2014 Research Annual Report

Pulmonary Medicine

Division Summary

RESEARCH AND TRAINING DETAILS	
Number of Faculty	**24**
Number of Joint Appointment Faculty	**4**
Number of Research Fellows	**7**
Number of Research Students	**15**
Number of Support Personnel	**23**
Direct Annual Grant Support	**$3,632,448**
Direct Annual Industry Support	**$442,529**
Peer Reviewed Publications	**59**

CLINICAL ACTIVITIES AND TRAINING	
Number of Clinical Staff	**103**
Number of Staff Physicians	**2**
Number of Clinical Fellows	**9**
Number of Clinical Students	**1**
Number of Other Students	**1**
Inpatient Encounters	**613**
Outpatient Encounters	**9,127**

Division Photo

Row 1: B Chini, T Guilbert, R Wood, R Amin, C Kercsmar, N Simakajornboon
Row 2: C Torres-Silva, N Zhang, A Shamsuzzaman, S Madala, M Schecter, C Towe, S Ishman
Row 3: H Sawnani, J Woods
Row 4: Z Cleveland, JP Clancy, R Bokulic, G McPhail, M Seid, D Grossoehme

Significant Accomplishments

High National Ranking Continues

For the fourth year in a row, our Division was ranked the No. two pediatric pulmonary program in the nation by *US News & World Report*.

New Ways to Treat Complex and Difficult Asthma

This year we developed The Asthma Complex Care Center (ACCC) for children with complex and difficult to treat asthma. Specialists including otolaryngologists (ENT), pulmonologists, allergists, gastroenterologists, bronchoscopists, nutritionists, and sleep and adherence specialists collaborate in a single location to care for each child. They meet weekly to review each child's case and care plan. The ACCC focuses on children with asthma who are prone to sleep difficulty, eczema, gastroesophageal reflux, eosinophilic esophagitis, allergies and food allergies.

The program allows children to spend up to eight hours in a patient unit as outpatients in order to complete treatment that would otherwise take several trips to the hospital to accomplish. For those who require multiple days of treatment, the ACCC allows families to return home or stay at the nearby Ronald McDonald House if they live out-of-town.

New Lung Transplant Program

Our new Lung Transplant program began in January 2014. We have had 23 referrals or inquiries into the

program and completed several evaluations. So far, planning has focused on processes, patient flow, space needs, key personnel, education, and establishing collaborative relationships throughout the hospital.

Quality metrics and data collection processes are in place; research efforts are underway to collect and store tissue and fluid to advance research in pediatric lung disease. In the coming year, the Lung Transplant program will continue to build collaborations among the Division of Pulmonary Medicine, the Heart Institute, and other disciplines within the hospital. We will continue to evaluate patients for transplant, attain proof of concept for storage of tissue, and refine processes.

A Collaborative Chronic Care Network (C3N) for Cystic Fibrosis

Leaders and faculty from Pulmonary Medicine and the Anderson Center for Health Systems Excellence collaborated with the Cystic Fibrosis (CF) Foundation and the Dartmouth Institute to develop a Collaborative Chronic Care Network (C3N) for CF. A C3N is a peer-produced Learning Health System in which patients, families, providers, and researchers collaborate to learn, conduct research, and implement the findings. We envision this will become the CF care model of the future: ensuring that patients get the right treatment at the right time, every time. The design of the network began in July 2014 and will continue for one year; the team will then conduct a pilot within the CFF Learning and Leadership Collaborative at select CF Care Centers. The CF Foundation will award Pulmonary Medicine $776,373 for this project.

Research Highlights

Recruitment

The Division of Pulmonary Medicine continues to expand its research focus with the recruitment of two leading senior pulmonary researchers, Drs. AP Naren and Assem Ziady.

Anjaparavanda P. Naren, PhD, is the Thomas Boat Chair in Cystic Fibrosis Research, co-director of the Cystic Fibrosis Research Center, and professor of Pediatrics. His laboratory is interested in (1) identifying interactions between the cystic fibrosis transmembrane conductance regulator (CFTR) and its binding partners, and (2) defining how spatiotemporal regulation of CFTR-containing macromolecular complexes in the apical compartment of polarized epithelial cells regulates overall fluid secretion. CFTR is a cAMP-regulated chloride channel located primarily on the apical surface of epithelial cells that line various organs, including the airways and the gut, and CFTR dysfunction can result in life-threatening medical disorders. Dr. Naren's laboratory studies two such disorders; (1) Cystic fibrosis, a lethal genetic disease in which the CFTR chloride channel is HYPO-functional and (2) Secretory diarrhea, a disease affecting millions of children worldwide, in which HYPER-function of the CFTR chloride channel can occur due to infectious toxins, such as Cholera toxin and *E. coli* enterotoxin. The goal of the Naren research program is to identify new drug targets for cystic fibrosis, secretory diarrhea, and other diseases resulting from CFTR dysfunction, and provide insights into the etiology of diseases associated with CFTR-interacting molecules.

Assem G. Ziady, PhD, is an associate professor who joined Pulmonary Medicine from Emory University. His laboratory is interested in (1) the study of redox-mediated inflammatory signaling and design, and (2) application of non-viral gene-delivery vectors in cystic fibrosis. He also is working with leaders across the CF community nationally to identify and validate novel biomarkers of CFTR function and CF disease severity. This work utilizes a systems biology approach, and is built off of a proteomics platform. The Ziady laboratory studies the role of the antioxidant response element (ARE) in inflammatory signaling by CF airway epithelial cells and discovered that Nrf2, a transcription factor central to ARE, is downregulated in CF cells. Dr. Ziady was the first to describe a decrease of Nrf2 function in CF epithelia resulting in a significant increase in oxidants that stimulate inflammation. More recently, his laboratory has described the mechanism of

downregulation of Nrf2, which stems from feedback responses to the loss of CFTR function. A goal of the Ziady research program is the development of DNA nanoparticles for gene therapy in the lung, brain, and liver.

Annual Celestial Ball

Cystic fibrosis (CF) is a disorder affecting over 30,000 patients in the US and 70,000 worldwide. CF patients develop problems with mucus in the lungs and abnormal food absorption that lead to lung infections, poor growth, and death in early adulthood.

The 2014 Celestial Ball marked the 10-year anniversary for this annual fund-raising event and honored Boomer and Gunnar Esiason. The Celestial Ball is a CF-focused partnership between individuals, local businesses, and Cincinnati Children's. Both the Esiasons and Cris Collinsworth were on hand as more than 1,300 friends of Cincinnati Children's came together in celebration of the medical center. The event's fundraising totaled $1 million, and honoree Boomer Esiason presented a $1 million check from the Boomer Esiason Foundation to make this a $2 million dollar event for Cincinnati Children's.

Clinical Research Programs

The Pulmonary Medicine division has among the highest number of clinical research studies at Cincinnati Children's, with the initiation of more than 30 trials since 2012 in a wide variety of disciplines, including cystic fibrosis, asthma, sleep disorders, and prenatal-related lung diseases.

Current trials and studies are focused on a number of pulmonary-related questions and disorders, including:

- novel treatments and monitoring tools for cystic fibrosis
- understanding the role of gut-derived hormones in sleep disordered breathing
- new ways to monitor lung function in children with myopathies
- phenotyping of asthma patients with severe disease
- development of learning platforms for the care of children with chronic lung diseases
- expansion of human lung cells and tissues to develop personalized model systems for drug testing
- defining the microbiome of the upper and lower airway of children with cystic fibrosis
- utilizing emerging gene-sequencing techniques to identify and track bacterial infections in patients with various pulmonary disorders
- determining the role of bone-marrow-derived cells in driving lung injury and fibrosis
- defining the long-term effects of prematurity on lung development and risk of disease

The basic and clinical research program in the Pediatric Pulmonary Medicine division is rapidly expanding and provides an integrated approach with clinical care to improve our understanding and treatment of critical lung diseases.

Significant Publications

Clancy JP, Dupont L, Konstan MW, Billings J, Fustik S, Goss CH, Lymp J, Minic P, Quittner AL, Rubenstein RC, Young KR, Saiman L, Burns JL, Govan JR, Ramsey B, Gupta R, Arikace Study Group. Phase II studies of nebulised Arikace in CF patients with Pseudomonas aeruginosa infection. *Thorax*. 2013 68;(9):818-25.

Arikace is a liposomal amikacin preparation for aerosol delivery with potent *Pseudomonas aeruginosa* killing and prolonged lung deposition. This study examined the safety and efficacy of 28 days of once-daily Arikace in cystic fibrosis (CF) patients chronically infected with *P. aeruginosa*. Subjects were evaluated in double-blind, placebo-controlled studies. Primary outcomes included safety and tolerability. Secondary outcomes included lung function, *P. aeruginosa* density in sputum, and the Cystic Fibrosis Quality of Life Questionnaire-Revised. The adverse event profile was similar among Arikace and placebo subjects. An open-label extension for 28

days followed by 56 days off over six cycles confirmed durable improvements in lung function and sputum *P. aeruginosa* density. Once-daily Arikace demonstrated acute tolerability, safety, biologic activity and efficacy in CF patients with *P. aeruginosa* infection.

Madala SK, Edukulla R, Phatak M, Schmidt S, **Davidson C**, Acciani TH, Korfhagen TR, Medvedovic M, Lecras TD, Wagner K, **Hardie WD**. Dual targeting of MEK and PI3K pathways attenuates established and progressive pulmonary fibrosis. *PloS One*. 2014 Jan 27;9(1):e86536.

Pulmonary fibrosis is often triggered by an epithelial injury resulting in the formation of fibrotic lesions in the lung, which progress to impair gas exchange and ultimately cause death. Although activation of MAPK and PI3K pathways have been detected in human fibrotic lung samples, the therapeutic benefits of in vivo modulation of these two pathways in combination are unknown. Overexpression of TGFα in the lung epithelium of transgenic mice results in the formation of fibrotic lesions similar to those found in human pulmonary fibrosis, and inhibitors of either the MAPK or PI3K pathway can alter the progression of fibrosis. The objective of this study was to determine whether simultaneous inhibition of the MAPK and PI3K signaling pathways is a more effective therapeutic strategy for established and progressive pulmonary fibrosis. Inhibiting both pathways had additive effects compared to inhibiting either pathway alone in reducing fibrotic burden, including reducing lung weight, pleural thickness, and total collagen in the lungs of TGFα mice. This study demonstrated that inhibiting MAPK and PI3K in combination abolished proliferative changes associated with fibrosis and myfibroblast accumulation and thus may serve as a therapeutic option in the treatment of human fibrotic lung disease where these pathways play a role.

Seid M, Margolis PA, Opipari-Arrigan L. Engagement, peer production, and the learning healthcare system. *JAMA Pediatrics*. 2014 Mar;168(3):201-2.

Physicians deliver about half of indicated care, and patients do about half of what it takes to stay healthy, despite the best intentions and tireless efforts of both physicians and patients. The learning healthcare system (LHS) has been proposed as a solution. As envisioned by the Institute of Medicine, an LHS would “generate and apply the best evidence for the collaborative healthcare choices of each patient and provider, drive the process of discovery as a natural outgrowth of patient care, and ensure innovation, quality, safety, and value in healthcare.” However, this model begs the questions: Who is learning? And how? Traditional models suppose that highly trained experts—expert clinicians and expert researchers—are best suited for producing information, knowledge, and know-how. This reliance, however, on a small group of experts to improve health care and health outcomes has yielded the current system performance and impedes immediate, continuous, and transformative improvement. A new model of production is necessary.

Suzuki T, Mayhew C, Sallese A, Chalk C, Carey BC, Malik P, **Wood RE**, Trapnell BC. Use of induced pluripotent stem cells to recapitulate pulmonary alveolar proteinosis pathogenesis. *Am J Respir Crit Care Med*. 2014 15;189(2):183-93.

In patients with pulmonary alveolar proteinosis (PAP) syndrome, disruption of granulocyte/macrophage colony-stimulating factor (GM-CSF) signaling is associated with pathogenic surfactant accumulation from impaired clearance in alveolar macrophages. The aim of this study was to overcome these barriers by using monocyte-derived induced pluripotent stem (iPS) cells to recapitulate disease-specific and normal macrophages. iPS cells were generated from children with hereditary PAP (hPAP) caused by recessive CSF2RA(R217X) mutations and normal people, differentiated into macrophages (hPAP-iPS-Mφs and NL-iPS-Mφs, respectively), and evaluated for macrophage functions with and without gene-correction to restore GM-CSF signaling in hPAP-iPS-Mφs. Both hPAP and normal iPS cells had human embryonic stem cell-like morphology, expressed pluripotency markers, formed teratomas in vivo, had a normal karyotype, retained and expressed mutant or normal CSF2RA genes, respectively, and could be differentiated into macrophages with the typical

morphology and phenotypic markers. Compared with normal, hPAP-iPS-Mφs had impaired GM-CSF receptor signaling and reduced GM-CSF-dependent gene expression, GM-CSF- but not M-CSF-dependent cell proliferation, surfactant clearance, and proinflammatory cytokine secretion. Restoration of GM-CSF receptor signaling corrected the surfactant clearance abnormality in hPAP-iPS-Mφs. Patient-specific iPS cells were used to accurately reproduce the molecular and cellular defects of alveolar macrophages that drive the pathogenesis of PAP in more than 90% of patients. These results demonstrate the critical role of GM-CSF signaling in surfactant homeostasis and PAP pathogenesis in humans and have therapeutic implications for hPAP.

Wang W, Nguyen NM, Guo J, **Woods JC** . Longitudinal, noninvasive monitoring of compensatory lung growth in mice after pneumonectomy via (3)He and (1)H magnetic resonance imaging. *Am J Respir Cell Mol Biol*. 2013 49; (5):697-703.

In rodents and some other mammals, partial pneumonectomy (PNX) of adult lungs results in rapid compensatory lung growth. In the past, quantification of compensatory lung growth and realveolarization in animal models could be accomplished only after euthanasia, removal of lungs, and histologic analysis of lungs at single time points. Hyperpolarized (3)He diffusion magnetic resonance imaging (MRI) allows in vivo morphometry of human lungs, and this technique has been adapted by the authors for application to mouse lungs. Through imaging, maps of lung microstructural parameters that allow quantification of morphometric and physiologic measurements can be obtained. In this study, the (3)He MRI technique was used to image in vivo morphometry at baseline and serially assess compensatory growth after left PNX of mice. Compared with the individual mouse's own baseline, MRI was able to detect and serially quantify changes in lung volume, alveolar surface area, alveolar number, and regional changes in alveolar size that occurred during the course of post-PNX lung growth and were consistent with morphometry measurements reported in the literature for mouse post-PNX compensatory lung growth. Serial assessment and quantification of changes in the physiologic parameter of lung compliance during the course of compensatory lung growth also was performed. With these techniques, a noninvasive, in vivo method to serially assess the effectiveness of therapeutic interventions on post-PNX lung growth in the same mouse has been described.

Division Publications

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2. Chang YV, Quirk JD, Ruset IC, Atkinson JJ, Hersman FW, Woods JC. **Quantification of human lung structure and physiology using hyperpolarized 129Xe**. *Magn Reson Med*. 2014; 71:339-44.
3. Cheepala SB, Bao J, Nachagari D, Sun D, Wang Y, Zhong TP, Naren AP, Zheng J, Schuetz JD. **Crucial role for phylogenetically conserved cytoplasmic loop 3 in ABCC4 protein expression**. *J Biol Chem*. 2013; 288:22207-18.
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11. Fleck R, McPhail G, Szczesniak R, Knowlton J, Radhakrishnan R, Clancy J, Amin R. **Aortopulmonary collateral flow in cystic fibrosis assessed with phase-contrast MRI**. *Pediatr Radiol*. 2013; 43:1279-86.
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13. Goldstein SL, Kirkendall E, Nguyen H, Schaffzin JK, Bucuvalas J, Bracke T, Seid M, Ashby M, Foertmeyer N, Brunner L, Lesko A, Barclay C, Lannon C, Muething S. **Electronic health record identification of nephrotoxin exposure and associated acute kidney injury**. *Pediatrics*. 2013; 132:e756-67.
14. Grossoehme DH. **Overview of qualitative research**. *J Health Care Chaplain*. 2014; 20:109-22.
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18. Grossoehme DH, Szczesniak R, Dodd C, Opipari-Arrigan L. **Dyadic Adjustment and Spiritual Activities in Parents of Children with Cystic Fibrosis**. *Religions*. 2014; 5:385-401.
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20. Jain SV, Simakajornboon N, Arthur TM. **Central sleep apnea: does stabilizing sleep improve it?**. *J Child Neurol*. 2014; 29:96-8.
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barriers to care experienced by youth with type 1 diabetes. *J Pediatr*. 2014; 164:1369-75 e1.
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Faculty, Staff, and Trainees

Faculty Members

Raouf Amin, MD, Professor

Leadership Director, Division of Pulmonary Medicine;; Endowed Chair, Hubert and Dorothy Campbell Professorship in Pediatric Pulmonology

Research Interests Cardiovascular morbidity of sleep apnea in children

Thomas Boat, MD, Professor

Leadership Executive Associate Dean, University of Cincinnati College of Medicine

Ronald Bokulic, DO, Associate Professor

Lisa Burns, MD, Assistant Professor

Research Interests CF Transition of Care;Pulmonary Vascular Disease

Barbara Chini, MD, D-ABSM, FAAP, Associate Professor

Leadership Director, Pulmonary Fellowship Program; Associate Director, Cystic Fibrosis Center; Medical Director, A7C1

Research Interests Sleep Disordered Breathing, Outcomes Research, Self-Management of Chronic diseases

John P. Clancy, MD, Professor

Leadership Thomas Boat Endowed Chair; Director, Clinical and Translational Research

Research Interests Airway and epithelial biology, examining novel targets to treat cystic fibrosis;

Zackary Cleveland, Ph.D., Assistant Professor

Joseph Crisalli, MD, Assistant Professor

Research Interests Pediatric Sleep, Exercise Physiology

Daniel Grossoehme, DMin, BCC, Associate Professor

Research Interests Religion/ spirituality, adherence, coping, cystic fibrosis

William Hardie, MD, Professor

Leadership Director, Pulmonary Function Laboratory

Research Interests Molecular mechanism of pulmonary fibrosis, pediatric pulmonary function tests, pediatric pneumonia complications

Patricia Joseph, MD, Professor

Research Interests Cystic fibrosis infections and quality improvement

Carolyn Kercsmar, MD, Professor

Leadership Co-Director, Division of Pulmonary Medicine; Director, Asthma Center

Research Interests Asthma, inner city asthma, clinical outcomes and clinical trials, airway inflammation

Satish Madala, PhD, Assistant Professor

Research Interests Immunoregulatory Mechanisms in pulmonary inflammation and fibrosis; Stromal cell contribution in pulmonary fibrosis

Karen McDowell, MD, Associate Professor

Leadership Director, Infant Pulmonary Function Laboratory

Research Interests Asthma self management, utilization of technology for chronic disease management, bronchoscopy and wheezing/asthma, health care effectiveness, outcomes.

Gary McPhail, MD, Associate Professor

Leadership Director, Cystic Fibrosis Center; Associate Director, Fellowship Training Program

Research Interests Cystic fibrosis, quality improvement, clinical outcomes, pulmonary vascular disease

Anjaparavanda Naren, PhD, Professor

Research Interests Cystic fibrosis; secretory diarrhea.

Hemant Sawnani, MD, Assistant Professor

Research Interests Pulmonary Management of children with Neuromuscular diseases; sleep disordered breathing in Duchenne Muscular Dystrophy; Infant Apnea; Obstructive Sleep Apnea; Outcomes in Sleep Medicine

Marc Schecter, MD, Associate Professor

Leadership Medical Director, Pediatric Lung Transplant Program

Research Interests Risk factors affecting transplant outcomes and the impact of transplant procedures on recipients'quality of life.

Michael Seid, PhD, Professor

Leadership Director, Health Outcomes and Quality of Care Research

Research Interests Health outcomes for children with chronic health conditions, interventions to overcome barriers to care and adherence, clinical behavior and effects on self-management, quality improvement research

Abu Shamsuzzaman, MD, Assistant Professor

Research Interests Sleep and Cardiovascular Diseases

Narong Simakajornboon, MD, Professor

Leadership Director, Sleep Disorders Center; Director, Sleep Medicine Fellowship Program

Research Interests Sleep-disordered breathing in children, sleep apnea, restless legs syndrome, periodic limb movement disorders

Cherie Torres-Silva, MD, Assistant Professor

Research Interests Biomarkers in bronchoalveolar lavage and Pulmonary Outcomes in childhood cancer survivors

Robert Wood, PhD, MD, Professor

Leadership Director, Pulmonary Bronchology Program

Research Interests Airway abnormalities; pulmonary alveolar proteinosis

Jason Woods, Ph.D., Professor

Leadership Director, Pulmonary Imaging Research Center

Research Interests Pulmonary MRI, translational imaging, and image-guided pulmonary interventions

Joint Appointment Faculty Members

Kelly Byars, PsyD, Associate Professor (Psychology)

Research Interests Current research focuses on improving the assessment and treatment of pediatric insomnia and pediatric obstructive sleep apnea

Rhonda Szczesniak, PhD, Assistant Professor (Biostatistics & Epidemiology)

Research Interests Current areas of interest are Mixture Models and Functional Data Analysis with focus on Bayesian statistics, primarily using Markov Chain Monte Carlo. Content-specific areas include integration of fMRI and MEG modalities; developing statistical models to assess impact of OSA; CF outcomes research

Bruce Trapnell, MD, Professor (Neonatology and Pulmonary Biology)

Nanhua Zhang, M.D., Assistant Professor (Biostatistics & Epidemiology)

Research Interests Missing data;comparative effectiveness; clinical trial design; meta-analysis; scale development; joint modeling; environmental health; community-based intervention; health disparity; behavioral intervention; health psychology

Clinical Staff Members

- **Moutazz Abdulhadi, RPSGT**,
  PSG Tech/RRT III
- **Rosalynn Allie, RRT**,
  RT I
- **Denetra Bamonte, RRT, RPSGT**,
  PSG Tech III
- **Sallie Bauer, RRT, RPSGT**,
  PSG Tech III
- **Laura Bellew, RN**,
  Nurse Coordinator
- **Walter Blower, RRT**,
  Resp Therapist III
- **Marsha Blount, CNP**,
  Certified Nurse Practitioner
- **Kelli Brock, MA**,
  Medical Assistant II
- **Ginger Browning, RRT, BS**,
  Airway Clearance Specialist
- **Johnny Bryant, RRT, RPSGT**,
  PSG Tech
- **Carolyn Burrows, CNP**,
  Certified Nurse Practitioner
- **Monica Chapman, RN**,
  Nurse Coordinator
- **Jessica Co, CNP**,
  Certified Nurse Practitioner

- **Amy Cole, RRT, RPSGT**,
  Clinical Manager
- **Adrienne Conrad, RRT**,
  PSG Tech/RRT
- **Mindy Copens,** ,
  Patient Care Assistant
- **Lisa Corlett, RT**,
  PSG Tech/RRT
- **Shannon Deidesheimer, RN**,
  Nurse Coordinator
- **Guido DiMarco, LSW**,
  Social Worker III
- **Geri Dinkins, RN**,
  Care Manager
- **Catherine Disney, RT**,
  PSG Tech !!
- **Melodie Dixon, RRT, RPSGT**,
  PSG Tech III
- **Amanda Dressman, CNP**,
  Certified Nurse Practitioner
- **Lori Duan, RN**,
  Clinical Manager
- **Rebekah Dunning, RRT**,
  RT II
- **Julie Feldstein, RRT, CPFT**,
  RTIII
- **Karla Foster, MS**,
  Exercise Physiologist
- **Shanda Furnish,** ,
  PSG Tech Asst
- **Janice Gramke, RN**,
  Nurse Coordinator
- **Chuck Grone, RT**,
  RT III
- **Neepa Gurbani, DO**,
  Staff Physician
- **Robin Hamilton, RN**,
  Clinical Director
- **Joann Harmeyer, RRT, RPSGT**,
  Education Specialist I
- **Amanda Hatfield, RRT**,
  PSG Tech III
- **Samantha Hollandsworth, MA**,
  Medical Assistant II
- **Jami Johnson, CNP**,
  Certified Nurse Practitioner
- **Marion Johnson, RRT**,
  PSG Tech II
- **Robin Johnson, RRT**,
  PSG Tech I

- **Shannon Johnson, RN**,
  Clinical Manager
- **Sharon Kadon, RN**,
  Nurse Coordinator
- **Michelle Kaiser, RRT**,
  RRT III
- **Amanda Kelly, RRT**,
  PSG Tech
- **Michelle Kleinhenz, RRT**,
  PSG Tech II
- **Beth Koch, RRT, RPFT**,
  Clinical Manager
- **Margaret Landers, RRT, RPSGT**,
  PSG Tech III
- **Denise Leonard, RN**,
  Care Manager
- **Jean Luchini, RN**,
  Nurse Coordinator
- **Janice MacBrair, CNP**,
  Certified Nurse Practitioner
- **Julie Malkin, CNP**,
  Certified Nurse Practitioner
- **Holly Malone,** ,
  PSG Tech Asst
- **Patricia Manaster, RN**,
  REgistered Nurse
- **Carrie Martin, CNP**,
  Certified Nurse Practitioner
- **Karin Mauser, RN**,
  Registered Nurse II
- **Susan McCarthy, RRT, RPSGT**,
  PSG Tech III
- **Carolyn McHendry, RT**,
  RT II
- **Connie Meeks, RN**,
  Care Manager
- **Jamie Miller, LSW**,
  Social Worker
- **Alyssa Mohr, RN**,
  Nurse Coordinator
- **Steve Moore, RN**,
  Clinical Coordinator
- **Susan Moore, LSW**,
  Social Worker
- **Abigail Motz, RT**,
  RT II
- **Whitney Niles,** ,
  PSG Tech Asst
- **Patricia Norton, RN**,
  Clinical Program Manager

- **Andrea O'Brien, Ph.D, MSW, LSW**,
  Social Worker II
- **Laura Ogilby, RRT**,
  RT II
- **Teresa O'Hara, RN**,
  Care Manager
- **Kenneth Olding, RT**,
  PSG Tech/RRT
- **John Pack, RRT**,
  RT III (Bronch)
- **Jennifer Parson,** ,
  PSG Tech
- **Grace Pestian, RD**,
  Registered Dietician
- **Rebecca Quarles, RN**,
  Care Manager
- **Jeanne Race, RN**,
  Registered Nurse II
- **Steven Reimondo, RT**,
  PSG Tech/RRT
- **Melissa Rice, CNP**,
  Certified Nurse Practitioner
- **Rachel Sackenheim, MSW, LSW**,
  Social Worker
- **Valerie Sackenheim, RN**,
  Nurse Coordinator
- **Kathy Santoro, RD, LD**,
  RD III
- **Jennifer Schaber, RT**,
  PSG Tech/RRT
- **Kary Schmale, RN**,
  Nurse Coordinator
- **Leah Seals, RD**,
  Registered Dietician
- **Joshua Shannon, RT**,
  RT II
- **Erika Skovmand, RT**,
  PSG Tech II
- **Dusti Snider, RN**,
  Registered Nurse
- **Dianne Stratton, RRT**,
  RT II
- **Jackie Taylor, RD, LD**,
  RD III
- **Jenetta Thomas, RN**,
  Nurse Coordinator
- **Sarah Thomas, CNP**,
  Certified Nurse Practitioner
- **Karin Tiemeyer, RN**,
  Care Manager

- **Stephanie Torrens, RN**,
  Registered Nurse
- **Simone Urbach, CNP**,
  Certified Nurse Practitioner
- **Tracey Van Vliet, CNP**,
  Certified Nurse Practitioner
- **Aarthi Vemana, M.D.**,
  Staff Physician
- **Allison Volpenhein,** ,
  PSG Tech Asst
- **Brittany Waddle, CNP**,
  Certified Nurse Practitioner
- **Mark Washam, CNP**,
  Certified Nurse Practitioner
- **Debbie Webster, BA, RRT, RPSGT**,
  RRT II
- **Tonya Weddle, RRT**,
  PSG Tech II
- **Jeanne Weiland, CNP**,
  Certified Nurse Practitioner
- **Erin Wells, RN**,
  Transplant Care Manager
- **Jenny Werder, RN**,
  Care Manager
- **Kathy Witschger, RRT**,
  RT II
- **Lilianna Wooten, CNP**,
  Certified Nurse Practitioner
- **Brenda Young, RRT**,
  PSG Tech

Trainees

- **Dan Benscoter, DO**, PL-8, Geisinger Medial Center
- **John Brewington, MD**, PL-5, Cincinnati Children's Hospital Medical Center
- **Justin Brockbank, MD**, PL-6, Virginia Comm. Univ. Medical Center
- **Thomas Dye, MD**, PL-6, Cincinnati Children's Hospital Medical Center
- **Zarmina Ehsan, MBBS**, PL-5, Indiana University
- **Annette Lopez, MD**, PL-4, University of Arizona Tucson, Arizona
- **Oscar Rodriguez, MD**, PL-7, St. Louis Children's Hospital Medical Center
- **Geoffrey Rulong, M.D, MPH**, PL-4, Children's Hospital of the Kings Daughter Norfolk, VA
- **Christopher Siracusa, MD**, PL-5, Akron Children's Hospital

Division Collaboration

Treatment of chronically ill children with complex airway, pulmonary, upper digestive tract, sleep and feeding disorders.
(Robert Wood, MD, PhD)

Aerodigestive and Sleep Center » Raouf Amin, MD, Dan Benscoter, D.O., Cherie Torres-Silva, MD, and Robert Wood, MD, PhD

Treatment of children with neuromuscular disorders. This collaboration focuses on the development of an integrated neuromuscular program as well as clinical research activities characterizing cardio-pulmonary interactions in DMD.
(Hemant Sawnani, MD)

Comprehensive Neuromuscular Center » Raouf Amin, MD and Hemant Sawnani, MD

The Asthma Center has developed and implemented best practices that have significantly improved the percentage of children with well-controlled asthma. The center also leads important research into understanding the causes of asthma and improving treatment.
(Carolyn Kercsmar, MD; Karen McDowell, MD, Theresa Guilbert, MD)

Asthma Center » Carolyn Kercsmar, MD, Theresa Guilbert, MD, and Karen McDowell, MD

The Cystic Fibrosis Research Program examines the underlying cause of CF and novel treatment strategies.
(JP Clancy, MD; Anjaparavanda Naren, PhD; Michael Seid, PhD; Satish Madala, PhD)

Cystic Fibrosis Research » Raouf Amin, MD, Barbara Chini, MD, John P. Clancy, MD, Gary McPhail, MD, Anjaparavanda Naren, PhD, and Bruce Trapnell, MD

Pulmonary Fibrosis Research investigates lung injury and disease and the repair of damaged tissues.
(William Hardie, MD; Satish Madala, PhD)

Pulmonary Fibrosis Research » William Hardie, MD and Satish Madala, PhD

Diagnosis and management of children with rare lung diseases, including interstitial lung diseases, surfactant mutations, lung development disorders, lymphatic disorders and chronic lung diseases associated with immunodeficiency/immune dysfunction, rheumatologic disorders and other systemic disorders.
(Christopher Towe, MD)

Rare Lung Disease Center » Raouf Amin, MD and Bruce Trapnell, MD

Craniofacial Team. Helps children born with head and/or facial abnormalities who require care from many specialists. The Center follows children through each stage of treatment, usually beginning after birth and continuing through adolescence
(Barbara Chini, MD)

Craniofacial Team » Barbara Chini, MD

The Spine Center assembles a world-class team of experts to diagnose and treat early onset scoliosis and other spine conditions.
(Gary McPhail, MD)

Crawford Spine Center » Raouf Amin, MD and Gary McPhail, MD

The Sleep Center offers multidisciplinary assessment and management to help children with sleep problems get the sleep they need to stay healthy. The Sleep Center offers services for serious sleep disorders in two outpatient clinics, as well as in an inpatient sleep laboratory, where sleep patterns are studied more in depth.
(Narong Simakajornboon, MD; Hemant Sawnani, MD; Joseph Crisalli, MD; Barbara Chini, MD; Gary McPhail, MD; Kelly Byars, PsyD)

Sleep Center » Raouf Amin, MD, Kelly Byars, Psy.D., Barbara Chini, MD, Joseph Crisalli, MD, Gary McPhail, MD, Hemant Sawnani, MD, and Narong Simakajornboon, MD

Lung Transplant Center is a multi-disciplinary activity that synergizes surgical and medical specialties to transplant lung and or heart/lungs from donors to patients who have severe pulmonary-related disorders.
(Marc Schecter, MD; Christopher Towe, MD)

Lung Transplant Center » Raouf Amin, MD and Marc Schecter, MD

Upper Airway Center-Provides care coordination for patients suffering from upper airway abnormalities requiring intervention from multiple services.
(Raouf Amin, MD; Barbara Chini, MD; Joseph Crisalli, MD)

Upper Airway Center » Raouf Amin, MD, Barbara Chini, MD, Joseph Crisalli, MD, Gary McPhail, MD, Narong Simakajornboon, MD, and Dan Benscoter, D.O.

Our cystic fibrosis program is one of the largest in the US and is a major center for research to develop a new generation of more effective therapies.
(Gary McPhail, MD; Raouf Amin, MD; Lisa Burns, MD; JP Clancy, MD; Barbara Chini, MD; Patricia Joseph, MD)

Cystic Fibrosis Center » Raouf Amin, MD, Gary McPhail, MD, JP Clancy, MD, Benscoter, Dan, Bokulic, Ronald E., Carolyn Kercsmar, MD, Barbara Chini, MD, William Hardie, MD, Karen McDowell, MD, Hemant Sawnani, MD, Miachel Seid, PhD, Rhonda Szczesniak, PhD, Daniel Grossoehme, DMin, Jeanne Weiland, CNP, and Amanda Dressman, CNP

Cardiomyopathy Clinic. Studying arterial structure function in sleep apnea.
(Lisa Burns, MD)

Cardiomyopathy Clinic » Raouf Amin, MD and Hemant Sawnani, MD

The Division of Asthma Research partners with the Pulmonary Asthma Center to form the Cincinnati Children's Asthma Program to improve the health of children with asthma by integrating the evidence-based clinical care with innovative research that will lead to personalized asthma therapy for children living in the Greater Cincinnati area.
(Carolyn Kercsmar, MD; Karen McDowell, MD, Theresa Guilbert, MD)

Asthma Research » Theresa Guilbert, MD, Carolyn Kercsmar, MD, and Karen McDowell, MD

Collaboration with Epidemilogy and Biostatistics and Pulmonary Medicine on extramural grants and publications for asthma, neuromuscular dystrophy, cystic fibrosis, rare lung disease and sleep apnea research. Rhonda Szczesniak and Nanhua Zhang oversee the Pulmonary Biostatistical Core, which acts to advance all facets of pulmonary research through biostatistical consulting and collaboration with excellence in education, collaborative research and methodologic research.
(Rhonda Szczesniak, PhD; Nanhua Zhang, PhD)

Epidemiology and Biostatistics » Raouf Amin, MD, JP Clancy, MD, Daniel Grossoehme, DMin, Carolyn Kercsmar, MD, Gary McPhail, MD, Michael Seid, PhD, Abu Shamsuzzaman, MD, Narong Simakajornboon, MD, and Jason Woods, PhD

The Pulmonary Imaging Research Center is developing novel ways to assess lung conditions while reducing the need for invasive surgical biopsies.
(Jason Woods, PhD; Zachary Cleveland, PhD)

Pulmonary Imaging Center » Raouf Amin, MD, Jason Woods, PhD, and Zachary Cleveland, PhD

Grants, Contracts, and Industry Agreements

Grant and Contract Awards		Annual Direct

AMIN, R

Passive Stretch of the Chest Wall in Patients with Congenital Muscular Dystrophy
National Institutes of Health

R34 HL 113390	08/01/13-05/31/15	$252,587

Pediatric Sleep Research Program
National Institutes of Health

K24 HL 078989	03/01/11-02/29/16	$139,466

AMIN R / FLECK R / GUTMARK I / SHOTT S

Dynamic Computational Modeling of Obstructive Sleep Apnea in Down Syndrome
National Institutes of Health

R01 HL 105206	09/17/10-08/31/15	$702,133

BREWINGTON, J

Clinical Fellowship Training Grant
Cystic Fibrosis Foundation

	07/01/13-06/30/15	$48,000

CLANCY, J

CFF Research Development Program
Cystic Fibrosis Foundation

R457-CR11	03/01/12-06/30/15	$380,144

Whitsett, J	Transgenic Core	$50,000
Hogan, S	Pilot & Feasibility Project	$65,000
Szczesniak, R	Pilot & Feasibility Project	$65,000
Hoebe, K	Pilot & Feasibility Project	$65,000

CFF Therapeutics Development Center
Cystic Fibrosis Foundation Therapeutics, Inc

CLANCY14Y0	01/01/13-12/31/15	$140,968

MR Predictors of Infection, Inflammation, and Structural Lung Damage in CF
National Institutes of Health

R01 HL 116226	09/26/12-06/30/16	$375,937

CFFT Biomarker Consortium
Cystic Fibrosis Foundation Therapeutics, Inc.

CLANCY11CS0	01/01/2014-12/31/2014	$23,232

GROSSHOEME, D

Parental Adherence to CF Homecare: Research Chaplaincy Career Commitment
National Institutes of Health

K23 HD 062642	08/13/10-05/31/15	$91,029

HARDIE, W

Ruth L. Kirschstein National Research Service Award Short-Term Institutional Research Program
National Institutes of Health

T35 HL 113229	05/01/12-04/30/16	$50,255

Biomarkers of Immunologic Function and Preterm Respiratory Outcomes
National Institutes of Health

U01 HL 101800	05/01/10-04/30/15	$111,771

HEUBI, J

Baby Observational and Nutritional Supplement (BONUS) Study
Cystic Fibrosis Foundation Therapeutics, Inc(Seattle Children's)

	12/01/10-04/30/15	$14,592

MADALA, S

Molecular Mechanisms of TGF (alpha)-driven Pulmonary Fibrosis
Parker B. Francis Fellowship Program

	07/01/13-06/30/16	$50,000

Role of TGFa-induced Fibrocytes in Pulmonary Fibrosis and Pulmonary Hypertension
American Heart Association

12SDG9130040	01/01/12-12/31/15	$70,000

The Role of IL-31 in TH2 Cytokine-Driven Systemic Sclerosis
National Institutes of Health

R03 AR 062832	06/17/13-05/31/16	$50,000

MCPHAIL, G

Cystic Fibrosis Center Program Accreditation And Funding
Cystic Fibrosis Foundation

	07/01/13-06/30/18	$118,320

NAREN, A

Inhibition of an Apical cAMP/cGMP Transporter (MRP4) in the Gut Induces Diarrhea
National Institutes of Health

R01 DK 080834	09/18/13-03/31/18	$222,205

LPA2 Receptor-Containing Complexes in Regulating Secretory Diarrhea
National Institutes of Health

R01 DK 093045	08/01/13-06/30/15	$184,126

Stabilizing Macromolecular Complexes of Mutant CFTR at the Plasma Membrane
Cystic Fibrosis Foundation

	08/01/13-12/31/13	$13,875

SEID, M

FL3X: An Adaptive Intervention to Improve Outcomes for Youth with Type I Diabetes
National Institutes of Health(University of North Carolina)

UC4 DK 101132	09/15/13-06/30/18	$260,098

WOODS, J

Evaluation of Endobronchial Interventions for COPD via CT and 3He MRI
National Institutes of Health

R01 HL 090806	08/28/13-07/31/14	$146,617

Regulatory Advancement of HXe as a Diagnostic MRI Contrast Agent
National Institutes of Health(Xemed, LLC)

R44 HL 087550	02/01/13-01/31/15	$98,112

Severe Asthma Research Program
National Institutes of Health(Washington University)

U10 HL 109257	02/01/13-05/31/17	$5,586

Single-Session Bronchial Thermoplasty for Severe Asthmatics Guided by Hxe MRI
National Institutes of Health(Xemed, LLC)

R44 HL 112397	08/22/13-07/31/14	$83,395

Current Year Direct **$3,632,448**

Industry Contracts

CLANCY, J

Genentech, Inc.	$12,000
Seattle Children's Hospital	$22,221
Gilead Sciences, Inc.	$75,990
Synedgen	$1,666
Vertex Pharmaceutical Incorporated	$132,581
KaloBios Pharmaceuticals, Inc.	$64,833
N30 Pharmaceuticals	$83,234

SIMAKAJORNBOON, N

Jazz Pharmaceuticals	$50,004

Current Year Direct Receipts **$442,529**

Total **$4,074,977**