

Division of Health & Science Policy

November 8, 2004

Director
Regulations Management (00REG1)
Department of Veterans Affairs
810 Vermont Avenue, NW, Room 1068
Washington, DC 20420

Re: Submitted in response to RIN 2900-AM09

Dear Director:

I am an epidemiologist and medical research who has been involved with veterans' health studies for 25 years (Boscarino 1979; 1980; 1981a; 1981b). Research over the past decade has confirmed that Vietnam combat veterans have had higher rates of postwar adjustment difficulties, medical morbidity, and mortality than non-combat veterans (Kulka et al. 1990; Centers for Disease Control 1987; 1988a; 1988b; Boscarino 2000). Furthermore, when we examined the health status of Vietnam veterans in the community by posttraumatic stress disorder (PTSD) status, we found that PTSD-positive veterans had substantially higher rates of many major chronic diseases, including circulatory, nervous system, digestive, musculoskeletal, and respiratory diseases (Boscarino, 1997). For example, we found that 25% of PTSD-positive veterans had physician-diagnosed circulatory diseases nearly 20 years after the service (vs. 13% for PTSD-negative veterans) and 19% had physician-diagnosed nervous system disorders (vs. 6%). Altogether, 68% of PTSD-positive Vietnam veterans reported the occurrence of a chronic disease-related medical condition 20 years after Vietnam service (comparison to 48% for PTSD-negative Vietnam veterans). We also found that PTSD-positive veterans were significantly more likely to have had abnormal electrocardiograph (ECG) results (28% vs. 14%), including a higher prevalence of myocardial (Q-wave) infarctions (6% vs. 1%) and atrioventricular conduction defects (9% vs. 3%) (Boscarino and Chang 1999a). Our ECG study was the first large-scale clinical study to suggest that coronary heart disease was associated with PTSD among Vietnam veterans. Similar findings are now being reported among other populations also exposed to traumatic stress (Boscarino 2003a; 2004a; 2004b).

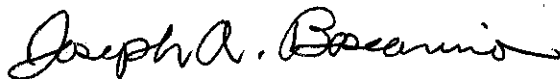
Since coronary heart disease is now considered an "inflammatory" disease, we also examined the immune status of PTSD-positive veterans. When we did this, we found abnormally high white blood counts ($>11,000/\text{mm}^3$) and T-cell counts ($>2,640/\text{mm}^3$) for these veterans (Boscarino and Chang 1999b). Based on these latter findings, we recently examined whether PTSD-positive veterans had a history of autoimmune-inflammatory diseases, since there was clinical evidence supporting neuroendocrine and immune alterations in chronic PTSD cases (Chrousos & Gold, 1992). In summary, there is evidence to suggest that severe psychological distress caused by PTSD may be related to altered neuroendocrine and immune system functions that could lead to disease (Boscarino and Chang 1999b). In particular, given the reduced cortisol levels found among PTSD victims, a down-regulated glucocorticoid system may potentiate elevations in leukocyte and other immune inflammatory activities (Chrousos 1995). Our preliminary autoimmune findings are consistent with these observations (Boscarino 2004b). Essentially, we found that veterans with PTSD, particularly complex PTSD (i.e., PTSD

concurrent with other major psychiatric disorders), were more likely to have autoimmune diseases, especially rheumatoid arthritis, psoriasis, insulin-dependent diabetes, and hypothyroidism, based on their post-discharge medical histories (Boscarino 2004b). In addition, veterans with complex PTSD also were more likely to have clinically higher T-cell counts, hyper-reactive immune responses on standardized delayed cutaneous hypersensitivity tests, and significantly lower levels of dehydroepiandrosterone, suggesting significant alterations in psychoneuroendocrinological functions indicative of disease pathology (Boscarino 2004b). Recently we reviewed additional evidence linking cardiovascular disease (CVD) and trauma in other studies (Boscarino 2004a). The evidence for a link is very strong and has been confirmed in 12 published medical studies involving 53,000 persons exposure to war, major disasters, and adverse childhood events. Over 75% of these studies were based on clinical outcomes, not self-reported medical conditions. Noteworthy is that *no* negative CVD studies have been published in the scientific medical literature to date.

In conclusion, given the findings noted, I conclude that if any veteran has a long-term history of PTSD, especially if this is concurrent with other major psychiatric disorders or inflammatory diseases, such as rheumatoid arthritis, psoriasis, thyroid disease, inflammatory bowel disease, etc., that this veteran has a high risk for developing CVD, including coronary artery disease and myocardial infarction. In addition, as noted, given our current knowledge of the psychobiology of PTSD, veterans with chronic PTSD also are at significant concurrent risk for autoimmune diseases. Since veterans who were prisoners of war are known to have higher rates of PTSD, in addition to other health-related risk factors, I would assume that these findings would be valid for this population as well.

If you have any questions or require additional information, please let me know.

Sincerely,



Joseph A. Boscarino, PhD, MPH
Senior Scientist
The New York Academy of Medicine
Email: jboscarino@nyam.org

References

- Boscarino JA.** Exposure to psychological trauma and cardiovascular disease: implications from clinical and epidemiologic research. Presented at: the 62nd Annual Meeting of the American Psychosomatic Society, Orlando, FL March, 2004a.
- Boscarino JA.** Posttraumatic stress disorder and physical illness: results from clinical and epidemiologic studies. *Annals of the New York Academy of Sciences* 2004b;1032 (in press).
- Boscarino JA.** Association between posttraumatic stress disorder and physical illness: results and implications from clinical and epidemiologic studies. Presented at: 34th Annual Meeting of the International Society for Psychoneuroendocrinology, Rockefeller University, New York, NY, September, 2003a.
- Boscarino JA.** Posttraumatic stress disorder and autoimmune disease among Vietnam veterans. Presented at the 61st Annual Meeting of the American Psychosomatic Society, Phoenix, AZ, March, 2003b.
- Boscarino JA.** Postwar experiences of Vietnam veterans." In: G. Fink (ed.), *Encyclopedia of Stress*, Vol. 3. Academic Press, New York, NY 2000: 656-662.
- Boscarino JA.** Diseases among men 20 years after exposure to severe stress: implications for clinical research and medical care. *Psychosomatic Medicine* 1997;59(6):605-614.

- Boscarino JA.** Post-traumatic stress disorder, exposure to combat, and lower plasma cortisol among Vietnam veterans: findings and clinical implications. *Journal of Consulting and Clinical Psychology* 1996;64(1):191-201.
- Boscarino JA.** Post-traumatic stress and associated disorders among Vietnam veterans: the significance of combat exposure and social support. *J Traumatic Stress* 1995;8(2):317-336.
- Boscarino JA.** Current excessive drinking among Vietnam veterans: a comparison with other veterans and non-veterans. *International Journal of Social Psychiatry* 1981a;27: 204-222.
- Boscarino JA.** Patterns of alcohol use among veterans and non-veterans: a confirmation of previous findings. *American Journal of Public Health* 1981b;71: 85-88.
- Boscarino JA.** Alcoholism in VA inpatient facilities: implications of the VA patient census. *American Journal of Drug and Alcohol Abuse* 1980;7: 403-411.
- Boscarino JA.** Current drug abuse among Vietnam and non-Vietnam veterans. *American Journal of Drug and Alcohol Abuse* 1979;6: 301-312.
- Boscarino JA, Chang J.** Electrocardiogram abnormalities among men with stress-related psychiatric disorders: implications for coronary heart disease and clinical research. *Annals of Behavioral Medicine* 1999a;21(3):227-234.
- Boscarino JA, Chang J.** Higher abnormal leukocyte and lymphocyte counts 20 years after exposure to severe stress: research and clinical implications. *Psychosomatic Medicine* 1999b;61(3):378-386.
- Centers for Disease Control. Health status of Vietnam veterans: I. psychosocial characteristics. *JAMA* 1988a;259(18):2701-2707.
- Centers for Disease Control. Health status of Vietnam veterans: II. physical health. *JAMA* 1988b;259(18):27018-2714.
- Centers for Disease Control. Post-service mortality among Vietnam veterans. *JAMA* 1987;257:790-795.
- Chrousos GP. The Hypothalamic-pituitary-adrenal axis and immune-mediated inflammation. *N Engl J Med* 1995;332: 1351-1362.
- Chrousos GP, Gold PW. The concepts of stress and stress system disorders: overview of physical and behavioral homeostasis. *JAMA* 1992;267: 1244-1252.
- Kulka RA, Schlenger WE, Fairbank JA, Hough RL, Jordan BK, Marmar CR, Weiss DS. *Trauma and the Vietnam Generation: Report of Findings from the National Vietnam Readjustment Study*. Brunner/Mazel, New York, NY: 1990.