



# Agent Orange Review

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*Information for Veterans Who Served in Vietnam*

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## Vietnam Experience Study Released by CDC

The Vietnam Experience Study, conducted by the Centers for Disease Control, is designed to evaluate possible health effects of the Vietnam experience on veterans. The study compared the health status of a group of male U.S. Army veterans who served in Vietnam with a group of male U.S. Army veterans who served elsewhere during the Vietnam Era.

The study has several components: a mortality assessment; a morbidity study (which includes telephone interviews, and medical and psychological examinations); a birth outcome validation; and a semen analysis.

### Mortality/Morbidity Assessment

CDC used a random sample of military records to find 9,324 male U.S. Army veterans who served in Vietnam and 8,989 Army veterans who served in Korea, Germany or the United States during the same time period. All of these men had been discharged starting in 1965 to 1971.

Over the entire followup period (mortality after discharge through December 1983), total mortality among the Vietnam veterans was 17 percent higher than for the other veterans. The excess mortality occurred mainly in the first five years after discharge from active duty, when the death rate among Vietnam veterans was about 45 percent higher than the rate among non-Vietnam veterans. Most of the increased mortality was from external causes, such as motor vehicle injuries, suicide, homicide and unintentional poisonings (mostly by drugs).

After the first five years, mortality among Vietnam veterans was similar to that of non-Vietnam veterans, except for drug-related deaths which continued to be elevated. This excess in post-service mortality among Vietnam veterans due to external causes is similar to that found among men returning from combat after World War II and the Korean Conflict.

An unexpected finding in the study was a deficit in deaths from diseases of the circulatory system among Vietnam veterans, CDC recently updated the first mortality report through 1986. As with the earlier data, with the exception of the first five years after discharge, Vietnam veterans continue to have a similar rate of death for all causes compared to non-Vietnam veterans. The morbidity findings of the Vietnam Experience Study include results of the telephone interview, the medical and psychological examinations, and the reproductive and child health components of the study.

In the telephone interview component, nearly 18,000 veterans were traced with 94 percent of the Vietnam and 92 percent of the

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## About the "Review"...

"Agent Orange Review" is prepared by VA's Office of Public Affairs. The "Review" is published periodically to provide information on Agent Orange to concerned veterans and their families.

This issue updates federal government studies and activities related to Agent Orange and the Vietnam experience.

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If you have had an Agent Orange Registry examination and have questions about it, contact the environmental physician at the VA medical center where you had the examination.

If you have questions about VA benefits, contact the VA facility nearest you. The phone number can be found in your telephone book under "U.S. Government" listings.

## Soft-Tissue Sarcoma Studies Show Veterans Not at Increased Risk

A VA study of soft-tissue sarcoma among men of draft age during the Vietnam Conflict shows that, in general, veterans who served in Vietnam did not have an increased risk of this type of cancer compared to those men who had never been in Vietnam.

The study was published in the October 1987 issue of the "Journal of the National Cancer Institute" and was conducted in collaboration with the Armed Forces Institute of Pathology (AFIP). The case-control study compared individuals with soft-tissue sarcomas and individuals without soft-tissue sarcomas with respect to Vietnam service, potential Agent Orange exposure and other possible risk factors, such as radiation therapy, exposure to specific chemicals, occupational exposure to phenoxy herbicides and certain medical conditions.

The cases were drawn from the AFIP soft-tissue tumor files. Between one-fourth and one-third of all soft-tissue sarcoma cases in the United States are sent to AFIP for review. The selection for the study was limited to men who were diagnosed at AFIP as having soft-tissue sarcoma between January 1, 1975 and December 31, 1980, and who were born between 1940 and 1955.

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## VA's Mortality Study Findings Prompt Further Analysis

The results of VA's proportionate mortality study of Army and Marine Corps Vietnam veterans, released in September 1987, indicated that Marine Corps Vietnam veterans appeared to have an increased mortality from lung cancer and non-Hodgkin's lymphoma. (Army Vietnam veterans did not.) The study, however, could not investigate possible causative factors for these elevated malignancies in Marines, and VA is conducting five followup studies either to confirm or refute the study findings.

The study also found statistically significant excess deaths among Army Vietnam veterans for motor vehicle accidents, non-motor vehicle accidents and accidental poisonings. Similar findings have been reported in other studies of Vietnam veterans, such as the Centers for Disease Control's Vietnam Veteran Mortality Study. Suicides were not elevated among this group of Vietnam veterans.

Published in May 1988 in the "Journal of Occupational Medicine," the study compared the mortality patterns and specific causes of death among 24,235 Vietnam veterans and 26,685 veterans without Vietnam service. The veterans were drawn from a random sample of deceased Vietnam-Era veterans identified in a computerized VA benefit file. Service information was obtained from military personnel records, and cause of death information from death certificates.

### Committee Review

In August 1987, the study was provided to the Veterans Advisory Committee on Environmental Hazards for scientific review. The committee, whose membership includes experts in the field of dioxin exposure, discussed the study findings during their October 1987 meeting and recommended no changes in VA's current guidelines that do not allow disability compensation claims based on dioxin exposure.

The committee determined that the findings concerning lung cancer and non-Hodgkin's lymphoma, while statistically significant, are inconclusive and should be interpreted with caution. Among the reasons given by the committee for this cautious position was that a proportionate mortality study, by its very nature, cannot resolve the question of whether study results constitute a direct cause and effect relationship without the need for additional studies.

Concerning the lung cancer finding, the committee also noted the absence of any information on the smoking history of the study subjects.

### Followup Studies

Based on conclusions of the Advisory Committee on Environmental Hazards, VA is conducting five followup studies to confirm or refute the findings of the Vietnam Veteran Mortality Study.

The first of these efforts involves updating the mortality study by including an additional 11,000 Vietnam-Era veterans' deaths in the analysis. These deaths occurred between 1982 and 1984.

The data will give to the study added statistical power and cases with longer latency periods -- an important factor because some of the diseases suggested as being associated with Agent Orange exposure and Vietnam service may take years to develop.

The second effort involves a separate analysis for Army Vietnam veterans who served in the I Corps area of Vietnam. This analysis is

## AGENT ORANGE CLASS-ACTION SUIT SETTLEMENT...

The Supreme Court recently declined to review rulings that had dismissed lawsuits by approximately 300 veterans who had challenged the \$180 million settlement between Vietnam veterans and their families and the manufacturers of Agent Orange. This action now opens the way to begin payments to totally disabled veterans who were exposed to Agent Orange or to their survivors. It is anticipated that it will be some time next year before the first payments are made. Payments will vary depending on the onset and duration of the total disability.

Neither the Veterans Administration nor any other federal agency is directly involved in the distribution of the settlement assets. The Court has designated the Aetna Life Insurance Company to serve as the claims administrator for the program. Information about the settlement can be obtained either by calling, toll-free, 1-800-225-4712, or by writing to the Special Master, Kenneth Feinberg, in care of Kaye, Schoter, Fierman, Hays and Handler, 1575 Eye St., NW, Washington, DC 20005.

being undertaken to determine whether the Army veterans who were stationed in the same geographic areas as the Marine Corps veterans experienced mortality patterns similar to the Marines.

Because of the widely accepted view of a causal relationship between smoking and lung cancer, the third activity involved obtaining military medical records of Marines in the mortality study who died from lung cancer in an attempt to determine their smoking status. It was later found impossible to determine who smoked and who did not.

Fourth, the VA is reviewing the Patient Treatment File for non-Hodgkin's lymphoma and Hodgkin's disease among Vietnam-Era veterans who have been treated in VA medical centers. The cases and the control patients will be compared with respect to Vietnam service and other factors associated with military service. The hypothesis is that if military service in Vietnam is not associated with an increased risk of non-Hodgkin's lymphoma or Hodgkin's disease, then the proportion of veterans having served in Vietnam or having certain military characteristics should be similar for both the cases and the controls.

In the fifth effort, a separate mortality study has been designed exclusively for Marine Vietnam veterans. To date, the only study providing an overall mortality rate of Vietnam veterans is a cohort mortality study recently published by the Centers for Disease Control which was restricted to Army veterans. A substantial portion (approximately 20 percent) of U.S. ground troops in Vietnam were Marines.

Unlike the Army units, the Marine Corps units were located in one geographic area -- I Corps. In view of the results of the VA mortality study and the lack of overall mortality rates as well as cause-specific mortality rates for Marine Vietnam veterans, a separate mortality study for Marine veterans will be conducted.

The control group, which duplicated such characteristics as residency and socio-economic status, was drawn from the pathology records of hospitals and clinics that send reports to AFIP.

Interviews were conducted for 217 of 279 cases and 599 of 808 controls with study subjects or next of kin. Military and Vietnam service for all study subjects was documented by reviewing existing military personnel records.

An effort also was made to determine whether the odds of developing soft-tissue sarcoma increased with a greater probability of exposure to Agent Orange. To determine the likelihood of Agent Orange exposure, the following factors were reviewed: service in the Army or Marine Corps, occupation in the military, location of the veteran's unit in Vietnam or a combination of these factors,

Forty-five (21 percent) of 217 soft-tissue sarcoma cases and 145 (24 percent) of 599 controls had military service in Vietnam. There was no statistically significant association between soft-tissue sarcomas and Vietnam service.

Although the assumption is that ground troops in Vietnam as a group had a greater opportunity for exposure to Agent Orange, the study showed that this group actually had a slightly lower risk of soft-tissue sarcomas than men who had never been in Vietnam.

No statistically significant association was found between soft-tissue sarcomas and other study variables, such as viral diseases, skin problems, other types of cancer, smoking, alcohol use and occupations in which exposure to radiation or certain chemicals occurred.

In a parallel effort to the VA-AFIP soft-tissue sarcoma study, a review was undertaken of soft-tissue sarcoma cases in VA's Patient Treatment File.

The review of VA hospital patients was conducted to determine if there was a connection between Vietnam service and soft-tissue sarcomas. The review found that the chance of Vietnam veterans having soft-tissue sarcoma was not greater than that of veterans without Vietnam service.

VA's Agent Orange Projects Office, in collaboration with VA's Pathology Service and AFIP, reviewed soft-tissue sarcoma cases among Vietnam-Era veterans who were admitted to VA medical centers in 1969-1983. The cases consisted of 234 Vietnam-Era veterans who served in the military between 1964 and 1975, were treated in one of VA's 172 medical centers between 1969 and 1983, and had a diagnosis of soft-tissue sarcoma. The comparison group consisted of 13,496 patients who were drawn from the same patient population sample.

The findings of the review are consistent with other studies of Vietnam veterans and soft-tissue sarcoma, including the Air Force Health Study of personnel who were involved in Agent Orange spraying missions in Vietnam, the New York State mortality study of Vietnam veterans and the Australian government's mortality study of Vietnam veterans.

An article on the results of the patient treatment file review was published in the December 1986 issue of the "Journal of Occupational Medicine."

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## Agent Orange Study Cancelled

The Centers for Disease Control's Agent Orange Epidemiological Study, which was intended to assess the possible adverse health effects on Vietnam veterans of Agent Orange exposure, has been cancelled.

Progress on the study -- one of three components of the large-scale Epidemiology Study mandated by Congress -- was delayed because of the inability to discriminate between ground troops who were exposed to Agent Orange and ground troops who were not.

A variety of methods were attempted in an effort to solve the problem, but none succeeded, partly because military records lack sufficient detail to pinpoint an individual's location with respect to areas of Agent Orange use (with the exception of Air Force Ranch Hand personnel and an even smaller group of chemical corps veterans).

The Congressional Office of Technology Assessment and the Science Panel of the Agent Orange Working Group have agreed that military records cannot be used as a basis for determining individual exposure.

In addition, self-reporting of exposure by Vietnam veterans cannot be used because troops were exposed to a variety of aerial spraying in Vietnam, making it impossible for an individual to distinguish among the sprayings of Agent Orange, other herbicides and insecticides,

The inability to evaluate Agent Orange exposure by other means resulted in a decision to conduct a special TCDD (Dioxin) Validation Study to determine whether measuring dioxin levels retained in the body can be used as a way of identifying and measuring exposure. Dioxin had been shown to remain for years in body fats

after exposure to the herbicide, and technical advances have made it possible to measure minute amounts of dioxin in human blood.

The Validation Study conducted by CDC found that the dioxin content of blood from 646 Vietnam ground troop veterans matched the amount of dioxin in the blood of 97 non-Vietnam veteran contemporaries. The dioxin content and, therefore, the exposure to it was essentially the same whether the individual had been in Vietnam as part of ground troops or had never been in Vietnam. Virtually all the study participants had dioxin levels below the upper limit for U.S. residents without known dioxin exposure. These findings were reviewed by the Domestic Policy Council's Agent Orange Working Group and the Congressional Office of Technology Assessment.

The final conclusion of the Validation Study was that the dioxin content of blood cannot be used to identify a group or cohort of Vietnam veterans large enough to serve as a study group of men who had been exposed to Agent Orange.

The other components of the Epidemiology Study -- the Vietnam Experience Study and the Selected Cancers Study -- are proceeding. The Vietnam Experience Study is looking at the health experience of veterans with Vietnam service and veterans without Vietnam service to determine whether Vietnam veterans have health problems that are different from those who did not serve in Vietnam.

The Selected Cancers Study is focusing on whether Vietnam veterans are at increased risk of developing certain cancers that have been suggested as associated with exposure to phenoxy herbicides and their dioxin contaminant. The cancers are: lymphoma, soft-tissue sarcoma, nasal and naso-pharyngeal cancer, and primary liver cancer. The CDC reports that the study should be completed some time in 1988.

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non-Vietnam men located during 1985 and 1986. Of those located, 93 percent of the Vietnam and 91 percent of the non-Vietnam men were interviewed.

The interviews revealed a broad similarity between the two groups in terms of current demographic and social characteristics, such as education, income, employment rates and marital status.

Although the two groups are very similar socio-economically, the Vietnam veterans reported more current limitations in activities, more current use of prescription drugs, and a greater prevalence of many types of diseases and somatic and psychological symptoms.

Also, while this study was not large enough to evaluate risks of specific types of cancers, the two groups were similar in the total reported number of physician-diagnosed cancers. These findings are consistent with the results of other studies of the health of Vietnam veterans.

The Vietnam veterans reported more problems with impaired fertility, yet both groups reported fathering the same average number of children.

The Vietnam veterans also reported more birth defects and other health problems among their children. However, when this information was checked against medical records, the children of Vietnam veterans were no more likely to have birth defects than the children of non-Vietnam veterans.

In the examination component, a random subsample (approximately 41 percent) of those interviewed were provided comprehensive physical, psychological and laboratory examinations. Physical and laboratory examinations showed few current differences between the two groups, despite the many differences reported by telephone interview. For example, there were large differences in reported skin problems; but on examination, all skin conditions, including scars from possible past chloracne, were found at the same rate for both groups.

Psychological evaluation of the men who were examined was done through standardized interviews and questionnaires. Although most men in both groups fell within normal limits in these evaluations, current psychological problems -- primarily alcohol dependence or abuse (13.7 percent versus 9.2 percent), anxiety (4.9 percent versus 3.2 percent), or depression (4.5 percent versus 2.3 percent) were more prevalent among Vietnam than non-Vietnam veterans.

Analysis of combat-related post-traumatic stress disorder was

limited to Vietnam veterans. About 15 percent of these veterans reported ever experiencing symptoms which met diagnostic criteria for this disorder. Combat-related psychological symptoms diminished over time, but 2 percent still experienced episodes of post-traumatic stress disorder during the month before examination, up to 20 years after their Vietnam service.

Overall, hundreds of physical health items were evaluated as part of the examinations, including blood pressure, electrocardiograms, chest roentgenograms, pulmonary function tests, visual acuity and hearing tests, peripheral nerve function, immunologic status and more than 100 laboratory tests. For most items, no statistically significant differences were found between the two groups. The most noteworthy differences were hearing loss, evidence of past infection with hepatitis B, lower sperm concentrations, and lower average proportions of morphologically "normal" sperm cells. Despite these last two findings, the average number of children fathered per veteran in each cohort was identical -- 1.6 children.

### Reproductive Findings

Although Vietnam veterans reported more adverse reproductive and child health outcomes than non-Vietnam veterans during the telephone interview portion of the study, the children of Vietnam veterans were no more likely to have birth defects (all types combined) recorded on hospital birth records than were children of non-Vietnam veterans.

These results are consistent with the findings of three epidemiologic studies (the Australian Birth Defects Study, the CDC Birth Defects Study, and the U.S. Air Force Health Study or "Ranch Hand Study") conducted since 1981 on the relationship of Vietnam service and birth defects in children of male veterans.

In addition, the recently published study of birth defects in the Seveso, Italy, area, which was contaminated by dioxin as a result of an industrial accident in 1976, concluded "that the data collected contain no evidence to support the position that in the population of the Seveso area exposed to dioxin, there was greater risk of producing congenitally malformed offspring."

On February 13, 1987, CDC published the findings of the mortality review component of the Vietnam Experience Study in the "Journal of the American Medical Association." The findings on the health effects of Vietnam service were published in the "Journal of the American Medical Association" on May 13, 1988.

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