AIRBORNE HAZARDS AND BURN PITS
CENTER OF EXCELLENCE

Airborne Hazards and Burn Pits Center of Excellence

5-Year Report

JUNE 2024

VA | U.S. Department of Veterans Affairs

TABLE OF CONTENTS

Airborne Hazards and Burn Pits Center of Excellence — 5-Year Report

01

WELCOME

1.1

Letter from the Co-Directors

The Airborne Hazards and Burn Pits Center of Excellence (AHBPCE) was built upon the concerns of Veterans who were exposed to environmental hazards while deployed. The significance of the AHBPCE lies in its integration of research and clinical care, where research continually informs clinical practices and vice versa. This approach not only ensures that our Veterans receive state-of-the-art assessments but also contributes significantly to the ongoing efforts of the VA health care priority to serve Veterans with military environmental exposures.

For five years, the AHBPCE has been leading the field with significant milestones, including the achievement of a consensus for diagnostic criteria on Deployment-Related Respiratory Disease, the establishment of the Post Deployment Cardiopulmonary Evaluation Network (PDCEN), and the creation of the Living Evidence Analysis Program (LEAP) in collaboration with Health Outcomes Military Exposures (HOME). We continue to advance research initiatives like the Oscar Auerbach Visiting Scholar Program for VA investigators studying the prevalence of cancers and other diseases among Veterans who have added their information to the Airborne Hazards and Open Burn Pit Registry (AHOBPR). Our efforts to educate both VA and non-VA providers on emerging best practices in caring for Veterans with exposure concerns is always ongoing.

While celebrating our past achievements, we are driven by the sentiment that there is much more to be done in better understanding and improving care for Veterans with deployment-related health concerns. Now and in the future, we are committed to advocating for Veterans who have concerns about potential adverse health outcomes related to airborne hazard exposures.

Anays Sotolongo
MD

Michael Falvo
PhD

1.2

Who We Are

The Airborne Hazards and Burn Pits Center of Excellence, located at the New Jersey War Related Illness and Injury Study Center (NJ WRIISC), was officially recognized by Congress and the President in Public Law 115-929 as a VA Center of Excellence in May 2019.

The Center focuses primarily on:

- Clinical and translational research related to airborne hazards and burn pits
- Specialized evaluations and diagnostic approaches to unexplained shortness of breath and other respiratory conditions
- Detection of emerging patterns in health conditions using data from the Airborne Hazards and Open Burn Pit Registry
- Education that involves developing and disseminating best practices that can improve health outcomes for Veterans

We are advocates for Veterans who have concerns about potential adverse health outcomes related to airborne hazard exposures. Through ongoing research and clinical work, we seek to understand and find solutions for these exposure-related health issues. Through education and outreach, we present information to providers and Veterans on our findings that can lead to better evaluation, management, and care.

02

OUR HISTORY

2.1

AHBPCE and the PACT Act

The PACT Act is sweeping legislation passed in 2022 that expands and strengthens health care and benefits for Veterans exposed to burn pits, Agent Orange, and other toxic substances. This law helps us provide generations of Veterans—and their survivors—with the care and benefits they have earned and deserve.

The PACT Act grants health care eligibility to more than 5 million Veterans.
It is the most significant expansion of benefits and services for toxic-exposed Veterans in more than 30 years.

Through research and education, the AHBPCE furthers the goals of the PACT Act by informing the care that VA is required to provide. The work done at and through the Center also helps VA at large accurately diagnose and support Veterans with exposure concerns.

2.2

5-Year Flashback

2019

April

Designated Center of Excellence

Launch of Post Deployment Cardiopulmonary Evaluation Network

2020

January

Addressing COVID-19 pandemic

October

Launch of AIMES Collaboration

November

Launch of pilot research project program

2021

January - March

Systematic review of asthma/ sinusitis/rhinitis

April

Systematic review for asthma/ sinusitis/rhinitis informs presumptive decisions

August

Establishment of AHOBPR data sharing processes

Visit from Secretary of VA

December 2021- January 2022

Consensus panel on constrictive bronchiolitis

2022

February

First PechaKucha research day

August

PACT Act signed into law

HOME-LEAP project

September

Power BI/Data Analytics development starts

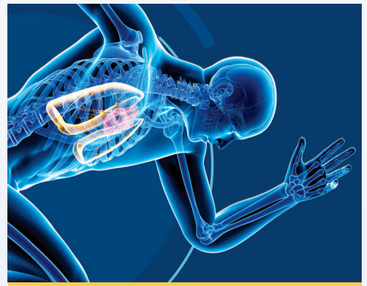
October

Took over AHOBPR daily operations

PDCEN Nashville expansion

December

DRRD toolkit



2023

March

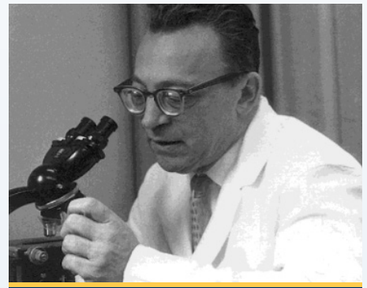
CHEST publication on definition consensus for constrictive bronchiolitis

September

Control group projects (Michigan, Nashville)

October

Dr. Wilhite/Applied Pulmonary Physiology Laboratory (APPL)



2024

January

Control group project (San Francisco)

February

Visiting Scholar Program

March

Veterans education project

June

AHOBPR 10-year symposium

See acronym list in appendix.

03

FOCUS AREAS

3.1

Research

AHBPCE researchers are committed to improving the diagnosis, management, and treatment for Veterans facing health concerns related to airborne hazard exposures. Using data from the VA Airborne Hazards and Open Burn Pit Registry, clinical evaluations, and other sources, researchers can identify questions and conduct in-depth studies that will help find answers to these concerns.

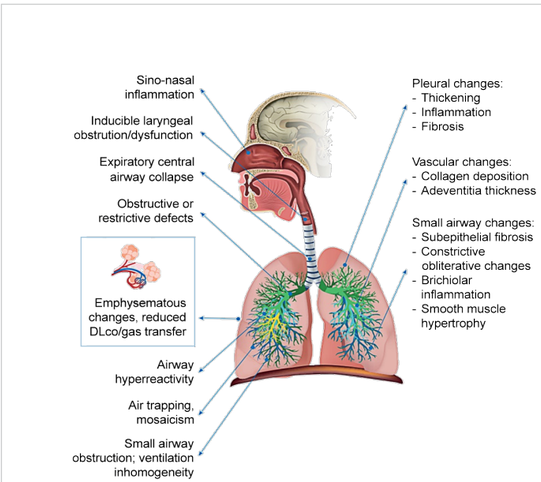
Research conducted by the Center of Excellence and other collaborators is regularly published in peer-reviewed journals and presented at national and international scientific meetings. For a full list of published research, please see the appendix.

Major Research Initiatives

CONSTRICTIVE BRONCHIOLITIS DIAGNOSIS

In collaboration with experts in pathology, radiology, and pulmonary medicine at the Joint Pathology Center, University of Maryland, and University of Michigan, respectively, AHBPCE published illustrative cases on the diagnostic approach to constrictive bronchiolitis (CB). These cases can be found published in the ***New England Journal of Medicine*** and ***Military Medicine.***

We convened a group of multidisciplinary experts (thought leaders who were conducting cutting-edge research and using novel and advanced clinical assessments in their fields) to address the difficulty in achieving consensus around the diagnosis of CB and associated terminology. After agreeing that employing the Delphi method would help to achieve consensus on the clinical



Above figure was published alongside CHEST manuscript in 2023.

approach to diagnosis and management of CB, AHBPCE awarded a contract to Eureka! Inventing in August 2021 to facilitate a modified Delphi panel. We convened an expert panel that included 19 pathologists, radiologists, pulmonologists, and environmental and occupational medicine physicians across VA, Department of Defense (DoD), and academia.

Ultimately, the panel reached consensus on the approach to diagnosing and managing CB as well as definitions and agreed upon terminology. Findings from this panel were summarized in a manuscript published in the journal ***CHEST*** in 2023. Components of the clinical evaluation were converted into a toolkit for providers that gives guidance on how to approach diagnosis and management of CB.

PRESUMPTIVE SERVICE CONNECTION FOR ASTHMA, SINUSITIS, AND RHINITIS

In response to the 2020 ***NASEM*** report that concluded there was insufficient evidence of an association between military deployment and respiratory conditions, the AHBPCE collaborated with HOME to conduct an expedited (3 months) supplemental review of the literature.

We assembled a team of 24 subject matter experts to review the civilian epidemiologic and toxicologic literature to understand the relationship between fine particulate matter exposure and asthma, rhinitis, and sinusitis. Our approach and findings were detailed in the ***Federal Register.***

Results of this review led to VA establishing presumptions of service connection through rulemaking, helping VA Secretary McDonough fulfill his pledge to deliver more care and more benefits to more Veterans than ever before. Additionally, this scientific review process laid the foundation for the new internal VA process for scientific review.

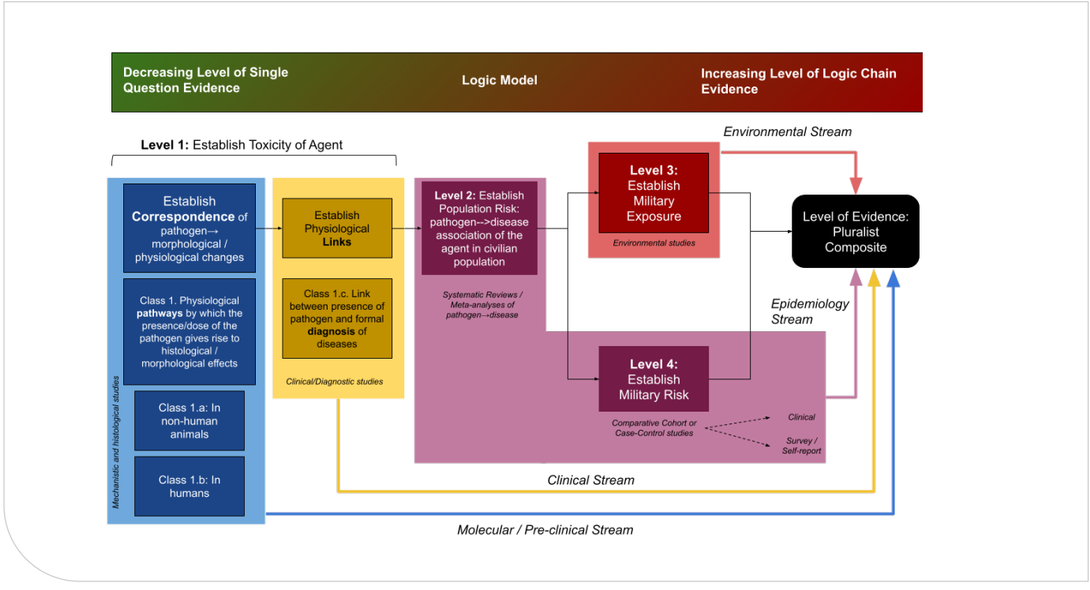
LIVING EVIDENCE ANALYSIS PROGRAM (LEAP)

A top priority for VA is to provide appropriate and timely benefits for Veterans who were exposed to military environmental hazards. To accomplish this goal, we focused on efficient evaluation of evidence for health care and policy decision-making. In collaboration with Dr. James Parrott (Rutgers University) and Health Outcomes Military Exposure (HOME), the AHBPCE developed the HOME-LEAP project.

Since August 2022, the team has developed an innovative multilevel logic model as a framework for synthesizing multiple streams of scientific evidence to provide a basis for VA decision-making. This model has been included as part of VA's improved presumptive decision process that is currently under review by the National Academies of Sciences, Engineering, and Medicine. In addition, Drs. Parrott and Falvo co-led a WRIISC-HOME webinar in March 2023, entitled "Is it Exposure-Related? Evidence Informed Clinical Decision Making," which was attended live by more than 300 people.

Dr. Falvo also recently showcased the HOME-LEAP approach at the 2024 AMSUS (The Society of Federal Health Professionals) meeting during a special symposium session highlighting work from the HOME office entitled, "VA Health Outcomes Military Exposures (HOME): Updates on PACT Act and Other Military Environmental Exposures Research."

Furthermore, an abstract summarizing the process was accepted for oral presentation at the 2024 Global Evidence Summit (to be held in Prague in fall 2024), an international collaboration between global leaders in evidence-based policy and practice (Cochrane, JBI, GIN, and the Campbell Collaboration).



Logic model developed by the HOME-LEAP program that was reviewed by the National Academies of Sciences, Engineering, and Medicine.

To support the HOME-LEAP effort and engage with graduate students interested in military exposures, we participated in the Virtual Student Federal Service (VSFS) internship program.

More than 25 VSFS and 10 non-VSFS interns from across the country have engaged with a team of scholars and subject matter experts to learn evidence analysis methodology, military exposures, pulmonology, and other specialty disciplines to screen, extract relevant data, and analyze peer-reviewed medical literature in the context of military exposures during deployment. Some of our VSFS interns were co-authors on a recent abstract

submission to the Military Health Research Symposium entitled, "Exposure to Airborne Hazards and Interstitial Lung Diseases among Deployed Soldiers: A Weight of Evidence Synthesis of the Scientific Literature."

The HOME-LEAP program has also created enhancements to the publicly available Systematic Review Data Repository, sponsored by the Agency for Healthcare Research and Quality, including incorporation of machine learning algorithms to enhance the efficiency of article screening and triaging. HOME-LEAP components have also been featured in the VA's internal process for scientific review that was recently reviewed by the NASEM.

PILOT RESEARCH PROJECT PROGRAM

The Pilot Research Project Program supports VA-affiliated investigators in the pursuit of preliminary data and/or proof-of-concept feasibility studies to develop novel research questions across the spectrum of basic, clinical, and health services research.

Applications with a strong rationale that clearly articulate both the potential impact for Veteran health as well as the near-term leveraging potential for future funding are given the highest priority. A two-tiered review system is used to evaluate each application, including external subject matter expert critique and internal programmatic review.

Research in this program includes:

- The Airway Epithelium Harbors Pathologic Epigenetic Features of Deployment-Related Lung Disease
- Detoxification Genomic Polymorphisms Impact on Reproductive Health Outcomes in Female Gulf War Veterans
- Actigraphy as a Patient-Centered Outcome for Evaluation of Dyspnea in Veterans Exposed to Airborne Hazards
- Persistent COVID-19 in Veterans with Exposure-Related Respiratory Dysfunction
- Investigating Pathogenesis and Treatment of Constrictive Bronchiolitis
- Identifying Targets for Neuroprotection Against Airborne Hazards
- High-Intensity Interval Training (HIIT) to Improve Symptoms of Deployment Related Respiratory Disease – A Pilot Study
- Mitochondrial Injury in Peripheral Blood Mononuclear Cells is a Pathologic Feature of Deployment-Related Lower Respiratory Disease
- Geographic Influence on Etiopathogenesis of Sarcoidosis Over the Life Span of AHOBPR Participants and Other VHA Users
- Examination of Sleep Architecture and Respiratory Indices in Veterans Exposed to Burn Pit Smoke
- Effectiveness of the Registry Exam on Improving Veteran Healthcare

NJIT CAPSTONE PROJECTS

The AHBPCE serves as a sponsor for the **New Jersey Institute of Technology (NJIT)** Capstone Program whereby senior-level engineering students participate in a project-based learning experience that spans two semesters.

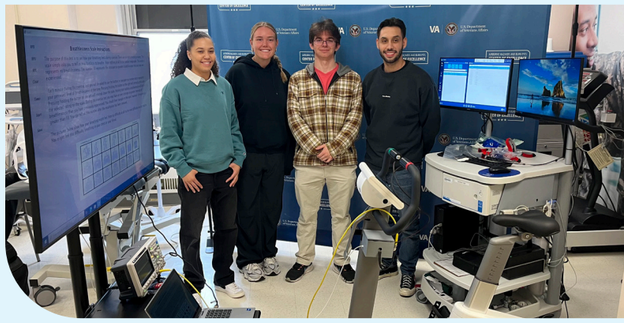
In the **2022-2023** program,

AHBPCE and NJIT students collaborated to create a device that induces dyspnea (breathlessness) while patients are in a functional MRI (fMRI).

The device, named N3VMA, is designed to control the inhalation of the subject in order to give the subject a sensation of "air hunger." Final pilot testing is currently being conducted, after which a formal human subjects research protocol will launch.

In the **2023-2024** program,

a second cohort of NJIT students have designed and are currently completing an interactive response system to allow patients who are undergoing cardiopulmonary exercise testing to reliably provide ratings of perceived breathlessness, exertion, and fatigue.



Undergraduate honors students from New Jersey Institute of Technology with the final prototype of their 'dyspnea rating device.'

Academic Collaborations

STUDYING BLAST EXPOSURE

In collaboration with Baylor University (Dr. Helmer) and Walter Reed Army Research Institute (Dr. Sajja), we will complete enrollment in spring 2024 for the project, "Lung Injury Etiology, Risk Factors, and Morbidity of Single and Repeated Low-Level Blast Overpressure Exposure" that is supported by the Congressionally Directed Medical Research Program. In support of this project, we also conducted a more focused analysis on the effects of blast exposure from our WRIISC AHBPCE clinical cohort, which was published in ***Respiratory Research*** in 2022.

- Therkorn JH, Hu S, Sotolongo AM, Christie IC, Wu TD, Van Doren WW, Sajja VS, Jani N, Klein-Adams JC, Helmer DA, Falvo MJ. Relationship between clinician documented blast exposure and pulmonary function: a retrospective chart review from a national specialty clinic. *Respiratory Research*. 2022 Jun 10;23(1):153.

EXPANDING BASIC SCIENCE EXPERTISE

We developed a collaboration with investigators at Rutgers Environmental and Occupational Health Sciences Institute (Drs. Howard Kipen and Andrew Gow) to expand our basic science research to study alterations in the inflammatory state within the lung lining or in circulation using sputum and blood, respectively. Initial results were presented at the 2020 Nitric Oxide Society Meeting. Recruitment is projected to end in spring 2024, but the preliminary results have already informed two research grant submissions (pending), and a draft manuscript is near ready for submission.

- Pappas G, Gardner C, Guo CJ, Chung E, Laskin DL, Kipen H, Falvo MJ, Gow AJ. Inflammatory status and vascular function in Veterans of burn pit exposure. Nitric Oxide Society NO 2020, Chicago, IL.

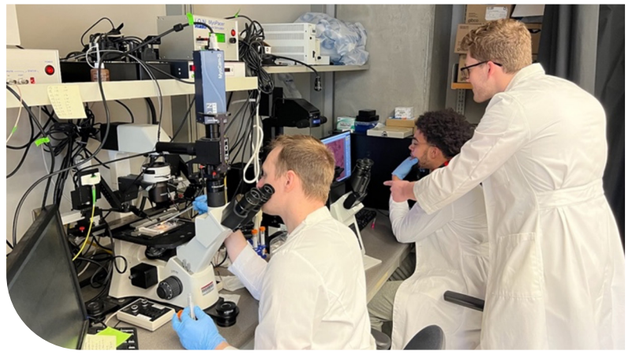
RECREATING DEPLOYMENT IN AN ANIMAL MODEL

Through a long-time collaboration with the Wold Laboratory at The Ohio State University, the AHBPCE has designed a military-relevant preclinical model that investigates the health effects of co-exposure to elevated levels of fine particulate matter (PM) and psychological stress. Researchers have manipulated the introduction of stress to mimic the effects before and during deployment. This work has been presented at national meetings and one manuscript has been published in ***Toxicology Letters*** with a second now in review.

- Aslaner DM, Saldaña TA, MacKenzie DM, O'Piela DR, Miller RA, Schwieterman NA, Falvo MJ, Gorr MW, Wold LE. Short-term PM exposure and social stress cause pulmonary and cardiac dysfunction. *Toxicology Letters*. 2022 Nov 1;370:66-73.

The AHBPCE looks to continue our collaboration with the Wold Laboratory to study inter- and transgenerational effects of preconception stress and environmental exposure, an extension of some of our earlier collaboration. The AHBPCE and The Ohio State University recently secured funding to continue this collaboration. Read more on page 36.

- Tanwar V, Adelstein JM, Grimmer JA, Youtz DJ, Katapadi A, Sugar BP, Falvo MJ, Baer LA, Stanford KI, Wold LE. Preconception exposure to fine particulate matter leads to cardiac dysfunction in adult male offspring. *Journal of the American Heart Association*. 2018 Dec 18;7(24):e010797.



The Ohio State University investigators from the Wold Laboratory examining histological samples of lung and cardiac tissue from mice co-exposed to particulate matter and stress.

PECHAKUCHA RESEARCH DAY

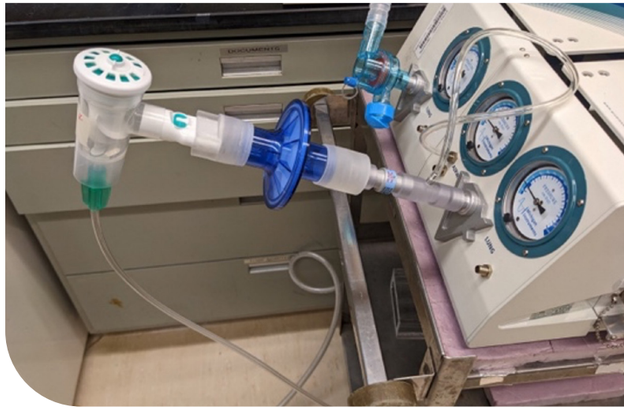
In February 2022, we held our first Airborne Hazards Research day. Academic researchers, VA physician scientists, clinicians, and our Post Deployment Cardiopulmonary Evaluation Network (PDCEN) members were invited to attend. Nine presentations were given using an innovative format known as PechaKucha (Japanese for "chit-chat"). The presentations were held to no more than 20 slides, with 20 seconds of commentary on each slide. The agenda was divided into several categories that encouraged presenters to provide details on their research in a format that allowed for a greater exchange of information and collaboration. The successful research day fostered collaboration among AHBPCE investigators, collaborators, and attendees, and we plan on this being a reoccurring event going forward.

IMPROVING DIAGNOSTIC ACCURACY OF ASTHMA IN VETERANS

In collaboration with experts in aerosol science (Drs. Gediminas Mainelis and Taewon Han from Rutgers University), this project characterizes aerosol output from different nebulizers used in the MCT challenge and tests different breathing patterns' effects on MCT delivery. The investigation specifically focuses on producing particles smaller than 5 µm by the nebulizers because they penetrate the alveolar region of the lungs to deliver MCT and other substances used for treatment and diagnosis.

Preliminary results will be presented at the 2024 American Thoracic Society meeting. The project also models the deposition of produced aerosols in the human respiratory system as a function of nebulizer type and breathing pattern. The project deliverable will be a tool to predict administered methacholine dose depending on the nebulization technique, drug concentration, and patient breathing rate.

- Mainelis G, Han TT, Falvo MJ. Performance characteristics of the Aeroeclipse II nebulizer using a lung simulator. 2024 ATS Annual Meeting, San Diego, CA.



Dr. Mainelis (Rutgers University) and colleagues developed a custom experimental approach that utilizes a lung simulator to assess nebulizer characteristics.

3.2

Education and Outreach

An important part of our work at the Airborne Hazards and Burn Pits Center of Excellence is to create and disseminate education about airborne hazard exposures and best practices in treatment—for Veterans, their health care providers, and individuals in the medical and scientific community.

Educating Providers

MILITARY EXPOSURES WEBINAR SERIES

WRIISC-HOME's monthly webinar series provides advanced training from VA subject matter experts and the most recent updates on research and clinical findings for military exposure concerns. Attended live by over 2,000 VA and non-VA learners, many reported they gained new knowledge and were able to apply this information to their work three months after the webinars. As of spring 2024, 9 webinars have been focused on airborne hazards education topics. These webinars continue to be available on demand.

MILITARY EXPOSURES CLINICAL BRIEF SERIES

WRIISC-HOME's monthly Military Exposures Clinical Brief Series interviews subject matter experts in the field of military environmental exposures and provides clinicians with quick, concrete skills related to exposure-informed care. AHBPCE experts participated in the inaugural launch of the series, conducting briefs on "Tips for Working with Veterans with Airborne Hazards Concerns" and "Registry Exams: What Clinicians and Healthcare Staff Need to Know."

MILITARY ENVIRONMENTAL EXPOSURE CERTIFICATE PROGRAM

To ensure clinicians have entry-level knowledge and competence in airborne hazards, AHBPCE experts led the development of content on airborne hazards as part of a curriculum in post-deployment health available to VHA and community providers on demand for accreditation on TMS and TRAIN. This on-demand e-learning module entitled "Airborne Hazards" continues to receive attention and distribution. From inception through March 2023, 2,806 learners have taken the continuing education activity. The module is currently going through the reaccreditation process in order to be accredited through July 2026.

The level II advanced module on airborne hazards ("Airborne Hazards and Open Burn Pit Exposures") was created as part of an advanced certification program on military environmental exposures. These include case examples and tips for applying skills to clinical work with Veterans.

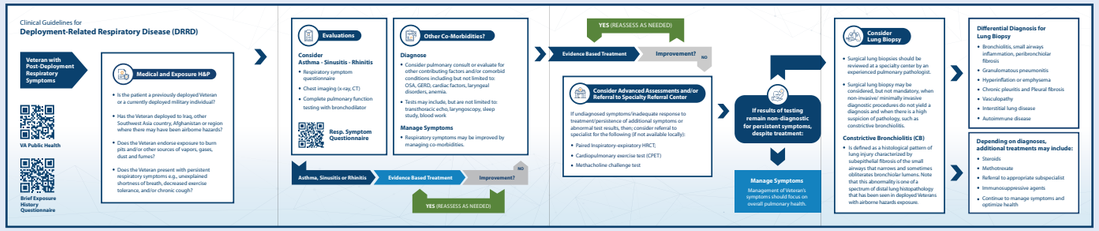
VIRTUAL DAY OF LEARNING

AHBPCE played an integral role in the WRIISC's "Interactive Day of Learning: The Basics of Military Environmental Exposures (MEEs) & Caring for Veterans with these Concerns."
This virtual, full-day training aimed to provide engaging entry-level information on military environmental exposures to ensure all clinicians are able to provide exposure-informed care. AHBPCE led a presentation on airborne hazards titled "Airborne Hazards and Burn Pits: What Healthcare Professionals Need to Know," and provided an overview of the Center of Excellence and its operations. Over 980 VA and non-VA health care professionals attended, including physicians, physician assistants, nurses, social workers, environmental health clinicians, and other behavioral health providers, educators, and administrators.

DEPLOYMENT-RELATED RESPIRATORY DISEASE TOOLKIT FOR PROVIDERS

AHBPCE created a providers' toolkit on Deployment-Related Respiratory Disease in December 2022. The toolkit was developed by eliciting feedback from clinicians who participated in our 2021 Consensus Panel on Constrictive Bronchiolitis and is meant to serve as a clinical decision guide for providers who are evaluating patients with possible respiratory exposures.

Toolkits are available in hard copy and online versions. To date, 489 hard copies have been distributed across 31 facilities and 317 digital copies have been downloaded from our website.



DRRD Toolkit for Providers

AIRBORNE HAZARDS AND OPEN BURN PITS SHAREPOINT TOOLKIT

AHBPCE partnered with WRIISC- HOME to create a toolkit on Airborne Hazards and Open Burn Pits. This toolkit is housed within the WRIISC's SharePoint site and is therefore available to all VA providers. The toolkit has collated a variety of resources on airborne hazards, the Registry, and resources for clinical evaluations and documentation in one easily accessible place.

Educating Veterans and Stakeholders

WEBSITE LAUNCH

The AHBPCE launched dedicated pages on the WRIISC website—primarily geared to the Veteran community—introducing the Center's purpose, goals, and protocol for identifying Veterans to participate in research at the study center.

The site also gives information on the AHBPCE's clinical evaluations, the PDCEN, and research and education efforts. The web pages went live on February 7, 2020, and are updated regularly with new information.

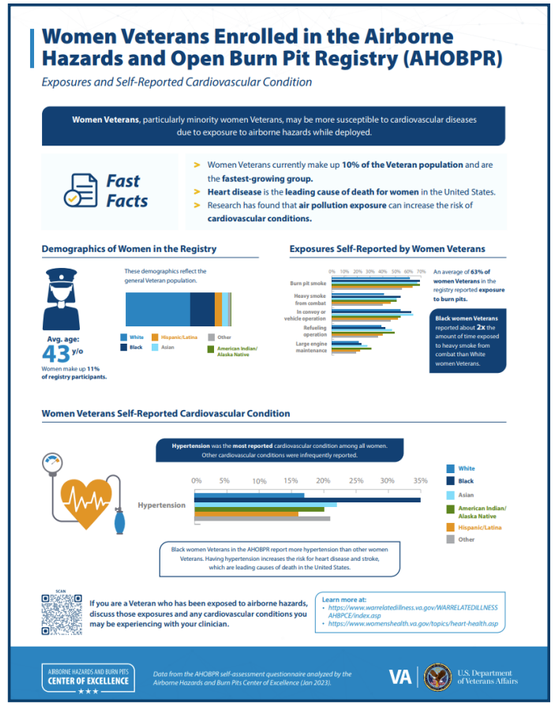
VETERAN EDUCATION CLASSES

Veterans with questions or concerns about airborne hazards can get the information they need by attending the webinar, "Airborne Hazards and Burn Pits: What You Need to Know." Content topics include defining airborne hazards, understanding exposures to burn pits/other airborne hazards, clinical effects of airborne hazards exposure, the AHOBPR, and tips on how to manage common symptoms. Nearly 2,700 Veterans have attended these Veteran education classes.

INFORMATION SHEETS

AHBPCE created and maintained information sheets and infographics for providers on airborne hazards and related topics.

These information sheets provide easily digestible information on sources of airborne hazards, the Airborne Hazards and Open Burn Pit Registry, clinical assessment of airborne hazards, and more.



AHBPCE Infographic

WRIISC ADVANTAGE NEWSLETTER

The WRIISC publishes a Veteran-facing newsletter three times per year that provides updates on exposure-related topics, including results from recently published research and education on military environmental exposures. AHBPCE has contributed articles regularly, highlighting information about airborne hazards, the Center of Excellence, and the Airborne Hazards and Open Burn Pit Registry.

The WRIISC Advantage newsletter was mailed to over 8,800 Veterans and electronically distributed to over 50,000 VA providers, Veterans, and community members.

VA NEWS PUBLICATIONS

In the last 5 years, AHBPCE has written 3 articles in VA News, a national online publication, educating the community about airborne hazards, exposure-related health concerns, and the Center of Excellence. Articles included "Teams working to care for Veterans exposed to burn pits,""From evaluation to treatment, what Veterans should know about toxic exposure," and "Scholars invited to apply to research health effects of airborne hazard exposure."

Educating the Medical and Scientific Community

PATIENT EDUCATION INFORMATION SERIES

The AHBPCE created a military burn pits fact sheet for inclusion in the American Thoracic Society's Patient Information Series and Public Health Information Series. The series includes more than 100 fact sheets on various topics related to pulmonary function and respiratory health.

PRESENTATIONS

The AHBPCE is a leader in educating the medical and scientific community on new breakthroughs in research and treatment for deployment-related respiratory issues.

Please see the appendix for a list of over 50 invited lectures and talks that have been presented at conferences and annual meetings across the country over the past 5 years.

Dr. Falvo, Dr. Hines, Dr. Sotolongo, and Dr. Krefft at the ACOEM conference in Philadelphia, PA (April 2023).

AHBPCE Co-Director Dr. Michael Falvo (second from left) spoke on a panel about military environmental exposures at the Society of Federal Health Professionals Annual Meeting (ASMUS) in February 2024.

3.3

Clinical Care

Advanced, specialty clinical evaluations are conducted for certain Veterans with self-reported health concerns through the Airborne Hazards and Open Burn Pit Registry who have then been selected or referred by clinicians at other VA facilities for in-depth clinical assessments. Information from these evaluations is used to make personalized management and treatment recommendations to guide care for individual Veterans, support research studies, and identify trends in health outcomes to improve care standards and treatment protocols.

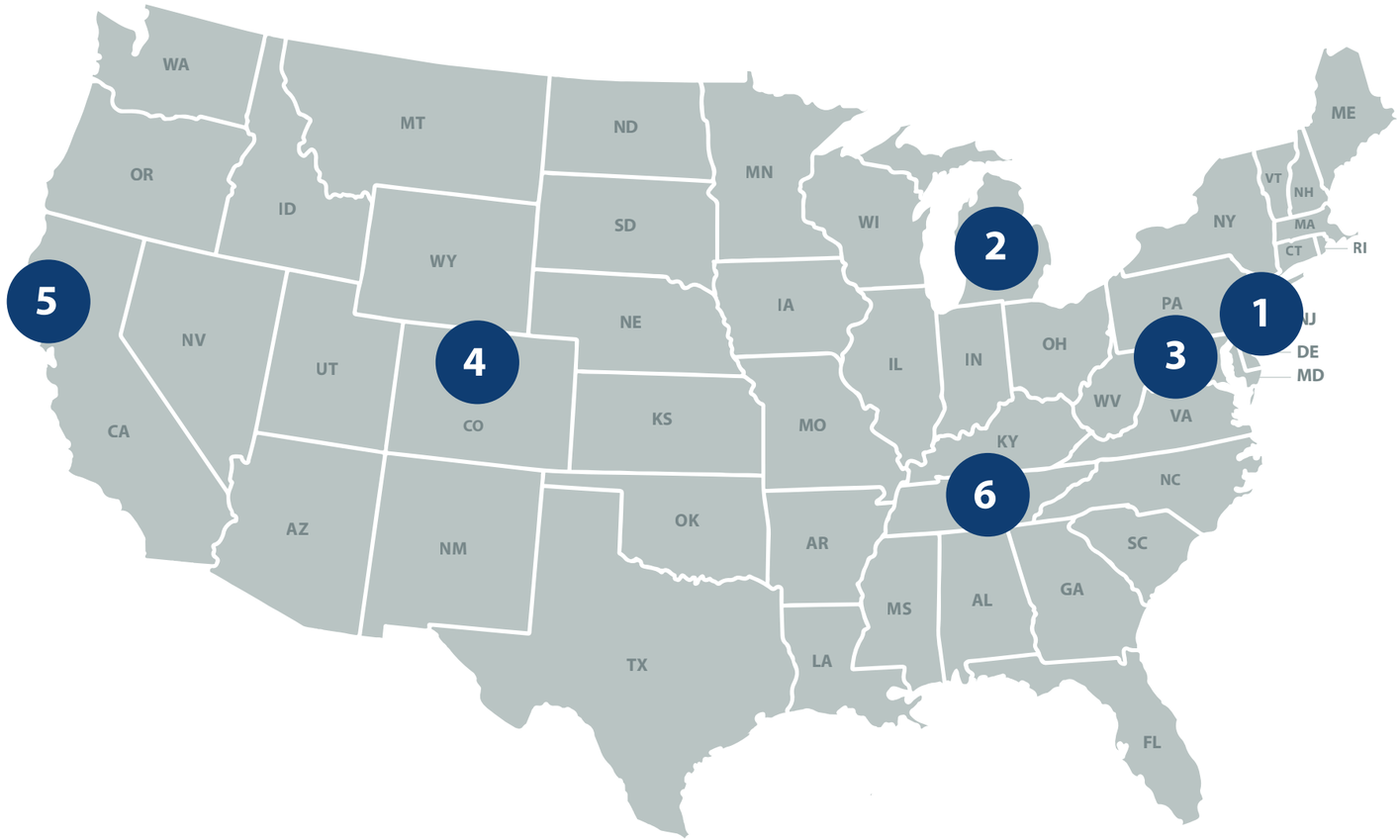
Hybrid Model of Care Delivery

In response to the COVID-19 pandemic, we transitioned to a hybrid model of care delivery that involves components able to be performed virtually (interview, history) as well as on-site physiologic assessments (lung function testing, imaging). This model emphasized reducing COVID exposure risk during the pandemic and now helps reduce the burden of travel for evaluation components that can be done through VA's exemplary telehealth systems. An increasing number of Veterans are choosing to come for in-person testing at the Center of Excellence, across our network, and at the VA New Jersey Health Care System.

Post Deployment Cardiopulmonary Evaluation Network

The Post Deployment Cardiopulmonary Evaluation Network (PDCEN) is a network of experts dedicated to furthering the understanding of deployment-related airborne hazard exposures.

The network was established by the Center of Excellence to develop clinical approaches, identify research questions, gather data, and conduct research that supports the development of new clinical care guidelines for Veterans who have been exposed to airborne hazards and burn pits.



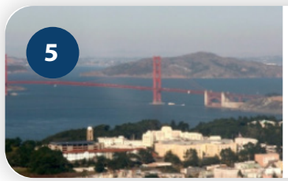
The network currently consists of the following sites:

VA New Jersey Health Care System, AHBPCE
East Orange, NJ
Site Directors: Anays Sotolongo, MD, and Michael Falvo, PhD

VA Ann Arbor Health Care System
Ann Arbor, MI
Site Director: John Osterholzer, MD

Baltimore VA Medical Center
Baltimore, MD
Site Director: Danielle Glick, MD

Rocky Mountain Regional VA Medical Center
Aurora, CO
Site Director: Silpa Krefft, MD, MPH



San Francisco VA Health Care System
San Francisco, CA
Site Director: Mehrdad Arjomandi, MD

Nashville VA Medical Center
Nashville, TN
Site Director: Bradley Richmond, MD, PhD

STANDARDIZING CLINICAL PROTOCOL

After establishing the PDCEN in FY19-20, we began to develop the infrastructure for the network over weekly meetings. This included a standardized evaluation that all PDCEN sites and the AHBPCE utilize today to enable consistent assessment of Veterans with specific health concerns, allowing us to better categorize findings and uncover trends.

Multidisciplinary specialty evaluation

Exposures, symptoms, lifestyle, behaviors

Complete PFT oscillometry methacholine challenge

Cardiopulmonary exercise testing

Polysomnography

Comprehensive lab panel

Transthoracic echocardiogram

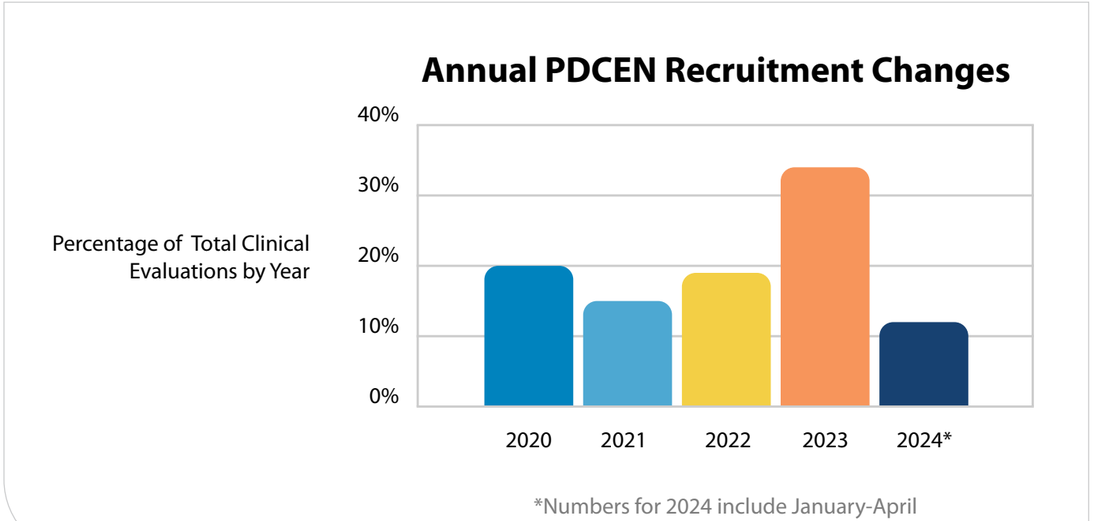
HRCT chest (inspiratory/expiratory)

Upper airway evaluation CT sinus imaging

We continue to share this standardized clinical protocol with the broader community as well as share standard operating procedures with new PDCEN staff for seamless onboarding. National coordinators provide both in-person and virtual training for local PDCEN staff to ensure consistent clinical care across sites.

PDCEN NUMBERS

These numbers represent Veterans' journey through the PDCEN clinical program from chart reviews to evaluations. Most Veterans take a minimum of 3 full days to complete their evaluation alone.



WORKING WITH THE REGISTRY

The Airborne Hazards and Open Burn Pit Registry (AHOBPR) provides an online questionnaire and optional health evaluation performed by a primary care or environmental health clinician. The PDCEN identifies Veterans whose further evaluation would benefit from ongoing research and brings them into the PDCEN location nearest to them to perform a one-time, comprehensive evaluation. Findings from each evaluation are then shared with the Center of Excellence for analysis of emerging patterns in health concerns in various cohorts and targeted information dissemination.

AHOBPR clinical evaluations represent an initial step to better understand post-deployment health conditions. The PDCEN clinical evaluation extends the AHOBPR evaluation by collecting and analyzing clinical data to advance the field and improve care for Veterans. Data from the Registry have also facilitated our ability to adapt and redesign our clinical evaluations based on trends identified in the Registry.

FURTHERING RESEARCH

In accordance with ***VA's strategic goals*** to serve Veterans with military environmental exposures, the PDCEN furthers the understanding of the effects of toxic military exposures and how they have harmed Veterans during their period of service. By expanding research efforts and collaborating with other VA agencies, the PDCEN helps to ensure Veterans will have access to the care and treatment options that will improve their quality of life, health, and well-being.

EDUCATING PROVIDERS

The PDCEN's main mission is to advance knowledge about airborne hazard-related health conditions and equip health care providers with innovative treatment protocols to best care for their Veteran patients.

VETERAN LISTENING SESSIONS

As part of our efforts to fully understand Veterans' respiratory health, we established a series of Veteran Listening Sessions to facilitate two-way communication between the Center of Excellence and Veterans who are interested in ongoing efforts surrounding the study of airborne hazards and burn pits. Our goal was to better understand Veterans' experiences, the respiratory health concerns that were most important to them, and the potential for current and future health effects. We partnered with the PDCEN to have site directors present to hear directly from Veterans who reside in their regional areas. Based on attendee interest, engagement, and feedback, we identified recommendations on how to better reach Veterans with the Center of Excellence's education materials and information.

3.4

Registry

VA established the Airborne Hazards and Open Burn Pit Registry (AHOBPR) in 2014 to put data to work for Veterans and help us understand the potential health effects of airborne hazard exposures. By joining the Registry, Veterans can provide information that supports ongoing research and surveillance. It can also help them identify potential health concerns, discuss them with their providers, and get follow-up care.

Since FY21-22, the AHBPCE has overhauled the way we interact with Veterans who sign up for the Registry. With the implementation of customer experience tools, we manage all daily operations of the Registry, including answering service member inquiries, reviewing eligibility for the Registry, and responding to general questions and technical issues.

AHBPCE was critical in developing a telehealth option for the Registry and in writing the directive for six registries. Given the ongoing concern regarding burn pits and airborne hazards exposure, we worked directly with VA Central Office to create telehealth options for Registry evaluations as a means to increase access to health care.

Since the inception of Directive 1308, we have continued to provide support both locally and nationally to educate and train primary care providers as well as environmental health clinicians and coordinators to provide care to Veterans.

Using Registry Data

In August 2023, we launched the Airborne Hazards and Open Burn Pit Clinical Dashboard in Power BI, which provides environmental health coordinators and clinicians with a tool that delivers accurate data to assist in AHOBPR participant record management. This dashboard, which is used by 370 people at 141 facilities, provides a streamlined user interface that allows for more accurate and timely data. It is ranked 32 across 16,344 reports in the organization in terms of how often it has been used in the last 30 days. An associated Microsoft Teams channel was developed to support the field and it is an active hub of communication and shared resources across VHA.

AHOBPR 1.0 CLINICAL DASHBOARD (POWER BI):

1,114 users with access

364 active users in last 30 days

254 users in the facility assignment change access group

7,734 page views in last 30 days

6,771 reports opened in last 30 days

90 facilities engaged the dashboard in last 30 days

18 VISNs engaged the dashboard in last 30 days

AHOBPR 1.0 CLINICAL DASHBOARD TEAMS CHANNEL:

1,043 members

832 active users in last 90 days

268 engagements (posts, responses, reactions, mentions) in last 90 days

*All numbers calculated from April 5, 2024

AIMES COLLABORATION

The AIMES Collaboration, a joint initiative between the AHBPCE and IQuEST, helps improve the health and care of Veterans with airborne hazards concerns. The AIMES team brings expertise in data management and analysis, implementation science, and quality improvement to the management and use of the Registry.

AIMES

AHBPCE - Airborne Hazards and Burn Pits Center of Excellence
IQuESt - Center for Innovations in Quality, Effectiveness & Safety
Military
Exposures
Surveillance

ALL ABOUT AIMES

To support the data access and analysis needs of the Center using the AHOBPR and VA medical record data, the Center of Excellence established the AIMES Collaboration.

The Center of Excellence supports AIMES to:

- Support data access and analysis needs of the AHBPCE using the AHOBPR and VA medical record data.
- Understand and improve the delivery of AHOBPR examinations across VHA.

The Center of Excellence engages AIMES to partner with VA medical centers (all 18 VISNs and 50 facilities) to improve delivery of the AHOBPR examinations through:

- Sharing best practices
- Generating and sharing site-specific data reports
- Sharing resources for implementation and quality improvement
- Consultation and support

In FY21-22, the AIMES team was asked to engage with HOME to develop novel metrics and data presentation to better communicate the status of clinical evaluations. The key metrics to identify trends in completed exams and the number of participants are pending. These reports are shared with environmental health leads at each VISN and HOME. This provides stakeholders a snapshot of exam metrics and allows them to track progress and compare their performance with other facilities and VISNs.

Based on feedback from the field, AIMES developed an implementation component to this collaboration to assist facilities and environmental health clinicians with exam completion. The team interviewed Veterans who have received the AHOBPR exam, and feedback from these interviews was vital in understanding how to optimize the benefits of the AHOBPR exams. AIMES developed a toolkit and started implementing best practices with the Michael E. DeBakey VA Medical Center (Houston, TX) as the pilot site. Overall, more than 40 parent VA facilities have accessed AIMES implementation team expertise.

The AIMES Collaboration team is initiating a comprehensive review of its implementation facilitation and audit and feedback efforts through data analysis and examination of run charts of facility and VISN completion of AHOBPR exams. It is also compiling lessons learned about the implementation effort to share with VA leadership and the field. These findings will inform a needs assessment to identify persistent gaps in knowledge and skills, and possible education and training solutions to address those residual gaps.

RESEARCH UNDER THE REGISTRY

The Registry has been invaluable in guiding our research. For example, through Registry analysis we first reported an independent relationship between blast exposure and respiratory symptoms. Our researchers utilize data from the Registry to identify trends that could lead to further research questions and studies or provide clinical implications. Integrating data from the Registry enhances the work we are able to do to understand the long-term effects of airborne hazard exposures.

In FY21-22, the AHBPCE established a process to expand access to AHOBPR data while ensuring the privacy and confidentiality of Veterans' personal health information. Qualified investigators associated with VA may request access to AHOBPR data for both research and operational purposes. Data requests are submitted through a two-step application process. Applications are reviewed by an AHOBPR Scientific Research Oversight Committee, comprised of subject matter experts from HOME, the AHBPCE, and external consultants (if necessary). This committee meets on a quarterly basis.

We currently have 13 studies using Registry data for research and 3 studies that have utilized the Registry as a recruitment resource. They address topics important to Veterans, including sleep disorders, headaches, clinical exams, and two clinical studies examining post-acute sequelae SARS-CoV infection (PASC). New data requests continue to be submitted and are reviewed on a quarterly basis.

Airborne Hazards and Burn Pits Center of Excellence — 5-Year Report

04
OUR FUTURE

4.1

Future Goals and Initiatives

While we celebrate our achievements over the past five years, we also look to the future. There is much more work to be done to bring greater understanding of military environmental exposures to Veterans, providers, and the scientific community at large.
Below are just a few of the plans and programs we are currently moving forward.

Visiting Scholar Program

In FY24, we are launching the Oscar Auerbach Visiting Scholar Program, which will further VA research on health effects related to airborne hazard exposure during deployment and improve medical care for Veterans and non-Veterans alike. This program is intended to provide multi-year support to highly accomplished VA investigators who are working to pursue research questions pertaining to long-term health outcomes (such as cancer or other noncommunicable diseases) among Veterans with military environmental exposures.

When the program commences in October 2024, Visiting Scholars will collaborate with the existing AHBPCE team to explore research questions such as:

- Linkage of AHOBPR participants to mortality, cancer incidence, or other chronic disease records
- Identification of Veteran cohorts disproportionately affected by cancer incidence, mortality, or cancer risk prevalence
- Assessment of the association of deployment-related exposures on cancer mortality or incidence, or on other chronic diseases among Veteran cohorts, including the AHOBPR cohort
- Other topics that relate to the follow-up of the AHOBPR cohort

In addition to pursuit of the research question(s), Visiting Scholars will have the following opportunities as part of the AHBPCE:

- Participate in existing AHBPCE-initiated or supported projects
- Lead and/or participate in national webinars, journal clubs, and related scholarly activity
- Respond to ad-hoc inquiries from VA senior leadership as a subject matter expert
- Assist AHBPCE in recruiting future Visiting Scholars, Center faculty, and scholars

Veterans Education Project

In collaboration with WRIISC-EXPRT (Exposure Related Care Transformation Center), AHBPCE is bringing together researchers and Veterans to understand Veterans' needs and preferences related to educational products. The goal is to develop a Veteran-facing educational product on Deployment-Related Respiratory Disease. The resulting product will address potential barriers for Veterans at three levels. At the Veteran level, it will address potential patient concerns about respiratory diseases, VA's screening process, and treatment options. At the encounter level, it will help Veterans understand their provider's approach to care. At the system level, it will offer guidance for understanding system-level factors (e.g., what tests to expect).

The format and messaging will be shaped by information obtained during focus groups with Veterans, and Veterans will be directly involved in the design process in order to ensure the end product meets the educational needs of Veterans with Deployment-Related Respiratory Disease.

Evaluation of the Deployment-Related Respiratory Disease Provider Toolkit

The Deployment-Related Respiratory Disease Toolkit was released in 2023 and is available online in an interactive format as well as in a PDF and hard copy, designed to fit into a provider's pocket. We will evaluate the toolkit's current use, including its ability to improve care. Our evaluation will use survey interview data to ascertain initial clinician feedback on the toolkit, its usefulness and usability, and recommendations for improvement. We will also conduct a structured medical record review to determine if the toolkit's use contributes to improvement in quality of referrals to pulmonology.

Control Group and Repository Project

To advance the understanding of DRRD, there is a critical need for comparator data (i.e., appropriate control groups). The PDCEN is actively working to address this gap through the PDCEN Control Group and Repository project. This effort seeks to leverage the PDCEN's academic affiliates to prospectively recruit 250 controls over a 2-year period. Control participants will undergo the majority of assessments performed as part of a PDCEN clinical evaluation and their data will be transferred to a repository maintained by the AHBPCE to facilitate future analyses.

Launch of New Study Supported by DoD's Toxic Exposure Research Program

The AHBPCE and The Ohio State University recently submitted a Partnering PI grant to DoD entitled, "Cardiovascular Profiling of Deployment-Related Respiratory Disease: A Translational Approach," that was recommended for funding. This combined human/animal study is an extension of our longstanding collaboration.

We will test the hypothesis that deployment-related exposures—i.e., PM2.5 and combat—induce subclinical (and overt) cardiovascular dysfunction that increases the risk of future cardiac events. At the AHBPCE, we are expected to begin recruitment in fall 2024 utilizing the AHOBPR.

Airborne Hazards and Burn Pits Center of Excellence 5-Year Report

05

THANK YOU

5.1

Thank You Message

The accomplishments of the past 5 years are not ours alone. The AHBPCE team is thankful to:

- Veterans and Veteran advocates
- Current and former HOME Leadership
  - Chief and Deputy Consultants: Drs. Patricia Hastings, Loren Erickson, and Michael Brumage
  - Operations Director and Post-9/11 Directors: Drs. Eric Shuping, Nick Lezama, and Michael Montopoli
- Current and former NJ WRIISC Leadership
  - Current and Past Directors: Drs. Helena Chandler, Drew Helmer, and Gudrun Lange
  - Current and Past Clinical Directors: Drs. Omowunmi Osinubi and Ronald Teichman
  - Education and Risk Communication Director: Dr. Susan Santos
- NJ WRIISC clinical, research, and education teams
- VA New Jersey Health Care System for support and collaboration
- Exposure Related Care Transformation Center (EXPRT)
- Post Deployment Cardiopulmonary Evaluation Network (PDCEN)
- Center for Innovations in Quality, Effectiveness & Safety (IQuESt)

This report was created in collaboration with Meraki Communications Group.

06

APPENDIX

6.1

Acronym List

AHBPCE
Airborne Hazards and Burn Pits Center of Excellence

AHOBPR
Airborne Hazards and Open Burn Pit Registry

AIMES
Airborne Hazards and Burn Pits Center of Excellence Center for Innovations in Quality, Effectiveness & Safety

CB
constrictive bronchiolitis

DRRD
Deployment-Related Respiratory Disease

DoD
Department of Defense

EXPRT
Exposure Related Care Transformation Center

fMRI
functional MRI

HOME
Health Outcomes Military Exposures

IQuESt
Center for Innovations in Quality, Effectiveness & Safety

LEAP
Living Evidence Analysis Program

MCT
methacholine challenge test

MEE
Military Environmental Exposure

NASEM
National Academies of Sciences, Engineering, and Medicine

NJIT
New Jersey Institute of Technology

PACT Act
Promise to Address Comprehensive Toxics Act

PASC
post-acute sequelae SARS-CoV

PDCEN
Post Deployment Cardiopulmonary Evaluation Network

PM
particulate matter

TMS
Talent Management System

VISN
Veterans Integrated Service Network

VSFS
Virtual Student Federal Service

WRIISC
War Related Illness and Injury Study Center

6.2

Published Articles

	Topic	Title	Authors	Publication
2024	Access to Care	Barriers and Facilitators to Administering Burn Pit Registry Exams in VHA Facilities.	Chen PV, Christie IC, Godwin KM, Han J, Jani N, Sotolongo A, Ali A, Helmer DA.	Military Medicine
	Environmental Exposures, Access to Care	Improving care for veterans' environmental exposure concerns: applications of the consolidated framework for implementation research in program evaluation.	Bloeser K, Kimber JM, Santos SL, Krupka CB, McAndrew LM.	BMC Health Services Research
2023	GWI	Bioenergetic function is decreased in peripheral blood mononuclear cells of veterans with Gulf War Illness.	Meyer JN, Pan WK, Ryde IT, Alexander T, Klein-Adams JC, Ndirangu DS, Falvo MJ.	PLoS One
	Exercise, Deployment	Deployed Veterans exhibit distinct respiratory patterns and greater dyspnea during maximal cardiopulmonary exercise: A case-control study.	Alexander T, Watson MA, Klein-Adams JC, Ndirangu DS, Serrador JM, Falvo MJ, Lindheimer JB.	PLoS One
	Exercise, GWI	Exercise-induced changes in gene expression do not mediate post exertional malaise in Gulf War illness.	Boruch AE, Lindheimer JB, Ninneman JV, Wylie GR, Alexander T, Klein-Adams JC, Stegner AJ, Gretzon NP, Samy B, Falvo MJ, Cook DB.	Brain, Behavior, and Immunity

2023	Sarcoidosis	Consensus Statements on Deployment-Related Respiratory Disease, Inclusive of Constrictive Bronchiolitis: A Modified Delphi Study.	Falvo MJ, Sotolongo AM, Osterholzer JJ, Robertson MW, Kazerooni EA, Amorosa JK, Garshick E, Jones KD, Galvin JR, Kreiss K, Hines SE, Franks TJ, Miller RF, Rose CS, Arjomandi M, Krefft SD, Morris MJ, Polosukhin VV, Blanc PD, D'Armiento JM.	Chest
2022		Factors associated with a diagnosis of sarcoidosis among US veterans of Iraq and Afghanistan.	Jani N, Christie IC, Wu TD, Guzman DE, Han J, Broderick B, Falvo MJ, Sotolongo A, Osinubi OY, Helmer DA.	Scientific Reports
	Environmental Exposures	Short-term PM exposure and social stress cause pulmonary and cardiac dysfunction.	Aslaner DM, Saldaña TA, MacKenzie DM, O'Piela DR, Miller RA, Schwieterman NA, Falvo MJ, Gorr MW, Wold LE.	Toxicology Letters
	Constrictive Bronchiolitis	The Severity of Functional Small Airway Disease in Military Personnel with Constrictive Bronchiolitis as Measured by Quantitative Computed Tomography.	Davis CW, Lopez CL, Bell AJ, Miller RF, Rabin AS, Murray S, Falvo MJ, Han MK, Galban CJ, Osterholzer JJ.	American Journal of Respiratory and Critical Care Medicine
	PDCEN	Postdeployment Respiratory Health: The Roles of the Airborne Hazards and Open Burn Pit Registry and the Post-Deployment Cardiopulmonary Evaluation Network.	Davis CW, Rabin AS, Jani N, Osterholzer JJ, Krefft S, Hines SE, Arjomandi M, Robertson MW, Sotolongo AM, Falvo MJ; Post-Deployment Cardiopulmonary Evaluation Network.	Federal Practitioner
	Methods, FOT	An analysis of alternative forced oscillation technique reporting and validation methods for within- and between-sessions in healthy adults.	Therkorn JH, Qian W, Toto DR, Falvo MJ.	Scientific Reports

2022	Blast Exposure	Relationship between clinician documented blast exposure and pulmonary function: a retrospective chart review from a national specialty clinic.	Therkorn JH, Hu S, Sotolongo AM, Christie IC, Wu TD, Van Doren WW, Sajja VSSS, Jani N, Klein-Adams JC, Helmer DA, Falvo MJ.	Respiratory Research
	Data Analysis, Spirometry	Beyond the Expiratory Limb: A Complete Raw Spirometry Dataset.	Ibraheem DL, Samy B, Therkorn JH, Falvo MJ.	Frontiers in Physiology
	Constrictive Bronchiolitis	A Burning Question.	Rabin AS, Davis CW, Sotolongo AM, Falvo MJ, Osterholzer JJ.	New England Journal of Medicine
	Methods, FOT	Employing the Forced Oscillation Technique for the Assessment of Respiratory Mechanics in Adults.	Qian W, Desai A, Therkorn JH, Klein-Adams JC, Sotolongo AM, Falvo MJ.	Journal of Visualized Experiments
2021	Exercise, GWI	Hemorheological responses to an acute bout of maximal exercise in Veterans with Gulf War Illness.	Qian W, Klein-Adams JC, Ndirangu DS, Chen Y, Falvo MJ, Condon MR.	Life Science
	Methods	A comparison of alternative selection methods for reporting spirometric parameters in healthy adults.	Therkorn JH, Toto DR, Falvo MJ.	Scientific Reports
2020	Constrictive Bronchiolitis	Diagnostic Workup of Constrictive Bronchiolitis in the Military Veteran.	Falvo MJ, Sotolongo AM, Osinubi OY, Helmer DA, Galvin JR, Franks TJ.	Military Medicine
	Chronic Fatigue, Fibromyalagia	Elevated Perceived Exertion in People with Myalgic Encephalomyelitis/ Chronic Fatigue Syndrome and Fibromyalgia: A Meta-analysis.	Barhorst EE, Andrae WE, Rayne TJ, Falvo MJ, Cook DB, Lindheimer JB.	Medicine & Science in Sports & Exercise
		An analysis of 2-day cardiopulmonary exercise testing to assess unexplained fatigue.	Lindheimer JB, Alexander T, Qian W, Klein-Adams JC, Lange G, H Natelson B, Cook DB, Hill HZ, Falvo MJ.	Physiological Reports

2020	Exercise-Induced	Exercise-Induced Bronchoconstriction in Iraq and Afghanistan Veterans With Deployment-Related Exposures.	Klein-Adams JC, Sotolongo AM, Serrador JM, Ndirangu DS, Falvo MJ.	Military Medicine
	Exercise, GWI	Post-exertional malaise in veterans with gulf war illness.	Lindheimer JB, Stegner AJ, Wylie GR, Klein-Adams JC, Almassi NE, Ninneman JV, Van Riper SM, Dougherty RJ, Falvo MJ, Cook DB.	International Journal of Psychophysiology
2019	Chronic Pain, GWI	Influence of pain anticipation on brain activity and pain perception in Gulf War Veterans with chronic musculoskeletal pain.	Lindheimer JB, Stegner AJ, Ellingson-Sayen LD, Van Riper SM, Dougherty RJ, Falvo MJ, Cook DB.	Psychophysiology
	GWI	Veterans with Gulf War Illness exhibit distinct respiratory patterns during maximal cardiopulmonary exercise.	Lindheimer JB, Cook DB, Klein-Adams JC, Qian W, Hill HZ, Lange G, Ndirangu DS, Wylie GR, Falvo MJ.	PLoS One
	Constrictive Bronchiolitis	Respiratory Health after Military Service in Southwest Asia and Afghanistan. An Official American Thoracic Society Workshop Report.	Garshick E, Abraham JH, Baird CP, Ciminera P, Downey GP, Falvo MJ, Hart JE, Jackson DA, Jerrett M, Kuschner W, Helmer DA, Jones KD, Krefft SD, Mallon T, Miller RF, Morris MJ, Proctor SP, Redlich CA, Rose CS, Rull RP, Saers J, Schneiderman AI, Smith NL, Yiallouros P, Blanc PD.	Annals of the. American Thoracic Society
	Forced Oscillation Technique	Forced oscillation technique in veterans with preserved spirometry and chronic respiratory symptoms.	Butzko RP, Sotolongo AM, Helmer DA, Klein-Adams JC, Osinubi OY, Berman AR, Ortiz-Pacheco R, Falvo MJ.	Respiratory Physiology & Neurobiology

6.3

Published Abstracts

	Topic	Title	Authors	Publications/ Conferences
2024	Blast exposure	Prior blast exposure is associated with physical and affective components of dyspnea in US veterans of Iraq and Afghanistan deployments	Christie IC, Klein-Adams J, Pappas G, Sotolongo A, Alexander T, Ndirangu D, Jani N, Wu D, Wentz A, Eager N, Samy B, Falvo MJ, Sajja VS, Helmer DA	Military Health Research Symposium
	Echo	Left Ventricular Concentric Remodeling In Deployed Post 9/11 Veterans and Effects On Exercise Performance	Abitante T, Falvo MJ, Piskura N, Cassady S	ACSM Annual Meeting
	Echo/ PDCEN	Left ventricular concentric remodeling in veterans evaluated by the Post-Deployment Cardiopulmonary Evaluation Network	Cassady SJ, Glick DR, Hines SE, Kreff SD, Osterholzer JJ, Richmond BW, Arjomandi M, Sotolongo AM, Falvo MJ	ATS Annual Meeting
	CT analysis	Radiographic assessment of suspected deployment related respiratory disease with parametric response mapping	Bell A, Ram S, Jagadev P, Falvo MJ, Pappas G, Osterholzer J, Galban CJ	ATS Annual Meeting
	Exercise	Classification of Exercise Intolerance in Formerly Deployed Veterans Varies Substantially with Choice of Reference Equation	Alexander T, Arjomandi M, Wilhite DP, Falvo MJ, Sotolongo AM, Osterholzer JJ, Krefft S, Glick DR, Cassady S, Richmond BW, and Post-Deployment Cardiopulmonary Evaluation Network	ATS Annual Meeting

2024	Methods	Performance characteristics of the Aeroeclipse II nebulizer using a lung simulator	Mainelis G, Han TT, Falvo MJ	ATS Annual Meeting
	PFT/ AHOBPR	Pulmonary Function, Chronic Respiratory Symptoms, and Functional Limitation Among Veterans in the Airborne Hazards and Open Burn Pit Registry	Zeng S, Jani N, Sotolongo AM, Luo G, Arjomandi M, Falvo MJ	ATS Annual Meeting
	Blast exposure	Multiple Correspondence Analysis of Self-Reported Blast Exposure in Deployed Veterans: A Preliminary Validation of Dimensional Structure and the Importance of What Can't Be Recalled	Christie IC, Alexander T, Ndirangu D, Klein-Adams J, Sotolongo AM, Jani N, Wu D, Domanski H, Watson MA, Aguilar J, Phen S, Piskura N, Falvo MJ, Sajja VS, Helmer DA	ATS Annual Meeting
	Blast exposure	Longitudinal Functional and Pathological Assessment of Pulmonary Changes Associated with Low-level Repeated Blast Exposure	Dahal S, Ramara KV, McCoy J, Mathew A, Wilder DM, Benton M, McLean VL, Falvo MJ, Helmer D, Long JB, Sajja VS	ATS Annual Meeting
	AHOBPR	Obstructive lung disease among veterans enrolled in the Airborne Hazards and Open Burn Pit Registry (AHOBPR) deployed to Join Base Balad and Iraq	Ndirangu DS, Sotolongo AM, Falvo MJ, Rahman A, Jani N	ATS Annual Meeting
	Preclinical	Time-course of systemic alterations in gene expression with co-exposure to particulate matter and stress	Woodbury ED, Sandstrom TK, Abid A, Miller RA, Schwieterman NA, Falvo MJ, Gorr MW, Wole LE	Society of Toxicology Annual Meeting
	Sleep/ PDCEN	Sleep Quality Among Post-9/11 Veterans with Exposure to Airborne Hazards	Glick DR, Konikkara JJ, Sotolongo A, Alexander T, Diaz-Abad M, So J, Arjomandi M, Krefft S, Osterholzer JJ, Richmond B, Falvo MJ	SLEEP

2023	Methods	Performance of a medical nebulizer when tested with a lung simulator	Han TT, Falvo MJ, Manelis G	AAAR Annual Meeting
	CT analysis	Initial HRCT findings and temporal changes of military veterans evaluated for unexplained dyspnea at a VA national specialty clinic	Nahar R, Falvo MJ, Alexander T, Slatore C, Sotolongo AM	CHEST Annual Meeting
	PFT	Comparison of lung clearance index and forced oscillation testing in Southwest Asia deployed military veterans with deployment lung disease	Kamineni S, Falvo MJ, Toczylowski R, Wilczynski A, Zell-Baran L, Krefft SD	ATS Annual Meeting
	PFT/PDCEN	Multidimensional dyspnea assessment associated with forced oscillometry and pulmonary function testing in Veterans in the Airborne Hazards and Open Burn Pit Registry	Chiurco J, Falvo MJ, Sotolongo AM, Arjomandi M, Krefft SD, Osterholzer JJ, Hines SE	ATS Annual Meeting
	CT analysis	Initial HRCT findings and temporal changes of military veterans evaluated for unexplained dyspnea at a VA national specialty clinic	Nahar R, Falvo MJ, Alexander T, Slatore CG, Sotolongo AM	CHEST
	Blast exposure	TBI classification and self-reported blast characteristics are strongly correlated in Veterans of Iraq and Afghanistan	Christie IC, Alexander T, Ndirangu D, Klein J, Sotolongo A, Jani N, Wu D, Domanski H, Watson M, Aguilar J, Eager N, Bishoy S, Falvo MJ, Sajja S, Helmer DA	Military Health System Research Symposium
	Blast exposure	Longitudinal functional and pathological assessment of pulmonary changes associated with low-level repeated blast exposure	Dahal S, McNeil E, Heyburn L, Sarpong K, McCoy, Wilder D, Benton M, McLean VL, Falvo MJ, Helmer D, Long J, Sajja S	Military Health System Research Symposium
	AHOBPR	Targeted healthcare for veterans who were exposed to airborne hazards and open burn pit	Jani N, Robertson M, Rahim A, Sotolongo AM	American Public Health Association Annual Conference

2023	Gulf War	Minimizing risks of acute exercise in chronic multisymptom illness: a randomized, controlled, dose-response, crossover study	Lindheimer JB, Boruch AE, Barhorst EE, Rayne TJ, Roberge GA, Brukardt SM, Leitel ZT, Falvo MJ, Cook DB	ACSM Annual Meeting
	CT analysis	Mosaic attenuation and air trapping in veterans with unexplained dyspnea may be driven primarily by a vascular component	Nahar R, Alexander T, Sotolongo AM, Falvo MJ	CHEST
	Echo	Resting diffusion capacity measures are moderately correlated with echocardiography-derived right ventricular parameters	Alexander T, Piskura NA, Klein-Adams JC, Watson MA, Ndirangu DS, Falvo MJ	ACSM Annual Meeting
	Exercise	Evaluation of inter-rater agreement for identifying dysfunctional breathing in cardiopulmonary exercise testing	Klein-Adams JC, Watson MA, Alexander T, Helmer DA, Falvo MJ	ACSM Annual Meeting
	Vascular Function	Association Between Peripheral Endothelial and Smooth Muscle Function with Cardiopulmonary Exercise Test Parameters Among Previously Deployed Military Veterans	Falvo MJ, Piskura NA, Alexander T, Klein-Adams JC, Watson MA, Samy B, Ndirangu DS, Eager N, Domanski H, Patrick-DeLuca L, Schneider A, Sotolongo AM	ATS Annual Meeting
	CT analysis	Quantitative CT analysis identifies comparable phenotypes amongst Gulf War and Post-9/11 Veterans with suspected deployment-related respiratory disease	Osterholzer JJ, Alexander T, Jagadev P, Bell AJ, Galban CJ, Falvo MJ	ATS Annual Meeting

2022	Preclinical	Short-term ambient particle exposure and social defeat cause reduction in heart and pulmonary function	Gorr MW, Aslaner DM, Saldana TA, MacKenzie DM, O'Piela DR, Yallourakis MD, Durisek GR, Falvo MJ, Wold LE	American Heart Association
	Exposure/ PDCEN	Laryngeal Hypersensitivity in a Veteran Cohort with Remote Exposure to Tear Gas and Pepper Spray	Shah A, Therkorn JH, Arjomandi M, Falvo MJ, Jani N, Krefft SD, Osterholzer JJ, Sotolongo AM, Hines SE	American Thoracic Society Annual Meeting
	Biomarker	Inflammatory Activation and Nitric Oxide Oxidation in Exertional Dyspnea in Southwest Asia Deployed Military Veterans	Pappas G, Ena V, Gardner C, Guo CJ, Kathleen B, Chung E, Jennifer T, Laskin DL, Kipen H, Falvo MJ, Gow AJ	Experimental Biology
	Blast exposure	Effect of self-reported blast exposure on CT-measured functional small airways disease in deployed veterans	Alexander T, Samy B, Sotolongo AM, Helmer DA, Sajja V, Osterholzer JJ, Jani N, Watson M, Ndirangu DS, Eager N, Domanski H, Falvo MJ	CHEST 162(4): A1570-1571
	Sleep	Respiratory muscle dysfunction in deployed post-9/11 Veterans with Obstructive Sleep Apnea	Qian W, Sotolongo AM, Alexander T, Watson M, Ndirangu DS, Eager N, Falvo MJ	CHEST 162(4): A2597
	PFT	Reduced gas diffusion among deployed veterans with preserved spirometry is driven by a reduction in pulmonary capillary volume	Falvo MJ, Therkorn JH, Qian W, Watson M, Alexander T, Ndirangu D, Kipen H, Gow A, Sotolongo AM	Am J Respir Crit Care Med 2022;205:A3846
	PFT	Exploring dimensionality reduction across spirometry and forced oscillation technique in a healthy subject population using principle components analysis	Therkorn JH, Ibraheem D, Samy B, Falvo MJ	Am J Respir Crit Care Med 2022;205:A2072
	COVID-19	COVID-19 in the Department of Veterans Affairs Airborne Hazards and Open Burn Pit Registry	Phen S, Therkorn JH, Jani N, Falvo MJ	AMSUS (Virtual)

2021	Biomarker	Inflammatory Mechanisms of Exertional Dyspnea in Southwest Asia Deployed Military Veterans	Pappas G, Ena V, Gardner C, Guo CJ, Kathleen B, Chung E, Jennifer T, Laskin DL, Kipen H, Falvo MJ, Gow AJ	Society for Redox Biology and Medicine (Virtual)
	Blast exposure	Retrospective review of clinically documented blast exposure does not demonstrate an association with abnormal pulmonary function test metrics in clinically evaluated Veterans of Iraq and Afghanistan	Helmer DA, Falvo MJ, Sajja S, Therkorn J, Christie I, Wu T, Hu S	Military Health System Research Symposium
	Biomarker	Circulating inflammatory state and vascular function in veterans of Southwestern Asian theater of war	Gow AJ, Falvo MJ, Pappas G, Kipen H	Military Health System Research Symposium
	AHOBPR	Association of self-reported occupational exposures and chronic respiratory disease among participants in the Airborne Hazards and Open Burn Pit Registry	Jani N, Falvo MJ, Krefft S, Arjomandi M, Osterholzer J, Hines S, Shuping E, Sotolongo AM	Military Health System Research Symposium
	Gulf War	Cardiopulmonary Responses To Submaximal Exercise Differ Between Veterans With And Without Gulf War Illness	Boruch AE, Lindheimer JB, Stegner A, Klein-Adams JC, Ninneman JV, Gretzon N, Almassi NE, Watson MA, Van Riper SM, Wylie GR, Falvo MJ, Cook DB	American College of Sports Medicine Annual Meeting (Virtual)
	CT analysis	Assessment of "Percent Functional Small Airways Disease" by Parametric Response Mapping as a Potential Radiographic Biomarker of Deployment-Related Constrictive Bronchiolitis	Davis C, Lopez C, Murray S, Miller RF, Falvo MJ, Arjomandi M, Galban CJ, Osterholzer JJ	American Thoracic Society (Virtual)
	COVID-19/ AHOBPR	COVID-19 Infection Among Airborne Hazards Open Burn Pit Registry Participants Utilizing the VA	Jani N, Falvo MJ, Arjomandi M, Krefft SD, Osterholzer JJ, Hines SE, Shuping E, Sotolongo AM	American Thoracic Society (Virtual)

2021	Gulf War	Symptom response patterns to exercise in veterans with Gulf War Illness	Cook DB, Falvo MJ, Stegner AJ, Wylie GR, Lindheimer JB, Gretzon N, Ninneman JV, Van Riper SM, Ndirangu DS, Alexander T	American College of Sports Medicine Annual Meeting (Virtual)
	Preclinical	Short-term PM exposure and social defeat cause reduction in pulmonary and right ventricle function	Gorr MW, Aslaner DM, Saldaña TA, MacKenzie DM, Falvo MJ, Wold LE	Experimental Biology (Virtual)
	PDCEN	Psychology program development in an interdisciplinary specialty medical evaluation: Example of the Airborne Hazards and Burn Pits Center of Excellence	Graff F, McCarron K, Chandler H, Falvo MJ, Sotolongo AM	AMSUS Annual Meeting (Virtual)
	PFT	Effects of combined upper and lower respiratory symptoms on pulmonary function and exercise tolerance among dyspneic veterans	Ng T, Sotolongo AM, Berman A, Therkorn JH, Jani N, Falvo MJ	CHEST 160(4): A1926
	PFT	Area under the inspiratory flow-volume curve: A new index for evaluating the upper airway	Ibraheem D, Samy B, Therkorn JH, Toto DR, Falvo MJ	Am J Respir Crit Care Med, 2021;203:A4614
	PFT	Evaluation of the 2019 ERS Task Force Guidelines for FOT Measurement Replication	Toto DR, Vesce A, Falvo MJ	Am J Respir Crit Care Med, 2021;203:A3266.
2020	AHOBPR	Association of Self-Reported Military Occupational Exposures and Chronic Respiratory Disease Among Participants in the Airborne Hazards and Open Burn Pit Registry	Jani N, Rajan M, Falvo MJ, Sotolongo AC	American Public Health Association Annual Meeting

2020	Methods	PNEUMON: A DDDAS framework to detect fatigue and dyspnea in COPD	Kanal V, Miller A, Rajavenkatanarayanan A, Kyrarini M, Wylie GR, Falvo MJ, Makedon F	International Conference on InfoSymbiotics / DDDAS (Dynamic Data Driven Applications Systems)
	Biomarker	Inflammatory status and vascular function in veterans of burn pit exposure	Pappas G, Gardner C, Guo CJ, Chung E, Laskin DL, Kipen H, Falvo MJ, Gow AJ	Nitric Oxide Society NO
	Non-Veteran	Cardiopulmonary, metabolic and perceptual responses during exercise in Myalgic Encephalomyelitis/Chronic Fatigue Syndrome (ME/CFS): The multi-site clinical assessment of ME/CFS (MCAM) study	Cook DB, Lindheimer JB, Falvo MJ, Lin JM, Unger ER, Dougherty R, Van Riper S, and MCAM Workgroup	IACFS/ME 13th International Scientific Conference
	AHOBPR	Association of Self-Reported Military Occupational Exposures and Chronic Respiratory Disease Among Participants in the Airborne Hazards and Open Burn Pit Registry	Jani N, Rajan M, Falvo MJ, Sotolongo AM	American Public Health Annual Meeting
	Non-Veteran	Perceived exertion is elevated in chronic fatigue syndrome and fibromyalgia: A meta-analysis of case-control studies	Lindheimer JB, Barhorst EE, Andrae WE, Rayne TJ, Falvo MJ, Cook DB	American College of Sports Medicine Annual Meeting
	Biomarker	Characterizing the bioenergetic profile of white blood cells for utility in assessing mitochondrial dysfunction in Gulf War Illness	Alexander T, Falvo MJ, Ryde I, Klein-Adams JC, Ndirangu D, Watson M, Qian W, Eager N, Meyer J	American College of Sports Medicine Annual Meeting
	AHOBPR	Examination of Insomnia and other sleep conditions among deployed US Servicemembers	Jani N, Falvo MJ, Arjomandi M, Hines S, Krefft S, Osterholzer JJ, Shuping E, Sotolongo AM	American Thoracic Society Annual Meeting

2020	AHOBPR	Self-reported sleep apnea among female US Servicemembers in the Airborne Hazard Open Burn Pit Registry	Jani N, Falvo MJ, Osterholzer JJ, Krefft S, Hines S, Arjomandi M, Shuping E, Sotolongo AM	American Thoracic Society Annual Meeting
	CT analysis	CT-Parametric Response Mapping Identifies Four Radiographic Signatures in Small Cohorts of Post-9/11 Veterans with Chronic Bronchiolitis and Symptomatic Veterans with Gulf War Veterans Illness	Osterholzer JJ, Falvo MJ, Qian W, Guttentag AR, Miller RF, Galban CJ	American Thoracic Society Annual Meeting
	PDCEN	VA's Post-Deployment Cardiopulmonary Evaluation Network (PDCEN): Standardized approach for the evaluation of unexplained dyspnea among registry participants	Falvo MJ, Hines S, Arjomandi M, Jani N, Robertson M, Graff F, Sotolongo AM	AMSUS Annual Meeting (Virtual)
	Blast exposure	Physician verified blast exposure is associated with small airway dysfunction in Iraq and Afghanistan Veterans	Hu S, Helmer DA, Berman AR, Sotolongo AC, Jani N, Klein-Adams JC, Butzko R, Ortiz-Pacheco R, Sajja V, Falvo MJ	Am J Respir Crit Care Med, 2020;201:A4377
	Exercise	Comparison of measured versus calculated maximum voluntary ventilation for determining ventilatory limitation in Veterans with unexplained dyspnea	Roque W, Sotolongo AM, Berman AR, Klein-Adams JC, Alexander T, Watson M, Falvo MJ	Am J Respir Crit Care Med, 2020;201:A3244
	PFT	Pulmonary capillary blood volume and membrane conductance in Iraq and Afghanistan Veterans with deployment-related exposures	Qian W, Klein-Adams JC, Watson WA, Ndirangu DS, Alexander T, Eager NA, Sotolongo AM, Falvo MJ	Medicine & Science in Sports & Exercise. 2020 Jul 1;52(7S):307.
2019	AHOBPR	Pulmonary evaluation for US Veterans before vs. after an optional, targeted registry examination	Jani N, Rajan M, Falvo MJ, Molina F, Sotolongo AM, Helmer DA	CHEST

2019	CT analysis	Parametric Response Mapping Identifies Increased Functional Small Airways Disease in Soldiers with Biopsy Evidence of Chronic Bronchiolitis	Osterholzer JJ, Guttentag AR, Miller RF, Falvo MJ, Galban CJ	American Thoracic Society
	AHOBPR	Agreement Between Dyspnea Symptoms and Lower Respiratory Conditions Across Three Modalities of Assessment Among Veteran Participants in the Airborne Hazards and Open Burn Pit Registry	Molina F, Jani N, Rajan M, Sotolongo AM, Falvo MJ, Helmer D	Amer J Resp Care Crit Med; 2019;199:A2773. American Thoracic Society.
	AHOBPR	Agreement Between Lower Respiratory Symptoms and Conditions Across Three Modalities of Assessment Among Veteran Participants in the Airborne Hazards and Open Burn Pit Registry	Jani N, Molina F, Rajan M, Sotolongo AM, Falvo MJ, Helmer D	Amer J Resp Care Crit Med; 2019;199:A2775. American Thoracic Society.
	PFT	Forced Oscillation Technique in the Evaluation of Biopsy-Confirmed Constrictive Bronchiolitis in a Southwest Asia Deployed Veteran	Butzko R, Sotolongo AM, Franks TJ, Helmer DA, Berman A, Osinubi OY, Klein-Adams JC, Osterholzer JJ, Falvo MJ	Am J Respir Crit Care Med, 2019;199:A1819.
	PFT	Respiratory Reactance Is Associated with Progressive Air Trapping in Dyspneic Veterans	Klein-Adams J, Sotolongo AM, Helmer D, Ndirangu D, Eager N, Greer SD, Alexander T, Falvo MJ	Am J Respir Crit Care Med, 2019;199:A6901.

6.4

Conference Presentations

	Organization	Format	Audience	Title
2024	VHA/AHBPCE	Virtual	Veterans	Airborne Hazards and Burn Pits: What you need to know
	VHA/ExPRT Mil Expo Day of Learning	Virtual	Clinician	AHBPCE Research Round-Up
	VHA/ExPRT Mil Expo Day of Learning	Virtual	Clinician	Airborne Hazards and Burn Pits: What Healthcare Professionals Need to Know
	American College of Preventive Medicine	Podium	Clinician	AHBPCE: Research Initiatives
	VISN 20 Pulmonary Scan Echo	Virtual	Clinicians	PDCEN: State-of-the-Art Care in Pulmonary Assessment of Burn Pit Exposed Veterans
	American Thoracic Society	Webinar	Researcher; clinician; policy	A burning question: identifying and understanding burn pit syndrome
	VHA/EES	Webinar	Clinician; researcher; policy	Understanding Deployment Related Respiratory Disease Workup
	AMSUS	Podium	Policy; clinician; researcher	VA Health Outcomes Military Exposures (HOME): Updates on PACT Act and Other Military Environmental Exposures Research
	AMSUS	Panel	Policy; clinician; researcher	Toxic Exposure Impact to the Lungs: Screening, Research & New Care Approaches
	American Thoracic Society	Podium	Researcher; clinician; policy	Research Careers in the Federal Government

2024	Society of Toxicology	Podium	Researcher	Burn Pit and Wildfire Aerosols—Chemical Composition and Health Consequences: What is in Common
	VHA/EES	Webinar	Clinician; researcher; policy	The AHOBPR at 10 Years: Looking back, looking forward
2023	Military enviornmental Exposure Training	Podium	Clinicians; researcher; policy	AHBPCE Overview
	Rutgers Environ Occup Health Science Inst	Podium	Clinician; researcher; policy	Airborne Hazards and Burn Pits: What We Know Now
	American Thoracic Society	Podium	Researcher; clinician; policy	VA's Approach to Post-Deployment Respiratory Health: Research, Clinical Care and Education
	American Occupational Health Conference	Podium	Clinician; researcher	The Department of Veterans Affairs Post-Deployment Cardiopulmonary Evaluation Network: State-of-the-Art Care in Pulmonary Assessment of Burn Pit Exposed Veterans
	VHA C&P Clinical Leaders	Virtual	Clinicians	Post-COVID conditions, long-haul COVID, post-acute COVID-19, long-term effects of COVID, chronic COVID, post-acute sequalae of COVID-19
	AMSUS	Podium	Policy; clinician; researcher	Impact of Military Environmental Exposures on Respiratory Health
	VHA/EES	Webinar	Clinician; researcher; policy	Is it Exposure Related? Evidence Informed Clinical Decision Making
	James J Peters VAMC	Virtual	Clinicians	Respiratory Health in the Previously Deployed Veteran: Role of the VA's Airborne Hazards and Burn Pits Center of Excellence
	University California - San Francisco OEM	Podium	Clinician; researcher	High and Low Altitude Environments: Updates in Occupational and Environmental Medicine
	American College of Preventive Medicine	Podium	Clinicians	Military Environmental Exposures: Exposure Assessment

2023	HOME Annual Conference	Podium	Clinicians	Occupational and Garrison Exposure
	National Medical Association	Podium	Clinicians	Addressing Military Environmental Exposure-Related Health Concerns
	American Occupational Health Conference	Podium	Clinicians	Military Exposures Training: Post-9/11 Exposures and Women's Health/Minority Health and Exposure Concerns
	VA Office of Academic Affilations Nurse Practitioner Grand Rounds	Virtual	Clinicians	Military Environmental Exposures
	CA WRIISC/WOMEN	Virtual	Clinician	PACT Act: Women and Exposure Updates
	American Occupational Health Conference	Podium	Clinician; researcher	Military Exposures Training: Post-9/11 Exposures and Women's Health/Minority Health and Exposure Concerns
	American Occupational Health Conference	Podium	Clinician; researcher	Military Exposures Training: Post-9/11 Exposures and Women's Health/Minority Health and Exposure Concerns
	American College of Preventive Medicine	Podium	Clinician	Military Environmental Exposures: Exposure Assessment
	HOME Annual Conference	Podium	Clinician	Occupational and Garrison Exposure
2022	DoD/VA Symposium	Virtual	Clinician; researcher; policy	VA Clinical Studies on Deployment-Related Dyspnea and other Respiratory Conditions
	VHA/ VISN 20 Pulmonary Scan Echo	Virtual	Clinicians	Airborne Hazards and Burn Pits: What We Know Now
	CHEST	Podium	Clinicians; researcher; policy	Lessons learned from the effects of airborne hazards in deployed military: VA Clinical Studies in Deployed Military Personnel
	VHA/EES	Webinar	Clinician; researcher; policy	WRIISC-HOME: Enhanced Implementation of the Burn Pit Registry Clinical Evaluation

2022	VHA/EES	Webinar	Clinician; researcher; policy	Southwest Asia Deployment Associated Lung Disease: Diagnostic Challenges
	CHEST	Podium	Clinicians; researcher; policy	Lessons learned from the effects of airborne hazards in deployed military: Epidemiologic and outcome studies
	American College of Preventive Medicine	Podium	Clinicians	Military Environmental Health Concerns
	American Occupational Health Conference	Podium	Clinicians	Addressing Veterans' Concerns with Exposures at the VA and the Promotion of Telehealth
	Meharry Medical School Occup Med Grand Rounds	Podium	Clinicians	Airborne Hazards and Burn Pits: What you need to know…
2021	DoD/VA Symposium	Virtual	Researcher; clinician; policy	VA Clinical Studies on Deployment-Related Dyspnea and other Respiratory Conditions
	VHA/EES	Webinar	Clinician; researcher; policy	The Airborne Hazards & Open Burn Pit Registry Follow-up Exam: What We've Learned
	VHA/EES	Webinar	Clinician; researcher; policy	Respiratory Issues of Returning Combat Veterans
	Mt. Sinai Icahn SOM	Virtual	Researcher; clinicians	Approach to the Military Veteran with Unexplained Dyspnea
	National Academies of Sciences, Eng, Med	Virtual	Policy; research; clinician	AHBPCE: Airborne Hazards and Open Burn Pit Registry Efforts
	Society of Risk Analysis	Podium	Clinician	Institutional Betrayal & Courage in Addressing Exposure Concerns

2020	DoD/VA Symposium	Podium	Researcher; clinician; policy	Review of AHBPCE Clinical Research Results
	Rutgers Environ Occup Health Science Inst	Podium	Researcher; clinician	Military Service is a Vulnerable Occupation: Lung Disease as a Model
	Rutgers Environ Occup Health Science Inst Grand Rounds	Podium	Clinician	Environmental Justice: A Military Perspective
	University of Pennsylvania Occup Med Grand Rounds	Podium	Clinician	Environmental Justice: A Military Perspective
	VHA/EES	Webinar	Clinician; researcher; policy	Institutional betrayal and courage in addressing veteran exposure concerns
	AMSUS	Podium	Clinician; policiy	Institutional betrayal, institutional courage, and environmental exposure concerns: A primer for federal health care professionals
2019	American College of Sports Medicine	Virtual	Researcher; clinician	Explaining Unexplained Exertional Dyspnea
	Duke University - Environ & Tox	Podium	Researcher	Airborne Hazards in the Deployment Environment: Implications for US Military Veterans
	National Academies of Sciences, Eng, Med	Podium	Policy; research; clinician	Effects of Deployment Related Exposures on Cardiopulmonary and Autonomic Function
	VHA/EES	Webinar	Clinician; researcher; policy	VA's Airborne Hazards and Burn Pits Center of Excellence: Evaluating Dyspnea
	University California - San Francisco OEM	Podium	Clinician; researcher	Military Service is a Vulnerable Occupation: Lung Disease as a Paradigm
	WRIISC Grand Rounds	Virtual	Clinician	Gulf War and Health Volume 11, Generational Health Effects of Serving in the Gulf War: An Overview of Final Recommendations

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