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STATEMENT OF

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before the

UNITED STATES SENATE COMMITTEE ON VETERANS' AFFAIRS,
HEARING ON EXPOSURES

“Airway injury in US soldiers following service in Iraq and Afghanistan”
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Chairman Akaka, Ranking Member Burr, and Members of the Committee, I thank you for the opportunity to testify today. My comments will focus on a group of United States soldiers with permanent respiratory impairment following service in Iraq and Afghanistan.

Background

In early 2003, 20,000 soldiers from the 101st Airborne from Ft. Campbell, KY were deployed to northern Iraq as part of Operation Iraqi Freedom. In June 2003, opposing forces set fire to the Mishraq Sulfur Mine, approximately 25 miles north the Qayyarah Airfield West (Camp Q West), a major military supply airstrip and the primary area of deployment for the 101st Airborne.

At that time, the Mishraq Sulfur Mine was the largest sulfur mine in the world. It burned for over 4 weeks and caused the release of 42 million pounds of sulfur dioxide (SO₂) per day. This represents the largest man-made release of SO₂ on record. Satellite imaging documented that the SO₂ plume extended in a Southeast direction over the city of Mosul and Camp Q West.

SO₂ is the gas that you and I would associate with striking a match. It is a potent lung toxin and has been shown to cause lung injury at levels as low as 0.1 PPM. Our soldiers were exposed to levels many times higher than this. The skin, eye and airway injury irritation noted by almost everyone in the area suggests levels in excess of 50 PPM. Random sampling by the US Army documented toxic levels of SO₂.

Clinical presentations

Most of the 101st Airborne deployed in early 2003 returned to Ft. Campbell in early 2004. This is when Vanderbilt began to receive referrals from providers at Fort Campbell, asking for assistance in evaluating soldiers who complained of shortness of breath on exertion and could no

longer pass physical fitness testing. The typical soldier previously had been able to complete a two mile run within regulation time, but now had to walk much of the course. In almost all cases, standard respiratory evaluations obtained at Fort Campbell had been normal, including chest x-rays, chest CT scans and pulmonary function testing. None of these routine tests could explain the cause for the soldiers' limitations.

Vanderbilt physicians ultimately referred patients for surgical lung biopsy. I must emphasize that it is very uncommon to obtain surgical biopsies to evaluate shortness of breath with exertion when standard testing is normal. But the degree of exercise limitation and SO₂ exposure were compelling enough for us to apply an aggressive approach. In almost every case, surgical biopsy showed constrictive bronchiolitis, a condition associated with damage or destruction affecting more than 50% of small airways. This abnormality causes pulmonary limitations, but is not detectable on x-ray.

Between 2004 and 2009 Vanderbilt physicians performed surgical biopsies on 45 of 70 soldiers referred for unexplained shortness of breath on exertion. All of the biopsies except one demonstrated some form of bronchiolitis. This condition has no known treatment and has resulted in med boards for almost all of those affected.

While the majority of the patients diagnosed with constrictive bronchiolitis were exposed to SO₂ from the Mishraq sulfur mine fire, 25% of those biopsied served at a time or place incompatible with this exposure. They had similar exercise limitations, test results, and biopsies showing bronchiolitis, but they did not report any extraordinary exposures that would distinguish them from other soldiers. However, almost all reported inhalational exposures that were common to the Iraqi combat experience. These include fumes from burn pits, burning human waste, fires and dust from combat, burning oil and diesel exhaust.

Consider the example of a 42 year-old physician who was deployed to northern Iraq in 2007. She had been an avid marathon runner prior to deployment and ran regularly during her 8 months in Iraq. Upon return, she was too short of breath to run a mile. Her X-rays and pulmonary function testing were normal and she ultimately had a surgical lung biopsy showing constrictive bronchiolitis, the same abnormality seen in most of the other soldiers. She remains limited and now finds it difficult to climb stairs and walk gentle inclines.

Up to this point, almost all of the soldiers diagnosed with constrictive bronchiolitis have been referred from Ft Campbell. However, we have begun to receive communications from soldiers and providers throughout the country, leading us to believe that this condition is present but not being diagnosed at other military facilities. As noted previously, this diagnosis can only be established by surgical lung biopsy and most clinicians would hesitate to recommend biopsy when x-rays and pulmonary function tests are normal.

Rating disability for bronchiolitis

Military and VA officials have had a difficult time rating disability in this population. In most cases, the affected soldiers are comfortable at rest and are able to perform the activities of daily living. They have normal or near normal pulmonary function tests, but at the same time they cannot meet physical training requirements and are considered unfit for deployment. This unique

circumstance has challenged those who must determine a disability rating. Pulmonary function testing is the usual standard for rating respiratory disabilities, but how does one rate the soldier who is too short of breath to serve and yet has normal test results? Unfortunately, the ratings applied thus far have not been standardized. Additionally, we have seen many examples of soldiers who received one rating from the US Army only to have it downgraded by the VA..

More research is needed to understand the cause(s) and prevention of this disease. There is little doubt about the cause of bronchiolitis in those who were exposed to the Mishraq Sulfur Mine fire. There is also little doubt that those not exposed to the sulfur fires suffer from a disease caused by toxic inhalation. We must determine what these other toxins are so that preventive measures can be employed. We should also consider baseline pulmonary function testing prior to deployment knowing that our soldiers too often encounter inhalational toxins. And finally, I urge the development of standards for evaluating the condition that I have described today.

Thank you for your attention and I would be glad to answer any questions.