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**Memorandum**

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From Director
Center for Environmental Health and Injury Control

Subject Review of VA Mortality Study

To Ronald W. Hart, Ph.D.
Director
National Center for Toxicological Research

The Veterans Administration (VA) has conducted a proportionate mortality study (PMR) of 24,235 deaths among U.S. Army and U.S. Marine male veterans who served in Vietnam and 26,685 deaths among male veterans of the same two services who did not serve anywhere in Southeast Asia. All deaths were identified from the VA BIRLS file and occurred between July 4, 1965, and March 1, 1982. These deceased veterans had to have served in the military sometime between July 4, 1965, and March 1, 1973. Career and non-career, officers, and enlisted men, as well as reservists, were included. In-service deaths occurring before 1974 and men dying from war-related injuries were excluded. In service deaths after 1973 were included.

Within the group of Vietnam veterans, the fraction of all deaths attributable to a particular cause was computed and compared to the corresponding proportion for non-Vietnam veterans. The comparison was done using the proportionate mortality ratio (PMR) technique in which age at death, race, and branch of service were taken into account. There was no adjustment for calendar year of death or rank. Altogether, PMRs were computed for 18 major cause of death groupings and for 23 specific cancer sites.

We will address our concerns in data collection, data analysis, and interpretation.

Data Collection. Are the BIRLS tapes truly at least 94 percent complete? From the CDC Mortality Study which used multiple sources of mortality we found that BIRLS was less complete.

Data Analysis. Why do the authors emphasize only the statistically significant positive findings? Why were not the significant decreases in deaths from genitourinary diseases (Table 3) and the decrease in deaths from all cancers for one-tour of duty veterans (Table 5) not discussed?

The lack of association between service in Vietnam and suicide needs to be reevaluated in light of the CDC finding that they were increased only in the first 5 years after discharge. CDC used the time period since discharge rather than year of death. This subject was repeatedly brought

up with the VA prior to completion of their analysis. The CDC study would indicate that grouping by 10 year periods would minimize the effect.

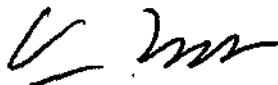
The findings for lung cancer and NHL in Marine Vietnam veterans are provocative, although similar observations were not made in other studies of Vietnam veterans. The absence of unusual mortality from soft-tissue cancers is consistent with some previous studies but at variance with others. Because so many statistical tests were done on the data set, these apparent findings could be due to chance. It would be helpful to see a more detailed analysis in which mortality from these cancer sites is examined by calendar year in Vietnam, rank, MOS, and principal duty. These additional analyses would help in deciding whether some factor related to the Vietnam experience is responsible for the apparent association.

Interpretation. The authors suggest that these were major differences in the findings of previous studies cited, but there are in fact few major differences in the findings.

Referenced studies were not critically discussed. There has never been, for example, an association demonstrated between lung cancer and phenoxy herbicides except in the Zack Study (Ref. 29) where 3.6 cases were expected and 6 were found in those exposed to 2,4,5-T. Those authors state that they cannot evaluate trends in lung cancer deaths as they relate to occupation because of "limitation in the data."

As noted above, it is not surprising to encounter the small number of statistical departures from expected mortality seen in this study. These could easily have arisen by chance alone. This study, as originally designed, cannot conclusively clarify mortality risks for Vietnam veterans, let alone elucidate possible causative factors within, or outside of, the Vietnam experience. Reasons include lack of a defined population-at-risk, incomplete ascertainment of deaths, and absence of "exposure" data on individual veterans.

This PMR study appears to be well executed in mechanics. However, the presentation and discussion of the results do not provide the necessary caution in interpretation and allow the uninitiated to make causal inferences where they do not exist.



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