Their findings revealed the importance of monitoring silica exposure for coal miners whose job duties weren't previously considered high risk.



"Severe black lung disease is incurable, disabling and entirely preventable," said **Cecile Rose, MD, MPH**, medical director for the Colorado Miners Clinic and co-senior author of the study. "This study underscored the need to control silica dust exposure for all coal miners."

Additionally, in a separate study, researchers found that even though Indigenous coal miners were more likely to develop black lung disease, they were less likely to qualify for medical benefits using currently required lung function standards. Indigenous populations already face numerous health disparities, and researchers felt it was crucial to assess barriers to federal compensation for black lung disease. "Racial disparities in access to benefits for work-related lung disease need to be addressed as updated lung function standards are being implemented," said

Jeremy Hua, MD, MPH, lead author of the study, pulmonologist and occupational and environmental health physician.

Of course, following 20 years of dedicated care, these recent studies represent just a fraction of the work being conducted. The goal, as always, is to usher in a future where scientific results can sponsor evolutions in the industry, ensuring a smarter, safer approach.

"Racial disparities in access to benefits for work-related lung disease need to be addressed."

– Jeremy Hua, MD



Jeremy Hua, MD, MPH



Cecile Rose, MD, MPH

"Severe black lung disease is incurable, disabling and entirely preventable."

– Cecile Rose, MD

RESEARCH LEADERSHIP

Leaps in Cystic Fibrosis Treatment

The development of therapies to treat the underlying defect in cystic fibrosis (CF) has transformed the lives of most CF patients. The use of cystic fibrosis transmembrane conductance regulator (CFTR) modulator treatments, a recent advancement, has resulted in improved health and increased expected life spans. Now, several years after the introduction of CFTR treatment, these therapies' long-term use is associated with fewer pulmonary exacerbations, maintained lung function and improved quality of life. While some have suggested that this transformation will reduce the need for cystic fibrosis clinical expertise and research, National Jewish Health pulmonologist **Katie Hisert, MD**, believes the opposite.

The population of CF patients will grow as their lives lengthen. However, twice daily therapy with CFTR modulators is not a cure for CF, and this growing population of people with the disease will need ongoing care for symptoms and complications.

Dr. Hisert and her colleague **Jennifer Taylor-Cousar, MD**, co-director of the Adult Cystic Fibrosis Program, were lead authors of two papers in a recent *Lancet* series on the current state of CF. Both are recognized experts in CF and part of the faculty at National Jewish Health, which is home to the largest adult CF clinic in the world.

Dr. Taylor-Cousar is co-director of the Adult Cystic Fibrosis Program and director of the Cystic Fibrosis Therapeutics Development Center at National Jewish Health. In her article, she describes how CFTR modulators have become available to more CF patients at younger ages. She also briefly discusses in utero treatment to prevent the pancreatic insufficiency and reproductive malformations in males that are present at birth. She notes that rare and/or understudied variants of CFTR, many of which are not currently eligible for CFTR modulator therapy, are more prevalent in Black, Indigenous and People of Color. These variants need to be a focus of ongoing research and considered in the development of the next generation of CFTR modulators.

In their article, Dr. Hisert and her colleagues outline the knowledge gaps and research questions in the current CF landscape. The long-term side effects of CFTR modulators and complications of CF that may occur in aging populations are still unknown.

What lasting effects will these medications have on CF-related diabetes, liver and sinus disease, along with gastrointestinal motility and nutrition?

In their own work, both doctors continue to find answers, with Dr. Taylor-Cousar conducting clinical trials of new medications, and Dr. Hisert evaluating the molecular and cellular events that contribute to lung disease in people with CF.



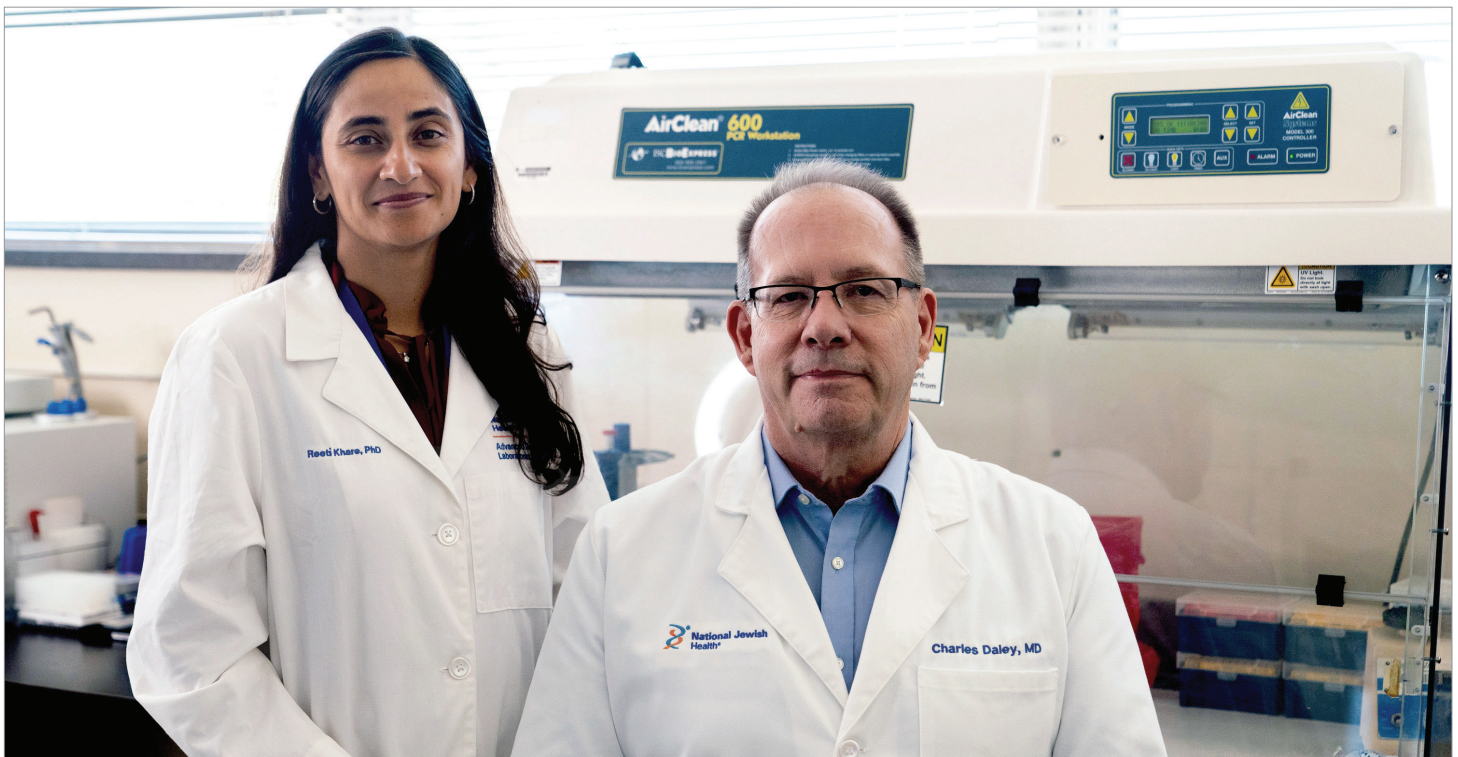
Jennifer Taylor-Cousar, MD, and Katie Hisert, MD, treat patients at the largest adult CF clinic in the U.S.

New CF Drug Monitoring Assay

The Advanced Diagnostic Laboratories at National Jewish Health recently released the first CAP/CLIA validated assay to measure serum levels of TRIKAFTA[®], a combination of the CFTR drugs elxacaftor, tezacaftor and ivacaftor (ETI) as well as the primary active metabolites of the drug. TRIKAFTA[®] is one of the most important CF therapies for adults and children on the market in the U.S. currently.

This new lab-developed test makes ETI levels available clinically, allowing physicians to accurately record drug levels over time. Multiple draws after administration can be evaluated to provide a more complete picture of dose effects, allowing for more personalized medicine. The ability to accurately monitor blood ETI levels also makes it possible to assess drug-drug interaction risks and gender differences in dosing. The high-performance liquid chromatography assay was fully validated using clinical data from patients taking TRIKAFTA[®].

RESEARCH LEADERSHIP



Reeti Khare, PhD, and Charles Daley, MD, developed analysis of NTM antibiotic susceptibility.

Experts Examine Progress in Addressing NTM

The field of nontuberculous mycobacterial pulmonary disease (NTM-PD) has seen significant changes in recent years. The exponential growth of cases in some regions of the world was met by the approval of the first drug for refractory infections. With the emergence of molecular diagnostics and other therapeutic advances, the future for NTM-PD patients looks promising.

In an effort to update pulmonologists on the state of this disease, **Shannon Kasperbauer, MD**, associate professor of medicine at National Jewish Health, and her colleague Rachel Thomson, PhD, of the University of Queensland, Australia, worked to edit a special issue of *Clinics in Chest Medicine* devoted to NTM-PD.

Throughout the issue, various authors emphasized the challenging nature of NTM-PD diagnosis and the limited arsenal available to treat it. Additionally, they looked to more advanced and objective tools to diagnose and monitor NTM-PD in the future.

Professor of Medicine **David Griffith, MD**, outlined essential criteria for diagnosing NTM and initiating treatment. **Charles Daley, MD**, chief of the Division of Mycobacterial and Respiratory Infections,

and Instructor **Minh-Vu H. Nguyen, MD**, advised physicians on therapies to use for mycobacterium avium complex (MAC), the most common form of NTM pulmonary disease. Drs. Daley and Nguyen also included guidance on amikacin liposome inhalation suspension, the first drug approved to treat refractory MAC infections.

Reeti Khare, PhD, director of the Infectious Disease Laboratory, outlined both traditional phenotypic methods and more advanced molecular methods used by her lab to identify NTM species and antimicrobial susceptibilities. Surgeon **John D. Mitchell, MD**, identified which patients are good candidates for surgery and surgical techniques unique to NTM-PD resections.

Separately, in 2023, Drs. Khare and Daley also published an analysis of NTM antibiotic susceptibility of more than 4,000 isolates evaluated at National Jewish Health. Their results, known as an antibiogram, offer guidance to physicians about the most promising antibiotics for initial treatment of NTM-PD patients.

CLINICAL RESEARCH – OPEN CLINICAL TRIALS

Allergy

Skin, Airway and Esophageal Epithelial Barriers

Principal Investigator:
Pamela Zeitlin, MD, MPhil

Researchers want to know if cells of the skin, airway and esophagus are different in people who have allergic conditions and those who do not. The goal is to understand if areas of the body that are exposed to environmental particles, either from inhaling or touching them, contribute to the development of asthma, eczema, food allergies, eosinophilic esophagitis and gastroesophageal reflux disease.

Asthma

Oral Steroid Dependent Asthma

Principal Investigator:
Michael Wechsler, MD

Researchers are investigating whether a new biologic treatment called tezepelumab can reduce or remove the need for oral corticosteroids in adults with severe asthma. The biologic will be compared against a treatment that does not contain any active medication.

Cardiology

Keto Diet to Reverse Heart Failure

Principal Investigator:
Darlene Kim, MD, FACC

The purpose of this study is to learn if a low carbohydrate ketogenic diet can treat obesity-related heart failure with preserved ejection fraction. Studies have shown that weight loss through gastric bypass and calorie restriction can improve heart function.

COPD

Treatment for Alpha-1 Antitrypsin Deficiency

Principal Investigator:
Robert Sandhaus, MD, PhD

Researchers want to see if a new drug, alvelestat, improves the symptoms of lung disease caused by COPD due to alpha-1 antitrypsin deficiency (AATD), as well as symptoms of AATD.

Cystic Fibrosis Investigational mRNA Therapy for Cystic Fibrosis

Principal Investigator:
Jennifer Taylor-Cousar, MD

This study is exploring an investigational drug, called VX-522, a type of messenger RNA therapy, for people living with cystic fibrosis who have genotypes not expected to benefit from cystic fibrosis transmembrane conductance regulator (CFTR) modulators. If effective, the drug will tell cells in the lungs to create normal CFTR protein, which may improve the way the lungs work in people with cystic fibrosis.

Lung Cancer

Treatment of Patients with Inoperable Lung Cancer

Principal Investigator:
Laurie Carr, MD

Investigators are seeking to determine if patients with medically inoperable stage I/IIA non-small cell lung cancer (NSCLC) may benefit from the combination of the drug pembrolizumab (MK-3475) and stereotactic body radiation therapy (SBRT) to stop or slow a relapse of NSCLC compared to SBRT alone.



Lung Disease

Mineral Dust and Lung Disease

Principal Investigator:
Cecile Rose, MD

This study is being conducted to better understand lung diseases that develop from inhaling mineral dust over time. Researchers hope to gain insight into why some people get these diseases and others do not, and how stopping exposure to mineral dust may affect the severity of these diseases.

Lung Injury

Understanding Lung Disease From Military Deployment

Principal Investigator:
Gregory P. Downey, MD

The purpose of this study is to better understand lung disease found in contractors and U.S. military personnel serving in Iraq and Afghanistan after September 11, 2001. The information collected will be used to learn about respiratory diseases associated with the inhalation of very small particulate matter and other harmful substances during deployment.

Interstitial Lung Disease Systemic Sclerosis with Interstitial Lung Disease

*Principal Investigator:
Mehrnaz Maleki Fischbach, MD*

Researchers are studying a new medication called PRA023 that has anti-inflammatory and antifibrotic properties to determine how well it works against systemic sclerosis with interstitial lung disease. The goal is to understand how safe and effective PRA023 is as a treatment option as compared to a placebo.

Pulmonary Hypertension Evaluating Medication Dosage

*Principal Investigator:
Mohammed Dalabih, MD*

People living with pulmonary arterial hypertension (PAH) often struggle with activities that once took little-to-no effort. The UNISUS study will compare the effectiveness and safety of a higher dose of an investigational medication called Opsumit® to a lower dose in people with PAH.

Sarcoidosis

Pulmonary Sarcoidosis Lung Study

*Principal Investigator:
Clara Restrepo, MD*

The RESOLVE-Lung study is evaluating the safety and effectiveness of the investigational medicine namilumab for the treatment of pulmonary sarcoidosis. Namilumab is a human monoclonal antibody believed to treat the underlying cause of sarcoidosis by inhibiting one of the key proteins responsible for the formation of sarcoidosis granulomas.

Pulmonary Fibrosis and GERD

*Principal Investigator:
Matthew Koslow, MD*

Pulmonary fibrosis is characterized by scarring of the lung, a process which can impair gas exchange and cause patients to feel shortness of breath. In many cases, the cause remains elusive despite extensive evaluation. This has prompted researchers to consider if an insidious injury or trigger is causing scarring. A leading candidate for the potential cause is recurrent reflux of material from the stomach into the laryngopharynx.

Data supporting this hypothesis:

- A high proportion of patients with pulmonary fibrosis have gastroesophageal reflux, a risk factor for aspiration (or more precisely, laryngopharyngeal reflux).
- Most forms of pulmonary fibrosis are lower lung-predominant diseases, similar to aspiration-related lung abnormalities.

The primary objective of this study is to evaluate whether the presence and severity of laryngopharyngeal reflux correlate with measures of pulmonary fibrosis severity.



Pulmonologist Matthew Koslow, MD, is pursuing answers to important questions surrounding the relationship between the scarring associated with pulmonary fibrosis and GERD.

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 475 peer-reviewed scientific journal articles. Here is some of the groundbreaking research being done at National Jewish Health.

Safety, Tolerability, and Efficacy of Pirfenidone in Patients with Rheumatoid Arthritis-Associated Interstitial Lung Disease: A Randomised, Double-Blind, Placebo-Controlled, Phase 2 Study

Joshua Solomon, MD, and colleagues showed for the first time that a class of antifibrotic drugs can slow the progression of interstitial lung disease (ILD) in patients with rheumatoid arthritis (RA). ILD is a relatively common complication for people suffering with RA and can lead to premature death in up to 10% of patients. Researchers found that pirfenidone, an anti-scarring medication, was a safe and effective treatment option in a trial of patients with RA and ILD. *Lancet Respiratory Medicine*. 2023 Jan;11(1):87-96.

Complete Genome Assembly of Hawai'i Environmental Nontuberculous Mycobacteria Reveals Unexpected Co-Isolation with Methylobacteria

Michael Strong, PhD, was the principal investigator on research that looked at the complete genome of environmental nontuberculous mycobacteria (NTM) found in the state of Hawaii, which has the highest incidence of NTM lung disease. The research team identified a suite of genes that might help NTM thrive in the Hawaiian environment. They also found evidence of co-occurring methylobacteria, suggesting that in some cases methylobacteria and NTM may exist in the same place, challenging previously accepted ideas. The efforts generated a new understanding of the potential survival strategies and microbial interactions of NTM in Hawaii. *PLoS One*. 2023 Sep 13;18(9):e0291072.

Nintedanib in Asian patients with progressive fibrosing interstitial lung diseases: Results from the INBUILD trial

Kevin Brown, MD, and colleagues found that in Asian patients with progressive fibrosing interstitial lung diseases (ILD), nintedanib reduced the rate of decline in forced vital capacity (FVC) with adverse events that were manageable for most patients. Genetic polymorphisms related to the pathogenesis of ILDs vary in prevalence among races, and there is limited

evidence that ILDs may progress more rapidly in Asian patients than in patients of other races. Over 52 weeks, nintedanib reduced the rate of decline in FVC in the Asian patients by 44%.

Respirology. 2023 May;28(5):465-474.

Vaccine-Elicited B- and T-Cell Immunity to SARS-CoV-2 is Impaired in Chronic Lung Disease Patients

Haolin Liu, PhD; Katja Aviszus, PhD; Pearlanne Zelarney, MS; Shu-Yi Liao, MD; Anthony Gerber, MD, PhD; Barry Make, MD; Michael Wechsler, MD; Philippa Marrack, PhD; and R. Lee Reinhardt, PhD, showed that 48% of vaccinated patients with chronic lung diseases had reduced antibody concentration to the SARS-CoV-2 vaccine antigen relative to healthy patients. Using samples from the National Jewish Health Biobank, they found vaccine antibody concentrations were significantly reduced among asthma, COPD and ILD patients as early as 3-4 months after vaccination. Vaccine-specific memory T cells were significantly reduced in patients with asthma and COPD compared to healthy controls. Impaired T cell responsiveness was also observed in a subset of ILD patients. The research shows the need for a targeted approach to COVID vaccination.

ERJ Open Research. 2023 Oct 16;9(5):00400-2023.

Desert particulate matter from Afghanistan increases airway obstruction in human distal lungs exposed to type 2 cytokine IL-13

Diana Cervantes; Niccolette Schaunaman, MS; Gregory P. Downey, MD; Hong Wei Chu, MD; and Brian J. Day, PhD, for the first time demonstrated particulate matter collected from the Bagram Air Force Base in Afghanistan exaggerated airway constriction in human distal lungs with high type 2 inflammation. The research group did not observe the same impact on airway hyperresponsiveness in particulate matter collected from the China Lake Basin in California, which was used as similar non-warzone control particulate matter. Airway hyperresponsiveness is the predisposition of the airways to narrow excessively in response to a

stimulus. The improved understanding of particulate matter airway obstruction may provide insights into mechanisms of deployment-related respiratory disease and potential treatments.

Frontiers in Medicine. 2023 Jun 28;10:1177665.

Discriminative Accuracy of the CAPTURE Tool for Identifying Chronic Obstructive Pulmonary Disease in US Primary Care Settings

Barry Make, MD, and colleagues across the country partnered to develop a new screening tool called CAPTURE to help primary care physicians identify chronic obstructive pulmonary disease (COPD). Screening tools are commonly used in primary care settings to identify a number of medical conditions, but CAPTURE is among the first with proven results to identify COPD.

Journal of the American Medical Association. 2023 Feb 14;329(6):490-501.

Association of sputum eosinophilia with easily measured type-2 inflammatory biomarkers in untreated mild persistent asthma

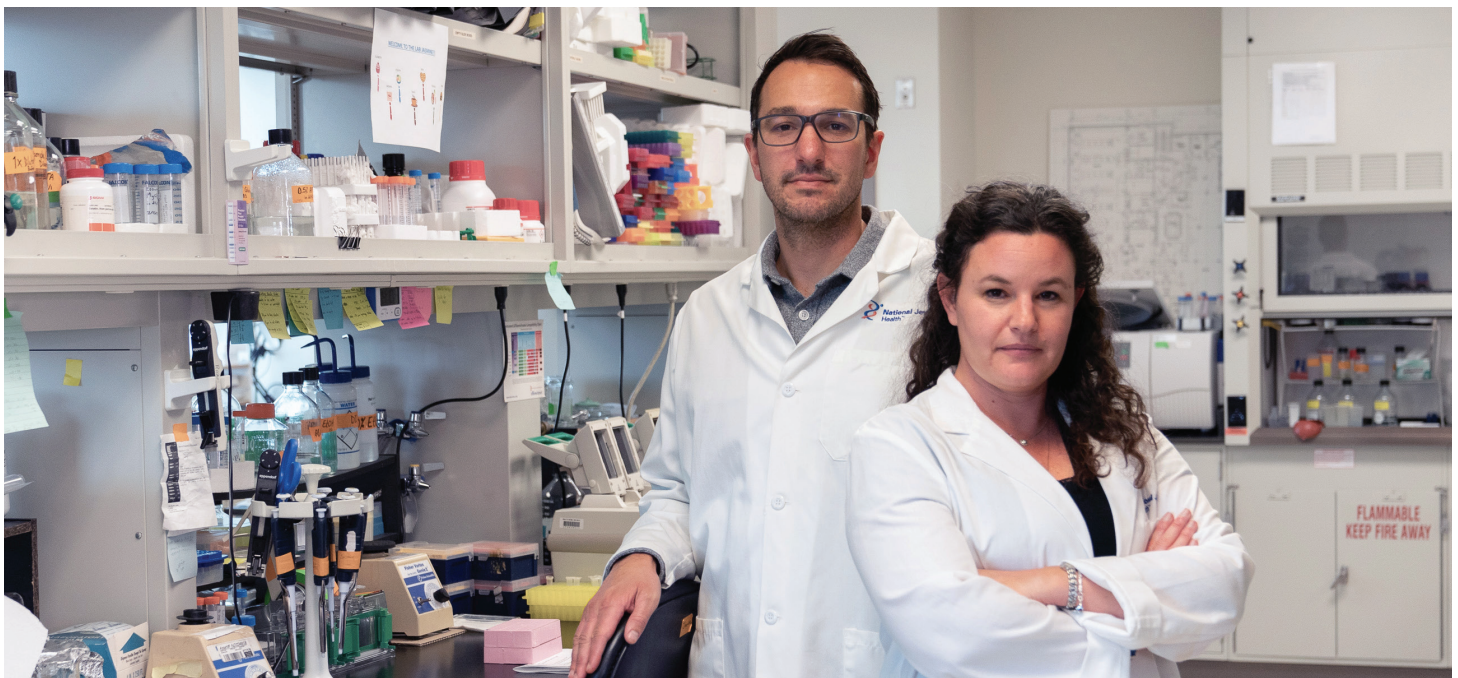
Ronina Covar, MD; Michael Wechsler, MD; and colleagues performed the first large study including adolescents to evaluate the performance of multiple biomarkers. The researchers found a lack of consistency between sputum eosinophilia and other T2 biomarkers. Until prospective trials test the ability of alternative biomarkers to predict inhaled corticosteroid (ICS) response, blood eosinophil count or fractional exhaled nitric oxide phenotyping may be an option to consider ICS through a shared decision making process with consideration of other clinical features.

J Allergy Clin Immunol Pract. 2023 Dec 12:S2213-2198(23)01356-9.

Inhibition of antiapoptotic BCL-2 proteins with ABT-263 induces fibroblast apoptosis, reversing persistent pulmonary fibrosis

Elizabeth Redente, PhD; Joseph Cooley, DO; and colleagues explained why fibroblasts become resistant to normal cell death signals in progressive fibrosis. The research team looked at idiopathic pulmonary fibrosis and silicosis in humans and mouse models. They showed that if anti-apoptotic signals were inhibited with a targeted therapeutic, fibroblast death and fibrosis resolution could be induced.

Journal of Clinical Investigation Insight. 2023 Feb 8;8(3):e163762.



Joseph Cooley, DO, and Elizabeth Redente, PhD

EDUCATION – Academic Training

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 offer 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.

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:

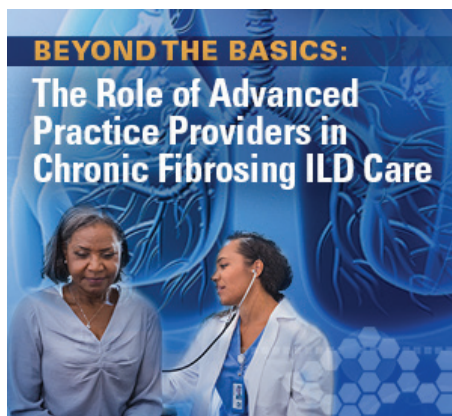
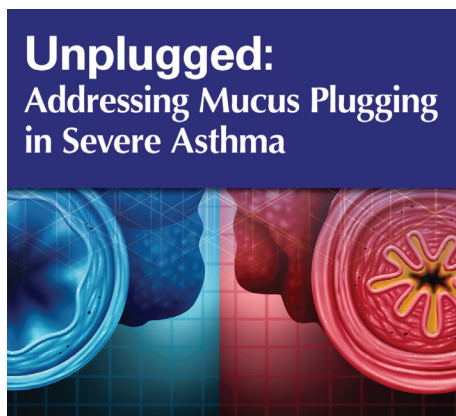
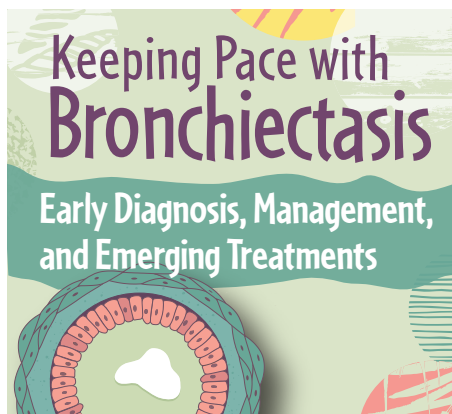
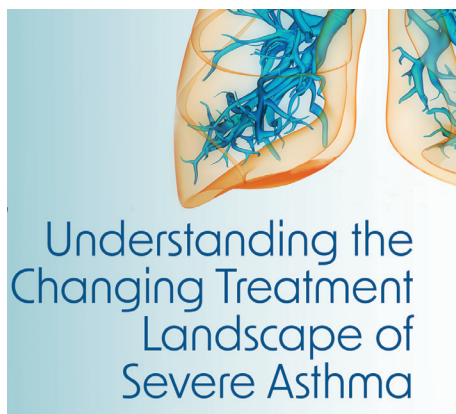
60th Annual Denver TB Course – April 3-4, 2024 (Hybrid Event)

Nontuberculous Mycobacteria (NTM) Lecture Series for Providers – April 25-26, 2024 (Hybrid Event)

Nontuberculous Mycobacteria (NTM) Course for Patients and Families – April 27, 2024 (Hybrid Event)

20th Annual Respiratory Disease Young Investigators' Forum – October 17-20, 2024

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, call 800.844.2305 or email proed@njhealth.org.

FACULTY LEADERSHIP



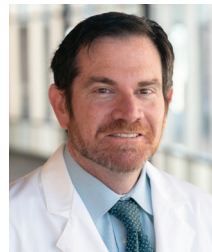
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Gregory P. Downey, MD



Stephen K. Frankel, MD



Seth J. Kligerman, MD, MS



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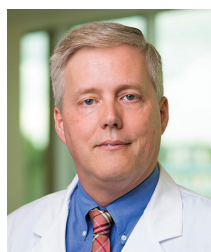
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STRONG ALLIES IN RESEARCH AND CARE

National Jewish Health continues to advance care and science through unique collaborations with medical and research partners across the nation. National Jewish Health collaborates and is an academic partner with the University of Colorado School of Medicine and UCHealth in Denver. Additionally, our unique Respiratory Institute® model brings our multidisciplinary, team-based model of care to patients, while providing a common 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 that encompasses opportunities for joint research, collaborative care and education programs, along with training for medical students. The organizations offer regular interaction through Grand Rounds and other medical and research programs.



Respiratory Institutes

In 2014, National Jewish Health formed its first partnership 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, this past year, a respiratory therapy training program was launched in both Philadelphia and Denver, with National Jewish Health and Thomas Jefferson University as founders of the new program.

MOUNT SINAI - NATIONAL JEWISH HEALTH

Respiratory Institute



Jane and Leonard Korman Respiratory Institute™



Partner Relationships

Our collaboration with Denver-based Saint Joseph Hospital, now 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. 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 2023 PUBLICATIONS

In 2023, National Jewish Health faculty published more than 475 articles in peer-reviewed scientific and medical journals. Included below is a selection of noteworthy articles.

ASTHMA

Prenatal exposure to poly- and perfluoroalkyl substances and the incidence of asthma in early childhood

Zell-Baran LM, Venter C, Dabelea D, Norris JM, Glueck DH, Adgate JL, Brown JM, Calafat AM, Pickett-Nairne K, Starling AP. *Environ Res.* 2023 Dec 15;239(Pt 1):117311.

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 DW, Huang EW, Wang HC, Tsai MJ, Mahboub B, Salameh LIJ, Jackson DJ, Busby J, Heaney LG, Pfeiffer 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.* 2023 Nov 28.

Treatment of Work-Related Asthma: More Severe, Less Adherent, and Still Working.

Pacheco KA. *J Allergy Clin Immunol Pract.* 2023 Nov;11(11):3414-3416.

Tezepelumab for the treatment of severe asthma: a plain language summary of the PATHWAY and NAVIGATOR studies.

Corren J, Menzies-Gow A, Bimmel J, McGuinness A, Almqvist G, Bowen K, Griffiths JM, Ponnarambil S, Bourdin A, Israel E, Colice G, Brightling CE, Wechsler ME; PATHWAY and NAVIGATOR study investigators. *Immunotherapy.* 2023 Nov;15(16):1327-1340.

Tezepelumab reduces exacerbations across all seasons in patients with severe, uncontrolled asthma (NAVIGATOR).

Pavord ID, Hoyte FCL, Lindsley AW, Ambrose CS, Spahn JD, Roseti SL, Cook B, Griffiths JM, Hellqvist Å, Martin N, Llanos JP, Martin N, Colice G, Corren J. *Ann Allergy Asthma Immunol.* 2023 Nov;131(5):587-597.e3.

Preference for and impact of telehealth vs in-person asthma visits among Black and Latinx adults.

Ugalde IC, Ratigan A, Merriman C, Cui J, Ericson B, Busse P, Carroll JK, Casale T, Celedón JC, Coyne-Beasley T, Fagan M, Fuhlbrigge AL, Villarreal GG, Hernandez PA, Jariwala S, Kruse J, Maher NE, Manning B, Mosnaim G, Nazario S, Pace WD, Phipatanakul W, Pinto-Plata V, Riley I, Rodriguez-Louis J, Salsiccioli J, Shenoy K, Shields JB, Tarabichi Y, Sosa BT, Wechsler ME, Wisnivesky J, Yawn B, Israel E, Cardet JC. *Ann Allergy Asthma Immunol.* 2023 Nov;131(5):614-627.e2.

Relationship Between Asthma Control as Measured by the Asthma Impairment and Risk Questionnaire (AIRQ) and Patient Perception of Disease Status, Health-Related Quality of Life, and Treatment Adherence.

Reibman J, Chipps BE, Zeiger RS, Beuther DA, Wise RA, McCann W, Gilbert I, Eudicone JM, Gandhi HN, Harding G, Cutts K, Coyne KS, Murphy KR, George M. *J Asthma Allergy.* 2023 Jan 5;16:59-72.

Epigenomic response to albuterol treatment in asthma-relevant airway epithelial cells.

Perez-García J, Pino-Yanes M, Plender EG, Everman JL, Eng C, Jackson ND, Moore CM, Beckman KB, Medina V, Sharma S, Winnica DE, Holguin F, Rodríguez-Santana J, Villar J, Ziv E, Seibold MA, Burchard EG. *Clin Epigenetics.* 2023 Oct 3;15(1):156.

(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.

Are We Ready for Asthma Remission as a Clinical Outcome?

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Highly Cited Paper: Discontinuation versus continuation of hypertonic saline or dornase alfa in modulator treated people with cystic fibrosis (SIMPLIFY): results from two parallel, multicentre, open-label, randomised, controlled, non-inferiority trials.

Mayer-Hamblett N, Ratjen F, Russell R, Donaldson SH, Riekert KA, Sawicki GS, Odem-Davis K, Young JK, Rosenbluth D, Taylor-Cousar JL, Goss CH, Retsch-Bogart G, Clancy JP, Genatossio A, O'Sullivan BP, Berlinski A, Millard SL, Omlor G, Wyatt CA, Moffett K, Nichols DP, Gifford AH; SIMPLIFY Study Group. *Lancet Respir Med*. 2023 Apr;11(4):329-340.

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Deficient Complement Opsonization Impairs Mycobacterium avium Killing by Neutrophils in Cystic Fibrosis.

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Mining Tenure and Job Duties Differ Among Contemporary and Historic Underground Coal Miners With Progressive Massive Fibrosis.

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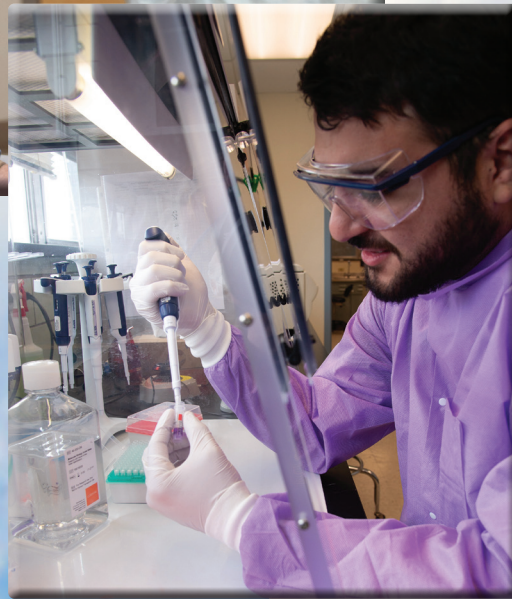


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