

3-16-22 Anthony Szema, MD, FCCP, FAAAAI, FACP, ATSF

I thank Chair Gillibrand, Ranking Member Tillis and the members of the Personnel Subcommittee of the Senate Armed Services Committee for the opportunity to participate in today's hearing.

My name is Dr. Anthony Szema, Clinical Associate Professor of Medicine (Divisions of Pulmonary/Critical Care and Allergy/Immunology), and Clinical Associate Professor of Occupational Medicine, Epidemiology and Prevention at the Donald and Barbara Zucker School of Medicine at Hofstra/Northwell where I am Director, International Center of Excellence in Deployment Health and Medical Geosciences. At Stony Brook University, as adjunct faculty, I am Research Assistant Professor, Department of Technology and Society, College of Engineering and Applied Sciences.

Between 1998 and 2015 I was Allergy Section Chief, Veterans Affairs Medical Center, Northport, NY. My expertise on this issue stems from the following: my team first reported new onset asthma from Iraq and Afghanistan Deployments among burn pit exposed soldiers in 2007, described deployment related rhinitis in 2008, coined the term Iraq Afghanistan War Lung Injury (IAW-LI) in 2011, based on lung function testing data, developed animal models with burn pit base dust in 2014, tested candidate drugs in mice in 2018, and co-invented new candidate medicines this year.

I agreed to testify because, as a physician, I care about the health and well being of my patients who are our soldiers.

The team in my office sees numerous patients post deployment with a variety of symptoms which include shortness of breath, cough, and chest tightness that is accentuated with exercise. I have diagnosed post burn pit exposed soldiers with asthma, chronic obstructive pulmonary disease, lung fibrosis, carbonaceous lung, constrictive bronchiolitis, titanium lung, bladder cancer as well as pulmonary ossification or bone in the lung. These are previously healthy, non-smoking, fit for deployment soldiers who have newly acquired lung disorders after their tours of duty. In one severe case, for example, my patient with lung fibrosis required two lung transplants and died last December.

As an expert in the field, I have concluded that these lung disorders are directly related to exposure to airborne hazards. These ailments resulted from inhalational exposures to: burn pits, dust storms, improvised explosive devices, as well as blast overpressure from mortar fired rounds.

My conclusions are based on our analyses of lung biopsies containing particles from these soldiers' lungs. These particles were subsequently processed at two different sites with two different types of technical machinery for analysis.

1) Center for Extraplanetary Exploration, Rahman Spectroscopy, Department of Geosciences, Stony Brook University

2) Brookhaven National Laboratory, National Synchrotron Light Source II Beam ID-5.

Analyses from both laboratories conclude that the particles from soldiers' lung biopsies sustained exposure to high combustion temperatures consistent with burning. Chemicals identified included

polycyclic aromatic hydrocarbons (PAH), and metals such as titanium and iron. These metals were bound together. These metals were also oxidized—which is evidence they were burned.

As doctors treating these patients, one challenge we face is that there is inadequate screening for those military personnel who are predisposed to lung injury. Lack of screening is a challenge for diagnosing and treating patients for several reasons. First, if individuals are not screened, then they may never get correctly diagnosed. In addition, if they are not screened, and therefore not treated properly, by the time they present to the doctor, the disease is already severe and therefore, more difficult to treat.

The dilemma with military personnel, who typically do not have asthma, since it is an exclusion diagnosis for enlistment, who must pass basic training outdoors, and who must be fit for deployment at Fort Hood prior to deployment, is that they usually do not have pre-deployment pulmonary assessments.

Unlike the Fire Department of New York which requires annual spirometry breathing tests and was able to assess respiratory changes after 9/11, soldiers most often do not have a baseline for comparison other than their 2-mile run time. An otherwise healthy young soldier may be 100% or more predicted on spirometry and oxygen consumption from a cardiopulmonary exercise test predeployment. So, reduction to 80% predicted post-deployment is a significant decrease even though 80% is the cutoff for normal.

Another challenge we face as the doctors treating these servicemembers is the lack of information we receive. Without knowing what they were exposed, or potentially exposed, to, it is hard to prove what caused the ailment. For example, in one recent case last month, a military firefighter, a patient of mine, was unable to get a referral to the East Orange WRIIC. The primary care doctor in the local VA did not believe that the military firefighter's sleep apnea, sinusitis, asthma, and rhinitis were related to deployment, even though he had a positive sleep study during his active duty.

Even if it is known that there were toxic materials at a certain site, too often, soldiers visit our academic center without complete documentation of locations of their deployment so their direct exposure cannot be proven. This is especially the case if they were at forward operating bases or places like Camp Stryker whose exact location is not on the map.

I have several recommendations to address these challenges and ensure we are taking care of our service members:

1. Conduct breathing tests before and after deployment.
2. Revamp the DOD method of documenting locations where military personnel served.
3. Utilize newer technology such as wearable particle monitors.

First, by conducting breathing tests before and after deployment for our troops, we can determine if there is a reduction in lung function much earlier than if we wait until disease is severe. In addition, these data will enable better screening protocols to identify ahead of time those soldiers at increased risk.

Second, by revamping the DOD method of documenting locations where military personnel served, we will have a better understanding of what these soldiers were exposed to, and therefore, a better understanding of the cause of the illness as well as how to treat it. For example, it is important for those treating these soldiers to know which regions of the country an individual soldier was in; what types of munitions they were exposed to; what the chemical makeup of these munitions are; how trash was disposed of in that region, including burn pits; what the weather patterns were, *i.e.*, dust storms in that region; whether depleted uranium was used in that region, for example, in armor piercing rounds PGU-14 and tank shells, as well as ship ballast; and whether that soldier used personal protective equipment and what types of PPE they used.

Third, by utilizing newer technology such as wearable particle monitors with GPS, we will be able to assess a given soldier's exposure and location. By utilizing this for a contingent of military personnel, the DOD will be better able to move troops to regions of safety away from airborne hazards. If exposure does happen, it will also provide critical information for treatment.

Our research team applied for a Congressionally Directed Medical Research Program (CDMRP) grant, got a great score, but was told there are insufficient DOD funds for the grant. We proposed to build on a beeper sized belt mounted device which measures particle counts, sarin and other toxic gas exposure, and gunshot sounds. Wearable tech is a mature enough field such that the industry should be able to respond to the needs of the DOD.

These recommendations will ease the burden on both soldiers and physicians when those soldiers seek medical care. My recommendations do not prevent exposure but they do allow us to provide data so we can intercede early with diagnosis and initiation of treatment; by doing so, then we may see the overall cost of medical care go down and, more importantly, more lives being saved.

We know that screening and monitoring programs have been extremely effective in preserving the health of those exposed to the World Trade Center disaster which is an analogous plume with JP-8 in burn pits. It is our sacred duty as Americans to protect the health of all the brave women and men who sacrifice their lives for our freedom.