

**Vietnam Veterans and Agent Orange
Independent Study Course**



Updated June 2008
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I found this on the VA website:
http://www.publichealth.va.gov/docs/vhi/VHlagentorange_text508.pdf

This is a VA Course Study and Handbook the next 8 pages are copies of some of the important pages.

There are no references to "Tactical Herbicides" Anywhere in this "Vietnam Veterans and Agent Orange" VA Course Study and Handbook. Why is the term "Tactical Herbicides" used in my rejection, by the VA, to Deny My Claim?



Veterans Health Initiative

Congratulations! You have completed the review of course material in this correspondence course. Please return to the VA LMS and launch this course to complete the final exam and end of course activities.

CHAPTER 2 AGENT ORANGE AND OTHER HERBICIDES USED IN VIETNAM

What is Agent Orange? Agent Orange is the name given to a specific blend of herbicides used for military purposes in Vietnam from 1965 to 1971. It was developed by the U.S. military for the purpose of eliminating plants and leaves from foliage in Vietnam that could have provided cover to the enemy. Vietnam veterans were exposed to many different health risks during the Vietnam War, including infectious diseases, smoke, unsanitary conditions, etc. However, Agent Orange remains even today a central focus for concerns about long-term health consequences of service in that war, among veterans, their families and others.

The name “Agent Orange” came from the orange identifying stripe around the 55-gallon drums in which it was stored. The name did not refer to the herbicide’s actual color -- the material inside the drums was actually a reddish-brown to tan colored liquid. Other herbicides, including Agent White and Agent Blue, each with their own color-coded stripe, were also used in Vietnam to a lesser extent.

The two herbicides or “active ingredients” mixed together to make Agent Orange had been developed and tested for military use in Vietnam by the U.S. military. Their tests came up with an optimized mixture containing about equal amounts of 2,4-D (2,4-Dichlorophenoxyacetic acid) and 2,4,5-T (2,4,5-Trichlorophenoxyacetic acid). Both of these are in a common class of herbicides often referred to as the “chlorophenoxy herbicides.” At one time, chlorophenoxy herbicides were some of the most widely used weed-killing chemicals domestically in the United States, although generally at lower application rates compared to what was used in Vietnam. These agents as a class were inexpensive and effective at controlling weeds, and because they were generally regarded as safe, they were widely used by private citizens, businesses, and state and federal organizations in the United States. Their wide application spanned from the 1950’s through the 1970’s, when the U.S. Environmental Protection Agency banned the use of 2,4,5-T. In fact, the herbicide 2,4-D is still available for use in the United States today.

Unfortunately, during the manufacture of one of the two herbicide ingredients of Agent Orange, the 2,4,5-T, small but significant amounts of the chemical dioxin (2,3,7,8-Tetrachlorodibenzodioxin, or “TCDD”) was formed as a contaminating byproduct. Knowledge that Agent Orange and other herbicides used in Vietnam were contaminated with dioxin surfaced in the 1970s, and dioxin health effects have remained a major focus of health concerns for Vietnam veterans even today.

Although dioxins are actually a class of closely related chemical compounds, the main dioxin contaminating Agent Orange was specifically one compound, TCDD. Today, TCDD is the most thoroughly examined dioxin in both animals and human studies, and it is considered to be the most hazardous of the dioxin chemical family. In fact, dioxins are produced as byproducts through a variety of processes including certain chemical manufacturing processes, waste incineration, and even in outdoor fires including forest fires and field burning. According to a recent draft risk assessment of dioxin health risks

effectiveness of aerial applications of various formulations of 2,4-D, 2,4,5-T, and other chemicals in the defoliation of jungle vegetation representative of Southeast Asia on several 10-acre plots. Aerial spray treatments were applied at rates of 0.5 to 3.0 gallons per acre, and at two- to three-month intervals, to determine minimal effective rates and proper season of application. Defoliation effectiveness was measured in terms of rate, volume, canopy penetration, vegetation response and season of application. Results of the test program showed that (1) 2,4-D and 2,4,5-T were effective for long-term defoliation, with more complete defoliation and longer duration of effective defoliation at higher rates of application; (2) best results were achieved during the rainy or growing season; (3) defoliation responses were influenced more by rate than by volume of chemical applied; (4) woody species varied in the duration and degree of defoliation; and (5) complete defoliation of all species in mixed forest types was not achieved (Warren, 1968).

Use of Herbicides in Vietnam. Phenoxy herbicides are synthetic chemical analogues of hormones found in plants that regulate the rate and pattern of plant growth; these herbicides cause aberrant growth or death of certain plant species. The types of herbicide used in Vietnam were very effective at killing certain types of tropical vegetation and the aerial spraying of herbicides allowed for easy application over a large area. The herbicides were applied aurally at a rate of approximately 3 gallons per acre. According to military records of Operation Ranch Hand, from August 1965 to February 1971, a total of 17.6 million gallons of herbicide was sprayed over approximately 3.6 million acres in Vietnam (NAS, 1974).

The different types of herbicide used by U.S. forces in Vietnam were identified by a code name referring to the color of the band around the 55-gallon drum that contained the chemical. These included Agents Orange, White, Blue, Purple, Pink and Green. From 1962 to 1965, small quantities of Agents Purple, Pink and Green were used. From 1965 to 1970, Agents Orange, White and Blue were employed, and from 1970 to 1971, only Agents White and Blue were used in the defoliation program (Young and Reggiani, 1988).

Agent Orange was the most extensively used herbicide in Vietnam; it consisted of a 50:50 mixture by weight of the n-butyl esters of two phenoxy acids: 2,4-dichlorophenoxyacetic acid (2,4-D) and 2,4,5-trichlorophenoxyacetic acid (2,4,5-T). A synthetic contaminant of 2,4,5-T is the compound 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD), informally known as dioxin. TCDD is an unavoidable by-product of the manufacture of 2,4,5-T and a contaminant in Agent Orange (Gough, 1986). Levels of TCDD contamination in Agent Orange ranged from less than 0.05 to almost 50 parts per million, with a mean of about two parts per million (NAS, 1974). An estimated 368 pounds of dioxin was sprayed in Vietnam over a six-year period (Gough, 1986).

The military use of 2,4,5-T, and thus Agent Orange, was suspended by the Department of Defense in April 1970 (Young and Reggiani, 1988). Following the suspension of 2,4,5-T, the White House announced on December 26, 1970, that it was initiating an orderly yet rapid phase out of the entire herbicide operation. On February 12, 1971,

been conclusive. The lethal dose in humans is not known, nor is that required to cause birth defects, if indeed there is such an activity. TCDD is strongly implicated as the main cause of chloracne, a disease that has affected employees in some plants manufacturing 2,4,5-T or its precursor, 2,4,5-trichlorophenol" (NAS, 1974).

Concerns Over the Long-Term Use of Herbicides. Public concern over the use of herbicides in Vietnam began in 1964, even before the toxicity of TCDD was first reported. At that time, the Federation of American Scientists urged the government not to use chemical and biological weapons unless they were used first by the enemy. The federation was concerned about the use of defoliants in Vietnam because the government was not discriminating between fighting forces and civilians while using the herbicides and that constituted biological and chemical warfare (Young and Reggiani, 1988). In January 1966, 29 scientists banded together to protest the U.S. policy on the use of herbicides and demand their complete abolition. They requested that President Lyndon B. Johnson begin discussions with the allies on adherence to the ban on the use of herbicides in Vietnam. "Even if it can be shown that the chemicals are not toxic to man, such tactics are barbarous because they are indiscriminate; they represent an attack on the entire population of the region where the crops are destroyed, combatants and non-combatants alike. [This is] . . . a precedent for the use of similar but even more dangerous chemical agents against our allies and ourselves" (Dux and Young, 1980).

In December 1966, the Council of the American Association for the Advancement of Science (AAAS) sent a letter to the Secretary of Defense, Robert McNamara, calling for studies of the short- and long-term consequences of the massive use of herbicides in Vietnam (Young and Reggiani, 1988). In February 1967, a second petition signed by more than 5,000 scientists, including 17 Nobel laureates, was delivered to President Johnson requesting that he end the use of herbicides in Vietnam (Dux and Young, 1980). A Department of Defense (DOD) official, responding to criticisms regarding the questionable military use of herbicides, stated, "Qualified scientists, both inside and outside the government, and in the governments of other nations, have judged that seriously adverse consequences will not occur. Unless we had confidence in these judgments, we would not continue to employ these materials." Several members of the AAAS council agreed that this statement was unjustified, noting that there was insufficient evidence to arrive at this conclusion (Wolfe, 1989).

Noting the strong opposition by some of the nation's leading scientists to the military use of herbicides, the Department of Defense commissioned a study by the Midwest Research Institute (MRI) in Kansas City, Missouri, to assess whether the use of the herbicides would have a long-term ecological impact. The MRI assessment did not include field studies or trips to Vietnam, but involved a review of approximately 1,500 scientific papers. The study, *Assessment of Ecological Effects of Extensive or Repeated Use of Herbicides*, was completed in December 1967 (MRI, 1967). The report could not provide conclusive answers about the long-term effects of chronic exposure to herbicides on the ecological system or on the population, and recommended further studies of the long-term effects on the environment and the population in order to assess properly the consequences of repeated use of herbicides (MRI, 1967).

→ In 1965, the National Cancer Institute contracted with Biometrics Research Laboratory in Maryland to investigate the possible teratogenic effects of a number of pesticides and herbicides. The study, *Evaluation of Carcinogenic, Teratogenic, and Mutagenic Activities of Selected Pesticides and Industrial Chemicals*, noted that among the herbicides tested on mice and rats were 2,4-D and 2,4,5-T (Bionetics, 1968). This study provided the first indication of the teratogenicity and fetotoxicity of 2,4,5-T (Lilienfeld and Gallo, 1989). The researchers determined that 2,4,5-T was teratogenic, causing malformations and stillbirths in mice when administered in high doses, and that 2,4-D was potentially harmful. This report was released to the public in 1969. Bionetics later re-analyzed the 2,4,5-T used for its initial study and revealed that the cause of toxicity was the contaminant TCDD and that 2,4,5-T itself was not teratogenic (Young and Reggiani, 1988).

Another study, *Congenital Malformations, Hydatidiform Moles and Stillbirths in the Republic of Vietnam, 1960-1969*, was conducted by R.T. Cutting on behalf of the government of South Vietnam and the U.S. Military Assistance Command, Vietnam (Cutting et al., 1970). Cutting examined maternity records of 22 hospitals for two time periods: the buildup of herbicide use (1960-1965) and larger-scale military herbicide use (1966-1969). He found that there were no differences in the incidence of stillbirths, congenital malformations, and hydatidiform moles between the two periods (Cutting et al., 1970; U.S. Congress, House, 1978). It was later revealed that the study was biased because of unreliable data and hospital records (Young and Reggiani, 1988). ←

In early 1970, the AAAS set up a commission to assess the effects of large-scale use of herbicides on the environment and population of Vietnam. The members of the Herbicide Assessment Commission (HAC) were Matthew Meselson, Arthur Westing, John Constable and Robert Cook. In June 1970, HAC held a conference at Woods Hole, Massachusetts with individuals who had experience with the herbicide program in Vietnam. They determined what HAC members would investigate and observe while in Vietnam, and prepared questionnaires for use in interviews of Vietnamese residents. In August 1970, they traveled to Vietnam on an inspection field trip to examine the extent to which the herbicides had destroyed the vegetation and local food crops in areas where they had been sprayed.

After returning from Vietnam, HAC members wrote a report on the defoliation of Vietnam in which they noted that the Department of Defense had stated that the herbicides were used "...for crop destruction of small, isolated crop patches along infiltration routes . . ." (Wolfe, 1989) and limited to areas of low population. HAC, however, found that "...crops had been sprayed in an area with an estimated population of 180 persons per square kilometer and that nearly all of the food being destroyed would have been used by mountain-dwelling Montagnard civilians instead of by enemy troops" (Wolfe, 1989). The commission maintained that the military use of herbicides had been considerably more destructive than previously imagined – half of the mangrove forests had been destroyed and there were indications of serious health effects (Wolfe, 1989). The HAC members documented reports of stillbirths and birth

defects in Vietnamese, noting that these adverse reproductive effects were possibly associated with 2,4,5-T (Young and Reggiani, 1988) and its contaminant, TCDD. On December 26, 1970, the White House announced that it was initiating an orderly yet rapid phase-out of the herbicide operation. The AAAS council adopted a resolution commending the U.S. government for its intention to phase out the use of herbicides in Vietnam (Wofle, 1989).

At the end of 1970, Congress directed the Department of Defense to contract with the National Academy of Sciences (NAS) to study the ecological and physiological effects of the widespread military use of herbicides in Vietnam. The NAS recruited a 17-member committee and 30 consultants to carry out the study. Committee members and consultants spent approximately 1,500 man-days in Vietnam in order to develop an inventory of the areas sprayed by herbicides, review the effects on various vegetation types, study the persistence of herbicides in soil, examine the effects of herbicides on animal populations in estuaries of Vietnam and attempt to identify the effects of herbicides on resident populations exposed to them (NAS, 1974).

The resulting report, *The Effects of Herbicides in South Vietnam* (NAS, 1974), concludes that (1) the committee was unable to gather any definitive indication of direct damage by herbicides to human health, although there were reports from Montagnards of respiratory distress in children; (2) although attempts to assess the social, economic and psychological effects of the herbicide spraying were less than satisfactory, the effect of herbicide spraying on the health of the Vietnamese appeared to have been smaller than feared; (3) the evidence of spraying on food crops indicated that they were highly vulnerable to the herbicides; (4) the mangrove forests were found to have been extremely vulnerable to herbicide spraying; and (5) although it was difficult to assess the damage to the inland forests because the committee had to rely on aerial photographs, the committee concluded that most of the damage occurred in overused open or thin forests and in young secondary forests.

Public concern about the military use of herbicides during the Vietnam conflict did not end when Operation Ranch Hand terminated with the last official herbicide spraying in 1971 or with the final departure of American troops in 1975. In April 1975, President Gerald Ford issued Executive Order 11850, in which the United States renounced the first use of herbicides in war except “under regulations applicable to their domestic use, for control of vegetation within U.S. bases and installations or around their immediate defensive perimeters.” In a historical account of Operation Ranch Hand, it was noted, “As long as this policy stands, no operation like Ranch Hand could happen again” (Buckingham, 1982).

Concerns About Exposure to Agent Orange

Vietnam Veterans Return Home. Historians have noted that during the 1970s, many Vietnam veterans returned to a society that did not welcome them (Schuck, 1987). The country had been greatly divided over the war and a strong antiwar sentiment pervaded most of the final years of the Vietnam conflict (Karnow, 1991; Spector, 1993). There

(Wilcox, 1989).

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Early in 1978, Paul Reutershan, a former helicopter crew chief responsible for transporting supplies to the 20th Engineering Brigade, appeared on the "Today" show and shocked many of the show's viewers by announcing, "I died in Vietnam, but I didn't even know it." He told of how he flew almost daily through clouds of herbicides being discharged from C-123 cargo planes, how he observed the dark swaths cut in the jungle by the spraying, and watched the mangrove forest turn brown and die (Wilcox, 1989). Even though he observed this destruction of the jungles and forests, he did not worry about his own health. He said that he was told by the Army that Agent Orange was "relatively nontoxic to humans and animals" (Wilcox, 1989). Upon returning home from Vietnam, Reutershan was diagnosed with cancer. On December 14, 1978, at the age of 28, Reutershan died from the cancer that had invaded his colon, liver, and abdomen (Schuck, 1987).

Prior to his death, Paul Reutershan had read a news account about Maude deVictor's data correlating health problems in Vietnam veterans and exposure to Agent Orange. Convinced that he had identified the cause of his illness, he contacted Edward Gorman, a personal injury lawyer on Long Island and requested that he file a suit in a New York State court naming Dow, Monsanto, and Diamond Shamrock (chemical companies that manufactured Agent Orange) as defendants. During this time, he also founded Agent Orange Victims International (AOVI), and before his death, he named his colleague, Frank McCarthy, to carry on as AOVI director. Reutershan spent his remaining time alerting the public to his belief that his cancer was the direct result of his exposure to Agent Orange.

This concludes this extensive quotation from the initial 1994 "Vietnam Veterans and Agent Orange" IOM committee report. This VHI independent study guide was developed to continue that story.

NOTE: Congress gave VA the authority to presumptively service-connect certain diseases associated with exposure to herbicides used in the Vietnam War (see subpar. (10)(c) for the conditions that are currently presumptively recognized as service connected) and to presume that Vietnam veterans were exposed to such herbicides. Veterans from other conflicts (Korea, etc.) may take advantage of these “presumptions of service connection” if the veterans are diagnosed with one of the presumed illnesses. But unlike Vietnam veterans, they are required to prove they were exposed to Agent Orange or other herbicides during their military service; they do not have the benefit of a presumption of exposure like Vietnam veterans.

b. Any U.S. veteran who served in Korea during 1968 or 1969.

c. Any U.S. veteran who may have been exposed to dioxin, or other toxic substance in an herbicide or defoliant, during the conduct of military operation, or as a result of, the testing, transporting, or spraying of herbicides for military purposes. *NOTE: See Web site <http://www1.va.gov/agentorange/> for a Department of Defense (DOD) list (75 percent complete) of locations and dates where dioxin (Agent Orange and other agents) was used. For those sites that are not listed, the veteran needs to provide some proof of exposure to be able to obtain a registry examination.*

4. HEALTH REGISTRY EXAMINATIONS

The health registry examination protocol for veterans exposed to dioxin or other toxic substance in an herbicide or defoliant is described in paragraph 15. *NOTE: Veterans eligible for inclusion in the AOR do not need to be enrolled in VA health care to receive the health registry examinations.*

5. FURTHER EVALUATION AND TREATMENT

Where the findings of the health registry examination reveal a condition requiring treatment, the veteran is to be referred to a VA primary care clinician to obtain the necessary medical assessment and appropriate treatment, if enrolled or otherwise eligible for VA health care. If the veteran is not enrolled or otherwise eligible, the veteran must be encouraged to enroll or seek non-VA care.

6. HEALTH REGISTRY PARTICIPATION DOES NOT CONSTITUTE A FORMAL CLAIM FOR COMPENSATION

Veterans must be advised that participation in the AOR examination program does not constitute a formal claim for compensation. Although the results of such an AOR examination may be used to support a compensation claim, the examination must not, in most cases, be considered such a claim. Veterans may be advised of the routine procedure to file a claim through the Veterans Benefits Representative (VBR) at the nearest VA facility, medical center, or regional office.

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(3) Comprehensive Metabolic Panel or blood chemistries and enzyme studies;

(4) Urinalysis; and


(5) Hepatitis C Screening; that is, with the patient's consent and consistent with the standards for patient evaluation and testing. Refer to Web site: <http://www.hepatitis.va.gov/> .

NOTE: Hepatitis C has particular importance for VA because of its prevalence in VA's service population.

f. Appropriate additional diagnostic studies must be performed and consultations obtained as indicated by the patient's symptoms, the physical examination, and the laboratory findings.

g. Non-routine diagnostic studies, such as sperm counts, are performed only if medically indicated.

h. Laboratory test results must be filed in the veteran's health record.

NOTE: EH Clinicians do not need to obtain blood or serum and/or adipose tissue for analysis of tetrachlorodibenzo-para-dioxin (TCDD). Surgical procedures must not be performed to obtain tissue for the purpose of TCDD analysis. Serum dioxin has no clinical value and is currently recommended only as a part of a well-designed research study. 

16. REPORTING REQUIREMENTS

a. Transmission

(1) AOR worksheet data must be entered and transmitted no later than 10 working days following the health registry examination to the AAC database via Web site:

<http://vaww.registries.aac.va.gov> .

(2) Copies of the registry worksheets (formerly registry codesheets) are to be filed in the veteran's health record.

b. **EH Clinician and Coordinator Listings.** Separate listings of the EH Clinicians and Coordinators are maintained by EAS, VA Central Office. In an effort to keep these listings current, facilities are required to notify EAS, VA Central Office, by e-mail, of any changes at their respective facilities and/or satellite clinics.

Questions for CME Credit Program Content Material:

Chapter 1 introduces how concerns about environmental exposure to herbicides including Agent Orange during the Vietnam War affected veterans, their families, and VA health care and compensation policies.

Chapter 2 reviews the history of the U.S. involvement in the Vietnam War and the use of herbicides including Agent Orange during that period.

Chapter 3 gives an overview of VA disability compensation programs for veterans and describes how VA turned to the National Academies of Sciences Institute of Medicine for an independent authoritative review of the science on health effects from herbicide exposure to help VA establish fair and scientifically credible compensation policies for disabilities related to herbicide exposure among Vietnam War veterans.

Chapter 4 describes VA Agent Orange Health Examination Registry program, as an examination provided to Vietnam veterans by VA's Environmental Health Clinicians and Coordinators to Vietnam veterans and to other veterans who have concerns about exposure to these herbicides while on active duty.

Chapter 5 summarizes current research on the health of Vietnam War veterans conducted by VA and other researchers, including mortality and morbidity studies conducted by VA and others.

Chapter 6 summarizes the wide variety of VA outreach and education materials, both on line and in paper form, available to Vietnam War veterans and their families, and to the VA staff who work with them.

Chapter 7 describes how VA's community-based Readjustment Counseling Center "Vet Center" program helps combat veterans including Vietnam veterans readjust to civilian life. This includes helping veterans resolve war-related traumas, financial issues, and how to improve work and family life.

Chapter 8 summarizes the previous chapters in preparation for the continuing medical education examination.

Chapter 9 provides supplemental reading material on Agent Orange and Vietnam Veterans' health including excerpts from Chapter 2 of the National Academy of Sciences' 1994 report, *Veterans and Agent Orange: Health Effect of Herbicides Used in Vietnam*.

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CHAPTER 1 INTRODUCTION

This “Veterans Health Initiative” (VHI) independent study guide was developed to provide a background for VA health care providers on the unique health issues and concerns of veterans of the Vietnam War. Perhaps more than for any other U.S. military deployment, the Vietnam War generated a lasting and vivid impression among veterans and all Americans about the environmental impact of this war on those who served.

Concerns about health effects from exposure to the herbicides used during the Vietnam War continue to have a tremendous impact on veterans, their families, and upon VA health care and compensation programs. Early on, Vietnam veterans during the 1960s and 1970s voiced increasing concerns about how exposure to herbicides and their dioxin contaminant had affected their health. Some developed health problems that they attributed to exposure to Agent Orange. Others suggested that birth defects among their children were related to Agent Orange exposure.

At first, VA had a hard time responding to the questions and health concerns of returning veterans. For one thing, military medical, personnel and exposure records were not maintained with future epidemiologic research in mind. The inadequacy of these records for research purposes continues to this day to thwart scientific investigation of possible long-term medical consequences among Vietnam veterans from Agent Orange exposure. In addition, in the 1970s and early 1980s there was far less scientific information available about the long-term health effects of herbicides and dioxins in any exposed population, further complicating VA’s ability to evaluate health problems among Vietnam veterans

Initially, this combination of minimal exposure data and limited scientific understanding of Agent Orange and dioxin health effects left VA poorly prepared to respond to mounting concerns among veterans and others. These limitations also affected VA’s ability to establish defensible policies on Agent Orange disability compensation. Moreover, the issue of Agent Orange and health and VA’s inability to effectively respond became a lightning rod for those concerned with the fair and equitable treatment of Vietnam veterans.

Today, VA has developed a number of approaches including scientific assessments of reviews herbicide and dioxin health effects by the independent National Academy of Sciences Institute of Medicine, and other related policies and procedures that together have made it easier for Vietnam veterans and in some cases their children to gain recognition for any illnesses or injuries they suffer that may be related to herbicide exposure. Vietnam veterans now have access to a comprehensive health care program tailored for them that recognizes their special concerns and needs. This includes a special health examination “Agent Orange” registry, which has provided medical examinations to over 452,000 Vietnam veterans as of April 2008, an enhanced disability compensation program for Vietnam veterans suffering from disabilities related to herbicide exposure, new health information from research, and perhaps most

importantly, a broad outreach and educational effort to get the word out to veterans about VA their benefits.

As you will see, this program has evolved over the years and continues to expand as more is uncovered on health effects of herbicides used in Vietnam. This is the second edition of "Vietnam Veterans and Agent Orange," and certainly our successors will generate future updates on this material to bring readers the most recent information on this ever-evolving topic.

Our hope is that this independent study guide will help our health care providers to understand and appreciate the concerns and issues that are most important to veterans of the Vietnam War. Further, we believe that an appreciation of these issues and the history of these events will provide an important foundation for providing the care and benefits that these veterans deserve.

June 2008

CHAPTER 2 AGENT ORANGE AND OTHER HERBICIDES USED IN VIETNAM

What is Agent Orange? Agent Orange is the name given to a specific blend of herbicides used for military purposes in Vietnam from 1965 to 1971. It was developed by the U.S. military for the purpose of eliminating plants and leaves from foliage in Vietnam that could have provided cover to the enemy. Vietnam veterans were exposed to many different health risks during the Vietnam War, including infectious diseases, smoke, unsanitary conditions, etc. However, Agent Orange remains even today a central focus for concerns about long-term health consequences of service in that war, among veterans, their families and others.

The name “Agent Orange” came from the orange identifying stripe around the 55-gallon drums in which it was stored. The name did not refer to the herbicide’s actual color -- the material inside the drums was actually a reddish-brown to tan colored liquid. Other herbicides, including Agent White and Agent Blue, each with their own color-coded stripe, were also used in Vietnam to a lesser extent.

The two herbicides or “active ingredients” mixed together to make Agent Orange had been developed and tested for military use in Vietnam by the U.S. military. Their tests came up with an optimized mixture containing about equal amounts of 2,4-D (2,4-Dichlorophenoxyacetic acid) and 2,4,5-T (2,4,5-Trichlorophenoxyacetic acid). Both of these are in a common class of herbicides often referred to as the “chlorophenoxy herbicides.” At one time, chlorophenoxy herbicides were some of the most widely used weed-killing chemicals domestically in the United States, although generally at lower application rates compared to what was used in Vietnam. These agents as a class were inexpensive and effective at controlling weeds, and because they were generally regarded as safe, they were widely used by private citizens, businesses, and state and federal organizations in the United States. Their wide application spanned from the 1950’s through the 1970’s, when the U.S. Environmental Protection Agency banned the use of 2,4,5-T. In fact, the herbicide 2,4-D is still available for use in the United States today.

Unfortunately, during the manufacture of one of the two herbicide ingredients of Agent Orange, the 2,4,5-T, small but significant amounts of the chemical dioxin (2,3,7,8-Tetrachlorodibenzodioxin, or “TCDD”) was formed as a contaminating byproduct. Knowledge that Agent Orange and other herbicides used in Vietnam were contaminated with dioxin surfaced in the 1970s, and dioxin health effects have remained a major focus of health concerns for Vietnam veterans even today.

Although dioxins are actually a class of closely related chemical compounds, the main dioxin contaminating Agent Orange was specifically one compound, TCDD. Today, TCDD is the most thoroughly examined dioxin in both animals and human studies, and it is considered to be the most hazardous of the dioxin chemical family. In fact, dioxins are produced as byproducts through a variety of processes including certain chemical manufacturing processes, waste incineration, and even in outdoor fires including forest fires and field burning. According to a recent draft risk assessment of dioxin health risks

by the U.S. Environmental Protection Agency, most “point sources” of dioxin in the United States such as incineration have been effectively controlled, and the largest remaining contributor to dioxin exposure today comes from field burning activities across the nation. In fact, dioxins from all of these sources can be detected in all Americans today, although the clinical significance of this is still controversial.

Veteran’s Concerns. Returning Vietnam veterans and others have attributed a wide range of illnesses including birth defects among their children to exposure to Agent Orange and the dioxin it contained. In April 1970, Congress held the first of many hearings on herbicide health effects.

Before the military spraying program ended, estimates are that at least 17 to 19 million gallons (more than 100 million pounds) of herbicide were sprayed over approximately six million acres in Vietnam. In fact, all regions in Vietnam were sprayed at least once, and some on multiple occasions. The most heavily sprayed areas included inland forests near the boundary between North and South Vietnam, inland forests at the junction of the borders of Cambodia, Laos, and South Vietnam, inland forests north and northwest of Saigon, mangrove forests of the southernmost peninsula of Vietnam and mangrove forests along major shipping channels southeast of Saigon.

Vietnam Veterans “Class Action” Lawsuit. Following the end of the Vietnam War, a group of Vietnam veterans and their families filed a class action lawsuit against seven chemical companies for injuries that veterans and their families believe were caused by exposure to herbicides used in Vietnam that were manufactured by these companies for the U.S. military. More than 2000,000 veterans joined the class action, claiming that a large number of their illnesses were caused by exposure to Agent Orange and related herbicides. The VA was not part of this class action suit.

On May 7, 1984, a tentative out-of-court settlement was announced, where the chemical companies involved agreed to pay \$180 million, reportedly the largest settlement of its kind at that time. A Settlement Fund was created to disperse the money received.

Applications for the Agent Orange Veteran Payment Program, established by the settlement, had to be submitted prior to January 17, 1995. To be eligible, Vietnam veterans or their survivors had to establish that the veteran served in Vietnam between 1961 and 1972, was either totally disabled or the survivor of a deceased Vietnam veteran, that the veteran’s death or disability was not caused by a traumatic or accidental occurrence, and that the death or disability occurred before December 31, 1994. Furthermore, the veteran had to demonstrate probable herbicide exposure.

The settlement itself did not end the controversy, and for more than four years various groups challenged the settlement. However, in 1988, the U.S. Supreme Court declined to review rulings that dismissed lawsuits brought by veterans and others who raised these challenges. The settlement fund was distributed to class members in accordance with a distribution plan established by the United States District Court Judge Jack B.

Weinstein, who presided over the litigation and settlement. In 1989, the first payments were made to the survivors of deceased Vietnam veterans and to totally disabled veterans exposed to Agent Orange. By then the assets had grown to about \$250 million.

The Payment Program operated over 6 ½ years, concluding in 1994, and distributing \$197 million in cash payments to eligible members of the class. Of the 105,000 claims received by the Payment Program, approximately 52,000 Vietnam veterans or their survivors received cash payments, which averaged about \$3,800 each. September 27, 1997, the District Court ordered the Fund closed, its assets having been fully distributed.

Additional information about this “Class Action Lawsuit” can be seen on the corresponding “Agent Orange Brief,” available at www.va.gov/AgentOrange.

(For additional information about the use of herbicides in Vietnam, see Chapter 2, History of the Controversy Over the Use of Herbicides, in the National Academy of Sciences’ Institute of Medicine 832-page report, “Veterans and Agent Orange: Health Effects of Herbicides Used in Vietnam.” An extract from the report is included in Chapter 9 – Supplemental Reading.)

CHAPTER 3 AGENT ORANGE DISABILITY COMPENSATION AND THE NATIONAL ACADEMY OF SCIENCES INSTITUTE OF MEDICINE

Congress has given VA the authority to provide compensation for veterans who are disabled by an injury or illness that happens or is made worse during their active duty military service. VA's disability compensation program provides monthly monetary benefits to veterans who are disabled by service-connected injuries or diseases, that is, for illnesses or injuries that were incurred or aggravated *during their active military service*. VA is authorized by Congress to pay disability compensation only for "disability resulting from personal injury suffered or disease contracted in line of duty, or for aggravation of a preexisting injury suffered or disease contracted in line of duty, in the active military, naval, or air service."

The amount of a monthly disability check is established by Congress. It is based on the degree of the service-connected disability in 10% increments (10%, 20%, *etc.*), depending on the degree of disability and resulting lost capacity for working, as determined by a VA disability rating specialist. A veteran who is totally disabled will receive substantially more than a veteran with a lesser disability. According to congressionally established disability compensation rates as of December 2007, a veteran with a 10% service-connected disability will receive \$117 per month, while a 100% service-connected disabled veteran will receive \$2,527 monthly. Additional amounts are paid to veterans with families and to certain veterans with severe disabilities and certain veterans with dependents. VA has several pamphlets describing VA benefits, including "Federal Benefits for Veterans and Dependents," which are available online at www.va.gov. In 2007, VA provided nearly \$50 billion for a range of benefits to over 3.7 million veterans and their family members, including for education, home loan guarantees, life insurance, survivor benefits, and disability compensation.

Direct Service Connection and Disability Compensation. Establishing service connection and degree of disability usually requires a simple review for a veteran with an obvious disease or injury, for example, from a bullet or shrapnel wound. To receive disability compensation, a veteran must provide evidence of their illness or injury, and evidence that it occurred or was made worse during their military service. VA adjudicates a veteran's direct service disability compensation claim based upon the merits and evidence supporting the individual case, and grants a claim when VA determines a veteran's illness or injury *is at least as likely as not* to have been caused by the environmental or occupational exposure. Generally, this will involve a Compensation and Pension (C&P) medical examination by a medical doctor to evaluate a veteran's medical condition and disability. Most veterans receiving disability compensation from VA have injuries that are evaluated through this "direct service connection" approach.

Presumptive Service Connection: Vietnam veterans during the 1960s and 1970s voiced increasing concerns about how exposure to herbicides and dioxin had affected their health. Some developed health problems that they attributed to exposure to Agent Orange, which extended to birth defects among their children. Initially, VA had

problems establishing policies on Agent Orange disability compensation. Minimal veteran exposure information and limited scientific understanding of Agent Orange and dioxin health effects meant that in the face of mounting concerns from veterans and others, the evidence needed to establish a direct service connection for Agent Orange disabilities was missing.

In response, Congress in 1991 passed Public Law 102-4, the “Agent Orange Act,” which established a new process for establishing presumptively service connected illnesses for Vietnam veterans relative to Agent Orange, other herbicides, and the contaminant dioxin, along with a presumption of exposure to those agents for veterans diagnosed with presumptively service connected illnesses. This represented a significant breakthrough for establishing compensation policies in this area for what remains a controversial issue even to this day.

Public Law 102-4 also made into law certain illnesses that VA had previously on its own authority presumed to be service connected for Vietnam veterans exposed to herbicides. These included non-Hodgkin’s lymphoma, soft tissue sarcoma, and chloracne (within one year of exposure).

The National Academy of Sciences Institute of Medicine -- An Independent Voice.

The Agent Orange Act directed VA to contract with the National Academy of Sciences (NAS) to conduct comprehensive and independent reviews of all scientific and medical literature on the health effects from exposure to Agent Orange and other herbicides used in Vietnam, and to dioxin. The initial 1994 NAS report established the pattern for all future reports, as an exhaustive and thorough review of *all* published literature on health effects from exposure to these agents.

Most of the reviewed literature comes from epidemiological studies of civilians exposed either from industrial accidents or exposed occupationally in the work place – little is based on studies of Vietnam veterans themselves. The ability to review and form conclusions based upon all human studies means that Vietnam veterans can benefit from results obtained from studying non-veterans as well as veterans.

These NAS reports have become the basis by which VA determines which illnesses may be associated with exposure to Agent Orange, related herbicides, and to dioxin. Their initial report also established how the NAS would describe the level of scientific evidence supporting an association between herbicide exposure and any specific illness:

- Their highest level of association, “sufficient evidence of an association,” is when a positive association between exposure and an illness is observed in studies in which chance, bias, and confounding can be ruled out with reasonable confidence.
- A lower but still positive level of association, “limited or suggestive evidence of an association,” is reached when the scientific evidence suggests an association

between exposure and an illness, but the evidence is limited by the inability to confidently rule out chance, bias or confounding.

- The largest category of used by the NAS is “inadequate or insufficient evidence to determine association.” By default, any health outcome falls into this category unless the NAS can accumulate enough reliable scientific evidence to promote that outcome into a more positive (or negative) level of association.
- The final category is “limited or suggestive evidence of *no* association.” This category is reserved for health effects having several adequate studies are consistent in showing no positive association between exposure and a specific health effect.

NAS Science Findings Support VA Policy Decisions: The statute gives the NAS responsibility for evaluating the relevant science. VA in turn is given responsibility for translating their scientific conclusions into veteran compensation policy:

“Whenever the Secretary determines, on the basis of sound medical and scientific evidence, that a positive association exists between (A) the exposure of humans to an herbicide agent, and (B) the occurrence of a disease in humans, the Secretary shall prescribe regulations providing that a presumption of service connection is warranted for that disease for the purposes of this section.”

“In making determinations for the purpose of this subsection, the Secretary shall take into account (A) reports received by the Secretary from the National Academy of Sciences under section 3 of the Agent Orange Act of 1991, and (B) all other sound medical and scientific information and analyses available to the Secretary. In evaluating any study for the purpose of making such determinations, the Secretary shall take into consideration whether the results are statistically significant, are capable of replication, and withstand peer review.”

In other words, the statute expressly invites the Secretary to consider evidence *in addition to* that provided by the NAS.

In practice, VA assembles an internal task force of scientists, medical doctors, attorneys and compensation experts to evaluate and recommend possible policy options to the Secretary in response to a NAS report.

The statute goes on to provide an automatic blanket “Evidence of a Scientific Association” for all Vietnam veterans, as:

“An association between the occurrence of a disease in humans and exposure to an herbicide agent shall be considered to be positive for the purposes of this section *if the credible evidence for the association is equal to or outweighs the credible evidence against the association.*” [Italics added]

The first NAS report, "Veterans and Agent Orange," was released in 1993 and set a pattern as an exhaustive review of all the published scientific and medical literature on health effects from exposure to herbicides used in Vietnam, and to the dioxin contaminant contained in some of them. The Agent Orange Act of 1991 also required that the NAS report be updated every two years, taking into account new scientific and medical publications in this area which may affect the results of the NAS review process.

Based upon findings contained in the initial 1994 NAS report, VA decided to recognize a range of illnesses as presumptively service connected for Vietnam War veterans diagnosed with soft tissue sarcoma, non-Hodgkin's lymphoma, Hodgkin's disease, chloracne, porphyria cutanea tarda, multiple myeloma and respiratory cancers (including laryngeal cancer, and cancer of the lung, bronchus and trachea). In fact, VA and Congress had previously recognized chloracne, non-Hodgkin's lymphoma and soft tissue sarcoma as related to herbicide or dioxin exposure for Vietnam veterans – the NAS review process confirmed the validity of these earlier decisions and added additional diseases to the list.

The legal requirement that the NAS update their reviews at least every two years has added to the list of presumptively service connected conditions. Updated reviews published in 1996, 1998, 2000, 2002, 2004 and 2006 have expanded VA's list of presumptively service-connected illnesses to include acute or sub-acute peripheral neuropathy (early-onset and transient), Type 2 diabetes, prostate cancer, and most recently, chronic lymphocytic leukemia.

Based upon the 1996 NAS update and congressional action, Vietnam veterans' children with the birth defect spina bifida are also eligible for certain compensation and other services.

Moreover, three special NAS brief reports supported VA's decision to add type 2 diabetes (in 2000) and to remove a previous presumptive period for the manifestation of respiratory cancers (in 2004).

The 2006 NAS update placed hypertension and AL amyloidosis in the category of "limited/suggestive evidence" of an association with herbicide exposure, their weakest positive association, and on that basis, VA has added AL amyloidosis to the list of presumptively service connected conditions. The limited evidence linking hypertension was considered to be too weak to support a presumption, although clearly future scientific studies could change this.

The 1991 statute also prescribed a "presumption of exposure" that frees a Vietnam veteran from having to prove they were exposed to herbicides while serving in the Vietnam War:

"For the purposes of this subsection, a veteran who, during active military, naval, or air service, served in the Republic of Vietnam during

the Vietnam era and has a disease referred to in paragraph (1)(B) of this subsection shall be presumed to have been exposed during such service to an herbicide agent containing dioxin or 2,4-dichlorophenoxyacetic acid, and may be presumed to have been exposed during such service to any other chemical compound in an herbicide agent, unless there is affirmative evidence to establish that the veteran was not exposed to any such agent during that service.”

As a result of this statutorily defined policy, an eligible veteran (*i.e.*, a veteran with another than dishonorable discharge) has only to show that they are a Vietnam veteran and that they were diagnosed with one of the diseases presumptively recognized as service connected to herbicides exposure, and service connection becomes automatic. This process eliminates a significant burden for Vietnam veterans trying to establish service connection and disability compensation for illnesses related to herbicide exposure.

Recently, the definition of what constitutes a Vietnam War in the context of who these laws cover has come up, over the "Blue Water Navy" personnel. Blue War Navy were sailors who served during the Vietnam War, but only on board ship off shore from Vietnam. In August 16, 2006, Blue War Navy veterans won a court decision that indicated VA should consider Blue Water Navy veterans the same as veterans who actually served physically on land in Vietnam. That would mean that a veteran could claim Vietnam service if they had evidence showing that they only served off shore in the Blue Water Navy. This is important to veterans because many who served in Vietnam only as Blue Water Navy have not been able to qualify for the presumptive disability compensation for exposure to AO that is available to other Vietnam War veterans. As of the writing of this independent study guide, the Veterans Benefits Administration (VBA) has developed a rule that would exclude Blue Water Navy veterans from being eligible for VA's compensation policies aimed at Vietnam War veterans because they were unlikely to be exposed to herbicides over the ocean.

Credibility and Independence. The strengths of the NAS scientific review process are its breadth and thoroughness, and the NAS reputation for independence and scientific prestige. Earlier efforts by VA to conduct its own scientific reviews on herbicide health effects were seen by many veterans as lacking credibility and independence. Veterans have not always been happy with the NAS findings, but the NAS credibility has remained intact. The NAS process has become an essential step to ensure that new presumptive service connected disabilities command scientific credibility.

VA Actions on NAS Reports. As provided for in Public Law 102-4 and through historical precedent, VA has accorded significant weight to previous NAS conclusions on herbicide and dioxin health effects. All of the conditions categorized by the NAS as having "sufficient evidence of an association" and most of those reaching the weakest positive level of evidence as "limited/suggestive evidence of an association" have been recognized by VA for service-connection, albeit not always immediately.

The 1994 initial NAS report. On the day the first NAS report was released, *Veterans and Agent Orange: Health Effects of Herbicides Used in Vietnam*, VA announced that it would establish presumptions related to Hodgkin's Disease and porphyria cutanea tarda, in addition to soft tissue sarcoma, chloracne, and non-Hodgkin's lymphoma, which had in fact been previously recognized by VA on its own authority as connected to herbicide and dioxin exposure for Vietnam veterans.^{1, 2} Two months later, VA announced that multiple myeloma and respiratory cancers would also be added to the list of conditions presumed to be service connected based on exposure to an herbicide containing dioxin. VA declined to presumptively service connect prostate cancer at that time, although the NAS report placed prostate cancer in the "limited/suggestive evidence of an association" category in their 1994 report.

Update 1996. The second biennial NAS report, *Vietnam Veterans and Agent Orange: Update 1996*, elevated acute and sub acute *transient* peripheral neuropathy into the "limited/suggestive" category of positive association. Their report also provided additional data to support the "limited/suggestive" association between herbicide and dioxin exposure and prostate cancer described in the 1994 report. The update also placed into the same category an association between herbicide exposure and the birth defect spina bifida in the children born to exposed individuals. In the months following release of the 1996 update, VA announced the recognition of prostate cancer and acute and subacute transient peripheral neuropathy as presumptively associated with herbicide exposure in Vietnam.³ VA also asked and received authority from Congress to provide benefits and services for Vietnam veterans' children born with spina bifida. VA's programs that provide a range of benefits to these children is still in effect today.⁴

Update 1998. *Update 1998* provided no significant changes in conclusions about long-term health effects from exposure to herbicides and dioxin.

Special report 2000 – *Veterans and Agent Orange: Herbicide/Dioxin Exposure and Type 2 Diabetes.* Shortly after *Update 1998* was finalized, VA learned of a new occupational study by the National Institute of Occupational Safety and Health (NIOSH) that had been released, which provided new evidence of an association between herbicide and dioxin exposure and Type 2 diabetes. In response, VA requested the

¹ **Chloracne and Porphyria Cutanea Tarda:** For compensation purposes, chloracne and porphyria cutanea tarda must have occurred, to a degree that is at least 10 percent disabling within one year of exposure to an herbicide used in the Vietnam War.

² **Soft Tissue Sarcoma:** The definition of soft tissue sarcoma does not include osteosarcoma, chondrosarcoma, Kaposi's sarcoma or mesothelioma for compensation purposes.

³ **Acute And Subacute Transient Peripheral Neuropathy:** The term acute and subacute transient peripheral neuropathy refers to a temporary peripheral neuropathy that appears within one year of exposure to a herbicide used in the Vietnam War, and resolves within two years of the date of onset.

⁴ **Spina Bifida:** Under most circumstances, VA does not have the authority to provide health care to family members of veterans. However, Public Law 104-204 gave VA the authority to provide children with the birth defect spina bifida born to Vietnam veterans certain benefits and services including monetary allowance, health care and vocational training and rehabilitation. Spina bifida does not include spina bifida occulta. Public Law 106-419, enacted November 1, 2000, authorized similar benefits and services for women Vietnam veterans' children who suffer from certain birth defects, however, this is not considered to be related to herbicide exposure but rather to military service itself by women in Vietnam.

NAS to make an expedited special review of this new report. The expedited, special report was delayed, at VA's request, to allow for consideration of a new Air Force Ranch Hand report that also included additional findings regarding diabetes. In October 2000, the NAS released the special report, which concluded that there was "limited/suggestive evidence" of an association. VA subsequently announced that VA would presumptively recognize Type 2 diabetes for service connection, and implementing regulations were published in 2001.

Update 2000. *Update 2000* added that there was "limited/suggestive evidence of an association" between herbicide exposure by Vietnam veterans and acute myelogenous leukemia (AML) in their children, leading VA's Secretary to announce that he would seek authority to provide benefits and services for these children. However, shortly after the report came out, an Australian study which was one of only several studies that the NAS based their conclusion upon was reported by its authors to be in error.

Special report 2002 – *Veterans and Agent Orange: Herbicide/Dioxin Exposure and Acute Myelogenous Leukemia in the Children of Vietnam Veterans.* In response to the withdrawal of the Australian study that had been key in supporting the conclusion that herbicide exposure of Vietnam veterans was associated with Acute Myelogenous Leukemia (AML) in their children, VA requested the NAS to conduct a special reassessment of this issue. The NAS special report, released in 2002, reassessed the remaining published data on AML and concluded that it now provided only "inadequate/insufficient evidence to determine whether an association exists" between herbicide exposure of the parent this illness in their children. Consequently, VA dropped plans for to provide benefits and services for individuals with this condition.

Update 2002. The findings contained in *Update 2002* were generally the same as those in previous reports, with one major exception. Based on the scientific evidence reviewed for that update, as well as the cumulative findings of research reviewed in the previous *Veterans and Agent Orange* reports, the NAS concluded that there is "sufficient evidence of an association" between exposure to the herbicides used in Vietnam or the contaminant dioxin and chronic lymphocytic leukemia (CLL).

For other forms of leukemia, the NAS concluded that there was still, as in all previous reports, "inadequate/insufficient evidence to determine whether an association exists." Previous NAS reports had lumped all leukemias together including CLL into a single disease, and had found "inadequate/insufficient evidence to determine whether an association exists" for leukemias as a whole. With the exception of CLL, all diseases discussed in the NAS report remained in the same category as in the last prior NAS report. Based on this report, VA's Secretary determined that a new presumption of service connect CLL among Vietnam War veterans was warranted, but not for any other forms of leukemia.

Special report 2004 -- *Veterans and Agent Orange: Length of Presumptive Period for Association between Exposure and Respiratory Cancer.* Based on a conclusion contained in the 1994 NAS report that there was "limited/suggestive" evidence of an

association between herbicide exposure and respiratory cancers, VA decided to presumptively service connect respiratory cancers for Vietnam veterans relative to their herbicide exposure. The NAS reaffirmed their conclusion in subsequent updates published in 1996, 1998, 2000, and 2002.

VA also determined that for presumptive service connection purposes, any respiratory cancers must show up within 30 years after the herbicide exposure. That is, respiratory cancers among Vietnam veterans would be presumed to be service connected only if they manifested within 30 years following exposure to herbicides while in Vietnam.

In proposing the rule, VA explained that the 30-year presumption period was based on studies indicating that the increased risk of respiratory cancers due to certain other types of chemical exposures was thought to have a definite duration, beyond which the risk abated or even vanished. Further, VA policy makers at that time observed that the longest latency period between herbicide exposure and respiratory cancer noted in a scientific study appeared to be 30 years. However, the underlying NAS reports in this series had not described any maximum time period for respiratory cancer risk following herbicide exposure.

Congress, in Public Law 107-103, the "Veterans Education and Benefits Expansion Act of 2001," decided to eliminate VA's 30-year limitation on the period during which respiratory cancers must become manifest for services connection (and disability compensation) to be granted on a presumptive basis.

The same law in which Congress abolished VA's latency requirement also directed VA to contract with the NAS to conduct a new study that would review "all available scientific literature on the effects of exposure to an herbicide agent containing dioxin on the development of respiratory cancers in humans," and "whether it is possible to identify a period of time after exposure to herbicides after which a presumption of service-connection" of respiratory cancer would no longer be warranted.

The resulting 2004 special NAS report, "Veterans and Agent Orange: Length of Presumptive Period for Association Between Exposure and Respiratory Cancer," concluded that "[b]ecause there are no epidemiologic data on the length of time after exposure to TCDD [dioxin] ceases during which an increase in respiratory cancer is associated with that exposure, the committee cannot determine a period beyond which occurrence of respiratory cancer could no longer be presumed to be related to exposure to TCDD, that is, no upper limits on the latency or presumptive period could be determined." The report added that "the effects of TCDD on respiratory cancer could last many decades." In other words, the committee was not able to find a scientific basis to support an outer limit on the presumptive period for developing respiratory cancer, based upon their exhaustive review of the relevant literature.

In response, VA's Secretary determined that there is no scientific basis to support an outer limit on the presumptive period for an association between herbicide exposure respiratory cancers. Today, there is no time limit imposed for when any respiratory

cancer must manifest in a Vietnam veteran for it to be presumptively service connected.

Update 2004. Update 2004 confirmed all the findings contained in previous NAS reports on long-term health effects from exposure to herbicides and dioxin, but added no new findings. In response, VA's Secretary determined that there was no scientific basis to support any changes in current VA herbicide compensation policies relative to herbicide exposure of Vietnam veterans.

Update 2006. The most significant change contained in Update 2006 compared to previous NAS reports was placing hypertension in the category of "limited or suggestive evidence of an association," their weakest affirmative category of association. Update 2006 also moved AL amyloidosis into this same positive category of association with herbicide and dioxin exposure (previously both had been in the category of inadequate or insufficient evidence of an association). In response, VA's Secretary determined that the limited available scientific and medical evidence did not warrant a new presumption of service connection for hypertension for Vietnam veterans exposed to herbicides in Vietnam. However, the Secretary also determined that the scientific evidence presented in the 2006 NAS committee report and other information indicated that a new presumption of service connection is warranted for AL amyloidosis.

Receiving Compensation. To receive disability compensation, a veteran *must* file an application for benefits. It is important to make sure veterans understand that a medical examination, or a special Agent Orange health registry examination (described latter) does not by itself constitute a claim for disability. While VA provides billions of dollars to veterans and their survivors in disability compensation each year, each claim is evaluated on its own merits, and VA does not approve every claim. For information or assistance in applying, a veteran can write, visit or call a Veterans Service Representative at the nearest VA regional office (toll-free telephone: 1-800-827-1000), VA medical center or a local veterans service organization representative. Information is also available on line at www.va.gov. When a claim is denied, VA provides the applicant with the reason for this action as well as detailed information regarding appeal rights.

The "In-Country Effect." Although Agent Orange and related herbicides have become a major health focus, a true understanding of the impact of service in the Vietnam War requires an appreciation of the many different risk factors of that conflict. More than 58,000 service members were killed and more than 150,000 were wounded during this conflict (<http://web1.whs.osd.mil/mmid/CASUALTY/vietnam.pdf>). Many service members lived under harsh jungle conditions that included high temperatures and humidity, endemic infectious diseases, as well as a hostile and determined enemy. Many unfortunately succumbed to the temptations of readily available drugs. The ongoing war involved exposure to smoke, unsanitary food and water, and the horrors of war itself. Clearly, herbicide exposure was but a single health risk for U.S. service members during that conflict.

The "in-country effect" is an idea that suggests that a broad range of Vietnam War risk

factors possibly affected the health of Vietnam veterans. In September 2000, VA's Office of Public Health and Environmental Hazards convened a working group of representatives from the Centers for Disease Control and Prevention, the Air Force and VA field and central office personnel to discuss this approach. At the conclusion of the two-day meeting, the working group determined, among other things, that for most illnesses, the adoption of the "In-Country Effect" approach would probably not significantly change the current approach and outcome for establishing VA compensation policy, which uses the NAS to conduct independent analyses of the relevant scientific and medical literature. This is because either approach would presumably require scientific epidemiological evidence of adverse health outcomes among Vietnam veterans, and would probably ultimately rely upon the same underlying body of data. Interestingly, the working group also noted that there are no ongoing longitudinal health studies of Vietnam veterans that might provide input for this approach.

CHAPTER 4 VA HEALTH CARE AND THE AGENT ORANGE REGISTRY

In response to mounting concerns about health effects from herbicide exposure among Vietnam veterans, in 1978 VA established a special health examination registry known as the Agent Orange Registry Examination. The program offers a medical examination at all VA health care facilities, as well as the chance for veterans to discuss their health concerns with a knowledgeable health care provider. In fact, this Independent Study Guideline is part of that program.

The Agent Orange Registry is a computerized record of these examinations, and as of April 2008, the program has provided more than 452,000 individual Vietnam veterans, including over 8,000 women Vietnam War veterans. Assuming there were about 2.8 million Vietnam veterans, this means that about 16 percent have been seen in an Agent Orange registry examination at least once.

It is important to note that even though the program is three decades old, many veterans still are contacting the VA each week for their initial Agent Orange Registry exam. Clinicians performing the Registry examination follow a comprehensive protocol described in VHA Handbook 1302.01 on the Agent Orange Registry Examination (see appendix A, or on line at www.va.gov/EnvironAgents).

There is nothing particularly unique about the Agent Orange examination in that generally, clinicians should evaluate each patient's signs and symptoms and provide standard appropriate treatment and follow up based upon sound medical judgment. Each veteran participating in the voluntary Agent Orange Registry examination program receives a baseline laboratory evaluation, complete blood count, blood chemistries and enzyme studies and urinalysis. Particular attention is given to those diseases associated with exposure to Agent Orange and other herbicides used in Vietnam, and to their dioxin contaminant. Based upon the NAS scientific literature review process described in chapter 3, currently this includes chronic lymphocytic leukemia, soft tissue sarcoma, non-Hodgkin's lymphoma, Hodgkin's disease, chloracne, respiratory cancers (lung, bronchus, larynx, or trachea), prostate cancer, multiple myeloma, early-onset transient peripheral neuropathy, porphyria cutanea tarda, and type-2 diabetes. (For additional information and recommendations for prostate cancer screening, see the Agent Orange Handbook 1302.01 in Appendix A.)

Following completion of the examination, the veteran is given results of the physical examination and laboratory studies. Longstanding VA policy requires that this information be provided to the veteran in a face-to-face discussion with a physician familiar with the health aspects of the Agent Orange issue and in a follow-up letter summarizing results of the examination.

“Agent Orange Testing.” There are no specific diagnostic tests or treatments generally recommended specifically for Vietnam veterans. Occasionally, veterans will request that their body dioxin levels be measured. Although there are special techniques for measuring serum dioxin levels, they are expensive and are generally

used only as part of experimental protocols. Furthermore, an individual's serum dioxin level today may have little bearing on exposures that occurred many decades in the past – in fact, the *average* Vietnam veteran's serum dioxin level today may not be very different from the average American citizen's. In addition, since there are no treatments or interventions that would be based upon measuring serum dioxin levels, VA will not cover the expense of such tests. Finally, for compensation purposes, by law VA presumes that all U.S. service members who served in Vietnam were exposed to Agent Orange, making it unnecessary to “prove” Agent Orange exposure.

VA Environmental Health Clinicians and Coordinators. Each VA medical center has an Environmental Health Clinician who is responsible for the conduct of Agent Orange Registry examinations (as well as for other special registry and deployment-related environmental and occupational health issues). Each VA medical center also has an Environmental Health Coordinator who is responsible for coordinating Agent Orange Registry examinations, and for reporting the examination results and related matters (their names and contact information can be found at www.va.gov/EnvironAgents.) Both the Environmental Health Clinicians and Coordinators participate in quarterly nationwide conference calls, and automatically receive mailings from VHA's Environmental Agents Service (EAS) at VHA CO, updates on the latest developments, policies, scientific studies and other issues surrounding Agent Orange health and compensation issues. For more on these regularly scheduled conference calls, contact EAS at (202) 461-7222.)

Agent Orange Registry Data. The Agent Orange Special Health Examination Registry program is not a research program. Because of the self-selected nature of the veterans who come in for the voluntary examination program, and the lack of any controls, the registry is no substitute for a properly designed epidemiological study. The results of such studies are described in chapter 5, “Vietnam Veteran Health Research.”

Nevertheless, the Agent Orange Registry can function as a sort of health surveillance, since it contains medical information based on more than 452,000 examinations and follow-up examinations of Vietnam veterans (out of about 2.8 million veterans who served in the Vietnam War). The most recent such analysis, completed in 2000, shows that the most common symptoms reported by Agent Orange registry participants involve nervous and musculoskeletal systems, skin and other integumentary tissues (e.g., skin rashes), and those of the head and neck (e.g., headaches). Common diagnoses also include endocrine/metabolic effects, immunological effects, respiratory, circulatory, skin and subcutaneous tissue, and musculoskeletal effects, and neuroses, personality and other non-psychotic mental disorders. Tables 1 and 2 list the number of Vietnam veterans with selected diagnoses, obtained from initial registry evaluations, and frequency percentages.

Table 1. Frequency and Percent of Diagnoses Among Vietnam Veterans Who Participated in the VA Agent Orange Registry

<i>Frequency</i>	<i>Percent</i>	<i>Diagnoses</i>
20,813	11.2	Hypertension
12,375	6.6	Adjustment Problems
12,311	6.6	Post Traumatic Stress Disorder
8,502	4.6	Contact Dermatitis
7,513	4.0	Diabetes Mellitus
6,378	3.4	Skin Rash
6,322	3.4	Depression
5,633	3.0	Back Problems
5,540	3.0	Hearing Loss
5,528	3.0	Alcohol Dependence
5,360	2.9	Neurotic Anxiety
4,213	2.3	Acne
3,496	1.9	Headaches
2,563	1.4	Sebaceous Cyst
30	0.0	Drowsiness/Fatigue

Table 2. Frequency and Percent of Cancer Diagnoses for Vietnam Veterans Participating in the VA Agent Orange Registry

<i>Frequency</i>	<i>Percent</i>	<i>Cancer Diagnoses</i>
1,570	0.8	Skin (other than Melanoma)
1,495	0.8	Other
1,191	0.6	All Lymphoma
315	0.2	Hodgkin's Disease
743	0.4	Non-Hodgkin's Lymphoma
878	0.5	Respiratory
666	0.4	Lung
634	0.3	Digestive
426	0.2	Urinary
374	0.2	Melanoma
323	0.2	Leukemia
288	0.2	Oral
208	0.1	Testis
147	0.1	CNS
139	0.1	Multiple Myeloma
133	0.1	Soft Tissue

Undiagnosed Illnesses among Vietnam Veterans. Of the 186,495 Vietnam veterans that formed the basis of this analysis, 155,490 (83.4%) have some kind of diagnoses, while 31,005 (16.6%) had an undiagnosed condition. These figures are similar to those reported in similar summaries of Gulf War Veteran Registry examinations, and are likely

similar to what might be reported by VA outpatient clinics and in the private sector as well.

Outreach. Participation in the Agent Orange Registry offers an opportunity to provide information to Vietnam veterans about VA health care and compensation issues, and to discuss with them any particular health concerns they may have. Participants are automatically added to the mailing list for the “Agent Orange Review,” a newsletter that regularly provides updates on Agent Orange health care, other benefits, and new relevant scientific findings (described in Chapter 6, and available on line at www.va.gov/EnvironAgents). The NAS Agent Orange review and update process described in Chapters 3 occasionally results in decisions by the Secretary of Veterans Affairs to recognize new diseases as service connected. The Agent Orange Review is one good way that VA can get the word out to veterans about related changes in their eligibility for disability compensation.

VA medical center libraries also offer considerable resources on Agent Orange health issues, including books and videotapes. VA’s Environmental Agents Service (131), Department of Veterans Affairs, 810 Vermont Avenue, N.W., Washington, DC 20420, is another good source of information on this subject. The VA Web site for Agent Orange is located at www.va.gov/AgentOrange, and www.va.gov/EnvironAgents.

Registry Eligibility. Any veteran, male or female, who had active military service in the Republic of Vietnam between 1962 to 1975, and who expresses a concern relating to exposure to herbicides, may participate in the Registry. Eligible veterans who want to participate in this program should contact their nearest VA medical facility for an appointment.

Initially, veterans who did not serve in Vietnam were not eligible for the Agent Orange Registry examination even if they could have been exposed to herbicides elsewhere during military service. However, in October 2000, eligibility for the registry examination was expanded to include U.S. military veterans who served in Korea in 1968-69, when Agent Orange was used there to control weeds in the demilitarized zone separating North and South Korea. Subsequently, in March 2001, VA’s Secretary directed VA staff to offer the examination to any U.S. veteran who may have been exposed to herbicides used in Vietnam or to dioxin during or as a result of testing, transporting or spraying of an herbicide for military purposes. Spouses and children of veterans are not eligible for this examination.

Disability Compensation and the Agent Orange Registry Exam. It is very important to make certain that veterans understand that participating in the Agent Orange Registry does not automatically result in a veteran being considered for disability compensation, even when they are diagnosed with a compensable illness. Veterans who may qualify for disability compensation should be counseled that to be considered, they must file a claim with VA.

Veterans seeking compensation should contact the appropriate VA Regional Office by

calling toll-free 1-800-827-1000, or by going online at www.va.gov. Veterans who change their residences after receiving the Agent Orange examination should contact the Agent Orange Coordinator at the nearest VA medical center and the Agent Orange Clerk (200/397A), VA Automation Center, 1615 Woodward Street, Austin, TX 78772-0001. Both the old and new addresses and social security numbers should be included, and the veteran should explain that changes are for the Agent Orange Registry.

Enrollment for VA Health Care. In 1996, Congress passed Public Law 104-262, the “Veterans’ Health Care Eligibility Reform Act of 1996.” This law requires VA to establish and implement a national enrollment system to manage the delivery of health care services for all veterans. According to this law, after October 1, 1998, veterans (with some exceptions) must be “enrolled” to be eligible to receive health care. The exceptions are those veterans needing treatment for a service-connected condition, veterans with service-connected disabilities rated 50 percent or more, and veterans discharged or released from active duty for a disability that was incurred or aggravated in the line of duty during the 12-month period following separation.

Veterans will be enrolled to the extent Congressional appropriations (the funding Congress provides for VA each fiscal year) will allow. If appropriations are limited, then enrollment may also be limited based on eight priority levels, ranging from Priority 1 (veterans with service connected conditions rated 50 percent or more disabling), to Priority 8 (non-service connected veterans, and zero percent non-compensable service-connected veterans with income and net worth above the statutory threshold and who agree to pay specified co-payments.) Priority level also affects requirements for co-payments from veterans for health care. Veterans can call toll-free 1-877-222-8387 for information on enrollment and enrollment priority. Veterans can obtain applications for enrollment by visiting, calling or writing to their nearest VA health care facility or veterans’ benefits office.

NOTE: It is important to understand that a decision by VA that a veteran is eligible for health care does not automatically constitute a basis for service connection or in any way affect determinations regarding service connection.

Because of the complexity in determining eligibility for VA medical care benefits, veterans with questions regarding this matter are strongly encouraged to contact the Health Administration Service or comparable office at the nearest VA health care facility, or by calling 1-877-222-8387 to get the latest information. Veterans will be interviewed individually and their eligibility will be determined accordingly. For additional information about the Agent Orange Registry and health care eligibility, see the VHA Handbook 1302.01, Agent Orange Registry (AOR) Program Procedures, an extract of which is printed in Appendix A, and on-line at www.va.gov/AgentOrange.

CHAPTER 5 VIETNAM VETERAN HEALTH RESEARCH

The more than 3-decades following the end of the Vietnam War has seen a tremendous amount of research on health effects from exposure to Agent Orange, other herbicides used in Vietnam, and on the key contaminant dioxin. Responding to the concerns of returning Vietnam veterans, their families, Congress and the American public, academic and government scientists have carried out many studies to improve our understanding of the health risks associated with Vietnam service and herbicide exposure. The purpose of this section is to summarize the findings of the major Vietnam veteran-related studies. Details of some of these studies are provided in the appendices. The even greater number of studies on dioxin and herbicides in non-veteran populations are not summarized here, but are the basis of the regular congressionally mandated reviews by the National Academy of Sciences Institute of Medicine, described in Chapter 3, and available on-line at www.nap.edu.

Many of the veteran health studies focus on post-Vietnam War morbidity and mortality of Vietnam veterans. Much of this research was conducted by the Department of Veterans Affairs (VA), while other research was conducted by the Department of Health and Human Services Centers for Disease Control and Prevention (CDC), the U.S. Air Force, individual state agencies, veterans' service organizations and other entities. The unifying purpose has been to learn more about the health effects of Agent Orange and other herbicides used in Vietnam. Although many studies have been completed, the research effort is ongoing today – more than 3 decades after the last American troops left Vietnam and long after that herbicide spraying program was terminated.

Poor Exposure Data. From the beginning, the lack of good exposure data for Vietnam veterans has frustrated researchers in their attempts to conduct large-scale scientific investigations on long-term health consequences of exposure to Agent Orange, other herbicides used during the Vietnam War, and the dioxin they were contaminated with. In fact, today there is a great deal of published scientific research on health effects from exposure to these agents. However, nearly all of it comes from studies of non-Vietnam veterans, such as civilian workers who were exposed to these materials on the job, and civilians exposed during industrial accidents. These civilian subjects have been much easier to study because they come with much better exposure data compared to active duty troops serving in the Vietnam War. Moreover, exposures among these civilians are typically much greater compared to average exposures experienced by Vietnam veterans, making any associated health effects easier to detect (for more information on relative exposures see reference 1, pp 284-287).

One approach for assessing dioxin exposure sometimes long after the fact (and indirectly to Agent Orange and other herbicides) has been to measure the current amount of dioxin in a person via fat or serum samples, and then try and estimate what the original exposure may have been. However, this approach has been disappointing for trying to reconstruct the actual initial herbicide exposure of Vietnam veterans. For example, Vietnam veterans who had been estimated to have higher opportunities for Agent Orange exposure by virtue of their military occupation or location of their units

were generally not found to have increased levels of dioxin in their adipose tissue (2, 3).

Exposure Reconstruction. Despite past difficulties with exposure evaluation, some investigators have maintained that a general index of Agent Orange exposure for all ground troops who served in Vietnam remains feasible. In 1993, the Institute of Medicine (IOM) of the National Academy of Sciences recommended that a non-governmental organization with appropriate experience in historical exposure reconstruction be commissioned to develop and test models of herbicide exposure for use in studies of Vietnam veterans (1).

In response, VA contracted with the IOM to attempt to develop an historical exposure reconstruction model for Agent Orange. Subsequently, the IOM issued a call for proposals to develop an exposure model, and selected Dr. Jeanne Stellman at Columbia University for this effort. Her efforts were completed in April 2003, with the publication of her findings in the journal *Nature*, and (5) and a report from the IOM oversight committee (6). The committee concluded that, “. . . a valid exposure-reconstruction model for wartime herbicide exposures of U.S. veterans of Vietnam is feasible . . . therefore . . . the Department of Veterans Affairs and other government agencies [should] facilitate additional epidemiologic studies of veterans by non-government organizations and independent researchers.”

VA has funded the VA Environmental Epidemiology Service (EES) to help attempt to validate the exposure model, using actual existing data on illnesses commonly associated with Agent Orange exposure among Vietnam veterans. EES maintains complete rosters of all Vietnam veterans that have died from illnesses commonly associated with herbicide exposure, such as soft tissue sarcoma, non-Hodgkin's lymphoma, Hodgkin's disease, lung and laryngeal cancer, as well as diseases not currently linked to such exposures such as testicular, colon and skin cancer. In other words, EES is attempting to validate the model by testing its ability to accurately predict diseases among Vietnam veterans known to be associated with herbicide exposure. VA will use the results of these efforts to help plan further research using the exposure reconstruction model.

Another approach for getting around the lack of good exposure data has been to focus on specific groups of Vietnam veterans that are likely to have had the largest exposures. An example is service members involved in the actual spraying of herbicides in Vietnam. However, one significant limitation of studies that look for health effects associated with Agent Orange exposure among Vietnam veterans is that the *average* Vietnam veteran was unlikely to have experienced a dioxin exposure that would be all that different from that experienced by the average U.S. civilian at that time (1, pp 284-287). Nevertheless, certain groups of Vietnam veterans have been identified as possibly having significantly greater than average Agent Orange exposure.

One such group includes U.S. Air Force personnel who participated in Operation Ranch Hand -- the primary aerial herbicide spraying operation during the Vietnam War. Tables 6, 7 and 8 summarizes the results from these studies. Another high-exposure group is

the U.S. Army Chemical Corps, who were responsible for the mixing, storage and application of chemical agents including Agent Orange (summarized in Appendix C). The Army Chemical Corps sprayed Agent Orange around the perimeters of military installations in Vietnam to clear foliage and improve security surveillance. Studies of these two high-exposure groups, the Operation Ranch Hand and Army Chemical Corps, have proven to be the most useful of actual Vietnam War veterans themselves.

Morbidity and Mortality Studies on Vietnam Veterans. Both VA and non-VA scientists have completed many studies on morbidity (including reproductive health) and mortality among Vietnam veterans. This research is summarized in Tables 4 through 8, and includes a brief description of each study's methodology and principle findings.

Although some of these studies focus specifically on Agent Orange health effects, others focus more broadly on any health effects associated with service in the Vietnam War -- the so-called "Vietnam experience" effect. Evaluating health effects specific to herbicide exposure is difficult due to the lack of good herbicide exposure data for the average Vietnam War veteran, as described earlier.

For research purposes, VA has defined "Vietnam War veterans" as those individuals who served in the U.S. military anytime between July 4, 1965 and March 28, 1973 and who were stationed in Vietnam or off the coast of Vietnam within its territorial water during this period. "Non-Vietnam veterans" are those individuals who served in the U.S. military anytime between this period, but who were not stationed in Vietnam or off the coast of Vietnam during that time. "Vietnam-era veterans" are individuals who served in the U.S. military anytime between July 4, 1965 and March 28, 1973.

Early Efforts. In 1979, in Public Law 96-151, Congress directed VA to conduct a large-scale epidemiologic study to determine if Agent Orange has caused health problems in Vietnam veterans. The "obvious" way to study herbicide health effects was thought to be to study the veterans themselves. However, for about three years, VA and its contractor struggled to develop an appropriate protocol or study design against the backdrop of missing or non-existent exposure data.

At a congressional hearing in September 1982, an official from Health and Human Services, Centers for Disease Control and Prevention (CDC) told a frustrated congressional committee that CDC had the expertise to conduct the study that Congress had ordered. VA, at Congress' suggestion, subsequently transferred responsibility of the study to CDC. Unfortunately, several years and many millions of dollars later, CDC also found that the available military records were not adequate for establishing any meaningful herbicide exposure data for Vietnam veterans, which would be required for any large epidemiological study on herbicide health effects.

CDC then tried to indirectly evaluate Vietnam veteran exposure data by estimating herbicide exposure from military records, including self reports, and then validating those estimates through comparison with serum dioxin levels – the "Agent Orange Validation Study" (2). Unfortunately, the effort to validate exposure estimates were not

successful, as the estimates from military records and self reports did not match measured serum dioxin levels.

Based on these serious limitations in establishing a study cohort with appropriate exposure data, a CDC advisory group, the Science Panel of the Domestic Policy Council Agent Orange Working Group and the Agent Orange Advisory Panel of the Congressional Office of Technology Assessment, reached a consensus that the hoped-for Agent Orange health effects epidemiological study was not feasible. Nevertheless, although the CDC Agent Orange Study could not be initiated, many related research efforts have been completed and published, while scientific studies of other populations exposed to Agent Orange or dioxin are still ongoing.

**TABLE 3
VA-CONDUCTED VIETNAM VETERAN MORBIDITY STUDIES**

Authors and Year	Study Design	Description	Results
Kang, et al., 1986 ⁷	Case Control	Compared military service characteristics of 234 Vietnam-era veterans with soft tissue sarcoma, to those of 13,496 Vietnam-era veterans with other diagnoses.	No association between risk of soft tissue sarcoma and prior Vietnam service.
Kang, et al., 1987 ⁸	Case Control	Compared military service characteristics, including potential for Agent Orange exposure, of 217 Vietnam-era veterans with soft tissue sarcoma to those of 599 Vietnam-era controls.	No association between either Vietnam service or Agent Orange exposure and risk of soft tissue sarcoma.
Dalager, et al., 1991 ⁹	Case Control	Compared military service characteristics, including potential for Agent Orange exposure, of 201 Vietnam-era veterans with non-Hodgkin's lymphoma to those of 358 Vietnam-era veterans with other diagnoses.	No association between either Vietnam service or potential for Agent Orange exposure and risk of NHL.
Bullman, et al., 1994 ¹⁰	Case Control	Compared military service characteristics, including surrogate measures of Agent Orange exposure, of 97 Vietnam veterans with testicular cancer to those of 311 Vietnam veterans with no clinical diagnosis.	No association between surrogate measures of AO exposure and risk of testicular cancer.
Dalager, et al., 1995 ¹¹	Case Control	Compared military service characteristics of 283 Vietnam-era veterans Hodgkin's disease (HD) cases to those of 404 Vietnam-era veterans with other diagnoses.	No association between Vietnam service or surrogate measures of Agent Orange exposure and risk of HD.
Mahan, et al., 1997 ¹²	Case Control	Compared military service characteristics, including surrogate	No association between either

		measures of Agent Orange exposure, of 329 Vietnam-era veterans with lung cancer cases to those of 269 Vietnam-era veterans with non-cancer diagnoses and 111 Vietnam-era veterans with a diagnosis of colon cancer.	Vietnam service or surrogate measures of Agent Orange exposure and risk of lung cancer.
Kang, et al., 2006 ⁶¹	Cross-sectional survey	Compared 1,499 deployed (who sprayed herbicides in Vietnam) to 1,428 non-deployed U.S. Army Chemical Corps veterans, using telephone survey for self-reported data, and hospital records to verify diabetes.	Risk for diabetes, heart disease, hypertension, and chronic respiratory disease were slightly but significantly elevated in Vietnam veterans who sprayed herbicides.

Vietnam Veteran Morbidity: VA Studies (Summarized in Table 3)

Based upon reports that civilian workers who handled Agent Orange-related herbicides had increased risks of soft tissue sarcoma, non-Hodgkin's lymphoma and Hodgkin's disease (14-17), VA researchers conducted several case-control studies to assess the risk of those cancers associated with either Vietnam service in general, or with the job spraying Agent Orange and related herbicides in Vietnam. In summary, these studies do not find an association between service in Vietnam, the likelihood of Agent Orange exposure, and increased risks of soft tissue sarcoma, Hodgkin's disease, non-Hodgkin's lymphoma, testicular cancer or lung cancer. Cancer risk did not significantly vary according to branch, calendar year of service, region of service in Vietnam or location of unit relative to recorded sprayed areas. For additional information about these studies, see Table 3 and Appendix C.

The absence of a positive association in these studies may be explained by several factors. First, the observation period may have been insufficient. All of the cases and controls selected for these studies were examined only up to 1991 – providing between only about one to three decades between exposure and possible diagnosis. This may be an insufficient latency period for any actual carcinogenic effects to show up.

A second factor may be that the Vietnam veterans examined in this study had *on average* only relatively small Agent Orange exposures. Perhaps the proportion of veterans with relatively high exposures was so small that these studies lacked the statistical power to detect any real excess risk.

In summary, the possibility of a modestly increased risk for several types of cancer among Vietnam veterans exposed to Agent Orange and related herbicides cannot be ruled out (or confirmed) based upon these studies.

A 2005 VA study looked at the health of U.S. Army Chemical Corps veterans who sprayed herbicides in Vietnam and therefore had relatively high exposure to herbicides

and dioxin (61). The study involved a health survey of 1,499 Army Chemical Corps members who sprayed herbicides in Vietnam veterans compared to 1,428 non-Vietnam veterans with similar jobs. They found that Vietnam veterans who were occupationally exposed to herbicide had higher risk of several chronic medical conditions compared to non-Vietnam veterans. Specifically, risk for diabetes, heart disease, hypertension, and chronic respiratory disease were slightly but significantly elevated in those Vietnam veterans who sprayed herbicides.

**TABLE 4
VA VIETNAM VETERAN MORTALITY STUDIES**

Authors and Year	Study Design	Description	Results
Breslin, et al., 1988 ¹⁸	Cohort	Compared the cause-specific mortality of 24,235 deceased Army and Marine Vietnam veterans to that of 26,685 deceased Army and Marine non-Vietnam veterans. All comparisons were intro-branch.	Marine Vietnam veterans had statistically significant excesses of lung cancers and NHL compared to Marine non-Vietnam veterans, (PMR, 1.58, 95% CI, 1.09 - 2.29 and PMR, 2.10, 95% CI, 1.17 - 3.79, respectively).
Bullman, et al., 1990 ¹⁹	Cohort	Compared cause-specific mortality of 6,668 deceased Army Vietnam veterans who served in the I Corps region of Vietnam to that of 27,917 deceased non-Vietnam Army Veterans.	I Corps Vietnam veterans had statistically significant excesses in deaths due to all external causes (PMR, 1.06, 95% CI 1.03 - 1.09). This excess was due to motor vehicle accidents and accidental poisonings.
Watanabe, et al., 1991 ²⁰	Cohort	Follow-up to earlier study. Significant (Breslin, et al., 1988, reference 18) adding 11,325 additional deaths.	Army Vietnam veterans had statistically excesses of deaths due to external causes (PMR, 1.03), laryngeal cancer (PMR, 1.53) and lung cancer (PMR, 1.08). Marine Vietnam veterans had statistically significant excess deaths due to external causes (PMR, 1.06).
Watanabe, et al., 1996 ²¹	Cohort	Follow-up study of two prior studies (Breslin, et al., 1988 and Watanabe, et al., 1991, references 18 and 20) adding 9,040 additional veterans deaths.	Army Vietnam veterans had statistically significant excesses of deaths due to laryngeal cancer (PMR, 1.47) lung cancer (PMR, 1.06) and external causes (PMR, 1.04). Marine Vietnam veterans had statistically significant excesses of deaths due to pancreatic cancers (PMR, 1.47) skin cancer (PMR, 1.28) and lung cancer (PMR, 1.48).
Watanabe, et al., 1995 ²²	Cohort	Compared cause-specific mortality of 10,716 Marine	Marine Vietnam veterans had statistically significant

		Vietnam veterans to that of 9,346 Marine non-Vietnam veterans.	increased risk of overall mortality (SMR, 1.15; 95% CI 1.02-1.29), primarily due to external causes (SMR, 1.21; 95% CI 1.00 -1.49).
Thomas, et al., 1990 ²³	Cohort	Compared cause-specific mortality of 894 Vietnam Army Chemical Corps veterans to that of the U.S. population.	Vietnam veteran Chemical Corps workers had statistically significant excesses of death due to digestive disease (SMR, 2.98), primarily cirrhosis of the liver (SMR, 2.95) and motor vehicle accidents (SMR, 2.00).
Dalager, et al., 1997 ²⁴	Cohort	Follow-up study to earlier Chemical Corps study (Thomas, et al., 1990, reference 23). Adding 1,978 Chemical Corps veterans and 2,737 non- Vietnam Chemical Corps to the veteran comparison group.	Vietnam Chemical Corps veteran workers had a statistically significant increased risk of digestive disease (RR, 3.88; 95% CI 1.12-13.45) compared to non-Vietnam Chemical Corps veterans.
Thomas, et al., 1991 ²⁵	Cohort	Compared cause-specific mortality of 4,582 women Vietnam veterans to that of 5,324 non-Vietnam women veterans and U.S. women. Women veterans were nurses in Vietnam.	Mortality rates for all causes and for all cancers among women Vietnam veterans were similar to those among women non-Vietnam veterans. Suicide rates were nearly the same, but a slight mortality excess among women Vietnam veterans came primarily from motor vehicle accidents (RR = 3.19). Women Vietnam and non-Vietnam veterans had lower overall mortality compared to US women from lower mortality from circulatory diseases.
Dalager, et al., 1995 ²⁶	Cohort	Follow-up study of earlier women Vietnam veteran mortality (Thomas, et al., 1991, reference 25) adding three years of follow-up.	Vietnam veteran nurses had a statistically significant increased risk of pancreatic cancers compared to non-Vietnam nurses (RR, 5.74) and U.S. women (SMR, 2.78).
Bullman, et al., 1994 ²³	Cohort	Compared cause-specific mortality of 4,247 Vietnam veterans with a diagnosis of PTSD to that of 12,010 Vietnam veterans with no clinical diagnosis.	PTSD veterans had statistically significant increased risks for deaths due to suicide (RR, 3.97), and accidental poisonings (RR, 2.89).
Bullman, et al., 1996 ²⁷	Cohort	Assessed risk of suicide for 34,534 Vietnam veterans who were wounded in Vietnam.	As severity and the number of times wounded increased, so did risk of suicide.

Vietnam Veteran Mortality: VA Studies (Summarized in Table 4)

Ongoing VA studies on Vietnam veteran mortality have suggested an increased risk of death for all causes among Vietnam veterans in comparison to non-Vietnam veterans. Specific causes for increased mortality include cancers including lung cancer, laryngeal cancer, Hodgkin's disease, non-Hodgkin's lymphoma, pancreatic cancer, skin cancer, and uterine cancer among women veterans. Because of the lack of exposure data, it is not possible to tie this excess mortality risk to herbicide or dioxin exposure – rather, the excess risk may be tied to service in the Vietnam War itself.

Increased Mortality from Accidents. The most consistent finding from VA mortality studies is an increased risk of death from accidents, especially motor vehicle accidents, during the first five years after leaving Vietnam. Similar findings of an initial increased risk of death from accidents shortly after returning from a combat mission have been reported among veterans from other wars, including World War II and more recently among veterans returning from the 1991 Gulf War. The underlying cause for an increased risk of accidental death is not fully understood. Fortunately, however, these studies also show that the increased risk disappears within 5 to 10 years after returning from a combat mission.

VA Studies of Mortality among Women Vietnam Veterans. Most mortality studies have focused on male Vietnam veterans, almost certainly because most veterans from that conflict were in fact men. The exact number of women who served in Vietnam is not known. Estimates place the number between 5,000 to 10,000 (29, 30), which is clearly only a small proportion of the nearly 3 million service members who participated in that war.

Studies of the health of women Vietnam veterans have shown similarities and differences compared to health of their male counterparts. A 1991 study found mortality rates among women Vietnam veterans for all causes and for all cancers to be similar to rates among women non-Vietnam veterans. Suicide rates were nearly the same in both groups, but the study reported a slight mortality excess among women Vietnam veterans that came primarily from greater rates of motor vehicle accidents (Relative Risk = 3.19). Women Vietnam and non-Vietnam veterans had lower overall mortality compared to US women from lower mortality from circulatory diseases (25). A 1995 follow up study of this cohort reported that Vietnam veteran nurses had a statistically significant increased risk of pancreatic cancers compared to non-Vietnam nurses (Relative Risk, 5.74) and U.S. women (Standard Mortality Ratio 2.78) (26).

PTSD and Mortality. A 1994 VA study reported a statistically significant increased risk for deaths due to suicides and accidental poisoning among veterans diagnosed with PTSD (28). In fact, several studies have reported that various groups of Vietnam veterans are at increased risk of PTSD (32-35). Vietnam veterans diagnosed with PTSD compared to the U.S. population had statistically significant excesses of deaths due to all external causes, all accidents, all motor vehicle accidents and suicides.

Moreover, the magnitudes of the excess among those Vietnam veterans with comorbid disorders were much higher.

A study of wounded Vietnam veterans also addressed the reported excess of traumatic deaths among Vietnam veterans (28). Veterans who experienced trauma are at increased risk for PTSD, while in turn, veterans with PTSD are at increased risk for subsequent traumatic deaths. This study, while having no diagnostic data regarding PTSD, assessed the risk of traumatic deaths associated with experiencing trauma while in Vietnam, *i.e.*, being wounded (28). Subjects were randomly sampled from the 70,000 Army Vietnam veterans who received one or more non-lethal wounds between 1969-1973 from hostile forces in Vietnam. Assessing cause-specific mortality risk, there was a statistically significant increased risk of suicide associated with having been wounded more than once and receiving a wound(s) that required hospitalization (Relative Risk 5.42; 95% Confidence Interval 3.1-9.5). For additional information, see Appendix D.

Of course, mortality is not the only health issue associated with PTSD, and other studies have reported that 70 percent to 94 percent of PTSD cases have co-morbid mental disorders, including depression and alcohol and drug dependency (36-38). An excess of alcohol and drug use could be related to the reported excess of motor vehicle accidents among Vietnam veterans. Excessive alcohol and drug use, along with depression, could also place veterans at greater risk for accidental poisonings, *i.e.* drug overdoses and suicide.

**TABLE 5
NON-VA VIETNAM VETERAN MORBIDITY STUDIES**

Authors and Year	Study Design	Description	Results
CDC – 1988 ³¹	Cohort	Compared psychosocial characteristics of 2,490 Army Vietnam veterans to that of 1,972 non-Vietnam Army veterans.	Significantly more Vietnam than non-Vietnam veterans reported depression, alcohol abuse and anxiety.
CDC – 1988 ³²	Cohort	Companion study to 1988 study.	Vietnam veterans were more likely than non-Vietnam veterans to self-report health problems.
Wolfe, et al., 1990 ³³	Cohort	Compared health of 995 Air Force Vietnam veterans of Ranch Hand unit to that of 1,299 non-Ranch Hand Air Force Vietnam veterans.	The two groups were similar regarding health problems.
Henriksen, et al. 1997 ³⁴	Cohort	Assessed risks of diabetes mellitus associated with serum dioxin level among 989 Air Force Ranch Hand Vietnam veterans and 1,276 non-Ranch Hand Vietnam veterans.	Ranch Hand veterans had significant more basal cell carcinomas than their non-Ranch Hand counterparts. Ranch Hand veterans had higher levels of dioxin than non-Ranch Hand veterans. Higher levels of dioxin were associated with statistically significant

			increases of diabetes (RR, 1.5, 95% CI 1.2 - 2.0).
CDC – 1990 ³⁵	Case-Control	Assessed risk of NHL associated with Vietnam service among 1,157 NHL cases and 1,776 controls.	Vietnam service was associated with an increased risk of NHL (OR, 1.47, 95% CI, 1.09 - 1.97).
CDC- 1990 ³⁶	Case-Control	Assessed risk of STS and other sarcomas associated with Vietnam service among 342 sarcoma cases and 1,776 controls.	No increased risk of any of the select cancers associated with Vietnam service.
CDC- 1990 ³⁷	Case-Control	Assessed risk of HD, Nasal cancer, nasopharyngeal cancer, and primary liver cancer associated with Vietnam service among 568 cancer cases and 1,776 controls.	No increased risk of sarcomas associated with Vietnam service.

Non-VA Morbidity Studies of Vietnam Veterans (Summarized in Table 5)

Both the CDC and DoD (in particular, the Air Force) have conducted major studies on the general health of Vietnam veterans and the risks of selected cancers associated with Vietnam service. CDC conducted most of these studies as part of their “Vietnam Experience Study.”

CDC’s first study of morbidity in Vietnam veterans compared the psychosocial characteristics of 2,490 Vietnam veterans to that of 1,972 non-Vietnam veterans (31). Both groups of veterans were a random sample of enlisted men that entered the Army between 1965- 1971. Data used in this study was based on interviews and comprehensive health examinations, including a psychological evaluation. Comparing the two groups, Vietnam veterans were at statistically significant increased risk for alcohol dependency (Odds Ratio 1.5; 95% Confidence Interval 1.2-1.8), generalized anxiety (Odds Ratio 1.5; 95% Confidence Interval 1.1-2.1), and depression (Odds Ratio 2.0; 95% Confidence Interval 1.4-2.9).

Using the same cohorts of 2,490 Vietnam veterans and 1,972 non-Vietnam veterans, the CDC study compared the physical health of the two groups (32). While Vietnam veterans reported more health problems than their non-Vietnam peers, subsequent medical examinations indicated no difference between the two groups.

In an effort to better assess the effects of Agent Orange exposure, the Air Force conducted a series of studies of Air Force veterans who participated in Operation Ranch Hand. The overall cohort consisted of 1,261 Ranch Hand Vietnam veterans and 19,101 Air Force Vietnam veterans who handled cargo missions in Southeast Asia, but did not participate in Operation Ranch Hand. As part of the continuing monitoring of Ranch Hand veterans, the Air Force provided a series of three medical exams for both Ranch Hand participants and non-Ranch Hand Air Force veterans. This study compared the findings from these exams for those 995 Ranch Hand and 1,299 non-Ranch Hand veterans, who received all three exams (33).

Overall, there was no difference in health problems between the two groups of veterans. However, Ranch Hand veterans did have more skin cancers and basal cell carcinomas than did the comparison group.

Ranch Hand veterans and their comparison group also were examined for levels of dioxin in blood serum and for glucose abnormalities, including diabetes mellitus (34). This study used the same 989 Air Force Ranch Hand Vietnam veterans and 1,276 Air Force non-Ranch Hand Vietnam previously described (33). Comparing the two groups, Ranch Hand veterans had higher levels of dioxin than non-Ranch Hand veterans (4.0 parts per trillion (ppt) vs. 1.2 ppt respectively). Using all non-Ranch Hand veterans as the control group, the risk of glucose abnormalities and diabetes mellitus increased as the level of dioxin increased (Relative Risk 1.4; 95% Confidence Interval 1.1-1.8; and Relative Risk 1.5; 95% Confidence Interval 1.2-2.0 respectively). However, there was no difference in the prevalence of diabetes in the two groups. For additional information, see Appendix E.

**TABLE 6
NON-VA VIETNAM VETERAN MORTALITY STUDIES**

Authors and Year	Study Design	Description	Results
Anderson, et al., 1985 ³⁸	Cohort	Compared cause-specific mortality of 43,398 Wisconsin Vietnam veterans to that of 78,840 Wisconsin non-Vietnam veterans.	Statistically significant excess of deaths due to motor vehicle accidents (SMR, 1.15), all accidents (SMR, 1.11), and all external causes (SMR, 1.10).
CDC - 1987 ³⁹	Cohort	Compared cause-specific mortality of 9,324 Army Vietnam veterans to that of 8,989 non-Vietnam Army veterans.	Vietnam veterans had a statistically significant increased risk for deaths due to all external causes (RR, 1.25) and motor vehicle accidents (RR, 1.48).
Michalek, et al., 1990 ⁴⁰	Cohort	Compared cause-specific mortality of 1,261 Ranch Hand Air Force Vietnam veterans to that of 19,101 non-Ranch Hand Air Force Vietnam veterans.	Ranch Hand veterans had statistically significant excess deaths due to all external causes the first five years after the tour ended (SMR, 3.0).
Lawrence, et al., 1985 ⁴¹	Cohort	Compared cause-specific mortality of 555 New York State Vietnam veterans deaths to 941 New York State non-Vietnam veterans deaths.	Found a statistically significant excess of MVA deaths among Vietnam cohort (MOR, 2.18).
Kogan, et al., 1988 ⁴²	Cohort	Compared cause-specific mortality of 840 deaths among Massachusetts Vietnam veterans to that of 2,515 Massachusetts non-Vietnam veterans' deaths.	Found a statistically significant excess of soft tissue sarcoma among Vietnam veterans (PMR, 8.80).
Boehmer, et al., 2004 ⁴³	Cohort	Mortality and cause-of-death data for the CDC "Vietnam Experience Study" cohort of	Mortality from all causes not significantly different in Vietnam vs non-Vietnam

		18,313 male Army veterans in comparison including controls was evaluated from the end of the original study to 2000.	veterans during the 30-year follow up period. A non-significant excess mortality among Vietnam veterans was isolated to the first 5 years after separation from military service, and was from an increase in external causes of death. No difference in cause-specific mortality related to any disease.
Akhtar et al., 2004 ⁴⁴	Cohort	Compared cancer and mortality among Air Force Operation Ranch Hand Vietnam veterans to veterans who did not spray herbicides.	Melanoma and prostate cancer incidence higher among white Ranch Hand veterans relative to national rates.
Ketchum & Michalek, 2005 ⁶²	Cohort	Update of the 1982 Air Force Health Study of Operation Ranch Hand veterans compared mortality for 1,262 Ranch Hand veterans through 1999 to 19,078 comparison veterans.	Relative risk for all-cause death was borderline significantly increased (1.15, 95% CI 1.0-1.3, p = 0.06). Cancer mortality was not increased but circulatory system disease mortality was significantly increased among enlisted ground crew workers.

Non-VA Mortality Studies of Vietnam Veterans (Summarized in Table 6)

A study conducted by the Wisconsin Department of Health and Human Service used military discharge papers filed with the Wisconsin Department of Veterans Affairs to identify 43,398 Vietnam veterans and 78,840 non-Vietnam veterans as a comparison group (38). The only statistically significant excesses in cause-specific mortality for Wisconsin Vietnam veterans came from motor vehicle accidents (Standardized Mortality Ratio 1.15; 95% Confidence Interval 1.02-1.29), all accidents (Standardized Mortality Ratio 1.11; 95% Confidence Interval 1.01-1.22), and all external causes (Standardized Mortality Ratio 1.10; 95% Confidence Interval 1.01-1.19).

The CDC “Vietnam Experience Study” compared mortality of 9,324 Army Vietnam veterans to 8,989 Army non-Vietnam veterans (39). They reported no statistically significant excess in any cause-specific mortality. However, when the analysis was done by years-since-discharge, there was an excess in overall mortality among Vietnam veterans (Relative Risk 1.45; 95% Confidence Interval 1.08-1.96) within the first five years of follow-up. Vietnam veterans were found to be at increased risk for motor vehicle accidents (Relative Risk 1.48; 95% Confidence Interval 1.04-2.09).

In a follow-up to the CDC mortality study, mortality and cause-of-death data for this cohort of 18,313 male Army veterans (including Vietnam veterans and controls) was evaluated from the end of the original study to 2000 (43). As with the earlier study on this group, mortality from all causes was not significantly different in Vietnam compared

to non-Vietnam veterans during the 30-year follow up period. There was no difference in cause-specific mortality related to any disease. A non-significant excess mortality among Vietnam veterans reported in the earlier study was apparently isolated to the first 5 years after separation from military service, and was due to an increase in external causes of death including unintentional poisonings and drug-related causes.

Similarly, the Air Force Ranch Hand study compared the cause-specific mortality of 1,261 Air Force Ranch Hand Vietnam veterans to that of 19,101 Air Force Vietnam veteran controls (33, 40). They reported no statistically significant excess in any cause-specific mortality. In a follow up report, these researchers compared cancer and mortality among Air Force Ranch Hand veterans to Vietnam veterans who did not spray herbicides (44). They also compared cancer incidence and mortality to national rates. They reported increased melanoma and prostate cancer incidence among white Ranch Hand veterans compared to *national* rates. A 2005 update of the Air Force Health Study of Operation Ranch Hand veterans, mortality for 1,262 Ranch Hand veterans through 1999 was compared to 19,078 control veterans (62). The relative risk for all-cause death was borderline significantly increased (Relative Risk 1.15, 95% Confidence Interval 1.0-1.3, $p = 0.06$). Cancer mortality was not increased but circulatory system disease mortality was significantly increased among enlisted ground crew workers (Relative Risk 1.7; 95% Confidence Interval 1.2-2.4; $p = 0.001$). The authors noted that mortality risk from circulatory system diseases continues to be increased especially for enlisted ground crew, which is a subgroup with relatively high skin exposure to herbicides.

In a related study, the New York Department of Health reported 555 Vietnam veterans deaths and 941 non-Vietnam veterans, selected from men who died in New York State, excluding New York City, between 1965-1967 and 1970-1980, and who were ages 18-29 between 1965-1971 (41). As with similar studies, the only statistically significant excess in mortality for Vietnam veterans was for non-motor vehicle injuries of transport (Mortality Odds Ratio 2.18; 95% Confidence Interval 1.19-3.96).

Finally, a study of Massachusetts's veterans who applied for a state military service bonus, matched the veteran bonus file against the state's mortality file to identified 840 Vietnam veteran deaths and 2,515 non-Vietnam veteran deaths (42). Comparing cause-specific mortality of the two groups, there was a statistically significant excess of soft tissue sarcoma (Standardized Proportionate Mortality Ratio 8.80; 95% Confidence Interval 5.13-15.1). To confirm the standardized Proportionate Mortality Ratio, a standardized Mortality Odds Ratio was calculated and again, there was a statistically significant excess of soft tissue sarcoma among Vietnam veterans compared to non-Vietnam veterans (Standardized Mortality Odds Ratio 5.16; 95% Confidence Interval 2.39-11.14). For additional information, see Appendix F.

TABLE 7
VIETNAM VETERANS REPRODUCTIVE HEALTH STUDIES

Authors and Year	Study Design	Description	Results
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Erickson, et al., 1984 ⁴⁵	Case-Control	Compared military service characteristics, including potential for AO exposure of fathers, of 4,386 babies born with defects to those of 2,699 normal babies.	Vietnam veterans, in general, did not have an increased risk of fathering babies with defects.
CDC – 1988 ⁴⁹	Cohort	Compared reproductive health status of 7,924 Army Vietnam veterans to 7,364 Army non-Vietnam veterans.	The rates of total, major, minor and suspected birth defects were similar among children of Vietnam and non-Vietnam veterans.
Wolfe, et al., 1994 ⁵⁰	Cohort	Compared the risk of spontaneous abortions, still birth, tubal pregnancy and birth defects by paternal dioxin level, among 454 Ranch Hand and 570 comparison subjects.	No meaningful elevation in risk for spontaneous abortions or stillbirths. An increase in nervous system defects in Ranch Hand children with increased potential dioxin levels.
Donovan, et al., 1984 ⁴⁶	Case-Control	Compared Vietnam service status of fathers of 8,517 babies born with birth defects to those of 8,517 normal babies.	No evidence that Army service in Vietnam increased the risk of fathering children with anomalies diagnosed at birth.
Aschengrau & Monson1990 ⁴⁷	Case-Control	Compared paternal military 1990 service in Vietnam and the risk of late adverse pregnancy outcomes (birth defects, still births, neonatal deaths) among 857 birth defect cases, 61 stillbirths cases, 48 neonatal deaths, and with that of 998 normal controls.	After controlling for confounding variables, the risk of fathering an infant with one or more major defects was 1.7 (95% CI= 0.8, 3.5), compared to non-Vietnam veterans.
Aschengrau & Monson1989 ⁴⁸	Case-Control	Compared paternal military 1989 service in Vietnam and the risk of spontaneous abortions among 201 spontaneous abortion cases and 1,119 control subjects.	The risk of spontaneous abortion was not increased in Vietnam veterans.
Kang, et al., 2000 ⁶⁰	Cohort	Compared reproductive health status of 4,140 women Vietnam veterans to that of 4,140 women non-Vietnam veterans.	No statistically significant association between Vietnam service and pregnancies resulting in spontaneous abortions, still birth, low birth weight, pre-term delivery or infant death. However, the risk of birth defects among children was significantly associated with mother's Vietnam service (adjusted OR=1.46, 95% CI=1.06, 2.02).

Studies on Reproductive Health of Vietnam Veterans (Summarized in Table 7)

The possibility of long-term health effects, including adverse reproductive health outcomes resulting from military service in Vietnam, has been a subject of research interest ever since the end of the Vietnam War.

For male veterans, the studies have been mostly negative, in that service in Vietnam was not associated with the risk of fathering a child with birth defects, spontaneous abortion, stillbirth or neonatal death (45-49). However, a publication from the Air Force Ranch Hand study reported neural tube defects (spina bifida, anencephaly) in four children of U.S. Air Force personnel who sprayed Agent Orange and other herbicides in Vietnam. No cases were found among children of “control” veterans (47). The study also reported higher than expected number of children born with cleft lip. Furthermore, when the 1984 CDC study on birth defects among children of Vietnam veterans was reanalyzed using an “exposure opportunity index” based upon interview data, the risk of spina bifida was significantly associated with the highest estimated level of Agent Orange exposure (45). Unfortunately, as described earlier, the approach used in these studies for estimating herbicide exposure for Vietnam veterans was eventually found to be ineffective and was abandoned.

Nevertheless, based on these reports and others, in their 1996 update “Veterans and Agent Orange: Update 1996,” the Institute of Medicine committee found an association between herbicide exposure in Vietnam and an increased risk of spina bifida in children (51).

In general, due to obvious differences in the biology of human reproduction, women are seen to be at much greater risk compared to men for environmental exposures affecting reproductive health, particularly for exposures that occur during pregnancy (52-53). Many potential risk factors for abnormal reproductive outcomes existed in Vietnam for female veterans, including psychological stresses of war, various infections, substance abuse and Agent Orange contaminated with dioxin (54-56). Other potential risk factors associated with military hospital nursing conditions in Vietnam included physical stress, exposure to infectious agents and exposure to waste anesthetic gases and ethylene oxide (57-59). In Public Law 99-272, Congress required VA to conduct a thorough epidemiologic evaluation of any long-term adverse health effects among women Vietnam veterans.

A 2000 study by VA researchers of pregnancy outcomes among 4,140 women Vietnam veterans compared to an equal number of women non-Vietnam veterans in the military during the same era found that the risk of birth defects among children was significantly associated with mother’s military service in Vietnam (60). Due to difficulties in assessing any specific exposure among this small, widely dispersed group of Vietnam veterans, the study looked at military service in Vietnam as the “exposure,” rather than to Agent Orange or any other specific agent.

Based upon this study, VA now offers disability compensation, vocational rehabilitation and other benefits to children with certain birth defects born to women Vietnam

veterans. This program is similar in scope to benefits offered to the children of all Vietnam veterans born with spina bifida.

In summary, among men veterans, Vietnam service has not been associated with adverse reproductive outcomes, except for spina bifida. Among women veterans, Vietnam service has been associated with the risk of having children with a wide range of birth defects.

Many Vietnam veterans have asked about possible birth defects in their grandchildren, but at this time there is no data suggesting that grandchildren of Vietnam veterans are at any increased risk for birth defects or any other health problems because of their grandparents' exposure to herbicides in Vietnam.

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CHAPTER 6 OUTREACH AND EDUCATION FOR VETERANS AND HEALTH CARE PROVIDERS

VA recognizes the value and the obligation of providing information for veterans, their families, and for all Americans about how exposure to Agent Orange and other herbicides used in Vietnam may have affected veterans' health, about related VA disability compensation policies, and to update this information as it changes. Since the end of the Vietnam War, VA has developed a wide range of means to communicate with veterans about these issues. These include the Agent Orange Review newsletter mailed to every veteran who has used VA, an Agent Orange Web site, a national toll-free telephone number, the popular *Federal Benefits for Veterans and Dependent* booklet, a series of Agent Orange fact sheets, Agent Orange brochures, and Agent Orange posters distributed throughout VA.

VA's Web site for Agent Orange-related matters is at www.va.gov/AgentOrange. The site contains virtually all of VA's outreach material for Vietnam veterans, including all the newsletters, brochures and posters, as well as information about special programs such as the Agent Orange Health Examination Registry.

VA's national toll-free telephone number for information about the benefits and medical services available to military veterans, 1-800-827-1000, is staffed by veterans service representatives who are knowledgeable about VA programs, skilled in responding to an array of veterans' problems, and sensitive to the varied concerns of Vietnam (and other) veterans and their families. These representatives respond to more than 10 million calls annually, including many regarding Agent Orange.

The annually updated *Federal Benefits for Veterans and Dependents* booklet includes sections on the benefits and services available from VA for Vietnam and other veterans including benefits related to herbicide exposure. This very popular book is available from the U.S. Government Printing Office, and on-line at www.va.gov.

In November 1982, VA released the first issue of the *Agent Orange Review*. Current and back issues are available on line at www.va.gov/AgentOrange. This national newsletter covers new developments about herbicide exposure and health including updated information from the National Academy of Sciences on possible connections between certain illnesses and herbicide exposure. It also serves to keep veterans informed of changes in VA compensation and benefits programs for them. Two to three issues each year are directly mailed to veterans, and distributed to VA medical centers and regional offices. In 2004, the circulation of the newsletter increased to nearly 800,000 copies mailed to veterans' homes. Issues are also distributed to VA Vet Centers and other locations.

The *Agent Orange Brief* fact sheet series, originated in 1988, has been updated and expanded considerably since, and is also available on line at www.va.gov/AgentOrange. As of June, 2008, there are 24 stand-alone fact sheets covering general information, all of the diseases that are presumptively connected to military service and herbicide

exposure for Vietnam veterans, VA programs for Vietnam veterans including the Agent Orange Registry health examinations, VA health care, disability compensation, information resources and research.

The general Agent Orange brochure “Agent Orange General Information Brochure” is a multi-page (8-1/2" x 11") general information publication regarding Agent Orange and what VA and other federal government departments and agencies are doing to help Vietnam veterans who may have been exposed to herbicides and are now ill. The brochure has been translated into Spanish. Both the English and Spanish language versions are also available on line at www.va.gov/AgentOrange.

Posters illustrating VA’s services for veterans exposed to Agent Orange and other herbicides have been developed over the years, and shipped to all VA medical centers and regional offices. Field facilities that wish to obtain additional copies of any of these publications can request copies through the VA Service and Distribution Center through their Publications Control Officer using the LOG system. They can also be viewed on line at www.va.gov/AgentOrange.

Finally, this Veterans Health Initiative (VHI) independent study guide is intended to help keep VA health care providers up to date on health and other aspects of Vietnam veterans and Agent Orange.

The Military History Project: How Veterans Can Record Their Military History with MyHealthVet. Taking a basic military history will be important for responding to any veteran seeking VA care. Recording a military history is even more crucial where deployment-related environmental and occupational health issues may be at the crux of a veteran’s current health concerns, and this is certainly going to often be the case for Vietnam veterans in the context of herbicide exposure in Vietnam. For these veterans, their military history will be critical to understanding their problem and providing them the best care.

The VA “MyHealthVet” on-line program at www.myhealth.va.gov has proven to be a very popular method for a veteran to record their military history, including relevant environmental and occupational health concerns. This military history record feature of MyHealthVet gives veterans the ability to record their personal circumstances surrounding an event or an exposure that may have had some impact on their health today. Veterans can record the time and location where an incident occurred, branch of service, military occupation and specialties, assignments, military or occupational exposures that may have occurred, and other relevant details. As with other MyHealthVet “journals,” the information recorded by veterans is completely secure and private. If they wish, a veteran can choose to share their history with their health care providers or disability claims specialists.

A veteran’s military history as recorded in MyHealthVet can be important for determining a veteran’s health care and for other benefits. But perhaps equally important, veterans have told us that they want the opportunity to record their

experiences and their related concerns based on their military service. The Military Health History program as part of MyHealthVet is VA's response. It can be of real value to both the veteran and to their health care provider as an aid to understanding their medical problems and complaints, and to help to establish a rapport with their provider.

VA has a brochure describing this program, called, "Your Story: How would you like to tell your military story." It describes how to log on to "MyHealthVet," and to record information about incidents that took place during a veteran's military career. Copies of the brochure have been distributed to every medical center, RO, and Vet Center, and is available on line at www.va.gov/EnvironAgents.

A related effort is the Military Service History pocket card, which suggests some key, basic questions that a provider may ask a veteran about their military service (available at www.va.gov/oaa/pocketcard).

CHAPTER 7 VA “VET CENTER” PROGRAM: READJUSTMENT COUNSELING FOR VETERANS

Today, in the context of the current wars in Iraq and Afghanistan, we take for granted that some veterans will return from combat missions abroad with wounds that may not be obvious, and that some of them will need help in making the transition back to civilian life.

In the 1970s, veterans returning from the Vietnam War had only limited resources available to help them reintegrate into their home lives. In response, VA established the Readjustment Counseling “Vet Center” program in 1979, as a unique program capable of meeting the wide range of readjustment needs of returning combat veterans. As defined in the law, the Vet Center service mission is unique in VA. It is primarily a readjustment-counseling program rather than as a source of primary health care treatment, although the Vet Center staff can and often do also provide referrals to appropriate VA medical care, as indicated.

The statute that authorized the Vet Centers, Public Law 96-22, initially limited eligibility to Vietnam veterans -- the population of combat veterans whose needs inspired the program. Many returning Vietnam veterans were more comfortable with how the new Vet Centers were physically separated yet linked to nearby VA medical centers. Staffed mostly with veterans and operating typically in community-based storefront offices and distinct from the typical VA medical center context made the new centers much more appealing for returning Vietnam veterans to seek help for psychological and social readjustment problems that came out of their combat experiences.

The Vet Centers report to the Chief Readjustment Counseling Officer at VA Headquarters and collaborate locally in full partnership with other VHA medical facilities to achieve a well-coordinated continuum-of-care for area veterans. In this regard, the Vet Center program’s consumer-oriented focus and community-based service functions are well suited as models for the new VHA health care system.

PTSD and the Vet Centers. Even before 1980 when the diagnosis of post-traumatic stress disorder (PTSD) appeared for the first time in the American Psychiatric Association’s Diagnostic and Statistical Manual of Mental Disorders, the VA Vet Centers were providing critical psychological and other counseling services to Vietnam veterans. Following recognition of PTSD as a diagnosis, Public Law 98-528, passed in 1984, included several provisions that affected VA’s ability to treat veterans with war-related PTSD. One of these established the first VA medical center based PTSD program, and authorized 12 Special inpatient PTSD units. This has allowed the Vet Centers to become a main source of veteran referrals for VA in-patient PTSD treatment.

Today, VA health care providers throughout VA should recognize that readjustment counseling and mental health programs for PTSD are central to VA’s mission and vital to the health care of combat theater veterans of all combat missions abroad. VHA has identified Vet Center-based readjustment counseling and VA medical center-based

PTSD programs as two of 12 special emphasis programs having particular relevance to veterans' health care and rehabilitation. On an annual basis, between 70 and 80 percent of veterans visits to Vet Centers are for counseling for war-related PTSD.

Holistic Approach to Health. The Vet Center program service mission features a holistic mixture of direct readjustment counseling and multiple community-access functions that include:

- community-based service units emphasizing post-war rehabilitation in an informal setting;
- extensive community outreach activities;
- services that emphasize combat-theater veteran staff;
- multiple activities designed to assist veterans in the community through veteran case management and referrals; and
- a varied mixture of direct counseling and supportive social services addressing the psycho-social dimensions of post-war readjustment.

The goal of the Vet Center service mission is to welcome veterans home with honor, to assist veterans resolve war-related traumas, and to help them attain an improved post-war work and family life. The Vet Center staff emphasizes an appreciation and understanding of the veteran's traumatic war experiences. The local "store-front" nature of the Vet Center and staff serves to support an understanding of the veteran's local community, cultural organization and economic and human service resources. To be responsive to various geographic, economic and social barriers to care, Vet Center counselors are strategically located and specifically skilled in engaging veterans in or near their communities. Specific Vet Center services include:

- assessment for PTSD in all cases;
- counseling and psychotherapy for PTSD when indicated;
- careful and systematic attention to psycho-social working through of traumatic war experiences;
- family counseling when needed for the readjustment of the veteran;
- psycho-educational and supportive counseling to help veterans improve social functioning in current civilian roles;
- employment and educational counseling;
- job-finding assistance; and

- multiple activities in the community designed to broker services for veterans.

Now Serving All Combat Veterans. In the years following their foundation, the Vet Center program has significantly broadened its focus to include veterans from military conflicts other than the Vietnam War. In 1991, on the day the ground war began in the Persian Gulf, Congress introduced legislation to extend eligibility for readjustment counseling to veterans of the 1991 Gulf War. Legislation enacted in 1991 also opened eligibility for the Vet Centers to veterans of combat missions in Lebanon, Grenada, and Panama. In April 1994, Congress gave VA authority to expand eligibility to veterans from the peacekeeping mission in Somalia. The Vet Centers' experience gained in providing readjustment services to Vietnam War veterans means that veterans from more recent combat missions have much greater access to readjustment counseling, and to appropriate interventions that can help prevent possible development of delayed and chronic forms of war-related PTSD.

New laws have further extended eligibility for readjustment counseling at the Vet Centers to any veteran who served in the military in a theater of combat operations during any period of war, or in any area during a period in which armed hostilities occurred. This means that VA is now authorized to provide timely outreach and counseling, through its Vet Centers, to any veteran exposed to war-zone stress from all war, conflict, and peacekeeping missions.

Since the Vet Centers received the authority to serve veterans in addition to the Vietnam War era, they have provided outreach and care to over 130,000 Gulf War veterans, more than 4,000 Somalia veterans, and about 39,000 Korean and World War II veterans.

Community-Based Service to Veterans. As of June 2008, nationally there are 207 Vet Centers located in all 50 states, Puerto Rico, the Virgin Islands, the District of Columbia and Guam, although their number is growing. The Vet Centers are listed in the local telephone directory under the United States Government, Department of Veterans Affairs. Information about the Vet Centers and their locations is available at www.va.gov/rcs. Since the Vet Centers do not have waiting lists, veterans are usually seen the same day they call for an appointment. The Vet Centers also maintain some non-traditional evening hours to accommodate working veterans. If the situation warrants, a Vet Center counselor can travel to the medical center to meet with a veteran in need of readjustment counseling.

For many veterans who would not otherwise receive VA assistance, the Vet Centers are the community access points for VA healthcare. Based upon the fact that Vet Centers make over 100,000 referrals annually to VA medical facilities, it is estimated that over 80 percent of the veterans seen at Vet Centers and VA medical centers every year are referred to VA medical facilities for primary care by the Vet Centers. In addition, the Vet Centers make over 120,000 referrals annually to VA Regional Offices for claims work, and over 115,000 referrals annually to non-VA community service providers.

VA's concept for the future of veteran's health care, contained in the March 1995 document, "Vision for Change," established the future direction of the Readjustment Counseling Service Vet Center program within the new VA health care system. The new VA health care delivery system prioritizes veterans' access to care through community-based facilities, a transition from hospital-based, inpatient programs to outpatient ambulatory care services, and improved value to veterans through performance measures tied to quantifiable outcomes.

The Vet Centers have served over 1 million Vietnam veterans since the inception of the program in 1979. In fiscal year 1998, the Vet Centers saw 131,310 total veterans and provided 804,749 visits to veterans and family members. Vet Center activity in fiscal year 1999 increased to 139,617 veterans served and 871,416 visits provided.

Outreach and Special Populations. The Vet Centers also have served as an easily accessible source of information for Vietnam War veterans on the possible medical consequences of exposure to Agent Orange. Vet Centers also can serve to provide Vietnam War veterans with referrals to VA medical centers for Agent Orange examinations and appropriate treatment, if required. Vet Center community outreach and brokering of care also provide the means for delivering timely and effective services to new eras of war veterans, and helping high-risk veteran groups utilize services available throughout VA.

The Vet Centers are VA's initial point of contact for many new returning war veterans and for many high-risk, hard-to-reach veterans such as ethnic minorities, women, disabled, high combat exposed, homeless and rural veterans. Over 50,000 of the veterans served in each year are not seen in any other VHA facility. These veterans constitute a core group of frequent users who access care primarily for treatment of psychological war trauma, including PTSD.

The Vet Centers work to track local veteran demographics to ensure that high-risk veterans receive the same level of care that is available to all veterans. Vet Center staff also work to ensure service delivery meets the cultural and psychological needs of high-risk veteran populations. For example, the avoidance symptoms of PTSD comprise a significant psychological barrier to care, often requiring that Vet Center staff engage the veteran at or near his home community to provide appropriate services.

In this vein, the Vet Centers pioneered an initiative to improve access to care for minority veterans in rural settings by locating Vet Center outstations on Native American reservation lands. The Vet Center outstation established in 1994 in Keams Canyon, Arizona on the Hopi Reservation, was the first VA facility ever sited on reservation land and dedicated to serving the Native American veteran. Based upon the success of this effort, a second outstation was established in 1997 in Chinle, Arizona, on the Navajo Reservation. In 1998 the VA Vet Center program advanced this effort by opening a Vet Center outstation in Martin, SD, serving the Pine Ridge and Rosebud Reservations. The Vet Center outstation dedicated to serving the Cherokee in Tahlequah, OK was

authorized for implementation in 1999. These initiatives provide culturally sensitive services to high-risk minority veterans close to their homes.

Vet Centers have long collaborated with local VA medical facilities to assist in the provision of limited primary care resources by making space available at some Vet Centers and by collocating with Community-Based Outpatient Clinics (CBOC). These initiatives have made strategic use of the Vet Center community access function in bringing limited primary care resources to previously under-served, high-risk veteran groups. Elaborating on the successful use of Vet Centers for this purpose, VA's Under Secretary for Health authorized the Vet Center-Linked Primary Care Initiative in 1997, which makes use of telemedicine technology in 20 Vet Centers to promote access to primary care for high-risk, under-served veterans closer to their respective communities. Of particular note in this regard is the 1999 opening of a collocated Vet Center and CBOC facility in inner city Cleveland, OH, to serve African American, Hispanic and other veterans.

Tracking Combat Histories. A major goal of VA's health care system is to develop and maintain an as complete as possible inventory of war-zone conditions that are likely to have an impact on veterans' health and level of functioning. Such an inventory should include life threatening, stressful combat experiences, exposure to toxic environmental agents, physical wounds and amputations, and other illnesses and injuries specific to the geographical area and the veteran's military occupation. The health-related consequences of exposure to environmental agents may include physiological effects requiring medical treatments and those of exposure to war-zone stress to be psychological, which may be effectively treated by readjustment counseling at Vet Centers.

These approaches help veterans. For example, the average difference between intake and closing Global Assessment of Functioning (GAF) scores for Vet Center clients receiving clinical services in 1999 was 5.0 as compared to 4.7 in 1998. This represents an increasingly higher level of functioning for veterans receiving readjustment counseling. In Fiscal Year 1999, 99 percent of veterans using Vet Centers reported being satisfied with services received. In many surveys, veterans respond that they would recommend the Vet Center to other veterans. This is the highest level of veteran satisfaction recorded for any VA program.

Bereavement Counseling for Surviving Family Members. The Vet Centers offer bereavement counseling to parents, spouses and children of Armed Forces personnel who died in the service of their country. Also eligible are family members of reservists and National Guardsmen who die while on duty. Bereavement counseling is assistance and support to people with emotional and psychological stress after the death of a loved one. Bereavement counseling includes a broad range of transition services, including outreach, counseling, and referral services to family members. Bereavement counseling is provided at community-based Vet Centers located near the families. There is no cost for VA bereavement counseling. Services can be accessed by contacting Readjustment Counseling Service at 202-273-9116 or via electronic mail at

vet.center@hq.med.va.gov both of which are specific to this specialized service. The Readjustment Counseling Service staff will assist families in contacting the nearest Vet Center.

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CHAPTER 8 SUMMARY

This Veterans Health Initiative (VHI) Independent Study Guide briefly covers a tremendous effort undertaken by many different individuals and institutions, including VA. Together, this forms our national response to concerns raised by Vietnam veterans, their families, veterans' service organizations and others about long-term health consequences of service in the Vietnam War, and also from exposure to Agent Orange and other herbicides in Vietnam.

From early efforts shortly after the end of the Vietnam War, VA has evolved an effective process for identifying those illnesses associated with Agent Orange, providing fair compensation to those affected, responding to the health and readjustment needs of returning veterans, and conducting further needed research.

This process has proven very effective in establishing fair and scientifically-based VA disability compensation policies for disabled Vietnam War veterans. As a testimonial to the acknowledged effectiveness of this process, Congress turned to it in 1998 as a model for responding to the needs of veterans from the 1991 Gulf War.

The National Academy of Sciences Institute of Medicine has played an essential role in this process by providing VA with an independent and scientifically unassailable review of the relevant medical literature that has been the basis of setting fair compensation policies. This process will undoubtedly go on for the foreseeable future, as new scientific evidence on Agent Orange and dioxin health effects becomes available.

Federal agencies other than VA have developed other approaches to an independent and credible scientific review of the ever-increasing literature on dioxin health effects. For example, EPA announced a new draft of a comprehensive dioxin health risk assessment that has been more than a decade in the making (and as of June 2008, still has not been officially released). Other governments, for example, of Australia, have pursued research efforts on behalf of those veterans who served in Vietnam and have made a significant contribution to the understanding and resolution of the concerns about Agent Orange.

An equally important component of VA's response has been the high quality primary health care provided by VA to veterans of the Vietnam War. In this regard, VA's Agent Orange Registry program has played a critical role in providing Vietnam War veterans an easy entry into VA health care, as well as ongoing health surveillance. Nearly three decades after the end of the Vietnam War, more than 452,000 Vietnam War veterans have been examined in this program, and more are coming in every day. The most common diseases identified in Agent Orange Registry participants involve the following systems: endocrine/metabolic, immune, respiratory, circulatory, skin and subcutaneous tissue, musculoskeletal, as well as neuroses, personality and other non-psychotic mental disorders.

Concerns about the health problems of returning Vietnam veterans also provided the

genesis of the completely unique VA Vet Centers program. From its early and uncertain beginnings, this program has proven itself so successful in meeting the unique health and readjustment needs of veterans that it has naturally expanded to provide similar readjustment services to essentially all combat veterans. U.S. veterans from future conflicts and peacekeeping missions will certainly benefit from a program that was developed in response to the needs for an earlier generation of veterans.

Epidemiological research on the health of Vietnam veterans conducted both within and outside of VA has also played a critical part in our understanding of the health of this population. This research has had a major impact on both our medical knowledge and our ability to provide appropriate health care for veterans. Equally importantly, it has proven invaluable for uncovering those illnesses that initially were not obviously service-connected. Through the scientific review process by the NAS, these studies have also served as the basis for providing fair and appropriate compensation for Vietnam veterans with those illnesses.

Sometimes it might be easy to overlook the breadth and extent of VA's response to Vietnam veterans' health issues. These efforts are not over, and the activities described in this Independent Study Guide will certainly all continue into the foreseeable future. Nevertheless, it is the hope of all who helped to prepare this VHI Independent Study Guide that those in VA who have been a part of this effort can take pride in what we have accomplished for these veterans.

CHAPTER 9 SUPPLEMENTAL READING

Excerpt from the National Academy of Sciences 1994 report, *Veterans and Agent Orange: Health Effects of Herbicides Used in Vietnam*, Chapter 2

The following is the first part of Chapter 2 of the National Academy of Sciences' Institute of Medicine report, entitled "Veterans and Agent Orange: Health Effects of Herbicides Used in Vietnam." This excerpt provides additional information about the history of the Agent Orange controversy, including early concerns about the use of herbicides in Vietnam. The material has been included in the study guide to provide the reader with an enhanced historical perspective of this important issue. The entire NAS report should be available at most VA Medical Center libraries, and is available online at www.nap.edu. Copyright 1994 by the National Academy of Sciences. Courtesy of the National Academy Press, Washington, D.C.

Chapter 2. History of the Controversy Over the Use of Herbicides. The United States has been involved for more than two decades in a controversy over the military use of herbicides in Vietnam during the Vietnam era. The controversy centers around both the use of herbicides in Vietnam and the purported health problems associated with exposure to herbicides, primarily Agent Orange and its contaminant 2,3,7,8-TCDD (2,3,7,8-tetrachlorodibenzo-p-dioxin), known scientifically as TCDD and to the general public as dioxin[footnote:- 1 2,3,7,8-TCDD is actually one specific member of the family of chemicals known as "dioxins." In other chapters of the report, TCDD is specifically used to denote 2,3,7,8-tetrachlorodibenzo-p-dioxin, but because public concern focuses on "dioxin," that term is also used in this historical review.] **Young and Reggiani, 1988).** The controversy is further complicated by public fears over exposure to herbicides and dioxin resulting from domestic herbicide spraying, chronic exposure to dioxin of workers in the chemical industry, accidents in chemical plants that exposed workers and dioxin released to the environment from several sources.

This chapter reviews the use of herbicides, the early history of the controversy, the concerns that Vietnam veterans have voiced about health problems they believe are related to exposure to herbicides, the Agent Orange product liability litigation and the response to concerns of Vietnam veterans and the public by the federal government, state governments, veterans organizations, and others. The events and issues surrounding the domestic use of 2,4-D (2,4-dichlorophenoxyacetic acid) and 2,4,5-T (2,4,5-trichlorophenoxyacetic acid) and occupational exposure to 2,4,5-T and its dioxin contaminant also are addressed in this chapter. As a result of several major events relating to dioxin exposure, the public became aware of the potential health effects of exposure to dioxin in tandem with the increased concern over possible health effects of exposure to herbicides sprayed in Vietnam. Researchers studied populations (described in this chapter) that had potential health effects from exposure to herbicides and TCDD, including production workers in chemical plants, agricultural and forestry workers, pulp and paper mill workers and residents environmentally exposed in specific areas, such as Times Beach, Missouri; Asea, Oregon; and Seveso, Italy. For the studies introduced

in this chapter, the methodological framework is described in Chapter 7 and the results are discussed in the health outcome chapters (8-11).

Military Use of Herbicides in Vietnam. The military use of herbicides in Vietnam began in 1962, was expanded during 1965 and 1966, and reached a peak from 1967 to 1969. Herbicides were used extensively in Vietnam by the U.S. Air Force's Operation Ranch Hand to defoliate inland hardwood forests, coastal mangrove forests, and, to a lesser extent, cultivated land, by aerial spraying from C-123 aircraft and helicopters. Soldiers also sprayed herbicides on the ground to defoliate the perimeters of base camps and fire bases. This spraying was executed from the rear of trucks and from spray units mounted on the backs of soldiers on foot. Navy riverboats also sprayed herbicides along riverbanks. The purpose of spraying herbicides was to improve the ability to detect enemy base camps and enemy forces along lines of communication and infiltration routes, and around U.S. base camps and fire bases. Spraying also was used to destroy the crops of the Vietcong and North Vietnamese (Dux and Young, 1980).

Herbicide Development and Testing. Experiments with chemicals for the control of vegetative growth were first conducted around the turn of this century. The practical purpose of these early compounds was to control weeds that competed with crops for available water, nutrients, and sunlight (NAS, 1974; Buckingham, 1982). It was not until the 1940s that agricultural chemical research led to the development of a number of synthetic compounds capable of regulating or suppressing plant growth. Some compounds, when applied at high doses, killed certain plants but did not harm others; these compounds were termed selective herbicides (NAS, 1974). Two of the most successful developments during that period were the discoveries of 2,4-D and 2,4,5-T. These chemicals were effective against broadleaf plants and several crops.

Throughout World War II and after, classified military research on these chemicals and nearly 1,100 other substances was conducted at the War Research Service in Fort Detrick, Maryland (MRI, 1967). Although defoliants were not introduced into the World War II conflict, the military potential of chemicals for reducing or removing heavy vegetative growth was further investigated.

The research program at Fort Detrick involved screening and evaluation of candidate defoliants (Warren, 1968). One component of the research program was organized to solicit "the best research and industrial competencies" to develop and evaluate various chemical defoliants and formulations (U.S. Army, 1964). Compounds for military consideration also were received from private companies as part of unsolicited proposals, and from individuals working in universities in other areas of chemical synthesis. The chemicals were evaluated in terms of their effectiveness at low doses, cost, availability or capability of being manufactured in large quantities, no toxicity to man and animals, stability in storage and corrosive properties. For chemicals that passed initial screening tests, field trials were conducted on major vegetational types using airplane dissemination equipment. Formulations and mixtures of chemicals were evaluated at various rates, volumes and seasons of application as a basis for selection and standardization of defoliants (U.S. Army, 1964).

In addition to research and development on chemical herbicides during the 1950s, anti-crop aerial spray trials for improving the delivery equipment also were conducted. In particular, U.S. military authorities were concerned about the various time lags in defoliation evidenced by different species of plants to which the herbicides were applied (U.S. Army, 1964; Huddle, 1969). The military assessment of chemical defoliants also appears to have involved questions such as the feasibility of developing techniques by which large, slow-moving and low-flying aircraft could traverse enemy-occupied jungle terrain without being shot down; the selection of the appropriate chemicals for particular types of foliage to be removed; and the optimum timing of spraying with regard to humidity, wind conditions, temperature and topography of the area to be sprayed (Huddle, 1969). During this time, the Hourglass spray system – the archetype for the spray equipment used initially aboard the Ranch Hand C-123 – was developed. The Hourglass, or MC-1, spray system was capable of distributing herbicide at a rate of 1 to 1.5 gallons per acre; however, after evaluation and modification, the 1,000-gallon C 123/MC-1 spray system was capable of depositing 3 gallons per acre on swaths 240 feet wide when flying at an airspeed of 130 knots and an altitude of 150 feet. In 1966, the MC-1 was replaced in all C-123s by a modular spray system designed for internal carriage in cargo aircraft (Young et al., 1978).

In June 1959, an experiment led by Dr. James Brown at Camp Drum, New York, demonstrated the long-term effectiveness of aeri-ally-dispensed herbicides in improving visibility for military operations (Buckingham, 1982). An improvised helicopter spray system delivered a 1:1 mixture of 2,4-D and 2,4,5-T over a 4-square-mile area at a quantity of one-half gallon per acre. Evaluation of the effectiveness of the defoliants on vegetation was made one year later and again in October 1962. In 1960, no signs of re-growth had occurred in the sprayed area. Upon re-examination in 1962, it was observed that maple trees, which had been predominant in the area, appeared to be dead. Sprouting had occurred in some other species of trees, and one species appeared to have recovered from the chemicals' effects. In general, trees throughout the area had been killed, and visibility had been improved nearly 100 percent (Warren, 1968). Additional field tests in the Florida Everglades and Puerto Rico demonstrated the chemicals' defoliant activity (MRI, 1967).

By 1960, the U.S. Army had tested numerous herbicides and aerial delivery techniques (MRI, 1967). With the anticipated intensified involvement of U.S. military advisory forces in Vietnam, the large-scale use of herbicides was pursued. In 1961, the U.S. Department of Defense conducted the first operational field tests in Vietnam of 2,4-D and 2,4,5-T, the major herbicides to be disseminated in Vietnam over the next 10 years. The primary purpose of the early missions was to test the soundness of the defoliation concept, as well as to measure optimum chemical concentrations and methods of delivery (Collins, 1967; Warren, 1968). Results of these early defoliation tests were mixed, and military authorities urged continued testing and evaluation of the herbicides in Vietnam (Buckingham, 1982).

A test program was conducted in Thailand during 1964-1965 to evaluate the

effectiveness of aerial applications of various formulations of 2,4-D, 2,4,5-T, and other chemicals in the defoliation of jungle vegetation representative of Southeast Asia on several 10-acre plots. Aerial spray treatments were applied at rates of 0.5 to 3.0 gallons per acre, and at two- to three-month intervals, to determine minimal effective rates and proper season of application. Defoliation effectiveness was measured in terms of rate, volume, canopy penetration, vegetation response and season of application. Results of the test program showed that (1) 2,4-D and 2,4,5-T were effective for long-term defoliation, with more complete defoliation and longer duration of effective defoliation at higher rates of application; (2) best results were achieved during the rainy or growing season; (3) defoliation responses were influenced more by rate than by volume of chemical applied; (4) woody species varied in the duration and degree of defoliation; and (5) complete defoliation of all species in mixed forest types was not achieved (Warren, 1968).

Use of Herbicides in Vietnam. Phenoxy herbicides are synthetic chemical analogues of hormones found in plants that regulate the rate and pattern of plant growth; these herbicides cause aberrant growth or death of certain plant species. The types of herbicide used in Vietnam were very effective at killing certain types of tropical vegetation and the aerial spraying of herbicides allowed for easy application over a large area. The herbicides were applied aurally at a rate of approximately 3 gallons per acre. According to military records of Operation Ranch Hand, from August 1965 to February 1971, a total of 17.6 million gallons of herbicide was sprayed over approximately 3.6 million acres in Vietnam (NAS, 1974).

The different types of herbicide used by U.S. forces in Vietnam were identified by a code name referring to the color of the band around the 55-gallon drum that contained the chemical. These included Agents Orange, White, Blue, Purple, Pink and Green. From 1962 to 1965, small quantities of Agents Purple, Pink and Green were used. From 1965 to 1970, Agents Orange, White and Blue were employed, and from 1970 to 1971, only Agents White and Blue were used in the defoliation program (Young and Reggiani, 1988).

Agent Orange was the most extensively used herbicide in Vietnam; it consisted of a 50:50 mixture by weight of the n-butyl esters of two phenoxy acids: 2,4-dichlorophenoxyacetic acid (2,4-D) and 2,4,5-trichlorophenoxyacetic acid (2,4,5-T). A synthetic contaminant of 2,4,5-T is the compound 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD), informally known as dioxin. TCDD is an unavoidable by-product of the manufacture of 2,4,5-T and a contaminant in Agent Orange (Gough, 1986). Levels of TCDD contamination in Agent Orange ranged from less than 0.05 to almost 50 parts per million, with a mean of about two parts per million (NAS, 1974). An estimated 368 pounds of dioxin was sprayed in Vietnam over a six-year period (Gough, 1986).

The military use of 2,4,5-T, and thus Agent Orange, was suspended by the Department of Defense in April 1970 (Young and Reggiani, 1988). Following the suspension of 2,4,5-T, the White House announced on December 26, 1970, that it was initiating an orderly yet rapid phase out of the entire herbicide operation. On February 12, 1971,

U.S. Military Assistance Command, Vietnam announced that herbicides would no longer be used for crop destruction in Vietnam and the last Ranch Hand fixed-wing aircraft (C-123) was flown. Subsequent spraying of herbicides was limited to controlled use around U.S. firebases by helicopter or ground troops (MACV, 1972). On October 31, 1971, nearly 10 years after the herbicide program began in Vietnam, the last U.S. helicopter herbicide operation was flown (NAS, 1974). The military use of herbicides is discussed in further detail in Chapter 3.

Early Concerns About the Use of Herbicides in Vietnam

Early Accounts of Dioxin (TCDD). Dioxin (TCDD) arises during the hydrolysis of tetrachlorobenzene to form 2,4,5- trichlorophenol, the industrial precursor of 2,4,5-T. TCDD is a solid that is insoluble in water and slightly soluble in fats or hydrocarbons. TCDD decays slowly in the soil under normal environmental conditions, which indicates that “its potential hazards may be very persistent” (NAS, 1974). Further characteristics of dioxin can be found in Chapter 4 on toxicology.

In 1872, two German chemists prepared the first chlorinated dioxin, but its structure was not understood until much later. In 1957, Dr. W. Sandermann of the Institute of Wood Chemistry in Hamburg published results of his synthesis of TCDD. While working on the synthesis, his laboratory assistant was exposed to the substance being tested when some of it blew into his face. He soon developed skin lesions over his entire face and decided to seek treatment from Dr. Karl Schulz, a dermatologist who treated chemical workers and had observed chloracne in some of them (Gough, 1986). After examining Sandermann’s laboratory assistant, Schulz identified the skin lesions on his face as chloracne. When the laboratory assistant explained that the compound he was synthesizing was TCDD, Schulz was the first to correlate the presence of chloracne with exposure to dioxin. To further confirm this assumption, Schulz applied a TCDD solution to the skin of his forearm and noted that chloracne appeared (Young and Reggiani, 1988).

In September 1971, an early account of research on the appearance of TCDD in trace quantities in samples of 2,4,5-T was presented at a session on the origin and fate of chlorodioxins at the American Chemical Society meeting. TCDD was defined to be the most toxic of all chlorodibenzodioxins studied at that time (Young and Reggiani, 1988). Further accounts of dioxin’s toxicity were presented at a meeting on “Perspectives on Chlorinated Dibenzodioxins and Dibenzofurans” sponsored by the National Institute of Environmental Health Sciences in North Carolina in April 1973. The major findings indicated “. . . that there was a variation of sensitivity among species; the liver was the target organ; the toxic effects were delayed after absorption; and the mechanism of teratogenesis was still incompletely understood. Patterns of absorption and of distribution among organs were beginning to emerge” (Young and Reggiani, 1988).

In 1974, the National Academy of Sciences’ Committee on the Effects of Herbicides in Vietnam reported, “TCDD is extremely toxic to some laboratory animals. TCDD has been found to be teratogenic in mice; results with other laboratory animals have not

been conclusive. The lethal dose in humans is not known, nor is that required to cause birth defects, if indeed there is such an activity. TCDD is strongly implicated as the main cause of chloracne, a disease that has affected employees in some plants manufacturing 2,4,5-T or its precursor, 2,4,5-trichlorophenol" (NAS, 1974).

Concerns Over the Long-Term Use of Herbicides. Public concern over the use of herbicides in Vietnam began in 1964, even before the toxicity of TCDD was first reported. At that time, the **Federation of American Scientists** urged the government not to use chemical and biological weapons unless they were used first by the enemy. **The federation was concerned about the use of defoliants in Vietnam because the government was not discriminating between fighting forces and civilians while using the herbicides and that constituted biological and chemical warfare (Young and Reggiani, 1988).** In January 1966, 29 scientists banded together to protest the U.S. policy on the use of herbicides and demand their complete abolition. They requested that President Lyndon B. Johnson begin discussions with the allies on adherence to the ban on the use of herbicides in Vietnam. "Even if it can be shown that the chemicals are not toxic to man, such tactics are barbarous because they are indiscriminate; they represent an attack on the entire population of the region where the crops are destroyed, combatants and non-combatants alike. [This is] . . . a precedent for the use of similar but even more dangerous chemical agents against our allies and ourselves" (Dux and Young, 1980).

In December 1966, the Council of the American Association for the Advancement of Science (AAAS) sent a letter to the Secretary of Defense, Robert McNamara, calling for studies of the short- and long-term consequences of the massive use of herbicides in Vietnam (Young and Reggiani, 1988). In February 1967, a second petition signed by more than 5,000 scientists, including 17 Nobel laureates, was delivered to President Johnson requesting that he end the use of herbicides in Vietnam (Dux and Young, 1980). A Department of Defense (DOD) official, responding to criticisms regarding the questionable military use of herbicides, stated, "Qualified scientists, both inside and outside the government, and in the governments of other nations, have judged that seriously adverse consequences will not occur. Unless we had confidence in these judgments, we would not continue to employ these materials." Several members of the AAAS council agreed that this statement was unjustified, noting that there was insufficient evidence to arrive at this conclusion (Wolfe, 1989).

Noting the strong opposition by some of the nation's leading scientists to the military use of herbicides, the Department of Defense commissioned a study by the Midwest Research Institute (MRI) in Kansas City, Missouri, to assess whether the use of the herbicides would have a long-term ecological impact. The MRI assessment did not include field studies or trips to Vietnam, but involved a review of approximately 1,500 scientific papers. The study, *Assessment of Ecological Effects of Extensive or Repeated Use of Herbicides*, was completed in December 1967 (MRI, 1967). **The report could not provide conclusive answers about the long-term effects of chronic exposure to herbicides on the ecological system or on the population, and recommended further studies of the long-term effects on the environment and the population in order to assess properly the consequences of repeated use of herbicides (MRI, 1967).**

→ In 1965, the National Cancer Institute contracted with Biometrics Research Laboratory in Maryland to investigate the possible teratogenic effects of a number of pesticides and herbicides. The study, *Evaluation of Carcinogenic, Teratogenic, and Mutagenic Activities of Selected Pesticides and Industrial Chemicals*, noted that among the herbicides tested on mice and rats were 2,4-D and 2,4,5-T (Bionetics, 1968). This study provided the first indication of the teratogenicity and fetotoxicity of 2,4,5-T (Lilienfeld and Gallo, 1989). The researchers determined that 2,4,5-T was teratogenic, causing malformations and stillbirths in mice when administered in high doses, and that 2,4-D was potentially harmful. This report was released to the public in 1969. Bionetics later re-analyzed the 2,4,5-T used for its initial study and revealed that the cause of toxicity was the contaminant TCDD and that 2,4,5-T itself was not teratogenic (Young and Reggiani, 1988).

Another study, *Congenital Malformations, Hydatidiform Moles and Stillbirths in the Republic of Vietnam, 1960-1969*, was conducted by R.T. Cutting on behalf of the government of South Vietnam and the U.S. Military Assistance Command, Vietnam (Cutting et al., 1970). Cutting examined maternity records of 22 hospitals for two time periods: the buildup of herbicide use (1960-1965) and larger-scale military herbicide use (1966-1969). He found that there were no differences in the incidence of stillbirths, congenital malformations, and hydatidiform moles between the two periods (Cutting et al., 1970; U.S. Congress, House, 1978). It was later revealed that the study was biased because of unreliable data and hospital records (Young and Reggiani, 1988).

In early 1970, the AAAS set up a commission to assess the effects of large-scale use of herbicides on the environment and population of Vietnam. The members of the Herbicide Assessment Commission (HAC) were Matthew Meselson, Arthur Westing, John Constable and Robert Cook. In June 1970, HAC held a conference at Woods Hole, Massachusetts with individuals who had experience with the herbicide program in Vietnam. They determined what HAC members would investigate and observe while in Vietnam, and prepared questionnaires for use in interviews of Vietnamese residents. In August 1970, they traveled to Vietnam on an inspection field trip to examine the extent to which the herbicides had destroyed the vegetation and local food crops in areas where they had been sprayed.

After returning from Vietnam, HAC members wrote a report on the defoliation of Vietnam in which they noted that the Department of Defense had stated that the herbicides were used "...for crop destruction of small, isolated crop patches along infiltration routes . . ." (Wolfe, 1989) and limited to areas of low population. HAC, however, found that "...crops had been sprayed in an area with an estimated population of 180 persons per square kilometer and that nearly all of the food being destroyed would have been used by mountain-dwelling Montagnard civilians instead of by enemy troops" (Wolfe, 1989). The commission maintained that the military use of herbicides had been considerably more destructive than previously imagined – half of the mangrove forests had been destroyed and there were indications of serious health effects (Wolfe, 1989). The HAC members documented reports of stillbirths and birth

defects in Vietnamese, noting that these adverse reproductive effects were possibly associated with 2,4,5-T (Young and Reggiani, 1988) and its contaminant, TCDD. On December 26, 1970, the White House announced that it was initiating an orderly yet rapid phase-out of the herbicide operation. The AAAS council adopted a resolution commending the U.S. government for its intention to phase out the use of herbicides in Vietnam (Wolfe, 1989).

At the end of 1970, Congress directed the Department of Defense to contract with the National Academy of Sciences (NAS) to study the ecological and physiological effects of the widespread military use of herbicides in Vietnam. The NAS recruited a 17-member committee and 30 consultants to carry out the study. Committee members and consultants spent approximately 1,500 man-days in Vietnam in order to develop an inventory of the areas sprayed by herbicides, review the effects on various vegetation types, study the persistence of herbicides in soil, examine the effects of herbicides on animal populations in estuaries of Vietnam and attempt to identify the effects of herbicides on resident populations exposed to them (NAS, 1974).

The resulting report, *The Effects of Herbicides in South Vietnam* (NAS, 1974), concludes that (1) the committee was unable to gather any definitive indication of direct damage by herbicides to human health, although there were reports from Montagnards of respiratory distress in children; (2) although attempts to assess the social, economic and psychological effects of the herbicide spraying were less than satisfactory, the effect of herbicide spraying on the health of the Vietnamese appeared to have been smaller than feared; (3) the evidence of spraying on food crops indicated that they were highly vulnerable to the herbicides; (4) the mangrove forests were found to have been extremely vulnerable to herbicide spraying; and (5) although it was difficult to assess the damage to the inland forests because the committee had to rely on aerial photographs, the committee concluded that most of the damage occurred in overused open or thin forests and in young secondary forests.

Public concern about the military use of herbicides during the Vietnam conflict did not end when Operation Ranch Hand terminated with the last official herbicide spraying in 1971 or with the final departure of American troops in 1975. In April 1975, President Gerald Ford issued Executive Order 11850, in which the United States renounced the first use of herbicides in war except “under regulations applicable to their domestic use, for control of vegetation within U.S. bases and installations or around their immediate defensive perimeters.” In a historical account of Operation Ranch Hand, it was noted, “As long as this policy stands, no operation like Ranch Hand could happen again” (Buckingham, 1982).

Concerns About Exposure to Agent Orange

Vietnam Veterans Return Home. Historians have noted that during the 1970s, many Vietnam veterans returned to a society that did not welcome them (Schuck, 1987). The country had been greatly divided over the war and a strong antiwar sentiment pervaded most of the final years of the Vietnam conflict (Karnow, 1991; Spector, 1993). There

were antiwar demonstrations held throughout the country during these years, and when the veterans came home, many Americans did not want to acknowledge their patriotic effort (Bonoir et al., 1984; Salisbury, 1985). There also was a lack of unanimity among veterans about their service in the Vietnam conflict. Some veterans were bitter at having served in a war they felt could not be won; however, an equal number of veterans would have returned to Southeast Asia if they were called upon by their country (Wilcox, 1989).

The returning veterans also were presented with more difficult adjustments than veterans of other foreign wars. Because of improved emergency medical care, more disabled veterans returned home. Of those discharged for disabilities during World War II, 18 percent were amputees and 3.1 percent were paralyzed; the comparable figures for Vietnam were 28.3 percent and 25.2 percent, respectively (Schuck, 1987). The returning veterans also had a difficult period of adjustment due to the fact that most of them were discharged from service one at a time. Since their tour of duty was for only one year, many veterans did not forge close attachments with each other as in earlier wars. Following the war, some veterans began to develop health problems, and in time, more veterans reported serious illness and claimed that their children were born with birth defects (Gough, 1986).

The Beginning of the Controversy. During the early and mid-1970s, a growing number of veterans began to question the possible linkage between their conditions or diseases and their exposure to herbicides, mainly Agent Orange, in Vietnam. In 1977, Maude DeVictor, a benefits counselor in the Chicago regional office of the Veterans Administration (VA), was contacted by the wife of Charles Owen, a Vietnam veteran who believed his terminal cancer was the result of exposure to Agent Orange. After learning that Charles Owen had died and that the VA had refused his widow's claim for benefits, DeVictor began to research the health effects of exposure to Agent Orange (Wilcox, 1989). She contacted Alvin L. Young, Major, U.S. Air Force, an expert in plant physiology, and inquired about the types of herbicides used in Vietnam.

DeVictor recorded the conversation in a memorandum to the file, which explained the use and toxicity of Agent Orange and Agent Blue (DeVictor, 1977). In response to this memorandum, a line-by-line commentary was prepared by Dr. Young and a copy was recorded in a congressional hearing (U.S. Congress, House, 1980b). DeVictor continued her inquiries into the possible connection between Agent Orange and certain health outcomes. She began gathering statistics on veterans' exposure to Agent Orange by questioning veterans who visited her office for benefits, widows of veterans and wives of veterans about the health of their husband and children. When the VA learned that she was carrying out this research, she was asked to cease these additional inquiries and concentrate on her assigned duties, but she continued her research on Agent Orange. Soon after, someone contacted Bill Kurtis, a local television reporter, about DeVictor's inquiries on veterans' exposure to Agent Orange (Linedecker et al., 1982). On March 23, 1978, WBBM, a CBS affiliate in Chicago, aired Kurtis' documentary *Agent Orange, the Deadly Fog*. Subsequently, local and national media began to report on Agent Orange and veterans' complaints with more frequency

(Wilcox, 1989).

Early in 1978, Paul Reutershan, a former helicopter crew chief responsible for transporting supplies to the 20th Engineering Brigade, appeared on the “Today” show and shocked many of the show’s viewers by announcing, “I died in Vietnam, but I didn’t even know it.” He told of how he flew almost daily through clouds of herbicides being discharged from C-123 cargo planes, how he observed the dark swaths cut in the jungle by the spraying, and watched the mangrove forest turn brown and die (Wilcox, 1989). Even though he observed this destruction of the jungles and forests, he did not worry about his own health. He said that he was told by the Army that Agent Orange was “relatively nontoxic to humans and animals” (Wilcox, 1989). Upon returning home from Vietnam, Reutershan was diagnosed with cancer. On December 14, 1978, at the age of 28, Reutershan died from the cancer that had invaded his colon, liver, and abdomen (Schuck, 1987).

Prior to his death, Paul Reutershan had read a news account about Maude deVictor’s data correlating health problems in Vietnam veterans and exposure to Agent Orange. Convinced that he had identified the cause of his illness, he contacted Edward Gorman, a personal injury lawyer on Long Island and requested that he file a suit in a New York State court naming Dow, Monsanto, and Diamond Shamrock (chemical companies that manufactured Agent Orange) as defendants. During this time, he also founded Agent Orange Victims International (AOVI), and before his death, he named his colleague, Frank McCarthy, to carry on as AOVI director. Reutershan spent his remaining time alerting the public to his belief that his cancer was the direct result of his exposure to Agent Orange.

This concludes this extensive quotation from the initial 1994 “Vietnam Veterans and Agent Orange” IOM committee report. This VHI independent study guide was developed to continue that story.

APPENDICES

APPENDIX A – THE AGENT ORANGE REGISTRY EXAMINATION HANDBOOK

This section comes from VA's Agent Orange Handbook 1302.01, updated September 5, 2006, and available on line at www.va.gov/EnvironAgents. VA established the Agent Orange Health Examination Registry Program in 1978 in response to escalating concerns among returning Vietnam veterans about herbicide health effects. The program offers veterans exposed to Agent Orange and related herbicides a medical examination at VA health care facilities, as well as the chance to discuss their health concerns with a knowledgeable provider. As of April 2008, the program has provided more than 452,000 examinations. Although the program is three decades old, hundreds of veterans are contacting the VA each month for their first Registry examination.

The Agent Orange Handbook describes the policies and procedures for the Agent Orange Registry Health Examination Program and VA medical treatment for Vietnam veterans with medical problems possibly related to Agent Orange exposure. It describes expanded coverage of registry examinations not only to the veterans who served in Korea between 1968 and 1969, but all other U.S. veterans who may have been exposed to dioxin or other toxic substance in a herbicide during the conduct of, or as a result of testing, transporting or spraying of herbicides for military purposes. The Handbook restates, clarifies and elaborates the policies and procedures in VHA Handbook 1302.1, August 17, 2001 which it supersedes.

Readers with questions about the handbook can contact the National Environmental Health Coordinators in the Environmental Agents Service (131) in VA Central Office. The telephone number is 202-461-7222. VHA Handbook 1302.1 was reissued and updated September 5, 2006. The principal changes are:

a. Implements a new electronic method of entering registry data to the Austin Automation Center via website: <http://vaww.registries.aac.va.gov> , replacing the manual process, and

b. Implements name change: Registry Physicians and Coordinators are now identified as Environmental Health Clinicians and Coordinators based on additional responsibilities beyond registries, i.e. 112/SHAD, Afghanistan, etc.

This handbook is regularly updated by the Environmental Agents Service (131) to reflect changes in Agent Orange health care and other benefits policies, eligibility and procedures for conducting and recording the Agent Orange Registry Health Examination. The latest update is always available on line at www.va.gov/AgentOrange.

**AGENT ORANGE HEALTH REGISTRY (AOR) PROGRAM PROCEDURES
TO INCLUDE ALL VETERANS EXPOSED TO AGENT ORANGE
AND SPECIAL HEALTH CARE BENEFITS FOR VIETNAM VETERANS' CHILDREN**

1. REASON FOR ISSUE. This Veterans Health Administration (VHA) Handbook establishes new reporting procedures for the Department of Veterans Affairs (VA), VHA, and the Environmental Agents Service (EAS) Agent Orange Health Registry Program.

2. SUMMARY OF MAJOR CHANGES. The principal changes to VHA Handbook 1302.01 are to:

a. Provide new Registry data entry procedures required to access the reconstructed EAS Web site <http://vaww.registries.aac.va.gov>, allowing Environmental Health (EH) Clinicians and Coordinators to search for and access exam information by veteran's name or social security number, and giving them the ability to retrieve all exam information, historical and current, regardless of point of entry, and

b. Provide new subscription instructions for the EAS publication "Agent Orange Review."

3. RELATED ISSUES: VHA Directive 1302.

4. RESPONSIBLE OFFICIALS: The Director, EAS (131), is responsible for the contents of this VHA Handbook. Questions may be referred to that individual at 202-273-8579. *NOTE: Questions relating to eligibility for VA care, including enrollment, are to be directed to the eligibility staff at each facility and on the Intranet at <http://www.va.gov/elig/>.*

5. RESCISSIONS: Handbook 1302.1, dated October 5, 2004, is rescinded.

6. RECERTIFICATION: This VHA Handbook is scheduled for recertification on or before the last working day of September 2011.

S/Louise Van Diepen for
Michael J. Kussman, MD, MS, MACP
Acting Under Secretary for Health

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**AGENT ORANGE HEALTH REGISTRY (AOR) PROGRAM PROCEDURES
TO INCLUDE ALL VETERANS EXPOSED TO AGENT ORANGE
AND SPECIAL HEALTH CARE BENEFITS FOR VIETNAM VETERANS' CHILDREN**

1. PURPOSE

This Veterans Health Administration (VHA) Handbook sets forth clinical and administrative procedures related to the maintenance of the VHA Agent Orange Health Registry (AOR) program of physical examinations for eligible, concerned, Vietnam veterans who served in the Republic of Vietnam between 1962 and 1975, veterans who served in Korea during 1968 or 1969, and any United States (U.S.) veterans who may have been exposed to dioxin, or other toxic substance in an herbicide or defoliant, during the conduct of, or as a result of, the testing, transporting, or spraying of herbicides for military purposes.

2. AUTHORITY

a. Under Public Law (Pub. L.) 102-585 Section 703, the Secretary of Veterans Affairs may provide, upon request, a health examination, consultation, and counseling to a veteran who is eligible for listing or inclusion in any health-related registry administered by the Secretary of Veterans Affairs. Under this authority, the Department of Veterans Affairs (VA) must provide registry examinations to veterans who served in Korea in 1968 or 1969, and/or any other U. S. veteran who may have been exposed to dioxin, or other toxic substance in an herbicide or defoliant, during the conduct of military operations, or as a result of, the testing, transporting, or spraying of herbicides for military purposes, and who requests an AOR examination. The results of such an examination are to be included in the AOR.

b. Pub. L. 100-687, the Veterans' Judicial Review Act of 1988, requires the Secretary of Veterans Affairs to organize and update the information contained in the VA AOR, enabling VA to notify Vietnam era veterans who served in the Republic of Vietnam of any increased health risks resulting from exposure to dioxin or other toxic agents. ***NOTE:** VA must continue to meet this mandate and extend it to include all other veterans who qualify for inclusion and participation in the AOR.*

3. VETERANS ELIGIBILITY FOR AO HEALTH REGISTRY EXAMINATIONS

Health registry examinations must be provided to:

a. Any U.S. male or female Vietnam era veteran who served in the Republic of Vietnam between 1962 and 1975, regardless of length of service (i.e., 1 hour, 1 day, 1 month, 1 year, etc.). Verification of service during the Vietnam era is required. ***NOTE:** Inasmuch VA presumes that a veteran was exposed to phenoxy herbicides during any service in Vietnam, a verified claim of such in-country service constitutes the required contention of exposure and establishes eligibility for registry examinations within these provisions.*

*NOTE: Congress gave VA the authority to presumptively service-connect certain diseases associated with exposure to herbicides used in the Vietnam War (see subpar. (10)(c) for the conditions that are currently presumptively recognized as service connected) and to presume that Vietnam veterans were exposed to such herbicides. Veterans from other conflicts (Korea, etc.) may take advantage of these “presumptions of service connection” if the veterans are diagnosed with one of the presumed illnesses. **But unlike Vietnam veterans, they are required to prove they were exposed to Agent Orange or other herbicides during their military service; they do not have the benefit of a presumption of exposure like Vietnam veterans.***

b. Any U.S. veteran who served in Korea during 1968 or 1969.

c. Any U.S. veteran who may have been exposed to dioxin, or other toxic substance in an herbicide or defoliant, during the conduct of military operation, or as a result of, the testing, transporting, or spraying of herbicides for military purposes. *NOTE: See Web site <http://www1.va.gov/agentorange/> for a Department of Defense (DOD) list (75 percent complete) of locations and dates where dioxin (Agent Orange and other agents) was used. For those sites that are not listed, the veteran needs to provide some proof of exposure to be able to obtain a registry examination .*

4. HEALTH REGISTRY EXAMINATIONS

The health registry examination protocol for veterans exposed to dioxin or other toxic substance in an herbicide or defoliant is described in paragraph 15. *NOTE: Veterans eligible for inclusion in the AOR do not need to be enrolled in VA health care to receive the health registry examinations.*

5. FURTHER EVALUATION AND TREATMENT

Where the findings of the health registry examination reveal a condition requiring treatment, the veteran is to be referred to a VA primary care clinician to obtain the necessary medical assessment and appropriate treatment, if enrolled or otherwise eligible for VA health care. If the veteran is not enrolled or otherwise eligible, the veteran must be encouraged to enroll or seek non-VA care.

6. HEALTH REGISTRY PARTICIPATION DOES NOT CONSTITUTE A FORMAL CLAIM FOR COMPENSATION

Veterans must be advised that participation in the AOR examination program does not constitute a formal claim for compensation. **Although the results of such an AOR examination may be used to support a compensation claim, the examination must not, in most cases, be considered such a claim.** Veterans may be advised of the routine procedure to file a claim through the Veterans Benefits Representative (VBR) at the nearest VA facility, medical center, or regional office.

7. SPECIAL HEALTH CARE BENEFITS FOR VIETNAM VETERANS' CHILDREN BORN WITH SPINA BIFIDA (EXCEPT SPINA BIFIDA OCCULTA)

a. Spina bifida (except spina bifida occulta) is presumptively recognized in the offspring of Vietnam veterans as due to herbicide exposure.

b. Title 38 United States Code (U.S.C.) Section 1803 states that VA must provide health care benefits for children of Vietnam veterans who are born with spina bifida or any disability that is associated with such condition. The term "child," with respect to a Vietnam veteran, means a natural child of the Vietnam veteran, regardless of age or marital status, who was conceived after the date on which the veteran first entered the Republic of Vietnam during the Vietnam era between January 9, 1962 and May 7, 1975, inclusive. **NOTE:** *The term "Vietnam veteran" means a veteran who performed active military, naval, or air service in the Republic of Vietnam during the Vietnam era.* The Veterans Benefits Act of 2003 extended these benefits to the natural children of veterans who served in Korea between September 1, 1967, and August 31, 1971, and who were exposed to certain herbicides during such service in or near the Korean Demilitarized Zone (DMZ). The spina bifida conditions covered apply with respect to all forms and manifestations of spina bifida except spina bifida occulta. **NOTE:** *For information about this program, access Web site <http://www.vba.va.gov/bln/21/benefits/Herbicide/index.htm#bm03>, or contact the VA spina bifida-birth defects Hotline at 1-888-820-1756.*

8. SPECIAL HEALTH CARE BENEFITS FOR WOMEN VIETNAM VETERANS' CHILDREN WITH BIRTH DEFECTS

a. In accordance with the mandate in 38 U.S.C. 1813, VA has identified the birth defects of children of women Vietnam veterans that:

- (1) Are associated with Vietnam service; and
- (2) Result in permanent physical or mental disability.

b. A list of those diseases is available at <http://www.vba.va.gov/bln/21/Topics/Women/Birth.htm>. For further details concerning these benefits, contact the VA spina bifida /birth defects hotline at 1-888-820-1756.

9. PROGRAM MANAGEMENT

NOTE: *The Environmental Health (EH) Clinicians, Coordinators, and health administration staff of each VA facility are often the first points of contact for veterans requesting health registry examinations. They play a significant role in determining the perception veterans have concerning the quality of VA health care services and of their individual treatment by VA health care providers. These individuals need to be well informed of the policies and procedures of this Agent Orange Program to provide good management and quality health registry examinations for this veteran population.*

a. **Environmental Health (EH) Clinician.** An EH Clinician, or designee, must be assigned by the Chief of Staff (COS) and approved by the Director at each facility.

b. **EH Coordinator.** An EH Coordinator and alternate(s) must be designated by administrative staff assigned by the facility Director. Final approval rests with the facility Director's office.

c. **Updating EH Clinician and EH Coordinator Appointments**

(1) Separate listings of the EH Clinicians and EH Coordinators are maintained within Environmental Agents Service (EAS) and published on internet and intranet Web sites <http://www.va.gov/EnvironAgents/> and <http://vaww.va.gov/EnvironAgents>.

(2) In an effort to keep these listings current, facilities are mandated to notify EAS of changes as they occur in status of EH Clinicians and Coordinators at their respective facilities and/or satellite clinics.

(3) As changes in appointments occur, submit the name, title, mail routing symbol, telephone and FAX numbers including area code, to the Environmental Health Coordinator, EAS (131), Department of Veterans Affairs, 810 Vermont Avenue, NW, Washington, DC 20420.

***NOTE:** In order to provide current Agent Orange Program information to concerned VA Registry Staff, it is important that any changes in appointments of EH Clinicians and Coordinators at VA facilities be provided to VA Central Office (131) as they occur.*

10. EH CLINICIAN RESPONSIBILITIES

The EH Clinician is responsible for clinical management and serves in an advisory capacity for the administrative management of the program. Major responsibilities include:

a. **Counseling.** The EH Clinician advises the veteran that the examination cannot detect the presence of dioxin in the body nor determine whether adverse health effects or potential health problems are related to Agent Orange.

b. **Documenting the Physical Examination.** ***NOTE:** If a compensation examination is performed for a veteran and the veteran requests inclusion in the AOR, it is not necessary to perform an additional health registry examination as long as the demographic and medical information is sufficient to adequately complete the AOR worksheet on the Web site <http://vaww.registries.aac.va.gov> for transmission to the Austin Automation Center (AAC). The EH Clinician must:*

(1) Conduct and document the physical examination in the veteran's health record at the time of the visit.

(a) Perform a complete medical history to include information about:

1. Family;
2. Occupation;

3. Social history noting tobacco, alcohol, and drug use;
4. Civilian exposure to possible toxic agents; and
5. Psychosocial history.

(b) If a non-VA doctor diagnoses a veteran with a significant health problem, the veteran is to be encouraged to contact a VA medical center to include the diagnosis in the veteran's health record.

1. This diagnosis must be submitted over a non-VA physician's signature and on official letterhead.

2. The private physicians' health registry examination data needs to be reported to the AAC via Web site <http://vaww.registries.aac.va.gov>.

(2) Review and complete, if necessary, the health registry examination worksheets at Web site <http://vaww.registries.aac.va.gov>.

(3) Review the records of every veteran examined to ensure that a complete physical examination was performed and documented.

(4) Personally discuss with each veteran the:

(a) Findings of the physical examination and completed diagnostic studies. **NOTE:** *The interview is to be conducted in such a way as to encourage the veteran to discuss health concerns, as well as those of family members, as they relate to herbicide exposure. This information must be documented in the veteran's health record.*

(b) Need for follow-up examination (not a consultation, but an additional registry examination) either recommended by the EH Clinician or requested by the veteran. **NOTE:** *A follow-up registry examination does not need to be provided routinely; it needs to be based on new symptoms or health problems experienced by the veteran.*

1. Preparing and Signing Follow-up Letter. The EH Clinician must ensure that an appropriate personalized follow-up letter, explaining the results of the examination and laboratory studies, has been signed and mailed to the veteran (see Apps. A, B, and C). **NOTE:** *It is essential that this letter be written in language that can be easily understood by the veteran. Inappropriate wording could unduly alarm or confuse the veteran. A great deal of sensitivity and care must be exercised in the preparation of this correspondence.*

a. Follow-up letters must be mailed to the veteran within 2 weeks of the initial examination appointment. The only exception to this timeframe is when a consultation at a specialty clinic is requested as part of the initial examination process. This exception suspends, but does not remove, the requirement for the follow-up letter. The follow-up letter must be sent within 2 weeks after the consultation.

b. A dated copy of the follow-up letter must be filed in the veteran's administrative record or scanned to an appropriately titled progress note in Computerized Patient Record System (CPRS).

c. The follow-up letter must explain that:

(1) If the veteran examined has no detectable medical problems, the follow-up letter needs to so indicate and suggest that the veteran contact the nearest VA health care facility if health problems appear later.

(2) If it is determined upon examination that the veteran does have medical problems, it is not necessary to specify the problems in the letter. The veteran needs to be advised in the letter that the recent examination indicated a health condition and/or problem, which may require further examination and/or treatment. *NOTE: Depending on the seriousness of the condition identified, the EH Clinician needs to phone the veteran to discuss the examination findings. Clinical judgment needs to be exercised.* If the veteran is eligible for VA medical treatment, the letter needs to so state and provide the name of a contact person, including telephone number, within the facility.

(3) If the veteran is not eligible for VA treatment, the letter needs to recommend that the veteran contact the EH Coordinator's office or a VBR at the VA facility or Regional Office for further information. *NOTE: Another point of contact is the local Enrollment Coordinator or Health Benefits Service Center at 1-877-222-VETS (8387) for those found not eligible for VA treatment. Rejected applicants are to be provided their appeal rights as part of the normal notification of the denial of health benefits.*

(4) If the problem(s) is (are) not necessarily related to possible Agent Orange exposure, the letter needs to explain that there is considerable research underway to learn more about the possible long-term health effects of Agent Orange exposure.

c. **Health Conditions Presumptively Recognized to Date**

Currently, the following conditions have been presumptively recognized as service connected (SC) for the treatment of veterans who were exposed to herbicide agents during service, so long as the condition has manifested to a degree of 10 percent or more:

(1) Chloracne or other acne form disease consistent with chloracne (must manifest to a degree of 10 percent or more within 1 year after the last date of exposure to Agent Orange);

(2) Non-Hodgkin's lymphoma;

(3) Soft-tissue sarcoma (other than osteosarcoma, chondrosarcoma, Kaposi's sarcoma, or mesothelioma);

(4) Hodgkin's disease;

(5) Porphyria Cutanea Tarda (PCT) (must manifest to a degree of 10 percent or more within 1 year after the last date of exposure to Agent Orange);

- (6) Respiratory cancers (cancers of the lung, larynx, trachea, and bronchus);
- (7) Multiple myeloma;
- (8) Prostate cancer;
- (9) Peripheral neuropathy, transient acute and sub-acute (i.e., transient peripheral neuropathy that appears within weeks or months of exposure and resolves within 2 years of date of onset) (must manifest to a degree of 10 percent or more within 1 year after the last date of exposure to Agent Orange).
- (10) Type 2 diabetes; and
- (11) Chronic lymphocytic leukemia.

NOTE: Other conditions may be recognized in the future.

d. **Reviewing Records.** The EH Clinician reviews records of every veteran receiving an AOR examination to ensure that a complete physical examination was performed and documented and that the veteran has been appropriately notified of the examination results.

11. EH COORDINATOR RESPONSIBILITIES

The EH Coordinator is responsible for the administrative management of the program, including:

a. **Scheduling of Appointments.** Every effort needs to be made to give each veteran an AOR examination within 30 days of the request date. If numerous consultations are required, whenever possible, all of these need to be scheduled on the same day, so that the veteran is not unduly inconvenienced. When it is not possible to provide all consultations on the same day, the EH Coordinator, or the scheduler, needs to work with the veteran to minimize the number of disruptions in the veteran's life. If a medical center fails to meet the time standard of 30 calendar days from date of request, the medical center Director, or designee, must explore all alternatives; i.e., referrals to other VA facilities, additional staff hours to perform these examinations, and the possibility of using fee-basis or contractual sources to furnish these examinations, to bring the medical center in line with the time standard. If, after these alternative measures have been explored and the time standard still cannot be met, an exemption needs to be requested by contacting EAS, VA Central Office, at (202) 273-8463 or (202) 273-8465.

b. Monitoring Timeframe Compliance

- (1) **Follow-up Letters.** Mail to veteran within 2 weeks of initial registry examination.
- (2) **Health Registry Examination Appointment.** Schedule within 30 days of request date.
- (3) **VA Staff (EH Clinician and Coordinator) Changes.** Advise EAS, VA Central Office (131), as staff changes occur.
- (4) **Health Registry Worksheets for Initial and Follow-up Examinations.** Enter worksheet data via EAS Web site <http://vaww.registries.aac.va.gov>.

c. **Reviewing Records for Accuracy and Completion.** All required records, follow-up letters, and health registry examination worksheet data of veteran participants, are to be completed, reviewed for accuracy, and filed and/or scanned into the veteran's health or administrative record.

d. **Collecting Data for Reporting Purposes.** Required registry worksheet data needs to be obtained from the veteran or family and entered into AAC database via Web site <http://vaww.registries.aac.va.gov>. The AAC provides the AOR data reports to VA Central Office based on VA facility input.

e. **Disseminating Information.** It is important that each veteran be fully advised of the AOR examination program.

(1) The facility staff are to fully communicate all aspects of the AOR examination program by an appropriate means, including advising the veteran to enroll with the VA on the initial visit.

(2) The EH Coordinator is required to provide veterans reporting to the Outpatient and/or admission area with a copy of the VA publication the Agent Orange Review, and upon request, or in response to questions, the Agent Orange Briefs, Agent Orange – General Information, and posting the Agent Orange Posters, inserting your name and phone extension as the individual responsible for the AOR Program. *NOTE: These publications and other informational materials are to be visible and accessible in prominent areas (outpatient clinics, admission areas, etc.) to ensure availability to Vietnam veterans, Korea veterans, and other interested individuals. The Agent Orange Review includes information relating to use of the herbicide Agent Orange used by the Republic of Korea troops along the Korean DMZ in 1968 and 1969 and during the conduct of, or the result of, the testing, transporting, or spraying of herbicides for military purposes.*

(a) The Agent Orange Review is a VA EAS publication, published periodically, to provide information on Agent Orange and related matters to veterans, their families, and others with concerns about herbicides used during the conduct of, or the result of, the testing, transporting, or spraying of herbicides for military purposes. *NOTE: The Agent Orange Review needs to be included as a supplement to an application for examination.*

(b) The Agent Orange Briefs consist of a series of fact sheets prepared and distributed periodically to VA facilities by EAS, VA Central Office, Washington, DC. The fact sheets are

designed to answer questions relating to the purpose of the examination, its limitations (i.e., explains that the examination cannot detect the presence of dioxin in the body nor determine whether adverse health effects or potential health problems are related to exposure, etc.) and a variety of related matters.

(3) The EH Coordinator receives all Agent Orange-related inquiries and informs each veteran of the toll-free helpline (1-800-749-8387) for Agent Orange concerns.

(4) The EH Coordinator provides copies of the VA Agent Orange Briefs and the Agent Orange Review (prepared and provided to VA facilities by EAS, VA Central Office, Washington, DC) to all telephone callers, local Veteran Service Organizations (VSOs) and public libraries. *NOTE: All past, current, and future issues of the Agent Orange Review have been, or are to be, posted on the internet at <http://www.va.gov/agentorange>. Many veterans may wish to obtain and/or read this publication via the Internet rather than receive it through the postal service.*

(5) The EH Coordinator posts and communicates the names, locations, and office telephone numbers of the EH Clinicians and Coordinators to concerned VA facility staff. *NOTE: An appropriate method of communicating is through the use of: (a) medical center memoranda providing registry policy and procedures which identify the staff who are responsible for carrying out these policies, and (b) the medical center patient handbook (both inpatient and outpatient, if available).*

f. **Records and Record Retention.** The EH Coordinator must establish a health record for the veteran, if one does not already exist. All health records of health registry examinations must be maintained within CPRS.

(1) A posting for 'herbicides' must be generated in CPRS and if appropriate, VA Form 10-1079, Emergency Medical Identification, is to be affixed to the front of the paper health record.

(2) AOR worksheets and dated follow-up letters must be scanned, or made electronic, and attached to an appropriately titled CPRS progress note. Documents that are considered strictly administrative need to be linked to the patient in Veterans Health Information Systems and Technology Architecture (VistA) Imaging only.

(3) Laboratory results are to be maintained within the electronic laboratory package unless results are only available on paper, i.e., outside laboratory results; in which case, those results are to be scanned into VistA Imaging.

(4) AOR examination documents that become part of the patient's health record must be retained for 75 years in accordance with VA Records Control Schedule (RCS) 10-1.

12. ACTIVE DUTY MILITARY PERSONNEL

a. When active duty members of the uniformed services apply to VA facilities for an Agent Orange examination, the DOD must provide VA with appropriate authorization, i.e., DOD Form 1161, Referral for Civilian Care.

NOTE: The requirements of M-1, Part I, Chapter 15, regarding the authorization and billing from the appropriate branch of service apply.

(1) The procedures for processing the examination are the same as those for a veteran participating in this program.

(2) A military facility may perform the Agent Orange examination according to VA instructions.

(3) Military facilities may obtain the pertinent information and samples of appropriate forms from the nearest VA facility. Military facilities must complete the health registry worksheets with the exception of the following coding identifiers which are to be filled in by VA coding clerks:

(a) Facility number and/or suffix,

(b) County and state, and

(c) Classification of Diseases, 9th Edition, Clinical Modification (ICD-9-CM) of the veteran's symptom and/or complaint.

(4) The completed health registry worksheets, copies of the physical examination, laboratory tests, etc., are to be forwarded to the EH Coordinator at the nearest VA medical center or outpatient clinic.

b. After the documents reach the EH Coordinator, the EH Coordinator must:

(1) Complete the health registry worksheet with identifier codes;

(2) Transmit the health registry worksheet data to the AAC via Web site: <http://vaww.registries.aac.va.gov>, in accordance with instructions; and

(3) Maintain the medical documents and original registry worksheets in the veteran's health record, which is to be available if, or when, the individual is discharged from the service and reports for treatment as a veteran.

13. INCARCERATED VETERANS

a. Agent Orange health registry examinations may be provided to incarcerated veterans either in prison, jail, or the VA facility.

b. If an incarcerated veteran is accepted at a VA facility for an AOR examination, VA may conduct such an examination, but only after the veteran has been released by an official under circumstances where there is no obligation placed on VA to exercise custodial restraint, or to ensure the return of the veteran to custody upon completion of the examinations. **NOTE:** *VA is encouraged to work with said penal institution to avoid potential disruptions at the VA medical center upon exam reporting (for example: the wearing of prison uniforms and restraints is discouraged).*

c. For purposes of entry into the AOR, upon request, VA medical facilities may assist penal institutions by providing copies of this Handbook 1301.2, worksheets, etc.

d. Penal authorities must be advised at the time of such requests, that the results of the examinations provided at their institutions are to be forwarded to the VA medical facility of jurisdiction for inclusion, on the veteran's behalf, in VA's AOR.

e. A recommendation can be made to the penal institution to retain a copy of the examination documents submitted to VA. **NOTE:** *Such documents need to be maintained by penal authorities until the individual is released from the penal institution; these documents are then given to the veteran.*

NOTE: *The clinic Director, or designee, must notify the civil authorities when the AOR examination is completed. The penal institution must not be billed for the examination conducted at the VA facility. On the other hand, VA must not reimburse the penal authorities when they conduct these AOR examinations.*

14. VETERANS WITH OTHER THAN HONORABLE DISCHARGES

The requirements of M-1, Part I, Chapter 4, paragraph 4.38, or appropriate Handbook and Directive, (Web site: <http://vaww1.va.gov/vhapublications/publications.cfm?pub=4>) apply to veterans with other than honorable discharges applying for AOR examinations.

15. CONDUCTING THE PHYSICAL EXAMINATION

a. It is essential that a complete medical history, physical examination, and interview be performed and documented on appropriate health record standard forms by the EH Clinician, or under the EH Clinician's direct supervision; this includes the Compensation and Pension (C&P) examination. **NOTE:** *If the veteran makes an informed decision to undergo prostate cancer screening, a digital rectal examination (DRE) of the prostate is to be included as part of the physical examination of a male veteran.*

b. The person actually performing the physical examination must be identified by signature and title (Doctor of Osteopathy (D.O.), Doctor of Medicine (M.D.), Physician's Assistant (P.A.), Nurse Practitioner (NP), etc.). If examinations are performed by someone other than a physician, this individual must be privileged to do physical examinations (see VHA Handbook 1100.19).

c. Special attention must be given to those organs and/or systems that may be affected by exposure to herbicides containing Agent Orange. Particular attention must be paid to the:

(1) Skin Examination

(a) Detection of chloracne, a skin condition which has been associated with acute exposure to Agent Orange and other herbicides containing dioxin; and

(b) PCT, a disorder which is characterized by thinning and blistering of the skin in sun-exposed areas (only genetically predisposed individuals have been shown to develop PCT after exposure to dioxin).

(2) Soft Tissue Sarcoma**(3) Lymph Nodes and Organs**

(a) Non-Hodgkin's lymphoma, and

(b) Hodgkin's disease.

(4) Respiratory System

(a) Cancer of the lung,

(b) Cancer of the larynx,

(c) Cancer of the trachea, and

(d) Cancer of the bronchus.

(5) Hematologic System and Bone

(a) Multiple myeloma, and

(b) Chronic lymphocytic leukemia.

(6) **Prostate Cancer.** Vietnam veterans need to be screened prostate cancer: **NOTE:** *“Veterans and Agent Orange: Health Effects of Herbicides Used in Vietnam (1994),” “Veterans and Agent Orange: Update 1996,” “Veterans and Agent Orange: Update 1998,” “Veterans and Agent Orange: Update 2000,” and “Veterans and Agent Orange: Update 2002,” “Veterans and Agent Orange, Update 2004,” which are Institute of Medicine (IOM) reports, concluded that there is “limited and/or suggestive evidence of an association” between exposure to herbicides used in Vietnam and the development of prostate cancer. Because of the provisions of the law and the IOM findings, VA has established a presumption that prostate cancer is related to exposure to herbicides in Vietnam. As a result of the establishment of this presumption, it is anticipated that many Vietnam veterans are going to seek advice about screening for prostate cancer.*

(a) While prostate cancer is one of the most serious malignancies for American men in terms of the number of cases and mortality, the value of performing screening tests on asymptomatic individuals remains controversial. The medical and scientific evidence supporting various

screening tests is far from conclusive, and recommendations of major groups differ regarding prostate cancer screening.

(b) For instance, DRE has limited sensitivity and specificity for detecting early prostate cancer resulting in many false-positive and false-negative findings. Conversely serum Prostate Specific Antigen (PSA) is very sensitive for detecting prostate cancer, but it is not very specific, since it may be elevated with benign prostate conditions. More definitive evaluation of individuals with positive screening tests, such as the performance of transrectal biopsies, carries the risk of morbidity from the procedure, as well as causing anxiety for the patient.

(c) The ultimate benefit of early detection and treatment of prostate cancer in asymptomatic men is unclear. Prostate cancer may not become clinically important for many afflicted individuals; surgery and other treatments all carry significant risks of serious complications (including incontinence, impotence, and death) and optimal therapy is uncertain.

(d) Clinicians must respond to the values of the individual patient, which are based on the individual patient's background, experience, and perspective. Since Vietnam veterans may be eligible for compensation if they are diagnosed with prostate cancer, considerations other than purely clinical issues may be important to them. Clinicians need to be prepared to explain the available evidence, and deal with patient requests that may diverge from a path based exclusively upon scientific data.

(e) If a Vietnam veteran requests a prostate cancer screening exam (DRE, transrectal ultrasound* and/or PSA) after the controversy regarding the value of such testing has been explained, it is recommended that the EH Clinician honor the veteran's request. ***NOTE:** *Usually limited to veterans with abnormal DRE and/or PSA tests.*

(7) **Peripheral Nervous System.** Acute and sub-acute peripheral neuropathy.
NOTE: *Peripheral neuropathy has been noted to develop after acute exposure to dioxin; however, there is no evidence that this persists beyond the sub-acute period.*

(8) **Diabetes (Type II)**

d. In gathering medical history data, it is important to determine and record:

- (1) The time of onset of the veteran's symptoms or conditions,
- (2) Intensity,
- (3) Degree of physical incapacitation, and
- (4) Details of any treatment received.

e. Each veteran is to be given the following base line laboratory studies:

- (1) Chest X-ray (if determined to be medically necessary);
- (2) Complete blood count;

(3) Comprehensive Metabolic Panel or blood chemistries and enzyme studies;

(4) Urinalysis; and


(5) Hepatitis C Screening; that is, with the patient's consent and consistent with the standards for patient evaluation and testing. Refer to Web site: <http://www.hepatitis.va.gov/> .

NOTE: Hepatitis C has particular importance for VA because of its prevalence in VA's service population.

f. Appropriate additional diagnostic studies must be performed and consultations obtained as indicated by the patient's symptoms, the physical examination, and the laboratory findings.

g. Non-routine diagnostic studies, such as sperm counts, are performed only if medically indicated.

h. Laboratory test results must be filed in the veteran's health record.

NOTE: EH Clinicians do not need to obtain blood or serum and/or adipose tissue for analysis of tetrachlorodibenzo-para-dioxin (TCDD). Surgical procedures must not be performed to obtain tissue for the purpose of TCDD analysis. Serum dioxin has no clinical value and is currently recommended only as a part of a well-designed research study. 

16. REPORTING REQUIREMENTS

a. Transmission

(1) AOR worksheet data must be entered and transmitted no later than 10 working days following the health registry examination to the AAC database via Web site:

<http://vaww.registries.aac.va.gov> .

(2) Copies of the registry worksheets (formerly registry codesheets) are to be filed in the veteran's health record.

b. EH Clinician and Coordinator Listings. Separate listings of the EH Clinicians and Coordinators are maintained by EAS, VA Central Office. In an effort to keep these listings current, facilities are required to notify EAS, VA Central Office, by e-mail, of any changes at their respective facilities and/or satellite clinics.

17. EDUCATION AND TRAINING

a. Current information on the status of the Agent Orange Program is to be presented to VA medical center staff (e.g., at staff conferences or grand rounds), VSOs, local public libraries, and community groups. **NOTE:** *This is an excellent means of exchanging ideas in a continuing effort to update and provide quality management of the Agent Orange Program.*

(1) VA Agent Orange Briefs and the Agent Orange Review, prepared and distributed periodically to all VA facilities by EAS, VA Central Office, are another training resource. Current and back issues of this material are available on-line at <http://www.va.gov/agentorange/>.

(2) Telephone conferences with VA medical facilities are held periodically by EAS, VA Central Office. **NOTE:** *Reports from these telephone conferences, research journal reprints, current Agent Orange Briefs, Agent Orange Review, and other education items are distributed to all VA facilities by EAS, VA Central Office. A Veteran Health Initiative (VHI), a system-wide training program for Agent Orange veterans' health, has been issued and can be accessed on VA Web site <http://www.va.gov/VHI/>. This ensures that VA physicians have the opportunity to be well informed regarding the latest developments on veterans' health issues.*

b. Education and training must ensure the successful accomplishment of the following goals for VHA staff. They need to be able to:

(1) Communicate effectively with special program participants by understanding the individual needs of specific groups of veterans.

(2) Acquire an in-depth knowledge of the specific processes, designated responsibilities, and time standard requirements of the Agent Orange Program.

c. A web-based training program for EH Coordinators has been developed and is to be available on the EAS Web site <http://vaww.va.gov/EnvironAgents/>.

**SAMPLE AGENT ORANGE FOLLOW-UP LETTER
(MEDICAL PROBLEMS INDICATED
FOR VIETNAM VETERANS)**

(Date)

(Name/Address)

Dear:

We wish to acknowledge your recent participation in the Department of Veterans Affairs (VA) Agent Orange Health Registry (AOR). This effort assists us to serve you and other veterans who are concerned about the possible health problems which might have resulted from military service in the Republic of Vietnam during the Vietnam era (between 1962 and 1975).

As discussed at the conclusion of your visit, the results of your examination and laboratory tests showed certain problems (optional-- these findings may be described in lay terms). In view of these findings, we have scheduled you for treatment of these health problems on (date). If for any reason you cannot keep this appointment, please call (phone number) at the earliest possible time to cancel and reschedule.

The results of your examination are to be maintained by VA. If you have any questions or concerns about your AOR examination, please contact the Environmental Health Coordinator at (phone number).

If a non-VA physician subsequently evaluates you, you are encouraged to have your non-VA physician provide VA with any additional diagnoses. This information is to be included in your health record as well as the AOR.

Remember, this examination does not automatically initiate a claim for VA benefits. If you wish to file a claim for compensation to establish possible service connection, contact your nearest VA Regional Office. In your area, the Regional Office is located at (address). Their telephone number is (phone number). VA may pay compensation for current disability due to any injury or disease that was incurred, or was aggravated, during military service. The condition does not have to be related to combat. If you need any further assistance, you may call one of the following toll-free numbers:

1. Veterans Benefits Representative: 1-800-827-1000 (for information on filing claims);
2. Veterans Health Benefits Service Center: 1-877-222-VETS (8387); or
3. VA Helpline: 1-800-749-8387.

September 5, 2006

VHA HANDBOOK 1302.01

APPENDIX A

To receive health care, veterans generally must be enrolled with VA. You may enroll at any time, if eligible. Additional information on enrollment, including enrollment forms and online applications, can also be found on the Internet at <http://www.va.gov/elig/>, or contact a Veterans Benefits Representative by calling the VA toll-free telephone number 1-800-827-1000.

An outreach program has been implemented in which VA notifies all individuals listed in the AOR of significant VA activities, including the health consequences of military service during the Vietnam era. You are now automatically included in our AOR, and are to receive an "Agent Orange Review" published periodically by VA's Environmental Agents Service (EAS). If you wish to obtain and/or read this publication via Internet, or if you have a change of address, please log on to the EAS Web page <http://www.VA.gov/EnvironAgents>, and follow the easy instructions.

We trust this information is helpful to you. Once again, your participation in the AOR is appreciated.

Sincerely,

_____(Name)_____
Name of Environmental Health Clinician

SAMPLE AGENT ORANGE FOLLOW-UP LETTER
(MEDICAL PROBLEMS INDICATED FOR VETERANS WHO MAY HAVE BEEN
EXPOSED TO AGENT ORANGE OR OTHER HERBICIDES OUTSIDE OF VIETNAM)

NOTE: If the veteran is not eligible for Department of Veterans Affairs (VA) treatment (e.g., the veteran is not enrolled for VA health care and/or served outside of Vietnam), the following letter is recommended.

(Date)

(Name and Address)

Dear:

We wish to acknowledge your recent participation in the Department of Veterans Affairs (VA) Agent Orange Health Registry (AOR). This effort assists us to serve you and other veterans who are concerned about the possible health problems which might have resulted from military service in Korea (1968 or 1969) or during the conduct of, or as a result of, the testing, transporting, or spraying of herbicides for military purposes.

As discussed at the conclusion of your visit, results of your examination and laboratory tests showed certain problems (optional-- these findings may be described in lay terms). These results are to be maintained by VA. If you have any questions or concerns about your AOR examination, please contact me at (phone number).

If a non-VA physician subsequently evaluates you, you are encouraged to have your non-VA physician provide VA with any additional diagnoses. This information is to be included in your health record as well as the AOR.

To receive health care, veterans generally must be enrolled with VA. You may enroll at anytime, if eligible. Additional information on enrollment, including enrollment forms and online applications, can also be found on the Internet at <http://www.va.gov/elig/>, or contact a Veterans Benefits Service Center by calling the VA toll-free telephone number 1-877-222-VETS (8387).

Remember, this examination does not automatically initiate a claim for VA benefits. If you need to file a claim for compensation to establish possible service connection, contact your nearest VA Regional Office. In your area, the Regional Office is located at (address). Their telephone number is (phone number). VA may pay compensation for current disability due to any injury or disease that was incurred or aggravated during military service. The condition does not have to be related to combat . If you need any further assistance, you may call one of the following toll-free numbers:

1. Veterans Health Benefits Service Center: 1-877-222-VETS (8387); or
2. VA Helpline: 1-800-749-8387.

September 5, 2006

VHA HANDBOOK 1302.01
APPENDIX B

An outreach program has been implemented in which VA notifies all individuals listed in the AOR of significant VA activities, including the health consequences of military service in Korea or other locations during the conduct of military operations, or as a result of, the testing, transporting, or spraying of herbicides for military purposes. Since you are now automatically included in our AOR, you are going to be receiving an "Agent Orange Review" published periodically by VA's Environmental Agents Service (EAS). If you wish to obtain and/or read this publication via or if you have a change of address, please log on to the EAS Web page <http://www.VA.gov/EnvironAgents>, and follow the easy instructions.

We trust this information is helpful to you. Once again, your participation in the AOR is appreciated.

Sincerely,

_____(Name)_____
Environmental Health Clinician

**SAMPLE AGENT ORANGE FOLLOW-UP LETTER
(NO MEDICAL PROBLEMS FOR ALL VETERANS EXPOSED TO AGENT ORANGE
OR OTHER HERBICIDES)**

(Date)

(Name/Address)

Dear _____:

We wish to acknowledge your recent participation in the Department of Veterans Affairs (VA) Agent Orange Health Registry (AOR) Program. This effort is helpful in assisting us to serve you and other veterans who are concerned about the possible health problems which may have resulted from exposure to Agent Orange or other herbicides during the conduct of, or as a result of, the testing, transporting, or spraying of herbicides for military purposes.

As discussed at the conclusion of your visit, results of your examination and laboratory tests indicate that there are no detectable medical problems. At this time you have no reason to be concerned about any adverse health effects resulting from your service in Vietnam, and/or Korea and/or other locations during the conduct of, or as a result of, the testing, transporting, or spraying of herbicides for military purposes. However, in the future, if you have a medical problem, I would encourage you to seek the help and advice of your nearest A medical center or outpatient clinic. You may reach us at telephone number (phone number). You may also contact a VA Helpline by calling 1-800-749-8387.

To receive health care, veterans generally must be enrolled with VA. They may enroll at any time, if eligible. Additional information on enrollment, including enrollment forms and online applications, also can be found on the Internet at <http://www.va.gov/elig/>, or call one of the following toll-free telephone numbers:

- 1 Veterans Benefits Representative at: 1-800-827-1000 (for information on filing claims); or
2. Veterans Health Benefits Service Center at: 1-877-222-VETS (8387).

The results of your examination are maintained by VA.

If a non-VA physician subsequently evaluates you, you are encouraged to have your non-VA physician provide VA with any additional diagnoses. This information is to be included in your health record as well as the AOR.

An outreach program has been implemented whereby VA notifies all individuals listed in the AOR of significant VA activities, including research on the health consequences of military service in Korea and/or the Republic of Vietnam during the Vietnam era and/or other locations during the conduct of, or as a result of, the testing, transporting, or spraying of herbicides for military purposes. Since you are now included in our AOR, you are going to be receiving an "Agent Orange Review" which is published periodically by VA's Environmental Agents Service (EAS). If you wish to obtain and/or read this publication via Internet, or if you have a change of

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address, please log in to Web page <http://www.VA.gov/EnvironAgents> and follow the easy instructions.

We trust this information is helpful to you. Once again, your participation in the AOR is appreciated.

Sincerely,

_____(Name)_____
Environmental Health Clinician

DEFINITIONS AND ACRONYMS

- 1. Austin Automation Center (AAC).** The AAC, Austin, TX, is the location of the Agent Orange Registry database.
- 2. Agent Orange.** Agent Orange is a term used to describe an herbicide or defoliant, used in Vietnam, Korea, and other service areas. It was composed of two active ingredients, 2,4-D and 2,4,5-T. The name "Agent Orange" came from the orange stripe on the storage drums.
- 3. Agent Orange Health Registry (AOR).** The AOR is a computerized index of veteran participants, and the coded findings of the Agent Orange Program physical examinations, including related diagnostic results. This AOR is managed centrally by the Environmental Agents Service (EAS) in the Department of Veterans Affairs (VA) Central Office and entered into a database by the AAC.
- 4. Basic Metabolic Panel (BMP).**
- 5. Chief of Staff (COS).**
- 6. Comprehensive Metabolic Panel (CMP).**
- 7. Computerized Patient Record System (CPRS).**
- 8. Defoliant.** A defoliant is a chemical preparation used to defoliate plants.
- 9. Defoliate.** Defoliate means to lose leaves or to strip off leaves; to destroy an area of jungle, forest, etc., by chemical sprays in order to remove places of concealment of enemy forces.
- 10. Department of Defense (DOD).**
- 11. Department of Veterans Affairs (VA).**
- 12. Digital Rectal Examinations (DRE).**
- 13. Demilitarized Zone (DMZ).**
- 14. Dioxin.** A family of chlorinated compounds produced as by-products in the manufacture of Agent Orange herbicides (see par. 29; 2,3,7,8-tetrachlorodibenzo-para-dioxin (TCDD)).
- 15. Doctor of Osteopathy (D.O.).**
- 16. Doctor of Medicine (M.D.).**
- 17. DOD Form 2161, Referral for Civilian Care.**

- 18. Environmental Agents Service (EAS).** The EAS, VA Central Office, has the responsibility to coordinate and monitor all Veterans Health Administration (VHA) activities, research and otherwise, relating to the Agent Orange issue. All policy and clinical questions relating to the potential effects of herbicides need to be referred to this office. *NOTE: Questions relating to eligibility of veterans or treatment of active duty personnel need to be referred to the Business Office (163), VA Central Office.*
- 19. Facility.** A facility is a VA entity that provides AOR examinations to any eligible United States veteran or active duty personnel who may have been exposed to dioxin or other toxic substances in an herbicide or defoliant during the conduct of, or a result of, the testing, transporting, or spraying of herbicides for military purposes.
- 20. Follow-up Examination.** The follow-up examination is an examination that is performed subsequent to the initial (first) examination. Data from completed copies of the follow-up health registry examination worksheets are transmitted to the AAC via Web site <http://vaww.registries.aac.va.gov>.
- 21. Herbicide.** An herbicide is a substance or preparation used to destroy vegetation.
- 22. Initial Examination.** The initial health registry examination is the first physical examination provided to eligible veterans. Data from completed copies of the initial health registry examination worksheets are transmitted via Web site [AAC http://vaww.registries.aac.va.gov](http://vaww.registries.aac.va.gov) for the purpose of entering a veteran into the AOR system. The original code sheet is filed in the veteran's health record.
- 23. Non-service Connected (NSC).** A veteran with no disabilities rated as service-connected by VA.
- 24. National Academy of Sciences (NAS).**
- 25. Nurse Practitioner (NP).**
- 26. Physician's Assistant (PA).**
- 27. Porphyria Cutanea Tarda (PCT).** PCT is a metabolic disorder characterized by thinning and blistering of the skin in sun-exposed areas.
- 28. Prisoner of War (POW).**
- 29. Records Control Schedule 10-1 (RCS 10-1).** The RCS 10-1 is a document supplying information regarding VHA record retention and disposition.
- 30. Tetrachlorodibenzo-para-dioxin (TCDD)-2,3,7,8.** TCDD is an abbreviation for a specific dioxin which was an impurity or contaminate, created in the manufacturing process for producing Agent Orange. This contaminate of some herbicides was used in the Republic of Vietnam, on a strip of land just south of the demilitarized zone (DMZ) and north of the Civilian

Control Line in Korea, and in other locations during the conduct of, or as a result of, the testing, transporting, or spraying of herbicides for military purposes.

31. The International Classification of Diseases - 9th Edition, Clinical Modification (ICD-9-CM). The ICD-9-CM provides standardized classification of diseases.

32. Toxicity. Toxicity is the relative or specific degree of being harmful.

33. Service Connected (SC). Veterans' disabilities that have been adjudicated as related to military service.

34. Social Security Number (SSN).

35. Veterans Benefits Representative (VBR).

36. Veterans Health Administration (VHA).

37. Veterans Health Record (VHR). This file contains health records relating to patient identify, diagnosis, prognosis, or treatment at a VA health care facility.

38. Veterans Integrated Service Network (VISN).

**INSTRUCTIONS FOR COMPLETING AND ACCESSING
VA AGENT ORANGE HEALTH REGISTRY WORKSHEETS**

1. General Instructions for Completing Department of Veterans Affairs (VA) Agent Orange Health Registry Worksheets

a. All Agent Orange Health Registry (AOR) worksheet data are required to be entered into the AOR database located at the Austin Automation Center (AAC) via the Environmental Agents Service (EAS) Web site at <http://vaww.registries.aac.va.gov>. Blank health registry worksheets are available on this Web site and a User's Guide with a Table of Contents provides instructions to:

- (1) How to Get Access to EAS Registries.
- (2) EAS Registries Logon.
- (3) Main.
- (4) Patients.
- (5) Exams.
- (6) Agent Orange Exam.
- (7) Depleted Uranium Exam.
- (8) Gulf War Exam.
- (9) Gulf War Phase II.
- (10) Ionizing Radiation.
- (11) Reports.
- (12) Appendix A – Sample 9957 for EAS Coordinator.
- (13) Appendix B – Sample 9957 for EAS Coder.
- (14) Appendix C – Sample 9957 for EAS Clinician.
- (15) Appendix D – Sample 9957 for EAS Depleted Uranium Follow-up.
- (16) Sample Worksheets.

NOTE: As of September 30, 2003, the AAC no longer accepted hard copies of code sheets (now identified as worksheets) mailed to their offices in Austin, TX.

b. Click on the User's Guide on Web site at <http://vaww.registries.aac.va.gov> and follow the registry entry instructions carefully to ensure that all data fields are accurately completed. Edits are automatically accomplished at the time of entry. The completed registry worksheet must be maintained in the paper administrative health record or it must be scanned and attached to an appropriately titled Computerized Patient Record System (CPRS) progress note.

(1) The patient information part of the worksheet may be completed in the presence of the veteran.

(2) The Environmental Health (EH) Clinician or Primary Care Clinician completes the examination data (symptoms, consultations, and diagnoses). These data are coded by appropriate staff, either the EH Coordinator or Coding Clerk. **NOTE:** *Careful attention needs to be paid to assigning the correct code for both complaints (symptoms) and diagnosis. International Classification of Diseases, Clinical Modification, (Current Edition (ICD-9-CM)) code 78999, for uncodable complaints (symptoms), needs to be assigned only after all coding possibilities have been thoroughly explored. The indiscriminate use of ICD-9-CM code 78999 may result in skewed or misleading statistics.*

APPENDIX B – THE AGENT ORANGE BRIEF “FACT SHEETS”

The following “Agent Orange Briefs” are a series of fact sheets developed by Environmental Agents Service (EAS, 131) on a wide range of common Agent Orange health benefits issues. They are available as “Word” files on line at www.va.gov/AgentOrange, and from EAS (131), VA Central Office, 810 Vermont Avenue, N.W., Washington, DC 20420.

Agent Orange Briefs organized by: Category, Brief Number, and Title

Category	Brief	Title
Introduction:		
General:	A1	Agent Orange - General Information
	A2	
VA Non-Research Programs:	B1	Agent Orange Registry
	B2	Agent Orange - Health Care Eligibility
	B3	Agent Orange and VA Disability Compensation
	B4	VA Information Resources on Agent Orange and Related Matters
Research:	C1	Agent Orange - The Problem Encountered in Research
	C2	Agent Orange and Vietnam Related Research - VA Efforts
	C3	Agent Orange and Vietnam Related Research - Non-VA Efforts
Medical Conditions:	D1	Birth Defects
	D2	Chloracne
	D3	Non-Hodgkin's Lymphoma
	D4	Soft Tissue Sarcomas
	D5	Peripheral Neuropathy
	D6	Hodgkin's Disease
	D7	Porphyria Cutanea Tarda

[D8](#) [Multiple Myleoma](#)

[D9](#) [Respiratory Cancers](#)

[D10](#) [Prostate Cancer](#)

[D11](#) [Spina Bifida](#)

[D12](#) [Diabetes](#)

[D13](#) [Chronic and Lymphocytic Leukemia](#)

APPENDIX C -- SUMMARY OF VA MORBIDITY STUDIES ON VIETNAM VETERANS

Statistics Used in Morbidity and Mortality Studies. Before summarizing the findings from the studies, it is useful to review the statistical analyses employed in morbidity and mortality studies. In mortality studies, where the total population at risk is unknown, the Proportionate Mortality Ratio (PMR) is used. The PMR is also sometimes referred to as a standardized Proportionate Mortality Ratio (sPMR). PMRs are expressed as the ratio of observed proportion of deaths from a cause to the expected proportion from the same cause. Expected mortality in veterans studies have been based on U.S. general population and non-Vietnam veterans, standardized by race, sex and age.

For populations where the population-at-risk is known, the Standardized Mortality Ratio (SMR) is used. The SMR is the ratio of observed number of deaths from a cause to expected numbers from the same cause, standardized for age, sex, race and calendar year of death. Both the PMR and SMR can be used to approximate a relative risk estimate of cause-specific mortality.

Another relative risk estimate used in mortality studies is the adjusted rate ratio (RR). In most of the studies reviewed here, the adjusted RR is calculated using the Cox Proportionate Hazard Model, with adjustment for effect modification and confounding by covariates. A relative risk estimate used in morbidity studies is the odds ratio (OR), as derived from multiple regression models. Statistical significance in both morbidity and mortality studies usually is determined by calculating a 95 percent confidence interval (C.I.).

One of the first morbidity studies to be conducted by VA (Table 3) compared 234 Vietnam-era veterans with soft tissue sarcoma to 13,496 Vietnam-era veterans with other diagnoses. Both groups were selected from the VA's database of inpatient hospitalizations, known as the Patient Treatment Files (PTF). The soft tissue sarcoma cases were any Vietnam-era veteran from the PTF who was hospitalized between 1969-1983. Controls were systemically sampled from all Vietnam-era veterans also hospitalized between 1969- 1983, but were not diagnosed with soft tissue sarcoma. Cases and controls were compared to each other regarding service in Vietnam (yes/no). For those who served in Vietnam, risk of soft tissue sarcoma was further assessed relative to having served as a ground troop [i.e., Army and Marine (7).]* [Footnote: For references in Appendices B through E, see footnotes at the end of Chapter 5, "Vietnam Veteran Health Research."]

The underlying assumption behind this study was that ground troops would have been more likely to have been exposed to Agent Orange than those who served aboard ships or aircraft. Among the 234 cases, 36.8 percent had served in Vietnam, compared to 41 percent of the 13,496 controls (OR, 0.83; 95% C.I. 0.63-1.09). There also was no association between serving as a ground troop in Vietnam and risk of soft tissue sarcoma.

A second study examining risk of soft tissue sarcoma associated with Vietnam service

(yes/no) selected soft tissue sarcoma cases from the tumor files of the Armed Forces Institute of Pathology (AFIP) at Walter Reed Army Hospital, Washington, D.C. Soft tissue sarcoma cases consisted of 217 male Vietnam-era veterans diagnosed with soft tissue sarcoma between January 1, 1975 and December 31, 1980. Controls were 599 patients with diagnoses other than soft tissue sarcoma, non-Hodgkin's lymphoma or Hodgkin's disease. Controls were matched at a ratio of 3 to 1, with cases for year of birth (8).

This study also assessed risk of soft tissue sarcoma associated with military service characteristics among Vietnam veterans. These military service characteristics included having served as a ground troop in Vietnam, type of duty in Vietnam (combat vs. non-combat) and geographical area of service in Vietnam. As with the ground troop dichotomy, it is believed that those who had combat duty would have been more likely to have served in Agent Orange-treated areas than those who served non-combat duty, i.e. administrative and clerical. Comparing cases and controls, there was no increased risk for soft tissue sarcoma associated with Vietnam service (OR, 0.82; 95% C.I. 0.55-1.21). Among Vietnam veterans, there was also no increased risk of soft tissue sarcoma associated with any of the military service characteristics.

Another cancer investigated by the VA was non-Hodgkin's lymphoma (9). In this study, 201 Vietnam-era veterans with a diagnosis of non-Hodgkin's lymphoma were compared to 358 Vietnam-era veterans with other diagnoses. As with the earlier VA study of STS, NHL cases were selected from the VA's PTFs. Hospitalizations included in this study occurred between 1969 and 1985. A diagnosis of non-Hodgkin's lymphoma was confirmed by reviewing pathology records. There was no increased risk of non-Hodgkin's lymphoma associated with any military service characteristic, including Vietnam service (OR, 1.03; 95% C.I. 0.70-1.50).

Testicular cancer is another cancer that has been reported to be associated with Vietnam service. To further address this possibility, the VA conducted a study assessing risk of testicular cancer associated with surrogate measures of Agent Orange exposure. This study compared military service data for 97 Vietnam veterans with a diagnosis of testicular cancer to 311 Vietnam veterans with no clinical diagnosis. All cases and controls were selected from the VA's Agent Orange Registry. Begun in 1978, the Agent Orange Registry is a computerized database recording demographic data, military service characteristics and diagnostic data for Vietnam veterans who report to the VA for a medical exam. The Registry was established primarily to monitor veterans' complaints and health problems that might be related to their service in Vietnam. Controls were randomly selected from all 24,000 males on the Agent Orange Registry with no diagnosis. Both cases and controls reported for an Agent Orange exam between March 1982 and January 1991 (10).

As all cases and controls were Vietnam veterans, the risk of testicular cancer was assessed relative to surrogate measures of Agent Orange exposure. Among these surrogate measures were branch of service, serving as a ground troop, geographical area of Vietnam service and type of duty in Vietnam (combat vs. non-combat). Military

service characteristics for each veteran were obtained from the veteran's military personnel records, stored at the National Personnel Record Center (NPRC), in St. Louis, MO. The only variable to be associated with a statistically significant increased risk of testicular cancer was having served in the Navy (OR, 2.60; 95% C.I. 1.08-6.24).

Unlike Army and Marine veterans who served on the ground where Agent Orange was sprayed, Navy veterans would seem to be unlikely candidates for Agent Orange exposure. However, some Navy veterans, known as "brown water" Navy, patrolled the rivers of South Vietnam. Often, Agent Orange was sprayed along the riverbanks to clear cover that might have been used by the enemy when ambushing U.S. military river traffic. Reviewing Vietnam service records, including unit description, it was determined that only one Navy case was a "brown water" Navy veteran. Veterans who served as ground troops also had their opportunity for Agent Orange exposure assessed based on their unit(s) proximity to Agent Orange-sprayed areas. This included areas sprayed as part of Operation Ranch Hand, as well as smaller scale spraying. This smaller scale application of Agent Orange was done around the perimeters of U.S. installations using hand-held tanks and tanks mounted on trucks and helicopters.

Two different criteria were used to determine unit proximity to sprayed areas; 1) unit was within 2 km of a reported Agent Orange spray tract within three days of application; and 2) unit was within 8 km of a spray tract within 90 days of Agent Orange application. Some Agent Orange spraying information was available in data tapes that included grid coordinates and dates of Agent Orange spraying. Neither of the time and proximity criteria was associated with an increased risk of testicular cancer. Another cancer investigated by the VA was Hodgkin's disease. This study's cases and controls were identified from the PTFs 1969-1985.

After applying several rules of exclusions, 283 Hodgkin's disease Vietnam-era veteran cases and 404 Vietnam-era veteran controls were identified. Controls were veterans with diagnoses other than malignant lymphoma and were matched two-for-one with cases by hospital, year of first discharge from hospital and year of birth. Military service characteristics including Vietnam service (yes/no) were obtained from the veteran's military personnel records (11). The only military service characteristic associated with a statistically significant increased risk of Hodgkin's disease was having served in Vietnam as a lower-level enlisted personnel, compared to having never served in Vietnam (OR, 1.65; 95% C.I. 1.02-2.68). While there was an increased risk of Hodgkin's disease associated with Vietnam service in general, it was not statistically significant (OR, 1.28; 95% C.I. 0.94-1.76). There also was no increased risk of Hodgkin's disease associated with the surrogate measures of Agent Orange exposure.

A more recent Vietnam veteran morbidity study conducted by the VA assessed the risk of lung cancer associated with Vietnam service, as well as surrogate measures of Agent Orange exposure. The surrogate measures examined were those previously described in the testicular cancer case-control study. Using 1983-1990 PTF data, the study identified 329 lung cancer cases and two control groups. One control group consisted of 269 veterans with non-cancer diagnoses, while the other consisted of 111 veterans with

a diagnosis of colon cancer. Veterans diagnosed with colon cancer were selected as an additional control group to reduce the bias possibly caused by the potential preferential admission by VA Medical Centers of Vietnam veterans with cancer. If Vietnam veterans with cancer were admitted to VA Medical Centers more readily than other veterans, this would tend to bias the study to find an increase risk of cancer associated with Vietnam service (12).

Comparing each control group separately to cases, this study assessed the risk of lung cancers associated with Vietnam service in general (yes/no) and surrogate measures of Agent Orange exposure, in particular. There was a statistically significant increased risk of lung cancer associated with Vietnam service using the non-cancer control group (OR, 1.39; 95% C.I. 1.01-1.92). However, adjusting for the age difference between cases and non-cancer controls, the increase disappeared. Examining the other surrogate measures of Agent Orange exposure, there was no increased risk of lung cancer.

In a more recent development, in July 1997, VA announced a new research initiative on the feasibility of conducting an epidemiologic study of the long-term health effects of exposure to Agent Orange on Army Chemical Corps Vietnam veterans (13). A total of 2,872 Vietnam veterans and 2,737 non-Vietnam era veterans who had also served in the Army Chemical Corps were identified in a phone survey. A random sample of 20% of these veterans had serum collected for dioxins measurement. Vietnam veterans with a history of spraying herbicides were found to have a statistically significant elevation of serum one dioxin, TCDD, compared to non-Vietnam era veterans who did not have a spraying history ($p=0.05$). Similarly, other dioxin congeners were comparable between the two groups. A study comparing health outcomes between the two groups is in press at the date of this update.

APPENDIX D -- SUMMARY OF VA MORTALITY STUDIES ON VIETNAM VETERANS

These studies (Table 4) were carried out to more completely assess possible long-term health consequences of serving in Vietnam. Much of this research used a retrospective cohort study design, comparing the cause-specific mortality of groups of Vietnam veterans to that of control or reference groups such as the U.S. general population and non-Vietnam veterans. Generally, these studies only assessed the effects of Vietnam service.

The first VA mortality study compared the mortality of Army and Marine Vietnam veterans to that of their Army and Marine non-Vietnam veterans' counterparts. All potential study subjects were randomly selected from Army and Marine veterans who served between 1965-1975 and whose deaths were recorded in the VA's Beneficiary Identification and Record Locator Subsystem (BIRLS). BIRLS is the VA's automated database of veterans who have received any VA benefit, including death benefits. This study used all deaths through July 1, 1982. BIRLS data was supplemented with data from each veteran's military personnel record(s). Applying several rules for inclusion in the study, this study's cohorts consisted of 19,708 Army and 4,527 Marine Vietnam veterans, and 22,904 Army and 3,781 Marine non-Vietnam veterans.

Comparing the mortality of Army Vietnam veterans to Army non-Vietnam veterans, there were statistically significant excesses in deaths due to all external causes (PMR, 1.03; 95% C.I. 1.02-1.04). This excess was due primarily to motor vehicle accidents (PMR, 1.05; 95% C.I. 1.01-1.09), and accidental poisonings (PMR, 1.15; 95% C.I. 1.02-1.30).

Among Marine Vietnam veterans, there was no comparable statistically significant excess in external causes of death. However, Marine Vietnam veterans did have excess mortality due to lung cancer (PMR, 1.58; 95% C.I. 1.09-2.29) and non-Hodgkin's lymphoma (PMR, 2.10; 95% C.I. 1.17-3.79) compared to non-Vietnam Marine veterans.

Several follow-up studies were done as a result of the previously reported excesses of lung cancer and NHL reported among Marine Vietnam veterans. The first of the follow-up studies compared the mortality of Army Vietnam veterans who served in the same area of Vietnam as Marines. The U.S. military divided South Vietnam into four tactical combat zones, known as Corps areas. Most of the Marines serving in Vietnam served in the northern most area, known as I Corps. This study compared the mortality of 6,668 Army Vietnam veterans who also served in I Corps to that of 27,917 Army non-Vietnam veterans (19). These veterans also were selected from BIRLS and included deaths up to December 31, 1984.

Unlike the Marine Vietnam veterans, I Corps Army Vietnam veterans had no excess risk of lung cancer or non-Hodgkin's lymphoma. However, they did have statistically significant excess death due to all external causes (PMR, 1.06; 95% C.I. 1.03-1.09), primarily due to motor vehicle accidents (PMR, 1.08; 95% C.I. 1.02-1.14) and accidental poisonings (PMR, 1.23; 95% C.I. 1.06-1.43).

Adding 11,325 deaths through 1984, this study was the third companion study to the 1988 mortality study (20). Comparing 24,145 Army Vietnam veteran deaths to 27,917 deaths among Army non-Vietnam veterans, there were statistically significant excesses of deaths due to laryngeal cancer (PMR, 1.69), all external causes (PMR, 1.03) and accidental poisonings (PMR, 1.15). Compared to all non-Vietnam veterans, i.e. Army and Marine, Army Vietnam veterans had statistically significant excesses of deaths due to laryngeal cancer (PMR, 1.53), lung cancer (PMR, 1.08), all external causes (PMR, 1.03) and poisonings (PMR, 1.15). Comparing the 5,501 Marine Vietnam veteran deaths to the 4,505 Marine non-Vietnam veteran deaths, there were statistically significant excesses in deaths due to all cancers (PMR, 1.15), lung cancer (PMR, 1.47), non-Hodgkin's lymphoma (PMR, 1.75) and Hodgkin's disease (PMR, 1.91).

The final follow-up study to the 1988 study, included an additional 9,040 veteran deaths through June 30, 1988 (21). These deaths also were identified in the VA BIRLS file, with supplementary military service characteristics being abstracted from the veteran's military personnel folder(s). Cause-specific mortality of the Army and Marine Vietnam veteran cohorts was compared to both their branch specific non-Vietnam veteran counterparts and to all non-Vietnam veterans combined. Only those findings based on branch of service-matched comparisons are discussed here. Comparing the 27,596 Army Vietnam veteran deaths to the 31,757 deaths among non- Vietnam Army veterans, there were statistically significant excesses of deaths due to laryngeal cancer (PMR, 1.47), lung cancer (PMR, 1.06), all external causes (PMR, 1.04), motor vehicle accidents (PMR, 1.03), accidental poisonings (PMR, 1.18) and homicides (PMR, 1.05). Statistically significant excesses of deaths among the 6,237 Marine Vietnam veterans compared to the 5,040 Marine non-Vietnam veteran deaths included all cancers (PMR, 1.20), pancreatic cancer (PMR, 1.47), lung cancer (PMR, 1.48), skin cancer (PMR, 1.28), non-Hodgkin's lymphoma (PMR, 1.68) and Hodgkin's disease (PMR, 1.85).

Because of the limitations of the PMR study, a retrospective cohort mortality was conducted to assess the cause-specific mortality risk of a sample of Marine Vietnam veterans. Using a file of all Marines on active duty between 1967 and 1969, a sample of 26,158 was selected and their military service records abstracted. After applying several exclusionary rules, 10,716 Marine Vietnam veterans and 9,346 non-Vietnam veterans were identified and their vital status through December 31, 1991 was determined (22). Using BIRLS to determine vital status, 701 Vietnam veteran deaths and 562 non-Vietnam veteran deaths were identified. Cause of death data was obtained from a veteran's claim folder for 89.6 percent of Vietnam veteran deaths and 92.5 percent of non-Vietnam veteran deaths. Assessing the relative risk of cause-specific mortality associated with Vietnam service, there were increased risks of overall mortality (RR, 1.15; 95% C.I. 1.02-1.29). This excess was due primarily to an excess of deaths due to all external causes (RR, 1.21; 95% C.I. 1.00-1.47).

VA's study of Army Chemical Corps personnel was based upon this group with apparently larger Agent Orange exposure (23). This study examined cause-specific mortality risks associated with having served in the Chemical Corps while in Vietnam.

Using morning reports of all Army Chemical Corps units that served in Vietnam between 1966-1971, 954 Chemical Corps workers were identified. The final study group of 894 Chemical Corps workers were those veterans for whom military records could be found and were not killed in action. Vital status was determined through December 31, 1987, using BIRLS and Social Security Administration (SSA) files of deaths. Using both sources, 53 deaths were identified and cause of death was obtained. Comparing cause-specific mortality of the Chemical Corps workers to that of the U.S. population, there were statistically significant excesses of deaths due to digestive disease (SMR, 2.98), primarily attributable to cirrhosis of the liver (SMR, 2.95) and motor vehicle accidents (SMR, 2.00). While not statistically significant because of the small numbers, there also were excesses of brain cancers (2 observed vs. 0.4 expected), and leukemia (2 observed vs. 0.4 expected). A study was done in 1996 with a total of 2,872 Army Chemical Corps Vietnam veterans (24).

An additional improvement over the first study, which was subject to the bias of the "healthy veterans effect," was the use of 2,737 Army Chemical Corps non-Vietnam veterans as the comparison group. Using both BIRLS and SSA files of deaths, 203 deaths were identified among Vietnam cohort and 121 among the non-Vietnam cohort. Cause of death data was obtained for 93 percent of both cohorts. Assessing relative risk of cause-specific mortality, the only statistically significant excess was for deaths due to digestive diseases (RR, 3.88; 95% C.I. 1.12-13.45).

VA's Study on Morbidity in Women Vietnam Veterans

VA's first study of women Vietnam veterans consisted of 4,582 women Vietnam veterans and a comparison group of 5,324 non-Vietnam women veterans (25). The woman Vietnam cohort was identified from morning reports of Vietnam units that were likely to have had women, namely hospital and administrative units. The comparison cohort was selected from the same type of units as the Vietnam cohort, except the units were stationed in the U.S. between 1964-1972. Vital status for both cohorts was determined through December 31, 1987 using BIRLS, SSA, and Internal Revenue Service (IRS) files of deaths. Using these sources, 132 deaths were identified among women Vietnam veterans and 232 among women non-Vietnam veterans.

In VA's study that reported statistically significant increased risk of all motor vehicle accidents in women Vietnam veterans compared to women era veteran counterparts (RR, 3.19; 95% C.I. 1.03-9.86), women Vietnam veterans also had a two-fold increased risk for both uterine cancer and pancreatic cancer, compared to non-Vietnam women veterans. However, because of the small numbers, it was not possible to calculate an adjusted RR.

Both women cohorts also were compared to the U.S. women, where there was a statistically significant deficit of overall mortality among women Vietnam veterans (SMR, 0.82; 95% C.I. 0.69-0.97).

A follow-up study used the same women Vietnam and non-Vietnam veteran cohorts as

the 1991 study (26). Extending vital status follow-up through December 31, 1991, the study identified 196 deaths among the Vietnam veteran cohort and 336 deaths among the non-Vietnam veteran cohort. Comparing the Vietnam cohort to the non-Vietnam cohort, there was no statistically significant excess in either overall mortality or any cause-specific mortality. Limiting the relative risk assessment to nurses, there was a five-fold statistically significant increased risk of pancreatic cancer among Vietnam nurses compared to non-Vietnam nurses (RR, 5.74; 95% C.I. 1.22-27.04).

When all women Vietnam veterans and women non-Vietnam veterans were compared separately to the general woman population, both groups had statistically significant deficits of overall mortality (SMR, 0.81; 95% C.I. 0.70- 0.94 and SMR, 0.89; 95% C.I. 0.80-0.99, respectively).

Comparing the mortality of the nurses of both cohorts to the general woman population, again there were statistically significant deficits of overall mortality among both groups of women veterans. However, there was a statistically significant excess of pancreatic cancer among Vietnam nurses compared to all women (SMR, 2.78; 95% C.I. 1.11-5.73).

VA's Studies on PTSD in Vietnam Veterans

To assess the risk of traumatic deaths associated with PTSD among Vietnam veterans, this study compared the mortality of 4,247 Vietnam veterans with a diagnosis of PTSD to that of 12,010 Vietnam veterans with no clinical diagnosis (27). Both groups of veterans were selected from those veterans on the Agent Orange Registry as of July 1990. The 4,247 PTSD cases were all veterans on the Agent Orange Registry with a diagnosis of PTSD. The 12,010 controls were sampled from the 24,043 veterans with no diagnosis. Vital status of both groups was determined through August 1990, using VA's BIRLS and a SSA file of deaths. There were 134 deaths identified among PTSD cases and 267 among the control group.

Cause of death data was obtained for 92 percent of the cases and 95 percent of the controls. Assessing cause-specific relative risk, there were statistically significant increased risks of overall mortality (RR, 1.84; 95% C.I. 1.50-2.29), all external causes (RR, 2.90; 95% C.I. 2.10-3.95), all accidents (RR, 2.00; 95% C.I. 1.28-3.14), accidental poisonings (RR, 2.89; 95% C.I. 1.03-8.12) and suicides (RR, 3.97; 95% C.I. 2.20-7.03) associated with having PTSD. Comparing the PTSD cohort to the U.S. population, the PTSD cohort had statistically significant excesses of overall mortality, including deaths due to digestive diseases, external causes, all accidents and suicides. The excess of digestive diseases was due to cirrhosis of the liver (SMR, 2.74; 95% C.I. 1.25-5.21).

The non-PTSD group also was compared to the U.S. population. They also had statistically significant excess of all external causes, all accidents, motor vehicle accidents and suicides. Finally, the PTSD cohort was divided into two groups and compared to the U.S. population. One group consisted of 1,001 who had co-morbid mental disorders recorded on the Agent Orange Registry, while the other group had no

recorded co-morbid mental disorder. While both groups had statistically significant excesses of deaths due to all external causes, all accidents, all motor vehicle accidents and suicides, the magnitudes of the excess among those with co-morbid disorders were much higher.

APPENDIX E -- SUMMARY OF NON-VA MORBIDITY STUDIES OF VIETNAM VETERANS

The Centers for Disease Control and Prevention (CDC) conducted the bulk of these studies, as part of their "Vietnam Experience Study." Other CDC studies were part of the "Selected Cancers Cooperative Study Groups," designed to address the risk of cancers reported to be associated with herbicides exposure, but were of too-low incidence for a cohort study to examine.

These studies, while presented separately in Table 5, are discussed collectively as all were part of the CDC's Selected Cancers Cooperative Study (35-37). The cancers examined were 1) non-Hodgkin's lymphoma, 2) soft tissue sarcoma and other sarcomas and 3) Hodgkin's disease, nasal cancer, nasopharyngeal cancer and primary liver cancer. The 1,776 controls for each of the three selected cancer studies were chosen using random digit dialing and were frequency-matched on a variety of characteristics to the cancer site for which they served as controls. All cancers were selected from the cancer registries of five metropolitan areas and three states. Vietnam service (yes/no) and veteran status (yes/no) were ascertained through interviewing and then confirmed by reviewing the veteran's military records. Agent Orange exposure was based on interview questions concerning possible contact with Agent Orange while serving in Vietnam. All cases and controls also were asked about possible occupational exposure to Agent Orange and related herbicides in ranching and farming.

Comparing the 1,157 non-Hodgkin's lymphoma cases to various subsets of the 1,776 controls, those who served in Vietnam had a 47 percent statistically significant increased risk of non-Hodgkin's lymphoma relative to all controls who did not serve in Vietnam. The risk of non-Hodgkin's lymphoma was also increased among Vietnam veterans when the referent group was all veterans (OR, 1.63; 95% C.I. 1.14-2.33, non-Vietnam veterans (OR, 1.52; 95% C.I. 1.00-2.32) and all non-veterans (OR, 1.41; 95% C.I. 1.03-1.93).

Interestingly, there was no association between self-reported Agent Orange exposure and risk of non-Hodgkin's lymphoma. Comparing 342 soft tissue sarcoma cases to various subgroups of the controls, there was no association between either Vietnam service or Agent Orange exposure and risk of soft tissue sarcoma. Using 310 Hodgkin's disease cases, 48 nasal carcinomas cases, 80 nasopharyngeal cancer cases and 130 primary liver cancer cases, this study found no association between any of the cancers and Vietnam service in general, nor self reported Agent Orange exposure specifically.

APPENDIX F -- SUMMARY OF NON-VA MORTALITY STUDIES OF VIETNAM VETERANS

The Wisconsin Department of Health and Human Service study used military discharge papers filed with the Wisconsin Department of Veterans Affairs to identify 43,398 Vietnam veterans and 78,840 non-Vietnam veterans. All veterans had to be on active duty for a period of 180 days or more sometime between January 1, 1964 and December 31, 1975. The vital status of both groups was followed through December 31, 1984, using BIRLS database. Among Vietnam veterans, there were 927 deaths and among non-Vietnam veterans there were 1,663 deaths.

Vietnam veteran mortality was compared to that of the U.S. general population, Wisconsin general population and Wisconsin non-Vietnam veterans. However, only the non-Vietnam veterans comparisons are discussed here because of the “healthy veteran effect” inherent in using the U.S. population as a referent group for veterans. The only statistically significant excesses in cause-specific mortality for Wisconsin Vietnam veterans were motor vehicle accidents (SMR, 1.15; 95% C.I. 1.02-1.29), all accidents (SMR, 1.11; 95% C.I. 1.01-1.22) and all external causes (SMR, 1.10; 95% C.I. 1.01-1.19) (38).

The first CDC study of the “Vietnam Experience Study” compared the mortality of 9,324 Army Vietnam veterans to that of 8,989 Army non-Vietnam veterans. Both groups of veterans were randomly selected from the five million U.S. Army records at the National Personnel Record Center at, St. Louis, MO. Among the criteria for entry into the selection process was having entered the military for the first time between January 1965 and December 1971 and having had at least 16 weeks of active service time. The Vietnam cohort had at least one Vietnam tour. The non-Vietnam cohort was restricted to those veterans who served in Korea, Germany or the U.S. Vital status was followed through December 31, 1983. Using BIRLS, SSA, IRS and National Defense Information (NDI) files of deaths, 246 deaths were identified among Vietnam veterans and 200 deaths were identified among non-Vietnam veterans.

Comparing the two groups, there was no statistically significant excess in any cause-specific mortality. However, when the analysis was done by years since discharge, there was an excess in overall mortality among Vietnam veterans (RR, 1.45; 95% C.I. 1.08-1.96) within the first five years of follow-up. Throughout the entire follow-up, Vietnam veterans were at increased risk for motor vehicle accidents (RR, 1.48; 95% C.I. 1.04-2.09) (39).

In a follow up of this study published in 2004, CDC evaluated mortality and cause-of-death data for the CDC “Vietnam Experience Study” cohort from the end of the original study to 2000 (43). This included the original 18,313 male Army veterans made up of both Vietnam veterans and era controls. Mortality from all causes not significantly different in Vietnam compared to non-Vietnam veterans during the 30-year follow up period. A non-significant excess mortality among Vietnam veterans was isolated to the first 5 years after separation from military service, and was from an increase in external

causes of death. They reported no difference in cause-specific mortality related to any disease.

July 23, 2007

NATIONAL HEPATITIS C PROGRAM

1. PURPOSE: This Veterans Health Administration (VHA) Directive defines the policies and programs relating to the VHA Hepatitis C Program.

2. BACKGROUND

a. Hepatitis C virus (HCV) infection is a major public health problem in the United States (U.S.) because of its potential to lead to cirrhosis, hepatocellular carcinoma, and other life-threatening conditions. Chronic hepatitis C is the most common bloodborne infection in the U.S. It affects approximately 1.3 percent of the general U.S. population. The Centers for Disease Control and Prevention (CDC) estimate that over 3 million Americans are chronically infected with HCV. A paper published by Dominitz *et al.* found a prevalence rate of 5.4 percent among a patient population of veterans who use VHA for their health care. The Dominitz paper (see subpar. 5b) reported that the seroprevalence rate in veterans who used VHA for their health care was three times that of the general U.S. population; the majority of these veterans have chronic infection. One-fourth of veterans with HCV infection are also infected with human immunodeficiency virus (HIV), not only putting them at risk for the acquired immunodeficiency syndrome (AIDS), but also increasing their risk of developing life-threatening complications from HCV infection. VHA recognized the significance of HCV infection in veterans early and has taken steps to address the issue.

b. The VHA Hepatitis C Program has used a comprehensive approach emphasizing clinical care and prevention through testing, counseling, research, and education.

(1) In 1998, an Under Secretary for Health's Information Letter outlined standards for provider evaluation and testing for hepatitis C in VHA.

(2) On March 17, 1999, the Department of Veterans Affairs (VA) conducted a nationwide surveillance activity and tested over 26,000 veterans for hepatitis C. The testing revealed a prevalence rate of 6.6 percent with a wide variation by geography and era of military service. *NOTE: A paper published by Roselle et al. reported the findings from this surveillance activity (see subpar. 5c).*

(3) In January 1999, VHA established two Centers of Excellence in Hepatitis C located at the VA Medical Center Miami, FL, and the VA Medical Center, San Francisco, CA.

(4) On June 28, 2000, the Under Secretary for Health designated an additional \$20 million to be distributed to the 22 Veterans Integrated Service Networks (VISNs) for outreach, testing, counseling, and treating veterans with hepatitis C.

THIS VHA DIRECTIVE EXPIRES JULY 31, 2012

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(5) VHA Directive 2000-019, mandated the installation and use of Veterans Health Information Systems and Technology Architecture (VistA) software on clinical reminders that support the hepatitis C reporting process.

(6) On August 24, 2000, the Policy Board designated specific Veterans Equitable Resource Allocation (VERA) reimbursement based on hepatitis C treatment for hepatitis C patients on antiviral therapy.

(7) In 2000, as part of the Public Health Strategic Health Care Group, the National Hepatitis C Program was created.

(8) In 2000, the National Hepatitis C Technical Advisory Group was created.

(9) In 2001, the Hepatitis C Clinical Case Registry was created through the Center for Quality Management.

(10) In 2001, VA issued a solicitation for applications to establish Hepatitis C Resource Centers (HCRC). Four sites were funded: San Francisco, Northwest (Seattle, WA and Portland, OR), West Haven, CT, and Minneapolis, MN.

(11) In 2001, a Veterans' National Hepatitis C Community Advisory Board was created with its first meeting in Washington DC.

(12) In 2002, hepatitis C screening and testing guidelines were published for VA primary care, mental health, and substance abuse clinics.

(13) Between 2002 and 2006, multiple educational meetings on hepatitis C were designed and conducted by the HCRCs for VA providers, including preceptorships and Advanced Liver Disease Resource Programs.

(14) Between 2002 and 2006, multiple meetings were held by the Hepatitis C Program to catalyze VA research on hepatitis C.

(15) In 2003, a toolkit for creating HCV support groups was published on the VA's Hepatitis C Web site (www.hepatitis.va.gov).

(16) In 2003, the Department of Veterans Affairs' recommendations for treatment of patients with cirrhosis were published on the VA's Hepatitis C Web site (www.hepatitis.va.gov).

(17) In 2006, VA recommendations for treatment of patients with hepatitis C were published on the VA's Hepatitis C Web site (www.hepatitis.va.gov) and in the Journal of the American Gastroenterology Association.

c. Since the beginning of the National Hepatitis C Program, data have been collected through the External Peer Review Program (EPRP), a national chart review to track and monitor efforts. Results show that over 95 percent of people who come into VA for care have been

screened for risk factors and over 90 percent of those persons found to be at risk have been tested for hepatitis C. However, only 35 percent of veterans infected with HCV have been tested for HIV infection; given the potential for interactions between these two infections, increasing HIV testing rates of HCV-positive veterans is a high priority for VA.

d. Hepatitis C treatment is rapidly evolving and new improved antiviral therapies continue to have an impact on the approximately 225,000 veterans who have been identified as having hepatitis C infection in VHA. Funding of the four HCRC programs has been renewed for an additional 5 years (through Sept 30, 2011). Hepatitis C continues to have a high priority and visibility in VHA.

e. Specific components of the National Hepatitis C Program include:

(1) A continuation of a Veterans' Hepatitis C Awareness Program that aggressively works within VA and with external groups to improve awareness about hepatitis C among veterans.

(2) Ongoing Hepatitis C Clinician Education Programs that ensure all VA clinicians are provided the most up-to-date scientific information about hepatitis C in order to deliver the highest quality care to veterans, as well as to prevent those at risk from becoming infected with the virus that causes hepatitis C.

(3) Continuation of a Hepatitis C Screening, Testing, and Counseling Program that provides multiple avenues of access to veterans who wish to be tested for hepatitis C.

(4) Programs to improve rates of HIV testing among veterans with hepatitis C.

(5) A Hepatitis C Care Program that delivers the highest standard of care to veterans with hepatitis C. **NOTE:** *Treatment recommendations for patients with hepatitis C are available at <http://www.hepatitis.va.gov/vahep?page=prtop04-gd-2006-00>.*

(6) A Veterans' Hepatitis C Quality Management and Database Program that works with existing VA data systems, collecting and analyzing quantitative data on hepatitis C, utilization, and quality parameters in order to continually improve hepatitis C care and prevention. The Hepatitis C registry was launched in 2002 and provides facilities the ability to produce local reports and do their own quality control; the registry was revamped in 2006 to improve its utility for HCV clinicians. **NOTE:** *Reports are available at: <http://www.hepatitis.va.gov/vahep?page=prin-cmg-01>.*

f. Goals for the new funding cycle for the National Clinical Public Health Program Office and the HCRC program include:

(1) Improvements in the management and treatment of the growing patient population with advanced liver disease and its complications;

(2) The evaluation of the implementation and application of the knowledge, products, and clinical practices developed by the HCRC program across the entire VA system;

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(3) The preparation of the health care system for meeting the demand that will occur when new and better HCV treatment becomes available, which is likely in the next five years; and

(4) A cross-cutting component of the previous three goals is the management of co-morbidities in patients with hepatitis C such as mental illness, HIV infection and substance use.

3. POLICY: It is VHA policy that each VA Medical Center Director must designate a Hepatitis C Lead Clinician to be the principal point-of-contact for all clinical hepatitis C program information and reporting between the facility, the Clinical Public Health Program office, and other facility program offices.

4. ACTION

Facility Director. The facility Director is responsible for:

a. Designating a Hepatitis C Lead Clinician to be the principal point of contact for all clinical hepatitis C communications and reporting.

b. Reviewing the Hepatitis C Lead Clinician list, to ensure that the information for their facility is correct, and providing the correct information to the Clinical Public Health Programs Office (13B) at (202) 273-6243, or by email to publichealth@va.gov if needed.

c. Ensuring, that by July 15 of each year, the following information is faxed to the Clinical Public Health Programs Office (13B) at (202) 273-6243, or by email to publichealth@va.gov , the name, address, phone, fax, e-mail address, and other locator information for the Hepatitis C Lead Clinician.

d. Ensuring that if the facility Hepatitis C Lead Clinician changes, the following information is faxed to the Clinical Public Health Programs Office (13B) at (202) 273-6243, or via email to publichealth@va.gov: the name, address, phone, fax, e-mail address, and other locator information for the facility Hepatitis C Lead Clinician.

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f. VHA Hepatitis C web page at: www.hepatitis.va.gov.

6. FOLLOW-UP RESPONSIBILITY: The Chief Consultant of the Public Health Strategic Healthcare Group (13B) is responsible for the contents of this Directive. Questions may be referred to 202-273-8567, or at publichealth@va.gov.

7. RECISSIONS: VHA Directive 2001-009 is rescinded. This VHA Directive expires July 31, 2012.

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APPENDIX H – “VIETNAM VETERANS AND AGENT ORANGE” INDEPENDENT STUDY TEST QUESTIONS FOR CME CREDIT

Select the best answer for each question

1. About how many U.S. personnel served in the Vietnam War?

- a) 300,000
- b) 1,000,000
- c) 3,000,000
- d) 10,000,000

2. Which U.S. department or agency has developed a roster, used for research and outreach purposes, of nearly all U.S. Vietnam veterans?

- a) DoD
- b) VA
- c) EPA
- d) None

3. Which U.S. veterans does the VA presume to have been exposed to herbicides?

- a) All veterans who served anywhere during the Vietnam War
- b) All veterans who served in Vietnam
- c) Only veterans of Operation Ranch Hand
- d) Only veterans of the “blue water” Navy

4. Why was Agent Orange given that name?

- a) Dioxin is orange at tropical temperatures of 100 degrees or higher.
- b) Ranch Hand personnel wore orange protective gear.
- c) Chemical Corps personnel used orange flags to mark sprayed areas.

d) Chemical drums were marked with orange stripes.

5. Children of both male and female Vietnam veterans with which birth defect currently may receive VA benefits?

a) Spina bifida

b) Down's syndrome

c) Cerebral palsy

d) Cleft palate

6. By law, the National Academy of Sciences conducts biennial reviews for VA of the medical and scientific literature on long-term health effects from exposure to herbicides used in the Vietnam War and the dioxin they contained. What is the primary source of the studies they review?

a) primarily studies of Vietnam War veterans.

b) studies of Vietnam citizens who were exposed during that war.

c) studies of U.S. and Australian Vietnam War veterans.

d) primarily studies of civilians exposed in the workplace or during accidents.

7. Which of the following cancer diagnoses currently is not presumed to be due to herbicide exposure in Vietnam veterans?

a) Hodgkin's disease.

b) Non-Hodgkin's lymphomas.

c) Chronic lymphocytic leukemia.

d) Acute myelogenous leukemia.

8. If a Vietnam veteran wishes to be screened for prostate cancer after the possible advantages and disadvantages of such screening is explained to him, VA Central Office recommends that:

- a) screening be performed.
- b) screening be denied.
- c) you transfer the veteran to the closest VA Agent Orange Referral Center.
- d) you submit VAF 13-078 to the Austin Automation Center for confirmation.

9. Which group of Vietnam War veterans should receive blood dioxin determinations?

- a) All Vietnam veterans.
- b) Those in the “brown water” navy.
- c) Only participants in special research studies.
- d) Those who also served in Korea.

10. Based on biennial reviews by the independent National Academy of Sciences Institute of Medicine on herbicide and dioxin health effects, which disease has VA not decided to add to the list of presumptively service connected illnesses for Vietnam War veterans?

- a) Prostate Cancer.
- b) Porphyria cutanea tarda.
- c) Renal cancer.
- d) Chloracne

11. Common symptoms identified in the most recent Agent Orange Registry participants involve:

- a) nervous and musculoskeletal system conditions.
- b) skin and other integumentary tissues (skin rashes) disorders.
- c) head and neck problems.
- d) All of the above are common in Registry participants.

12. About what percentage of Vietnam veterans have participated in the Registry program?

- a) 16
- b) 26
- c) 40
- d) 55

13. Common diseases among Registry participants involve which of the following systems?

- a) Endocrine/metabolic and immune
- b) Respiratory, circulatory, and skin and subcutaneous tissue
- c) Musculoskeletal, neuroses, personality and other nonpsychotic mental disorders
- d) All of the above are common among Registry participants.

14. What role does the National Academy of Sciences' Institute of Medicine play in the Agent Orange issue?

- a) They are conducting important original research studies as mandated by Congress in the Agent Orange Act of 1991.
- b) They are the lead Federal Governmental unit monitoring Agent Orange research worldwide. They provide annual reports to Congress on federally-sponsored and other Agent Orange research activities.
- c) Under Public Law 102-4, they conduct a comprehensive review and analysis of scientific literature on Agent Orange. VA uses the IOM findings to help formulate compensation policy (i.e., what conditions should be presumptively recognized for service connection in Vietnam veterans).
- d) None of the above. The IOM has no current role in Agent Orange issues. In the 1980's, they uncovered the facts about Agent Orange health effects, but concealed this information at the request of the Department of Defense so as not to undermine confidence in the U.S. government's credibility.

15. Why hasn't the Federal Government conducted a large-scale epidemiology study of

Vietnam veterans to assess the possible impact of Agent Orange exposure?

- a) Liability concerns. The government may be vulnerable to billions of dollars of additional claims.
- b) Lack of interest. Need to look forward. Don't dwell on past mistakes. We are building a bridge to the 21st century; don't need excess baggage for our journey.
- c) Too expensive to conduct. Will require many millions of dollars to conduct. Many Vietnam veterans already are receiving compensation or are deceased and will not benefit from such research.
- d) Lack of exposure data. Military records were not maintained in a way that they can be used effectively by researchers. The records do not clearly distinguish those who were exposed from those who were not.

16. What resources does VA provide for Vietnam War veterans to learn more about possible Agent Orange health effects and other health issues related to that conflict?

- a) VA Agent Orange Review newsletter; and VA Agent Orange Brief fact sheet series.
- b) VA Agent Orange Brochure entitled "Agent Orange – Information for Veterans Who Served in Vietnam: General Information."
- c) VA Web site: www.va.gov/AgentOrange
- d) All of the above.

17. One of the years that herbicides were used by the U.S. military in Vietnam was:

- a) 1959
- b) 1969
- c) 1979
- d) 1989

18. In an Agent Orange-based disability claim by a Vietnam War veteran for service-connected benefits, VA requires all of the following except:

- a) proof of exposure to Agent Orange in Vietnam.

- b) a medical diagnosis of a disease which VA recognizes as being presumptively associated with Agent Orange.
- c) competent evidence of service in Vietnam.
- d) competent medical evidence that the disease began within any applicable deadline.

19. Who is eligible for the Agent Orange registry examination?

- a) All Vietnam War veterans.
- b) All veterans who served in Korea in 1968 and 1969, or veterans who were exposed to Agent Orange elsewhere as a result of testing, transporting or spraying of an herbicide for military purposes.
- c) All of the above.
- d) None of the above. The examination program has been terminated.

20. The VHA Agent Orange Handbook (VHA Handbook 1302.01):

- a) describes policies and procedures for implementation of the VA Agent Orange Registry Program at VA health care facilities nationwide.
- b) is published periodically to provide concerned Vietnam veterans with current information about Agent Orange-related research efforts.
- c) should be discarded since it has been superseded by several directives issued by the Under Secretary for Health.
- d) contains classified information and should not, under any circumstances, be shared with Vietnam War veterans and their families.



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