The Center of Excellence for Deployment-Related Lung Disease
Annual Report to Peter and Jeanne Sullivan, The Sergeant Sullivan Fund
Submitted by Center Co-Director Dr. Richard Meehan
Oct 2, 2026

Patient Care

- To date, the National Jewish Health (NJH) Center of Excellence for Deployment-Related Lung Disease has seen approximately 450 patients (including active duty and retired post-9/11 service members and military contractors), and over 400 have consented to participate in the Center's deployment-related lung disease research database and/or biorepository. Over the past year, we have seen 41 new patients and 61 follow-up patients through the Center, including submariners, a new group of interest.

- We continue to hold regular multidisciplinary combined clinical research and patient care conferences for symptomatic deployers who have been evaluated at NJH and at the Denver VA Medical Center (VAMC). Faculty and staff attend these case conferences from Pulmonary, Occupational Medicine, Rheumatology, Thoracic Radiology and Pathology from both clinical research sites. We have also hosted case presentations from other sites including the VA Medical Center at the University of Michigan and from the VA New Jersey Health Care System. These conferences are held as a hybrid model for both in-person at NJH and via zoom for sites joining remotely.

- **Dr. Cecile Rose** remains director of the Center for Deployment-Related Lung Disease at National Jewish Health, and **Dr. Richard Meehan** remains Co-Director. She and **Dr. Jeremy Hua** (both board certified occupational pulmonologists and NJH faculty) evaluate and care for previously deployed patients. Physician Assistant **Richard Kraus** PA-C works with both Center physicians to also provide clinical diagnosis, care and benefits counseling (e.g., NEXUS letters for PACT Act benefits and referrals to Veteran Service Organizations).

- **Dr. Silpa Krefft** remains head of the Post-Deployment Respiratory Health Program and attending occupational pulmonologist at the Rocky Mountain Regional VA Medical Center (RMR VAMC)/VA Eastern Colorado Health Care System (ECHCS), one of six VA centers designated as a Post-Deployment Cardiopulmonary Evaluation Network center. Dr. Krefft also is Principal Investigator of the VA-funded Longitudinal Evaluation of Southwest Asia Asthma Patient Cohort (LEAP2), which examines the clinical course, phenotypes, exposure determinants, and treatment outcomes of deployment-related asthma. She also collaborates on studies evaluating L-citrulline as a potential treatment for deployment-related asthma, the MAS-EXPAND study examining lung cancer screening beyond smoking history alone while measuring military and occupational exposure histories and other lung cancer risk factors, and research investigating epithelial injury, inflammation, and impaired airway repair in deployment-related lung disease. Together, these projects span therapeutics, early cancer detection, and mechanisms of exposure-related lung injury.

- She has an ongoing part-time faculty Associate Professor appointment at NJH, and she remains a key participant in the Deployment-related Lung Disease Center of Excellence research activities.

Research Activities

Publications (manuscripts and abstracts) in the last 10 months relevant to deployment-related respiratory diseases (with Center faculty and staff names in bold):

Richmond BW, Alahmad B, Baird CP, Blanc PD, Ciminera P, Falvo MJ, Fan VS, Franklin M, Gutor SS, Hart JE, Hines SE, Hoisington A, Jaspers I, Jones KD, Kheradmand F, **Krefft SD**, Lewin-Smith MR, Maccarone JR, Osterholzer JJ, Polosukhin VV, Rabin AS, Redlich CA, **Rose C**, Savitz DA, Saers J, Sotolongo AM, Surolia R, Woskie SR, **Zell-Baran L**, Garshick E. "Deployment-Related Respiratory Health: Bridging the Gap between Clinical and Epidemiological Associations and Disease Mechanisms. An Official American Thoracic Society Workshop Report." Ann Am Thorac Soc. Published online June 26, 2026. doi: https://doi.org/10.1093/annalsats/aaoag166

Zell-Baran L, **Hua J**, **Krefft S**, Mohning M, Wohlfarth K, Moore C, **Rose C**. "Using a standardized interpretation tool and statistical clustering to inform cardiopulmonary exercise testing interpretation and application" Society of Epidemiologic Research (SER). June 24, 2026; accepted for poster presentation.

Hua JT, Farah WH, **Rose CS**, Kellermeyer L, **Zell-Baran LM**. Silicosis and silica dust sampling in mineral mining across 30 countries: a systematic review and meta-analysis BMC Public Health. 2026 Mar 21;26(1):1407. doi: 10.1186/s12889-026-27032

Cillay J, Sandrin B, Bull TM, Farrell A, Thurman B, **Zell-Baran L**, **Krefft SD**, Lahm T, Cornwell WK, Forbes LM. "Pulmonary Vascular Response to High-Intensity Interval Training in Deployment-Related Respiratory Disease: A Pilot Clinical Trial." Annals of the American Thoracic Society, 2026; aaoaf037. doi: https://doi.org/10.1093/annalsats/aaoaf037

Alexander T, Falvo MJ, Wilhite DP, Osterholzer JJ, Richmond BW, Cassady SJ, Schneider DJ, **Krefft S**, Glick DR, Sotolongo AM, Hines SE, Arjomandi M. Comparative analysis of VO2 prediction equations using a novel web-based application: an illustrative example in formerly deployed military veterans. Front Physiol. 2026 Mar 12; 17:1771831. doi: 10.3389/fphys.2026.1771831.

Hua JT, Zell-Baran LM, Cool CD, Krefft SD, Go LHT, Cohen RA, Majka SM, **Rose CS.** **"**Quantitative lung particulate analysis links increased anthracotic pigment burden to burn pit exposure in post-9/11 veterans with distal lung disease" Sci Rep. 2025 Dec 17;15(1): 43992.doi: 10.1038/s41598-025-27793-1.

Robinson R, **Hua JT**, Lee B, Villegas K, Gaboyan S, **Rose CS**, Lin CM, Golts E, Yung G, Akins T, Gaissert C, Malles C, Gloria AM, Afshar K. "One-year lung transplantation outcomes for engineered stone countertop workers with silicosis at a single center in Southern California, 2019 to 2023" JHLT Open. 2025 May 5; 9:100280. doi: 10.1016/j.jhlto.2025.100280. eCollection 2025"

Research Grants relevant to Deployment Related Respiratory Diseases (DRRD)

Group on Lung Injury from Deployment Exposures (GLIDE) studies:
Following the first Department of Defense (DOD)-funded GLIDE study, **Drs. Downey and Rose** were recipients of a DOD-funded Peer Reviewed Medical Research Program (PRMRP) Expansion Award titled "Innate Immunity and Deployment-Related Lung Diseases." A main study objective was to determine if upper airway samples obtained non-invasively (via nasal brushing and induced sputum) show comparable results to immune cells obtained by bronchoscopy and then characterize the immune reactively of these cells to various airborne pollutants and dust from deployer samples compared to individuals who have not deployed to Southwest Asia. Study scientists are analyzing innate immune cells from samples of bronchoalveolar lavage cells, nasal and bronchial epithelial brushings as well as induced sputum samples from deployed veterans and matched controls. All study sample collection is complete, with analysis and manuscript preparation in progress.

Lung Clearance Index (LCI) studies:
At NJH, we completed recruitment of previously deployed military personnel and published several studies on findings from LCI testing. We continue to recruit a scleroderma patient cohort for LCI testing (ClinicalTrials.gov ID: NCT04535245), a group at risk for small airways inflammation/bronchiolitis. We plan a combined analysis of the healthy control and deployer cohorts from NJH and the VA, where Dr. Krefft has collected additional longitudinal LCI data.

- Previously, **Drs. Zell-Baran, Krefft and Rose** demonstrated that LCI is a useful screening tool for small airways disease, examining 71 symptomatic deployers and 103 healthy controls, and then conducted a one-year pilot study with funding from the Mountain and Plains Education and Research Center to look at longitudinal LCI and spirometry outcomes in deployers and healthy controls. Baseline data were published in Respiratory Medicine in 2021 (https://doi.org/10.1016/j.rmed.2020.106281), and longitudinal data were presented at the American Thoracic Society (ATS) Conference in 2024.
- **Dr. Silpa Krefft** is the PI for an ongoing RMR VAMC longitudinal study titled "Clinical Markers and Monitoring of Post-9/11 Deployment Lung Diseases" under the auspices of the Deployment Longitudinal Evaluation and Assessment Program (LEAP). Two-hundred thirty-eight study participants including Southwest Asia-deployed veterans with and without lung disease have been enrolled and monitored for symptoms, pulmonary function, lung clearance index testing, and blood tests to investigate mechanisms of molecular inflammation. Study enrollment and data collection is complete. Dr. Krefft and her study team are completing data analysis and have submitted a final report. We also plan to combine this data with the data collected at NJH to examine longitudinal outcomes in a larger cohort with plans to publish findings from this cohort with the next year.
- **Dr. Richard Meehan** is PI on HS-3471 "Lung Clearance Index (LCI) measurement to determine pre-clinical airway involvement in scleroderma patients without lung disease as a risk factor for developing ILD". We have enrolled 4 new subjects in the last 12 months and are continuing to enroll additional study patients.

Southwest Asia deployment-related asthma (SWA DRA):

- DRA clinical trial: **Drs. Rose, Krefft and Zell-Baran** are collaborating with Dr. Fernando Holguin at the University of Colorado (CU) Denver Anschutz Medical Campus on a 5-year DoD-funded clinical trial titled "Study to Improve Deployment related Asthma by using L-citrulline Supplementation (SEALS)" that is exploring the utility of this treatment in study subjects with deployment-related asthma. This multi-

site study is actively enrolling subjects from CU, NJH and the RMR VAMC/VA ECHCS. Across the three sites, 56 participants have been randomized and 45 have completed the study so far, with enrollment ongoing.

- 2nd Deployment Longitudinal Evaluation and Assessment Program (LEAP 2): In August 2025, **Dr. Krefft** received a four-year MERIT award through the RMR VAMC to extend clinical research under the auspices of "LEAP 2." The major focus of this project, which launched in mid-2026, is to 1) compare clinical and biological characteristics of SWA DRA in veterans to a community adult-onset asthma cohort and identify clinical predictors of disease severity in SWA DRA; 2) determine how air quality/particulate matter impacts disease severity in SWA DRA and adult-onset asthma in a non-deployed population; and 3) elucidate immunologic processes impacting disease severity in SWA DRA. This study commenced on 04/01/2026 and will continue through 03/31/2030.

Deployment exposures and autoimmunity:
Dr. Meehan is continuing a fourth-year VA-funded literature meta-analysis using AI technology with Drs. Michael Falvo and Scott Parrott at the VA in New Jersey and Rutgers University. Their study focuses on the potential role of airborne hazards during military deployment in subsequent development of various autoimmune diseases: rheumatoid arthritis, systemic sclerosis, inflammatory bowel disease (Crohn's disease, ulcerative colitis), ankylosing spondylitis and inflammatory myopathies (polymyositis and dermatomyositis).

Patterns and mechanisms of exercise limitation following military deployment:
Dr. Zell-Baran was awarded the Boettcher Foundation Webb-Waring Biomedical Research Award for young investigators in 2024. Her 3-year funded project will improve our understanding and the value of cardiopulmonary exercise testing (CPET) by identifying patterns of exercise limitation among deployed military veterans with disabling respiratory symptoms. These findings will lay the groundwork for personalized and effective exercise-based treatment interventions for veterans.

- In the first year, she worked with a Master of Public Health Student to turn 280 CPET tests that were stored as 20+ page PDF reports into a usable database. Meanwhile, Drs. Krefft, Rose, Hua, and Mohning helped develop a standardized CPET scoring system, which has now been used to categorize all of the CPETs based on primary and second exercise impairment patterns. Each test was scored by two of the three reading physicians (Krefft, Hua, Mohning) and tie break scoring is now complete. These scores will serve as the "gold standard" for comparison to an artificial intelligence or data reduction-based analysis approach to categorizing the raw data in the newly developed CPET database. Preliminary findings from this analysis were presented at the Society of Epidemiologic Research meeting in June 2026, with additional analysis and manuscript preparation on-going.
- In a subset of symptomatic deployers with a mitochondrial dysfunction pattern identified via CPET (n=31), we worked with the University of Colorado Metabolomics Core to analyze central redox metabolites in stored serum compared to 27 symptomatic deployed controls. We found generally higher levels of poly-unsaturated and saturated fatty acids in veterans with mitochondrial dysfunction, suggesting impaired fatty acid oxidation capacity of mitochondria. We then applied to the NJH Central Biobank to obtain stored serum from healthy controls of similar age, sex, and smoking status as the deployers with mitochondrial dysfunction. We identified 29 samples for use as a more distinct control group in follow-up analysis. Updated statistical analysis are underway with a new collaborator, Elizabeth Wynn in

the Center for Genes, Environment and Health, with a manuscript expected in the coming months.

***Deployment exposures in lung cancer screening studies**:*
Drs. Krefft and **Rose** collaborated with Dr. Jennifer Lewis, an oncologist specializing in lung cancer screening and treatment at Vanderbilt University/VAMC, to assist the MAS-EXPAND research team in modifying their questionnaire to collect information on military occupational and deployment exposures to lung carcinogens. The MAS-EXPAND Lung Cancer Screening Cohort study is a national, multisite Department of Veterans Affairs-based study that seeks to expand lung cancer screening eligibility, reduce the time to lung cancer diagnosis, and increase veteran engagement. Study aims include enrolling a prospective experimental cohort of 1400 veterans ages 50-80 years old with any pack-year history of smoking including those with an additional risk factor such as military exposures to burn pits, or exposure to other carcinogens/risk factors (e.g., Agent Orange, radiation, diagnosis of chronic obstructive pulmonary disease, personal history of tobacco-related cancer, family history of lung cancer) who will be screened annually with low-dose chest computed tomography to detect lung cancer early. This group will be compared to a historical comparator group of 1400 veterans who meet traditional United States Preventive Services Task Force lung cancer screening guidelines. The study will also complete a subgroup investigation of whether the combination of a blood-based biomarker and radiomics can expedite lung cancer diagnoses with fewer biopsy procedures. **Drs. Krefft, Rose,** and **Zell-Baran** are continuing to build this research collaboration focused on improving measurement and exposure assessment of military occupational and deployment exposures in lung cancer risk and screening studies. A joint MERIT application is in development related to this work with planned submission for the Spring 2026 VA Research Grant cycle.

Chronic rhinosinusitis in deployed military veterans:
With senior mentorship from **Dr. Silpa Krefft** and research collaboration from **Drs. Hua, Zell-Baran** and **Rose**, **Dr. Connor Massey** submitted a VA Career Development proposal to increase understanding of how inhalational deployment exposures experienced by military personnel deployed to Southwest Asia (SWA) and Afghanistan, influence chronic rhinosinusitis (CRS) disease severity and characteristics. Dr. Massey's proposal represents the first rhinologist surgeon-scientist leading deployment-related airway research at the VA and describes the first systematic study of CRS phenotype and endotype in a post-deployment Veteran population.

Utility of the Individual Longitudinal Exposure (ILER) database compared to self-reported exposure in characterizing hazardous exposures affecting deployed veterans:
Drs. Zell-Baran and Krefft (with consultation from **Dr. Rose**) are working with a Colorado School of Public Health MPH student and active-duty military member, Victoria Robinson, on a research capstone project. She proposes to evaluate how well exposure information documented in the Individual Longitudinal Exposure Record (ILER) aligns with self-reported military and deployment exposure data collected in REDCap from Navy and Marine Corps Veterans enrolled in our current research studies. The project will focus on whether ILER captures the same deployments, occupations, locations, and specific exposure experiences reported by participants, and will identify areas where the two data sources agree, differ, or provide complementary information. The capstone could help determine the strengths and limitations of ILER for respiratory research and inform a larger study using LEAP or other Veteran cohorts.

Education, Outreach, Advocacy and Presentations

- We regularly update our Center for Deployment-Related Lung Disease website at NJH (https://www.nationaljewish.org/center-for-deployment-related-lung-disease/overview) to share findings from our current research projects and facilitate potential subject recruitment.
- Our **team** met at NJH on June 1, 2026, with Mr. David Bozarth of the SAG (Submariners' Advocacy Group) to discuss research priorities of former submariners who have concerns about health effects related to underseas service which are not covered under the PACT ACT. We continue to have an email dialogue with this group and are clinically evaluating a growing number of submariners who have a variety of respiratory medical conditions. So far, Dr. Rose, Mr. Kraus, and Dr. Hua have seen 4 submariners with lung disease. The next plan is to prepare a draft occupational history for submariners to submit to SAG for their review and feedback.
- Dr. Brian Day presented "Pro-inflammatory and oxidative responses to burn pit relevant desert particulate matter in macrophages: A role for TLR2 signaling" on Nov 14, 2025, at the AHBPCE Journal Club via zoom to multiple institutions.
- Kieran Wolfarth, MPH, a mentee of Dr. Zell-Baran, presented "Identifying Gas-Exchange Exercise Impairment in Previously Deployed Military Personnel and Examining Associations with Deployment Exposures" at the Colorado School of Public Health Capstone Forum in Aurora, CO on May 8, 2026.
- Dr. Jeremy Hua gave a poster presentation on "New onset Work-Related Asthma in two Navy Submariners" at the AsMA (Aerospace Medical Association) Annual Scientific Meeting in Denver, CO, May 21, 2026.
- Dr. Meehan and Dr. Donald Bross gave a presentation titled "The Crucible of Innovation: Military Origins of Modern Medicine" at MOAA (Military Officers Association of Colorado) in Boulder, CO on June 15, 2026.
- Dr. Zell-Baran led a poster presentation "Using a standardized interpretation tool and statistical clustering to inform cardiopulmonary exercise testing interpretation and application" at the Society of Epidemiologic Research meeting in Phoenix, AZ on June 24, 2026.
- The Center continues its work that contributed to the acknowledgement in the PACT Act of the link between lung disease and toxic exposures in during deployments in post-9/11 wars. Major contributions include assisting Act implementation by proposing classification criteria for the spectrum of lung diseases and including impactful novel clinical research at the Denver VA by Dr Krefft by means of participation in scientific symposium and presentations including:
    - Chair of scientific symposium "Earth, Wind, and Fire: Translational Lessons from a Changing Pulmonary Exposome" that include 3 presentations related to deployment-related respiratory disease at the American Thoracic Society International Conference in Orlando, FL, on May 20, 2026.
    - Presenting preliminary research findings from Department of Defense/War-funded study "Epithelial Repair Dysfunction in the Pathogenesis of Deployment Related Lung Disorders" to research participants at the VA-sponsored "Deployment Lung Disease Retreat" at the Rocky Mountain Regional VAMC in Aurora, CO, on September 10, 2026.
    - "From Recognition to Mechanism: The Evolving Story of Deployment-Related Lung Disease" at the Marvin Schwarz Early Career Alumni Lectureship & Celebration at the University of Colorado Anschutz Medical Campus in Aurora, CO, on September 3, 2026.

- "Smoke, Sand, and Service: Burn Pits and COPD After Military Deployment" at the Pittsburgh International Lung Conference in Pittsburgh, PA, on September 17, 2026.

Team & Infrastructure 2025-2026

Physicians, PhD scientists and research staff involved in current NJH research efforts include: **Drs. Cecile Rose (Director), Richard Meehan (Co-director), Jeremy Hua, Silpa Krefft, Camille Moore and Lauren Zell-Baran. Richard Kraus PA-C** continues to see deployers in clinic and support clinical research efforts. Dr. Krefft continues her clinical practice and funded clinical research studies at the RMR VAMC where she is director of the Deployment Respiratory Health Clinic. Pulmonary pathologist, **Dr. Carlyne Cool,** attends our DRRD case conferences and is an active research collaborator on the histopathologic features in military veterans with respiratory symptoms. NJH Thoracic Radiologist **Dr. Seth Kligerman** attends Occupational Medicine case conferences and provides expert lung imaging for symptomatic deployers seen in our Center. **Tayla Lange** and Research Coordinator **Nicholas Bark**er are key staff members on the Center's team, supporting clinical, research and administrative needs of the program. **Rahel Seyfou**, MPH, joined our team in June 2026 as a junior epidemiologist to assist with analyses and study management as our research needs continue to evolve. GLIDE collaborators including **Drs. Greg Downey, Max Seibold, Elizabeth Wynn,** and **Jamie Everman** continue to meet regularly to complete data analysis from the original GLIDE study and prepare manuscripts for publication. Study coordinator **Michael White** is a Clinical Research Center staff member involved in study subject recruitment and testing for the DOD-funded SEALS study exploring the use of a novel treatment for veterans with deployment-related asthma seen at CU, NJH and RMR VAMC/VA ECHCS. **Drs. Massey** and **Robinson** represent the new generation of academic researchers focused on deployment-related respiratory diseases and hazardous exposures.

Sgt. Sullivan Fund Partnership

Thanks to the Sgt. Sullivan Fund and its devoted supporters, the Center's research, training, and compassionate care for veterans continue to grow and make a lasting impact. Your generosity makes this progress possible, bringing healing, discovery, and hope to those who have served our nation.

On October 15th, 2026, we honor the birthday of Sgt. Thomas Joseph Sullivan and celebrate the 11th anniversary of the Fund and its enduring partnership with the Center of Excellence for Deployment Related Lung Disease at National Jewish Health. For more information about the Center of Excellence for Deployment-Related Disease or the Sgt. Sullivan Fund, please contact Kelly Ferris at FerrisK@NJHealth.org or 703-508-7064.