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To the Members of the Legislative Committee on Senior Citizens, Veterans and Adults with Special Needs

My name is Jack D. Thrasher, Ph.D., specializing in Toxicology-Immunotoxicology-Teratology-Fetaltoxicology.

I would like to provide a little background information about myself. I received my Bachelor's of Science degree in 1959 from California State University, Long Beach, and a Ph.D. from the University of California, Los Angeles (UCLA), School of Medicine, Department of Anatomy in 1964. I have taught medical students at both the University of Colorado and UCLA in cell biology, human anatomy, physiology and embryology.

I have specialized in Toxicology since 1966 and Immunotoxicology since 1986. I have been a consultant to toxicology laboratories and three human diagnostic laboratories. I have been an expert witness both nationally and internationally in government, defense and plaintiff cases. Also, with being qualified under both Daubert and Kelly-Frye challenges in numerous states.

I have had numerous published peer-reviewed research papers on the toxic effects of various chemicals, bacteria, molds and mycotoxins on animals and humans. These include the immunotoxicology of formaldehyde, organophosphate insecticides, chlorinated insecticides, solvents, isocyanates hydrogen sulfide, and molds and bacteria in water-damaged homes and buildings.

I was asked to provide a statement on the Committee's agenda item regarding Veterans. I am the Technical Director for the National Toxic Encephalopathy Foundation and we assist veterans with Gulf War Syndrome.

I am very familiar with the chemicals that veterans were exposed to albeit Agent Orange or those used in the Gulf War.

Rather than cite personal opinions, I am going to use peer reviewed research that validates our position, as our comments. Whether the exposure occurred at war, home

or at the workplace, the resulting harm is the same, thus the treatment and diagnosing should not be any different.

There is a direct interrelationship between toxic encephalopathy and Gulf War Syndrome, which necessitates clarification in order to effectively diagnose veterans. We are providing this as an informational guide to assist in fully confirming if their condition is physiological as opposed to psychological such as PTSD.

As toxic encephalopathy signs and symptoms maybe mimicked by many psychiatric, metabolic, inflammatory, neoplastic and degenerative diseases of the nervous system.[1]

It is known that neuro-toxins may reduce the functional reserves of the brain, potentially making the cells more vulnerable to the effects of aging and leading to accelerated senescence. As this may explain the observation that in some cases deterioration may continue for many years, even after exposure has ceased. [1]

The major clinical syndromes of toxic encephalopathy include diffuse acute or chronic encephalopathy, cerebellar syndrome, parkinsonism, and vascular encephalopathy. [2,3]

Various neurotoxins, including heavy metals, organic solvents and other chemicals, have been found to be responsible for these relatively specific neurological syndromes. [4,5]

The CNS is protected from toxic exposure to some extent, but it remains vulnerable to the effects of certain chemicals found in the environment. Nonpolar, lipid-soluble substances (e.g., organic solvents) gain the easiest access to the CNS, where neurons are particularly susceptible due to their high lipid contents and metabolic rates. Both gray matter and white matter can be easily damaged by lipophilic toxins. [6] Which comprise some of the chemicals that the troops were exposed to.

CTE is chronic toxic encephalopathy. The severity of CTE is graded as I-III or 1, 2A, 2B, and 3 [7,8] Type I CTE and types 1 and 2A CTE include subjective symptoms relating to memory, concentration, and mood. At this stage, clinicians may miss the diagnosis by considering these symptoms as a psychiatric issue due to altered mood. [2] Type II CTE and type 2B CTE are characterized by objective evidence of attention and memory deficits, decreased psychomotor function [7, 8] on neurobehavioral testing.

I would like to suggest, that veterans who present with these complaints be given, Neurobehavioral (neuropsychological) testing, which is an accepted methodology for assessing the functional integrity of the CNS, has been used extensively to evaluate subclinical neurotoxic effects on cognition, memory, alertness, executive function, mood and psychomotor skills [9,10,11].

The neurological examination will generally comprise assessment of mental function (mental status examination), cranial nerve function, muscle strength and tone, reflexes (muscle stretch and cutaneous), sensation, station and gait [12]

Many toxic encephalopathies may go unrecognized. In the absence of a detailed neurological examination and comprehensive work history, physicians may overlook the possibility of previous or current neurotoxin exposure. The recognition of toxic encephalopathy is important for clinicians for several reasons: 1) diagnosis can protect others (e.g., workers at the same worksite) from further harm by reducing exposure to the toxin; 2) diagnosis often provides some indication of prognosis; and 3) recognition of neurotoxic exposure can bring about improved hygiene measures that may protect other workers. [1]

Physicians must be aware of the typical signs and symptoms of toxic encephalopathy, and they should also pay attention to less typical, rather vague symptoms and signs because the toxicological characteristics of toxic encephalopathy may be less typical, particularly in cases of long-term, low-dose exposure, perhaps combined with the effects of aging. Close collaborations between neurologists and occupational physicians are needed to determine whether neurological disorders are neurotoxin-related. [1]

Additionally, a full blood work up including Phase 1 Cytochrome P450, Phase 2 conjugation with UGT, GST, glutathione for example. With excessive buildup in the vascular system, which results in an increase of the workload of the immune system, causing it to generate inflammatory chemicals, possibly auto-antibodies because of its hyper stimulated state. Immune dysfunction is common in the chemically overloaded environment we live in today.

In conclusion, medical practitioners who treat veterans with suspected Gulf War Syndrome, it is vital to their treatment to have the correct causation rather than a propensity to label everything as psychological.

If I can be of any further assistance, I can be reached at Toxicologist1@msn.com

Respectfully submitted,

/s/

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