



# Vietnam Veterans and Agent Orange Exposure

Independent Study Course  
Released: March 2002

*Sponsored by*  
Department of Veterans Affairs  
Employee Education System



This is a Veterans Health Administration System-Wide Training Program sponsored by the Employee Education System and Veterans Health Administration Office of Public Health and Environmental Hazards, Department of Veterans Affairs. It is produced by the Employee Education System.





**DEPARTMENT OF VETERANS AFFAIRS  
UNDER SECRETARY FOR HEALTH  
WASHINGTON DC 20420**

**MESSAGE FROM THE UNDER SECRETARY FOR HEALTH**

I am very pleased to introduce the Department of Veterans Affairs Veterans Health Initiative series of continuing medical education self-study programs. This first program addresses Agent Orange exposure and the possible health consequences of such exposure for veterans during service in Vietnam and elsewhere.

Over 3 million U.S. troops served in Vietnam at some point during the 1960's through the mid -1970's. Their tour of duty was generally for 12 months (13 months for Marines). More than 58,000 brave men and women were killed in Vietnam, and many others were injured in the line of duty during Vietnam service. Some of the survivors returned home physically healthy but--not surprisingly--emotional scarred from their wartime experiences and suffer from acute or chronic Post-Traumatic Stress Disorder (PTSD). VA's Readjustment Counseling Service was established with a network of more than 200 Vet Centers to help Vietnam veterans who were experiencing difficulties readjusting to civilian life.

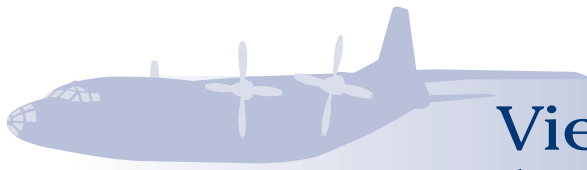
In addition to the psychological illnesses, some Vietnam veterans reported physical symptoms. In their search for answers, some Vietnam veterans attributed their health problems to exposure to Agent Orange or other herbicides used in Vietnam. VA responded to these concerns by developing a program that includes scientific research, medical examination and treatment, disability compensation for those with illnesses or injuries incurred in or aggravated by military service, and an education/outreach effort to provide Vietnam veterans and VA employees with essential information and training.

This continuing medical education self-study course synthesizes much information gathered over the years regarding Agent Orange exposure and VA's program to help Vietnam veterans whose health may have been harmed as a result of their exposure to Agent Orange.

We hope that this text will assist those who care for Vietnam veterans to provide the best possible health care to these veterans.

A handwritten signature in blue ink, appearing to read "Thomas L. Garthwaite".

Thomas L. Garthwaite, M.D.  
Under Secretary for Health



# Vietnam Veterans and Agent Orange Exposure

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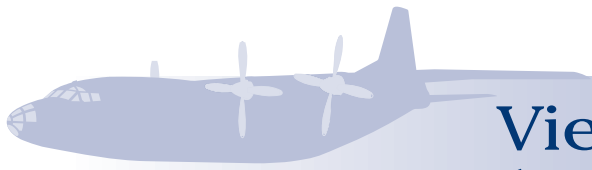
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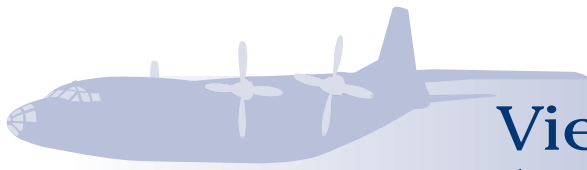
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## Independent Study Outline

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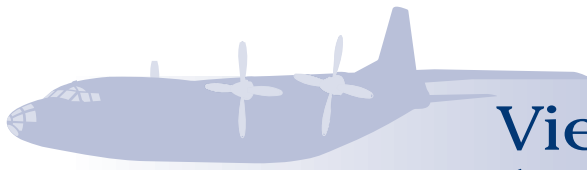
**Purpose** This independent study is designed to provide an introduction to issues regarding the long-term health consequences of exposure to Agent Orange and other herbicides used in Vietnam. This document provides an overview of Agent Orange, the Department of Veterans Affairs health care, research, disability compensation programs for Vietnam veterans and common symptoms and diagnoses of these veterans.

**Objectives** After completing this independent study, participants should be able to:

- recognize common symptoms and diagnoses of veterans exposed to Agent Orange and other herbicides used in Vietnam;
- identify the conditions presumptively recognized for service connection for Vietnam veterans based on evidence of an association with herbicides;
- explain the role of the Institute of Medicine in the process of establishing a scientific basis for VA's compensation policy for Vietnam veterans; and
- discuss the problems in conducting research on the health of veterans exposed to Agent Orange, including physicians, nurse practitioners, physician assistants, etc.

**Target Audience** This independent study is designed for the Department of Veterans Affairs' primary health care providers. Other health care providers, also are encouraged to complete the study.

**Format** This program is available in booklet form and **on the Web** at <http://vaww.sites.lrn.va.gov/vhi>. Participants are to read the course materials and at the conclusion of the reading, take the course test. If you score 70 percent or higher, you will be able to print your certificate from the Web site according to the instructions. The following is a synopsis of the course materials.



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## Program Description

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### This program includes:

- independent study written material (*also available on the VA Intranet*)
- test for CME credits (*also available on the VA Intranet*)
- program evaluation (*also available on the VA Intranet*)

This activity was planned and produced in accordance with the ACCME Essentials.

### Program Content Material:

Chapter 1 provides a brief overview of the health effects of Agent Orange and its impact on veterans and their families.

Chapter 2 includes a brief overview of Agent Orange and other herbicides used in Vietnam, the purpose of Agent Orange use, and the amount of Agent Orange used in Vietnam.

Chapter 3 presents historical involvement of VA in addressing long term health consequences of veterans exposed to Agent Orange.

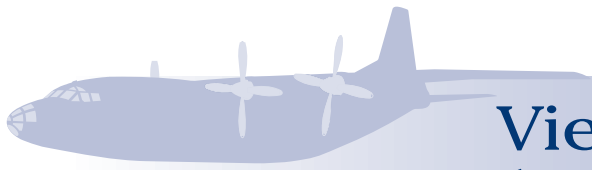
Chapter 4 focuses on medical care and treatment of veterans exposed to Agent Orange and the establishment of a national registry for veterans concerned about Agent Orange exposure. Over 300,000 veterans have taken advantage of this health examination program.

Chapter 5 reveals the role that the National Academy of Sciences Institute of Medicine plays in the development of VA compensation policy for Vietnam veterans.

Chapter 6 presents compensation policies for Vietnam veterans with Agent Orange-related illness. It shows certain conditions presumptively recognized as service-connected for Vietnam veterans.

Chapter 7 summarizes two-and-a-half decades of research on the health effects on veterans from exposure to Agent Orange and its key contaminant-dioxin.

Chapter 8 describes the role of the Vet Center in assisting veterans. This role includes, but not limited to, assisting veterans to resolve war-related traumas and improve post-war work and family life. These vet centers are community based.



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Chapter 9 discusses the various ways and means VA provides outreach and education as resources to veteran concerned about Agent Orange exposure.

Chapter 10 presents the conclusion and discusses future activities associated with epidemiological research on the health effects of veterans exposure to Agent Orange.

Chapter 11 provides excerpts from Chapter 2 of the National Academy of Sciences' 1994 report, *Veterans and Agent Orange: Health Effect of Herbicides Used in Vietnam*, and from the VA's Agent Orange Handbook.





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## Program Implementation

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1. Read the program materials provided in this package.
2. Complete the CME test questions.
3. Complete the program evaluation form.
4. A passing score of 70 percent or higher on the CME test is required to receive credit. This test may be retaken.
5. The estimated study time for this program is five hours.
6. You may submit the Registration/Independent Study Test Answers and Program Evaluation responses in either of two ways: by using the VA Web site if you have access to Internet Explorer 4.0 or Netscape 4.0 or higher, **or** by using the independent study booklet and included form.
7. For **expediency**, you may wish to **register**, take the CME test, and complete the program evaluation using the **VA Intranet**. The address is: <http://vaww.sites.lrn.va.gov/vhi>.

*Note: If you experience difficulty reaching this Web site, please contact Jeffrey Henry at 847-688-1900, extension 81736, your local computer support staff or librarian for assistance.*

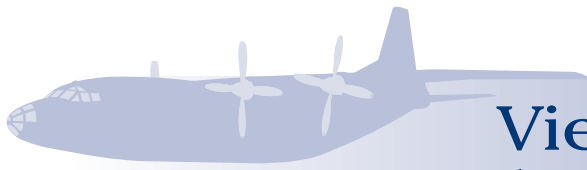
After you take the test, you will receive immediate feedback as to pass or fail. You will be allowed to retake the test. Upon passing the test and completing the program evaluation, you will be able to immediately print your certificate according to instructions.

If you are using the registration/answer/evaluation form (two sided) at the back of the independent study booklet, please send the completed form within two weeks after reading the material to:

Employee Education Resource Center  
Attn: SDU  
Medical Forum, Suite 500  
950 North 22nd Street  
Birmingham, AL 35203-5300

If you have attained a passing score of 70 percent or higher, a certificate will be mailed to you approximately 6-8 weeks after your test has been graded. The test may be retaken.

8. For extra copies of this independent study or other VHI Independent Study Modules, please contact your facility education contact person.
9. If you have questions or special needs concerning this independent study, please contact John C. Whatley, Ph.D. at 205-731-1812, extension 312 or e-mail at [john.whatley@lrn.va.gov](mailto:john.whatley@lrn.va.gov).



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## VA Application Procedures

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To receive credit for this course, you must read the independent study material and complete the Registration/Answer and Program Registration Form within two weeks after reading the independent study.

You may submit the Registration/Independent Study Test Answer and Program Evaluation responses in either of two ways: by using the **VA Web site** or by using the booklet and form included in the package.

1. For **expediency**, you may wish to use the **VA Web site** for reading the materials, completing the participant registration sheet, taking the test and completing the program evaluation. The **Web site** address is: <http://vaww.sites.lrn.va.gov/vhi>.

*Note: If you experience difficulty reaching this Web site, please contact Jeffrey Henry at 847-688-1900, extension 81736, your local computer support staff or librarian for assistance.*

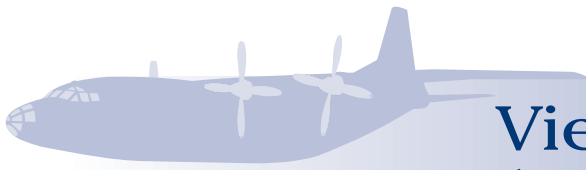
2. After you take the test, you will receive immediate feedback as to pass or fail. You will be allowed to retake the test. Upon passing the test and completing the program evaluation, you will be able to immediately print your certificate according to the instructions.
3. If you are using the booklet, complete the Registration /Answer Sheet and Program Evaluation form (two-sided) at the back of the booklet. Note: **This form may not be copied.** Within two weeks after reading the independent study materials, submit the form to:

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**Note: This program no longer will be authorized for CME credit after December 2003.**



# Vietnam Veterans and Agent Orange Exposure

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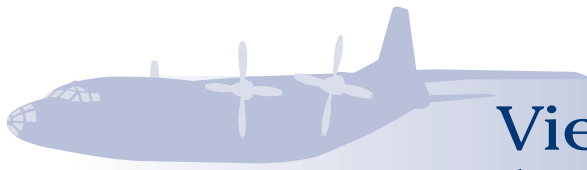
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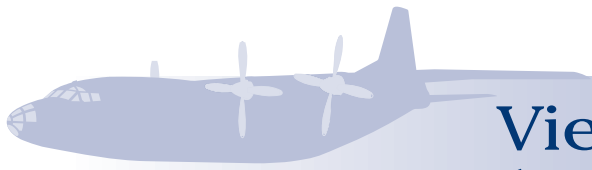
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## **AMA and ANCC Continuing Education Credits**

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### **Accreditation**

The VA Employee Education System is accredited by the Accreditation Council for Continuing Medical Education to sponsor continuing medical education for physicians. The VA Employee Education System takes responsibility for the content, quality, and scientific integrity of this CME activity.

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### **Continuing Education Credit**

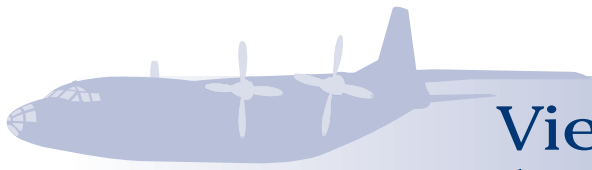
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The VA Employee Education system designates this education activity for 6 contact hours as determined by the American Nurses Credentialing Center's Commission on Accreditation.

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### **Report of Training**

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# Vietnam Veterans and Agent Orange Exposure

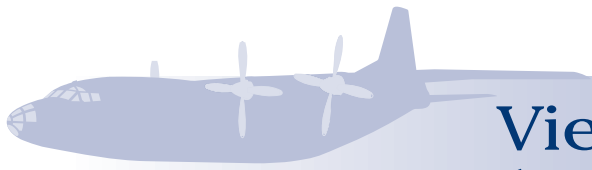
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## **Americans with Disabilities Act Policy**

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# Vietnam Veterans and Agent Orange Exposure

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## CHAPTER 1 INTRODUCTION AND EDITOR'S NOTE

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For more than a quarter century (since the mid-1970's), the controversy about possible long-term health consequences of Agent Orange has affected the Department of Veterans Affairs (VA), previously known as the Veterans Administration. The response has varied by departments and offices and was different over time and administrations. Initially, some officials hoped the concern about health effects would quickly subside. Some of them argued that these concerns were being advanced by the news media and veterans' advocates out of sync with mainstream medicine/science. Others concluded that these concerns were valid and should be dealt with in a forthright manner.

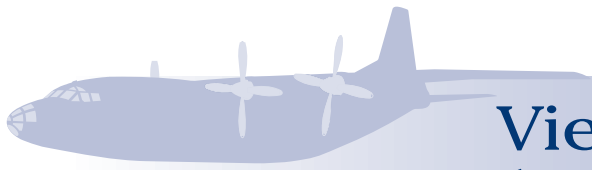
Those favoring the latter point of view ultimately prevailed and VA launched a comprehensive program to respond to the concerns of these veterans and their families. This program consists of a health registry that has provided medical examinations to over 300,000 Vietnam veterans, medical care to large numbers of Vietnam veterans, disability compensation for tens of thousands of veterans, benefits for the first time for certain dependents (based on their disability), new scientific research and extensive outreach and educational efforts.

As you will see, this program has evolved over the years and continues to expand as more is learned about the effects of herbicides used in Vietnam. While efforts were made to provide the most current information here, the reader should be mindful that this is not a static topic and that the only thing certain, regarding this subject, is change. With additional scientific information available in the future, additional conditions are likely to be considered for service connection.

The editor of this guide joined a newly established "temporary" office created to focus on the Agent Orange issue in September 1980. Many things have changed during the past two decades. The office now handles concerns about Gulf War veterans' illnesses, as well. The small office merged with another several years ago. The expanded office, known as the Office of Public Health and Environmental Hazards, is responsible for programs on AIDS, Women Veterans' Health, Ionizing Radiation, Smoke-Free, Environmental Hazards such as cold injury, Occupational Health, Gulf War-related medical problems, Hepatitis C, Emergency Management and Agent Orange.

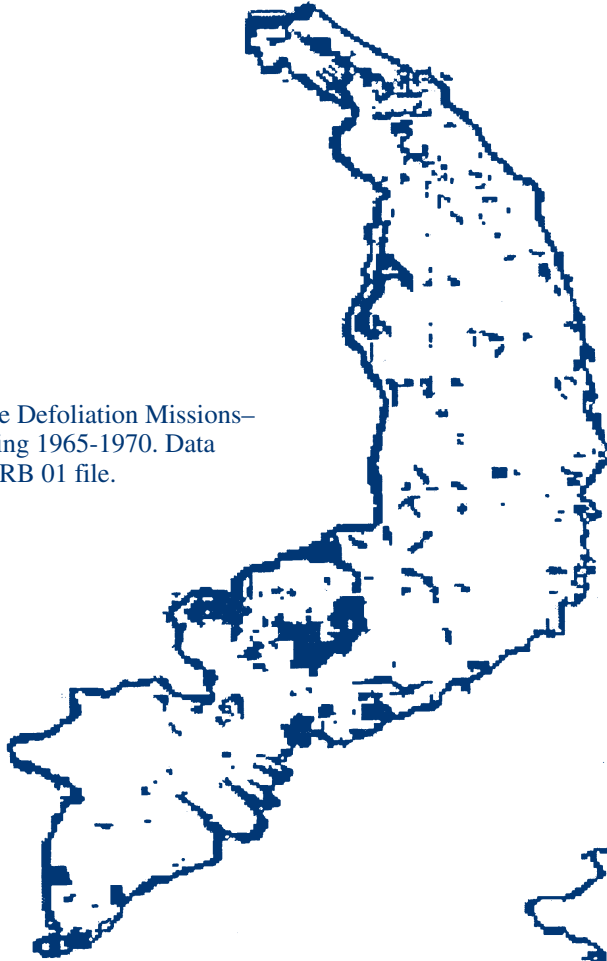
Twenty years from now, this editor will no doubt be long retired and the office may be long gone, as well the victim of reorganizations, downsizing and other events. It is unlikely, however, that all of the questions that have been raised by Vietnam veterans and their families about Agent Orange will have been satisfactorily answered. Lessons have been learned from this experience, and we are hopeful that our successors will use wisely the knowledge we have gained in the years to come.

Editor: Donald J. Rosenblum, Deputy Director, Environmental Agents Service, VA Central Office, Washington, DC.



# Vietnam Veterans and Agent Orange Exposure

Herbicide Defoliation Missions—  
Fixed Wing 1965-1970. Data  
from HERB 01 file.



Herbicide Crop Destruction  
Missions—Fixed Wing and  
Helicopter 1965-1971. Data  
from HERB 01 file.







# Vietnam Veterans and Agent Orange Exposure

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## CHAPTER 2 AGENT ORANGE AND OTHER HERBICIDES USED IN VIETNAM

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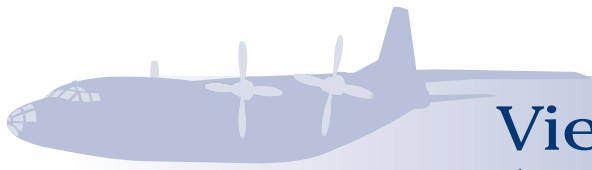
Agent Orange is the name used to describe a particular type of herbicide blend used for military purposes in Vietnam from 1965 to 1971. The herbicide killed unwanted plants and removed leaves from trees which otherwise provided cover for the enemy. Agent Orange was a reddish-brown to tan colored liquid. The name “Agent Orange” came from the orange stripe on the 55-gallon drums in which it was stored. Other herbicides, including Agent White and Agent Blue, were used in Vietnam to a much smaller extent.

Agent Orange was a mixture of chemicals containing nearly equal amounts of the two active ingredients, 2,4-D (2,4-Dichlorophenoxyacetic acid) and 2,4,5-T (2,4,5-Trichlorophenoxyacetic acid). These weed-killing chemicals were widely used commercially and privately in the United States and in many other countries from the 1940’s into the 1970’s.

During the manufacture of one of these ingredients, 2,4,5-T, a contaminant 2,3,7,8-tetrachlorodibenzo-*p*-dioxin or TCDD (commonly called “dioxin”) also was produced in minute quantities. Although there are actually a series of closely related dioxin chemical compounds, TCDD has been the most extensively examined in animals and in humans and is thought to be the most toxic members of the dioxin chemical family.

In April 1970, the Secretaries of Agriculture, Health, Education and Welfare, and the Interior announced the suspension of certain uses of 2,4,5-T. This action was taken in response to published studies that indicated that 2,4,5-T was a teratogen. Later studies concluded that these effects were the result of the contaminant 2,3,7,8-TCDD. Vietnam veterans and others attributed a wide range of maladies, including birth defects in their children, cancers, skin ailments and various other medical disorders to Agent Orange exposure. In April 1970, the first of dozens of congressional hearings concerning herbicides used in Vietnam was held.

Herbicides were shipped to and used in Vietnam between January 1962 and September 1971. Before the termination of spraying, an estimated 17-19 million gallons (more than 100 million pounds) of herbicide were sprayed over approximately six million acres. Some of these areas were sprayed multiple times. All four military zones (or Corps) in Vietnam were sprayed.

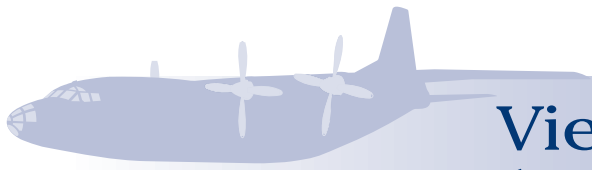


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Heavily sprayed areas included inland forests near the demarcation zone, inland forests at the junction of the borders of Cambodia, Laos, and South Vietnam, inland forests north and northwest of Saigon, mangrove forests of the southernmost peninsula of Vietnam and mangrove forests along major shipping channels southeast of Saigon.

*(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 11 – Supplemental Reading.)*



# Vietnam Veterans and Agent Orange Exposure

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## CHAPTER 3 EARLY INITIATIVES TO MEET VETERANS' CONCERNS

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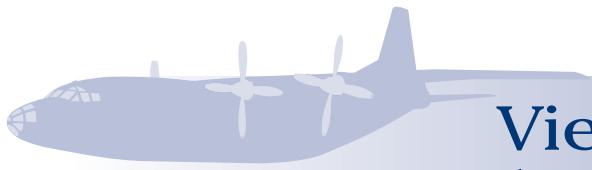
In the late 1970's, when Veterans Administration (VA) officials became aware of concerns about the possible long-term health consequences of exposure to Agent Orange, they initiated several efforts to respond. Over time, VA has developed a broad, comprehensive approach. The program includes clinical health assessments, a review of world scientific and medical literature and a large-scale epidemiology study of Vietnam veterans (the literature review and the epidemiology study authorized by Public Law 96-151).

In mid-1978, VA established a health examination program, called the Agent Orange Registry, to help Vietnam veterans who are concerned about the possible long-term health consequences of exposure to herbicides in Vietnam. Registry participants were offered free individual health assessments of their medical conditions and an opportunity to ask questions about their medical concerns. Through these examinations, VA was able to learn more about the medical problems that these veterans were experiencing. Additional information about this voluntary program is provided in the following chapter. More than 300,000 Vietnam veterans have benefited from this program.

Disability compensation is provided for veterans with service-connected illnesses and those illnesses that were incurred in or aggravated by military service. As it became clear that it would be impossible to determine who was exposed to Agent Orange in Vietnam, VA developed a policy that gave Vietnam veterans the benefit of the doubt and assumed that all veterans with an illness presumptively linked to Agent Orange exposure were also presumptively exposed to Agent Orange. Some Vietnam veterans have received monthly disability payments from VA for more than three decades.

In late 1979, the White House established the Interagency Work Group to Study Possible Long-Term Health Effects of Phenoxy Herbicides and Associated Dioxins. This group, made up of policy-makers and scientists from various Federal departments and agencies responsible for the development and implementation of policies concerning herbicides and dioxins, was charged with bringing together knowledgeable government scientists to oversee the research, develop areas where scientific study was needed and report the results as soon as they become available to Congress and the public. In 1981, the President established the Agent Orange Working Group, elevating and enlarging the scope of the prior group.

In 1979, VA also established the Advisory Committee on Health-Related Effects of Herbicides. This group brought together individuals from outside the government, including veterans' service organizations, to advise the Administrator of Veterans Affairs on a wide range of matters related to Agent Orange exposure. Over the next eleven years, this Advisory Committee held 32 meetings. Its final meeting was in 1990.



# Vietnam Veterans and Agent Orange Exposure

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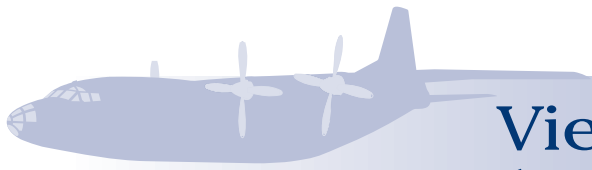
A second advisory group, called the Veterans' Advisory Committee on Environmental Hazards (VACEH), was established in accordance with Public Law 98-542, the Veterans' Dioxin and Radiation Exposure Compensation Standards Act, enacted in 1984. The purpose of the new committee was to advise the Administrator on VA regulations relating to claims for disability compensation based on exposure to Agent Orange in Vietnam, as well as ionizing radiation issues.

In 1981, VA published a two-volume report, prepared by a contractor, who also reviewed and analyzed world literature on herbicides. In 1984 (and annually thereafter through 1994) two additional volumes were produced.

In what has turned out to be a critical change in VA Agent Orange policy, Public Law 102-4, the Agent Orange Act of 1991, transferred the advisory function regarding dioxin and herbicides from the VACEH to the National Academy of Sciences (NAS). The NAS, an independent and highly regarded scientific body, then took the responsibility of reviewing the scientific literature concerning the association between herbicide exposure during Vietnam service and each health outcome suspected to be associated with herbicide exposure. Since responsibility for a scientific review was formally passed to the NAS, VA terminated publication of the scientific literature review mentioned in the previous paragraph.

Following receipt of the NAS reviews, the Secretary has 60 days to determine which, if any conditions evaluated will be recognized as service-connected. The legal standard that the Secretary of Veterans Affairs must use to evaluate what conditions should be presumptively recognized for service connection is described in Chapter 6 – Disability Compensation. The standard differs from the cause-and-effect relationship generally used by scientists seeking answers to health risk questions.

In addition to authorizing review of the scientific literature on Agent Orange health effects every two years, Congress also addressed the issue of health care for Vietnam veterans. In 1991, Congress passed Public Law 97-72, authorizing "priority" health care services in all VA medical centers for the treatment of health conditions in Vietnam veterans that may be related to Agent Orange exposure. This meant that Vietnam veterans with illnesses possibly related to their exposure to Agent Orange could get VA health care services, according to a priority ahead of other nonservice-connected veterans and equal to former Prisoners of War who are receiving care for nonservice-connected conditions. Hundreds of thousands of Vietnam veterans have received medical care from VA.



# Vietnam Veterans and Agent Orange Exposure

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## CHAPTER 4 VA'S AGENT ORANGE REGISTRY AND VA HEALTH CARE FOR VIETNAM VETERANS

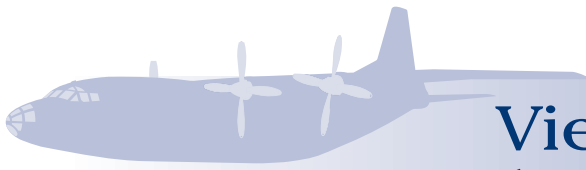
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*The focus of this chapter is medical care and treatment. As described in succeeding chapters (specifically Chapters 5 and 6), the National Academy of Sciences' Institute of Medicine has identified a number of conditions as associated with exposure to Agent Orange or other herbicides used in Vietnam, and the Department of Veterans Affairs has recognized these conditions for service connection. These conditions are chloracne, porphyria cutanea tarda (PCT), acute or subacute peripheral neuropathy, several cancers [non-Hodgkin's lymphoma, soft tissue sarcoma, Hodgkin's disease, multiple myeloma, prostate cancer, and respiratory cancers (including cancers of the lung, larynx, trachea, and bronchus)] and Type 2 diabetes.*

*VA clinicians provide high quality health care services for Vietnam veterans with any of these conditions plus any other health problems that might possibly be related to Agent Orange exposure. (The few restrictions as to eligibility are described in this chapter). There are no diagnostic tests generally recommended for Agent Orange or dioxin residue, and there are no unique treatments for Vietnam veterans. Clinicians performing the Registry examination follow a comprehensive protocol described in VHA Handbook 1302.1. Highlights of the handbook are included in Chapter 11. It is essential that a complete medical history, physical examination and interview be performed and documented on appropriate medical record standard forms.*

*In conducting the physical examination, special attention is given to those organs and/or systems that may be affected by exposure to Agent Orange. Particular attention is paid to the skin (for detection of chloracne and PCT), soft tissue sarcoma, respiratory system, hematologic and lymphatic systems, bone, prostate cancer, for the peripheral nervous system and other organs commonly affected by diabetes. A digital rectal examination of the prostate is included as part of the physical examination of a male veteran, if the veteran makes an informed decision to undergo prostate cancer screening. For additional information and recommendations for prostate cancer screening, see **Appendix B**.*

*As mentioned above, there are no unique treatments for Vietnam veterans with health problems possibly related to Agent Orange exposure. Clinicians evaluate their patients' symptoms and provide standard appropriate treatment based upon their sound medical judgment.*



# Vietnam Veterans and Agent Orange Exposure

## **The Registry**

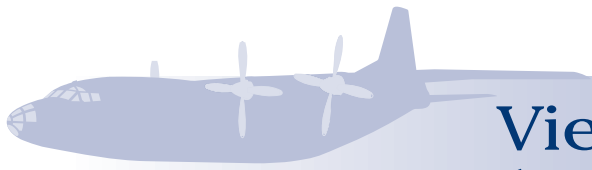
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In mid-1978, the Veterans Administration (known today as the Department of Veterans Affairs or VA) set up a registry of Vietnam veterans who were concerned about possible health effects from exposure to Agent Orange. These veterans were offered an extensive medical examination at all VA health care facilities. The Agent Orange Registry is a computerized record of those examinations. More than 300,000 Vietnam veterans have participated in this health examination program. It should be noted that there was no roster of the approximately 3 million service members who served in Vietnam until very recently. VA's Environmental Epidemiology Service has developed such a roster.

Each veteran participating in the entirely voluntary Registry program is given baseline laboratory studies, including chest x-ray (if one has not been done within the past six months), complete blood count, blood chemistries and enzyme studies and urinalysis. Particular attention is paid to the detection of diseases associated with Agent Orange exposure, currently including chloracne, porphyria cutanea tarda, soft tissue sarcoma, non-Hodgkin's lymphoma, Hodgkin's disease, respiratory (trachea, larynx, bronchus, and lung) cancers, multiple myeloma, prostate cancer, diabetes and peripheral neuropathy.

Evidence also is sought concerning the other potentially relevant symptoms or conditions, including reproductive effects, altered sex drive, congenital deformities (birth defects, including spina bifida) among children, sterility, difficulties in carrying pregnancies to term, as well as repeated infections and nervous system disorders.

This examination provides the participating veteran with an opportunity to receive a complete health evaluation, and to hear answers to questions about the current state of knowledge regarding the possible relationship between herbicide exposure and subsequent health problems. Following completion of the examination, the veteran is given results of the physical exam 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. Occasionally, previously undetected medical problems are found. With prompt attention, many times these illnesses can be successfully treated.



# Vietnam Veterans and Agent Orange Exposure

## Health Problems Identified

As of September 2001, the Agent Orange registry contains data from registry examinations performed for over 323,000 veterans who had military service in the Republic of Vietnam from 1962-1975. Of these registered Vietnam veterans, only 186,495 entries have symptom and diagnostic data since earlier code sheet/questionnaires prior to 1982 did not have ICD9 codes for data entry.

Of these 186,495 veterans, the most common symptoms involved nervous and musculoskeletal systems, skin and other integumentary tissues (skin rashes), and those of the head and neck (headaches). The most common diseases involve the following systems: endocrine/metabolic, or immunity, respiratory, circulatory, skin and subcutaneous tissue, musculoskeletal, neuroses, personality and other non-psychotic mental disorders. Listed below, in **Tables 1 and 2**, are the number of Vietnam veterans with selected diagnoses, obtained from initial registry evaluations, and frequency percentages. Of the 186,495 registered Vietnam veterans, 155,490 (83.4%) have some kind of diagnoses, with 31,005 (16.6%) without diagnoses.

**TABLE 1  
FREQUENCY AND PERCENT OF DIAGNOSES FOR VIETNAM  
VETERANS IN AGENT ORANGE REGISTRY**

<b>Frequency</b>	<b>Percent</b>	<b>Diagnoses</b>
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





# Vietnam Veterans and Agent Orange Exposure

**TABLE 2  
FREQUENCY AND PERCENT OF CANCER DIAGNOSED IN VIETNAM  
VETERANS IN THE AGENT ORANGE REGISTRY**

Frequency	Percent	Cancer Diagnoses
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

Note: The above tables do not include diagnoses made subsequent to the Registry examination unless a revised code sheet was submitted.

A high percentage (14.2 percent) of veterans have ill-defined diagnoses. Uncodable symptom entries also are a problem since coders indiscriminately use the code 78999. Since the International Classification of Diseases, 9<sup>th</sup> Edition, Clinical Modification (ICD-9-CM) coding system does not give sufficient codes to correctly identify all symptoms and diagnoses, code 78999 was initiated by the Environmental Agents Service to address this issue. When clinicians complete Part II of the Agent Orange code sheet they must be accurate in providing narrative description of both symptoms and diagnoses on code sheets to assure that coders have adequate information for quality dataset entries. Often, diagnoses have been erroneously listed as symptoms and vice versa. Coders also are responsible for locating correct codes to identify both the symptoms and diagnoses and when necessary, obtaining guidance from clinicians to complete these entries.





# Vietnam Veterans and Agent Orange Exposure

## Outreach

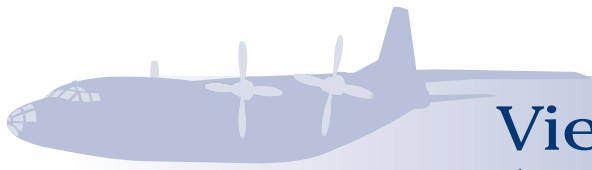
The Registry also offers an opportunity for outreach to Vietnam veterans about VA health care and compensation issues. Participants are automatically added to the mailing list for the “Agent Orange Review,” a newsletter that regularly provides valuable information about Agent Orange developments. The Registry permits VA to contact veterans for further testing if continuing research efforts should make this action advisable. Following new decisions by the Secretary of Veterans Affairs that recognize additional illnesses as service-connected, VA contacted Registry participants who received those diagnoses to urge them to file claims for disability compensation.

Although the Registry is not a research tool, VA scientists carefully review Registry data to look for any health trends that may be present. The Registry provides a means of detecting clues or suggestions of specific health problems in the event that unexpected or unusual health trends show up in this group of veterans. The Agent Orange Registry is not a substitute for well-designed epidemiologic studies, but it can provide important clues that can form the basis for the design and conduct of specific scientific studies. Because of the self-selected nature of the Registry participants (that is, the individuals decide themselves to be part of the Registry rather than being randomly selected in a scientific manner), this group of veterans cannot be viewed as being representative of Vietnam veterans as a whole.

At each VA medical center there is a “Registry Physician” who is responsible for the conduct of Agent Orange Registry examinations. These individuals participate in regularly scheduled nationwide conference calls and receive mailings from VA headquarters updating them on the latest developments on Agent Orange. Each medical center also has an Agent Orange Registry Coordinator who has access to a great deal of information about the Agent Orange Registry and related matters. VA medical center libraries also have considerable information, including books and videotapes, regarding Agent Orange. The 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 <http://www.va.gov/agentorange>.

## 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 the 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 might have been exposed to herbicides elsewhere during military service.



# Vietnam Veterans and Agent Orange Exposure

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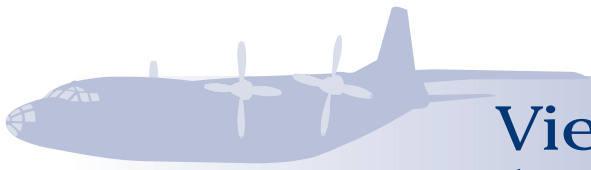
In October 2000, eligibility for the examination was expanded to include U.S. military veterans who served in Korea in 1968-69, when Agent Orange was used there. In March 2001, Secretary Principi directed VA staff to offer the examination to any U.S. veteran who may have been exposed to dioxin or other toxic substances in an herbicide or defoliant during or as a result of testing, transporting or spraying of an herbicide for military purposes. The spouses and children of veterans are not eligible for this examination.

No special Agent Orange exposure tests are offered since there is no test to prove that a veteran's medical problem was caused by Agent Orange or other herbicides used in Vietnam. There are tests that show the level of dioxin in human fat and blood, but such tests are currently recommended only as part of a well-designed research study. VA does not use dioxin levels as a clinical diagnostic test because they are of questionable clinical value in diagnosing or treating individual veterans. Furthermore, for compensation purposes, VA presumes that all U.S. service members who served in Vietnam who are diagnosed with illnesses presumptively linked to Agent Orange were exposed to Agent Orange. This policy makes it unnecessary to "prove" Agent Orange exposure by any tests.

Although the program is approximately 23 years old, many veterans still are contacting the VA each week for their initial Registry examination. Many of these veterans have no medical problems; others present a wide range of ailments. Veterans interested in receiving the Agent Orange Registry examination should contact the nearest VA medical center. Participating in the Registry does not automatically result in consideration for possible disability compensation. **Veterans who wish to be considered for disability compensation must file a claim for that benefit. They may contact the appropriate VA Regional Office by calling toll-free 1-800-827-1000.**

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.

There are no plans to stop the VA Agent Orange Registry. The examinations will continue for the foreseeable future.



# Vietnam Veterans and Agent Orange Exposure

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## Health Care

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In October 1996, Public Law 104-262, the Veterans' Health Care Eligibility Reform Act of 1996 was enacted. This law contains several provisions that affect the way the Department of Veterans Affairs (VA) delivers hospital care and medical services.

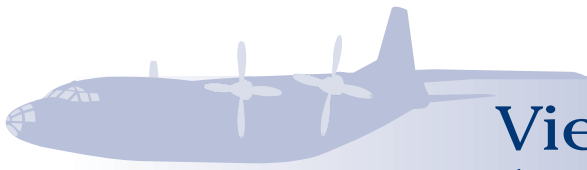
The new law repeals the former requirement that certain care only be provided in preparation for hospital admission, or to get around the need for hospital admission, or to complete treatment incident to hospital, nursing home, domiciliary or medical services.

The law also establishes two categories of veterans who are eligible for care. The first category includes veterans to whom VA "shall" furnish any needed hospital and medical services, but only to the extent and in the amount that Congress appropriates funds to provide such care. The second category includes veterans to whom VA "may" furnish any needed hospital and medical services, but only to the extent resources and facilities are available, and only if the veteran agrees to pay VA a co-payment in exchange for care.

Included in the first category are Vietnam veterans who may have been exposed to Agent Orange or other herbicides in Vietnam. These veterans have automatic eligibility for hospital care and medical services. In addition, they have discretionary (based upon VA resources) eligibility for nursing home care for any disability, notwithstanding that there is insufficient medical evidence to conclude that such disability may be associated with herbicide exposure.

There are some restrictions on the care that can be provided *under this law*. VA cannot provide such care for (1) a disability which VA determines did not result from exposure to Agent Orange (for example, injuries from auto accidents; alcoholic cirrhosis) or (2) disease which the National Academy of Sciences (NAS) has determined that there is "limited/suggestive" evidence of no association between occurrence of the disease and exposure to an herbicide agent. The NAS, in its most recent comprehensive report, "Veterans and Agent Orange Update 2000," categorized the following diseases as "limited/suggestive" evidence of no association with an herbicide agent: gastrointestinal tumors (stomach cancer, pancreatic cancer, colon cancer, rectal cancer), and brain tumors.

The following types of conditions are not generally considered to be associated with Agent Orange in exposed individuals: (a) congenital, that is, existing from birth, and developmental conditions (for example, scoliosis); (b) conditions which are known to have pre-existed military service; (c) conditions resulting from trauma, for example, deformity or limitation of motion of an extremity; (d) conditions having a specific and well established etiology not associated with Agent Orange (tuberculosis and gout); and (e) common conditions having a well recognized clinical course (for example, inguinal hernia and acute appendicitis).



# Vietnam Veterans and Agent Orange Exposure

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Those restrictions have not been implemented retroactively. Thus, any veteran already receiving hospital care, medical services, or nursing home care for a condition(s) possibly associated with exposure to herbicides under the old health care law, who would not be eligible for care under the new law, **remains** eligible for such care on the basis of presumed exposure with respect to the disability for which care and services were being furnished.

## Veterans Enrollment

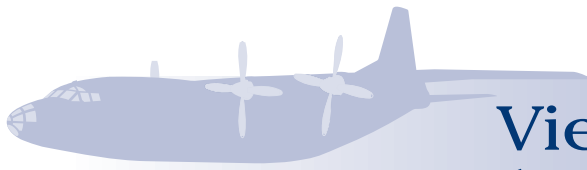
Public Law 104-262 also mandates VA to establish and implement a national enrollment system to manage the delivery of health care services for veterans. According to this law, after October 1, 1998, veterans (with some exceptions) must be “enrolled” to receive care. The exceptions are those veterans 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. There are seven levels (priority groups) of enrollment priority, ranging from Group 1, veterans with service-connected conditions rated 50 percent or more disabling, to Category 7, nonservice-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. Vietnam veterans seeking care solely for disorders associated with exposure to a toxic substance, such as Agent Orange, are included in Priority Group 6, unless they have other eligibility that would place them in a higher priority group. Veterans may call toll-free **1-877-222-8387** for information on enrollment.

VA encourages all veterans to apply for enrollment even if they are included in one of the exempt groups described above. Veterans can obtain applications for enrollment by visiting, calling or writing to their nearest VA health care facility or veterans benefits office.

*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. 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 1302.1, Agent Orange Registry (AOR) Program Procedures, an extract of which is printed in Chapter 11, Supplemental Reading and available on-line at <http://www.va.gov/agentorange>.



## CHAPTER 5 THE NATIONAL ACADEMY OF SCIENCES' INSTITUTE OF MEDICINE REVIEWS

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For nearly a decade, the National Academy of Sciences' Institute of Medicine has played a critical role in the development of VA compensation policy for Vietnam veterans.

Public Law 102-4, the Agent Orange Act of 1991, established in law a mechanism whereby VA presumptively recognized certain illnesses in Vietnam veterans for service connection. That legislation required VA to enter into an agreement with the National Academy of Sciences (NAS) for a comprehensive review and analysis of scientific literature on Agent Orange at least every two years.

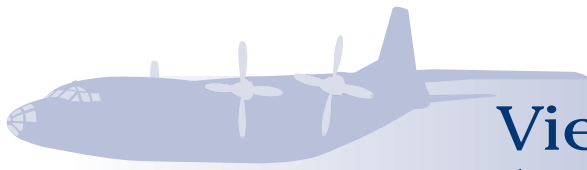
Under this legislation, the Secretary of Veterans Affairs must take into account the reports received from the Academy and all other available sound medical and scientific information in determining whether a “positive association” exists between exposure of humans to an herbicide agent and the occurrence of a disease in humans. The legal definition of a “positive association” is met when the evidence for an association equals or outweighs the evidence against an association. If such an association is determined to exist, the Secretary must prescribe regulations providing that a presumption of service connection is warranted for that disease. In practice, VA compensation policy has closely followed findings from the NAS.

### The First NAS Report

As of mid-2001, the NAS' Institute of Medicine (IOM) has released four comprehensive reports on the health effects in Vietnam veterans exposed to Agent Orange. The initial report was dated 1994 (although it was released in July 1993).

The classification schema, described below, was used in the initial report and in subsequent IOM reviews (Veterans and Agent Orange: Update 1996; Update 1998; Update 2000). IOM defined the categories as follows:

1. Sufficient Evidence of an Association – Evidence is sufficient to conclude that there is a positive association. That is, a positive association has been observed between herbicides and the outcome in studies in which chance, bias and confounding could be ruled out with reasonable confidence. For example, if several small studies that are free from bias and confounding show an association that is consistent in magnitude and direction.

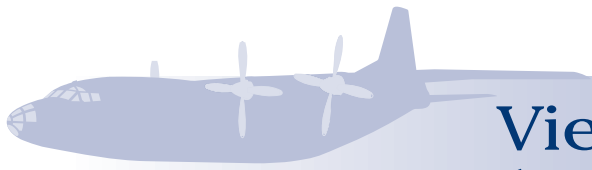


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2. Limited/Suggestive Evidence of an Association – Evidence is suggestive of an association between herbicides and the outcomes, but is limited because chance, bias and confounding could not be ruled out with confidence. For example, at least one high quality study shows a positive association, but the results of other studies are inconsistent.
3. Inadequate/Insufficient Evidence to Determine Whether an Association Exists – The available studies are of insufficient quality, consistency or statistical power to permit a conclusion regarding the presence or absence of an association. For example, studies fail to control for confounding, have inadequate exposure assessment or fail to address latency.
4. Limited/Suggestive Evidence of No Association – Several adequate studies, covering the full range of levels of exposure that human beings are known to encounter, are mutually consistent in not showing a positive association between exposure to herbicides and the outcome at any level of exposure. A conclusion of “no association” is inevitably limited to the conditions, level of exposure and the length of observation covered by the available studies. In addition, the possibility of a very small elevation in risk at the levels of exposure studied can never be excluded.

**Table 3** summarizes IOM’s combined findings in occupational, environmental and veterans’ studies regarding the association between specific health outcomes and exposure to herbicides.



# Vietnam Veterans and Agent Orange Exposure

**TABLE 3**  
**CONSOLIDATED SUMMARY OF NAS FINDINGS IN REPORTS**  
**DATED 1994, 1996 AND 1998 — ASSOCIATION BETWEEN SPECIFIC HEALTH**  
**OUTCOMES AND EXPOSURE TO HERBICIDES**

Cat. 1: Sufficient Evidence of an Association; Cat. 2: Limited/Suggestive Evidence of an Association; Cat. 3: Inadequate/Insufficient Evidence to Determine Whether an Association Exists; Cat. 4: Limited/Suggestive Evidence of *No* Association

Disease	1994				1996				1998			
	Cat 1	Cat 2	Cat 3	Cat 4	Cat 1	Cat 2	Cat 3	Cat 4	Cat 1	Cat 2	Cat 3	Cat 4
Soft Tissue Sarcoma	X				X				X			
Non-Hodgkin's Lymphoma	X				X				X			
Hodgkin's Disease	X				X				X			
Chloracne	X				X				X			
Porphyria Cutanea Tarda	X					X				X		
Respiratory Cancer (lung, trachea, larynx)		X				X				X		
Prostate Cancer		X				X				X		
Multiple Myeloma		X				X				X		
Hepatobiliary Cancers			X				X					X
Nasal/Nasopharyngeal Cancer			X				X					X
Bone Cancer			X				X					X
Female Reproductive Cancers (cervical, uterine, ovarian) and Breast Cancer			X				X					X
Renal Cancer			X				X					X
Testicular Cancer			X				X					X
Leukemia			X				X					X
Spontaneous Abortion			X				X					X
Birth Defects			X			X <sup>a</sup>	X <sup>b</sup>			X <sup>a</sup>	X <sup>b</sup>	
Neonatal/Infant Death and Stillbirths			X				X					X

<sup>a</sup> Spina bifida only.

<sup>b</sup> Other than spina bifida.

*Table continued on next page*





# Vietnam Veterans and Agent Orange Exposure

**TABLE 3**  
*continued*  
**CONSOLIDATED SUMMARY OF NAS FINDINGS IN REPORTS  
DATED 1994, 1996 AND 1998 — ASSOCIATION BETWEEN SPECIFIC HEALTH  
OUTCOMES AND EXPOSURE TO HERBICIDES**

Cat. 1: Sufficient Evidence of an Association; Cat. 2: Limited/Suggestive Evidence of an Association; Cat. 3: Inadequate/Insufficient Evidence to Determine Whether an Association Exists; Cat. 4: Limited/Suggestive Evidence of *No* Association

Disease	1994				1996				1998			
	Cat 1	Cat 2	Cat 3	Cat 4	Cat 1	Cat 2	Cat 3	Cat 4	Cat 1	Cat 2	Cat 3	Cat 4
Low Birth Weight			X				X				X	
Childhood Cancer in Offspring			X				X				X	
Abnormal Sperm Parameters and Infertility			X				X				X	
Cognitive and Neuropsychiatric Disorders			X				X				X	
Motor/Coordination Disorders			X				X				X	
Peripheral Nervous System Disorders			X			X <sup>c</sup>	X <sup>d</sup>			X <sup>c</sup>	X <sup>d</sup>	
Metabolic and Digestive Disorders (diabetes, changes in liver enzymes, lipid abnormalities, ulcers)			X				X				X	
Immune System Disorders (immune modulation and autoimmunity)			X				X				X	
Circulatory Disorders			X				X				X	
Respiratory Disorders			X				X				X	
Skin Cancer				X			X				X	
Gastrointestinal Tumors (stomach cancer, pancreatic cancer, colon cancer, rectal cancer)				X				X				X
Bladder Cancer				X				X			X <sup>e</sup>	
Brain Tumors				X				X				X

Note: In a special report, released in October 2000, limited to the association between herbicides and diabetes, the NAS moved diabetes from Category 3 to Category 2.

<sup>c</sup> Acute and subacute transient peripheral neuropathy.

<sup>d</sup> Chronic peripheral nervous system disorder.

<sup>e</sup> Now called urinary bladder cancer.





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It is an indication of the state of our knowledge regarding human health effects of dioxin that most of the health outcomes considered by the NAS were placed in the third category (that is, inadequate/insufficient evidence to determine whether an association exists) in all four comprehensive reports released to date.

On July 27, 1993 (the day the first NAS report was released), Secretary Jesse Brown announced that VA would recognize Hodgkin's disease and porphyria cutanea tarda for service connection. On September 27, 1993, after further review of the NAS report, Secretary Brown 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 herbicides which contained dioxin.

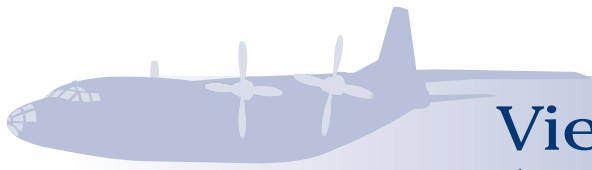
Although the Veterans' Advisory Committee on Environmental Hazards, a statutory group, had recommended that peripheral neuropathy should be recognized as service-connected, Secretary Brown concluded that a presumption is not warranted based on existing scientific evidence. In making this determination, he cited the NAS report that indicated that there was inadequate or insufficient evidence to make a determination about the association between herbicides used in Vietnam and the development of this condition. In view of the earlier advice VA had received on peripheral neuropathy, Secretary Brown asked the NAS to take a close look at the evidence on this condition during its next review.

The regulations regarding Hodgkin's disease and porphyria cutanea tarda (PCT) were announced and published in the [Federal Register](#) as proposed rules in September 1993. The rules were finalized in February 1994. The regulations regarding multiple myeloma and respiratory cancers were published as proposed rules in February 1994 and in final in June 1994. (Veterans receive compensation from the time they file a claim after the regulation is published, if the claim is approved.)

In January 1994, VA published a notice in the [Federal Register](#) that Secretary Brown had determined that a presumption of service connection based on exposure to herbicides used in Vietnam is not warranted for prostate cancer, and each of the conditions listed in the third and fourth categories, and any other condition for which the Secretary has not specifically determined a presumption of service connection is warranted.

## NAS Update 1996

In its 1994 report, the NAS included the following conditions in Category 1 (sufficient evidence of an association): soft-tissue sarcoma, non-Hodgkin's lymphoma, Hodgkin's disease, chloracne and PCT, in genetically susceptible individuals (**Table 3**). The 1996 update, released March 14, 1996, dropped PCT to Category 2 (limited/suggestive evidence



# Vietnam Veterans and Agent Orange Exposure

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of an association). The other four conditions remained in Category 1, and no additional health outcomes were included in this category. The first update also concluded that for the birth defect spina bifida, there is limited/suggestive evidence of an association between Agent Orange exposure and this birth defect in the children of Vietnam veterans.

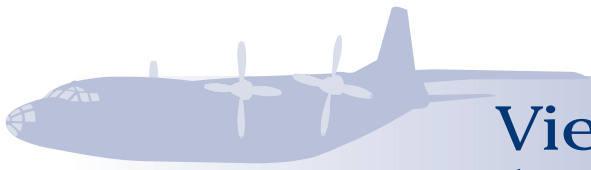
After careful review of the 1996 update NAS report, Secretary of Veterans Affairs Jesse Brown concluded that acute and subacute transient peripheral neuropathy (if manifested within one year of exposure to an herbicide in Vietnam and resolved within two years of onset) and prostate cancer should be added to the list of conditions presumed to be service-connected, based upon exposure to herbicides which contained dioxin. He also concluded that an appropriate legislative remedy should be enacted on behalf of Vietnam veterans' children who have spina bifida. On May 28, 1996, President Clinton and Secretary Brown announced these decisions at the White House.

On July 25, 1996, Secretary Brown sent draft legislation to Congress that would provide for health care, vocational training, and a monthly allowance (similar to disability compensation) for Vietnam veterans' children who have spina bifida, a neural tube birth defect. It became Public Law 104-204 on September 26, 1996, when President Clinton signed it.

## NAS Update 1998

On February 11, 1999, the NAS released its second update report. It contained no major change in category of association for any disease category compared to the 1996 update (**Table 3**). The only difference from the 1996 report was a change for urinary bladder cancer from limited/suggestive of *no* association (Category 4) to inadequate/insufficient evidence to determine whether an association exists (Category 3). Secretary of Veterans Affairs Togo West appointed a task force to review the 1998 update and other available information and recommend any necessary changes in VA policy. The task force found no changes were necessary as a result of the 1998 update.

In addition, Secretary West announced that statutory authority would be sought for certain benefits and services for children with birth defects who were born to women Vietnam veterans. This action was in response to a VA study that reported that the children specifically of women Vietnam veterans are at increased risk for birth defects (but not of other health effects). Legislation was introduced in Congress in May 2000. The legislation, with modifications, was enacted in November 2000. When implemented, Public Law 106-419, will, among other things, provide for health care, monetary benefits and vocational training for women Vietnam veterans' children who are suffering certain birth defects that will be described in regulations (not yet finalized).



# Vietnam Veterans and Agent Orange Exposure

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## Diabetes and Agent Orange

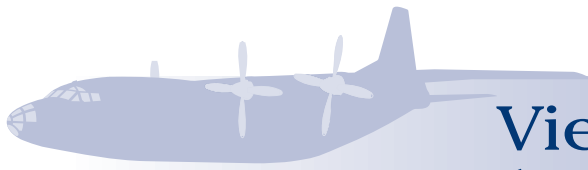
While the NAS 1998 update did not provide information indicating any significant policy changes, important studies published after the NAS review deadline led Secretary West to act on the issue of a possible association between herbicide exposure and Type 2 diabetes. Shortly after the NAS 1998 update was completed, the National Institute for Occupational Safety and Health (NIOSH) published a study of industrial workers exposed to dioxin. The NIOSH study suggested that there is an association between dioxin exposure and diabetes. These industrial workers were exposed to dioxin in a significantly different way than Vietnam veterans.

Secretary West wanted to act on this important matter, but he wanted the benefit of NAS advice, which had been so important for previous decisions on Agent Orange health effects. Unfortunately, the next NAS update report was not due for nearly two years – two long years if you are a Vietnam veteran with diabetes. Consequently, Secretary West asked the NAS to do a special, expedited review of diabetes to assist him in determining whether it should be added to the list of presumptively recognized conditions. The review was to be completed by May 2000.

However, in late March 2000 before NAS report was finalized, the Air Force released a report on the 1997 physical examination results of Operation Ranch Hand personnel. The Air Force suggested that this report “includes the strongest evidence to date that herbicide exposure is associated with diabetes, and some of its known complications.”

Consequently, the Secretary asked the NAS to postpone the release of its report and combine those results with a review of the Ranch Hand Study. It made sense to ask the NAS to review all relevant data on diabetes and Agent Orange exposure before making a decision on diabetes.

The NAS released the expanded special report on diabetes in October 2000. The NAS concluded that there is “limited/suggestive evidence” of an association between exposure to Agent Orange and diabetes. However, the NAS indicated that other traditional risk factors for diabetes (heredity, physical inactivity, and obesity) continue to greatly outweigh any suggested increased risk from wartime exposure to herbicides. In response to this report and review of other relevant information, Acting Secretary Hershel Gober announced on November 9, 2000, that he was directing the addition of Type 2 diabetes to the list of presumptive conditions associated with herbicide exposure. Regulations implementing this decision were published in final form in the Federal Register on May 8, 2001.



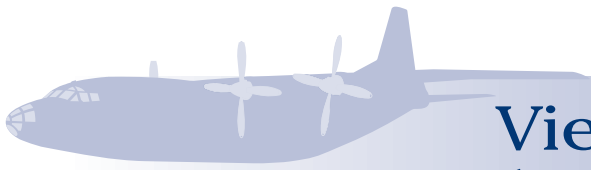
# Vietnam Veterans and Agent Orange Exposure

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## NAS Update 2000

On April 19, 2001, the NAS released its third update. The findings of *Update 2000* are similar to the earlier updates. Category 1 is unchanged. Category 2 includes Type 2 diabetes (moved there in the special NAS report released in October 2000) and acute myelogenous leukemia (AML) in the children of veterans. Category 3 includes a condition not previously considered, AL-type primary amyloidosis. Category 4 is unchanged. Note: This report was released as this self study course was being finalized and is not reflected in **Table 3**.

Shortly after the release of Update 2000, questions were raised about the AML finding when the authors of one of the studies upon which the finding was based announced they were mistaken in their calculations, and that the corrected information does not show that the children of Australian Vietnam veterans face a significantly greater risk of AML than children in the general community. VA has asked the NAS to re-examine this issue. The NAS agreed and is currently re-assessing the conclusions. A report of findings should be released in early 2002.



## CHAPTER 6 DISABILITY COMPENSATION

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### Compensation of Vietnam Veterans for Agent Orange-Related Illnesses

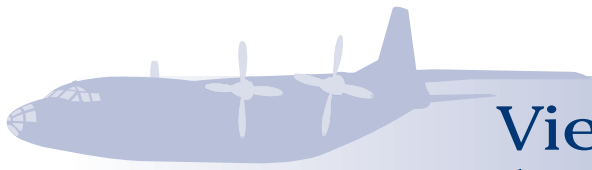
Veterans who are disabled by injury or disease incurred or aggravated during active service in the line of duty during wartime or peacetime service and discharged or separated under other than dishonorable conditions are eligible for monthly payments from the Department of Veterans Affairs (VA).

The amount of these payments, called disability compensation, is based on the degree of disability. For example, a veteran with a 30 percent service-connected disability would receive more money than a veteran with a 10 or 20 percent disability. A veteran who is totally disabled would receive substantially more than a veteran with a lesser disability. For the year 2001, monthly payment rates range from \$101 for a 10 percent rating to \$2,107 for 100 percent. Additional amounts are paid to certain veterans with severe disabilities and certain veterans with dependents. VA has several pamphlets describing VA benefits. They are available on the Internet at <http://www.va.gov/>.

Exposure to Agent Orange and other chemicals used in military service by itself does not automatically qualify Vietnam veterans for compensation. Many Vietnam veterans who were exposed to Agent Orange are healthy. Some Vietnam veterans have disabilities clearly unrelated to their military service. For example, a Vietnam veteran who injured his back 15 years after leaving military service would not be eligible for disability compensation.

In an Agent Orange-based claim from a Vietnam veteran for service-connected benefits, VA requires the following: (1) a medical diagnosis of a disease which VA recognizes as being associated with Agent Orange or other herbicides used in Vietnam (see list below); (2) competent evidence of service in Vietnam; and (3) competent medical evidence that the disease began within a certain deadline for that disease (if applicable). Under the law, disability compensation can only be approved for conditions incurred in or aggravated during military service.

Veterans who served in Vietnam between 1962 and 1975 (including those who visited Vietnam briefly), and who have a disease that VA recognizes as being associated with Agent Orange, are presumed to have been exposed to Agent Orange. These veterans are eligible for compensation based on their service, if they have one (or more) of the diseases on VA's list of "Diseases associated with exposure to certain herbicide agents." The list, which is updated regularly, is found in VA's regulations, Section 3.309(e) in the title 38 of the Code of Federal Regulations.

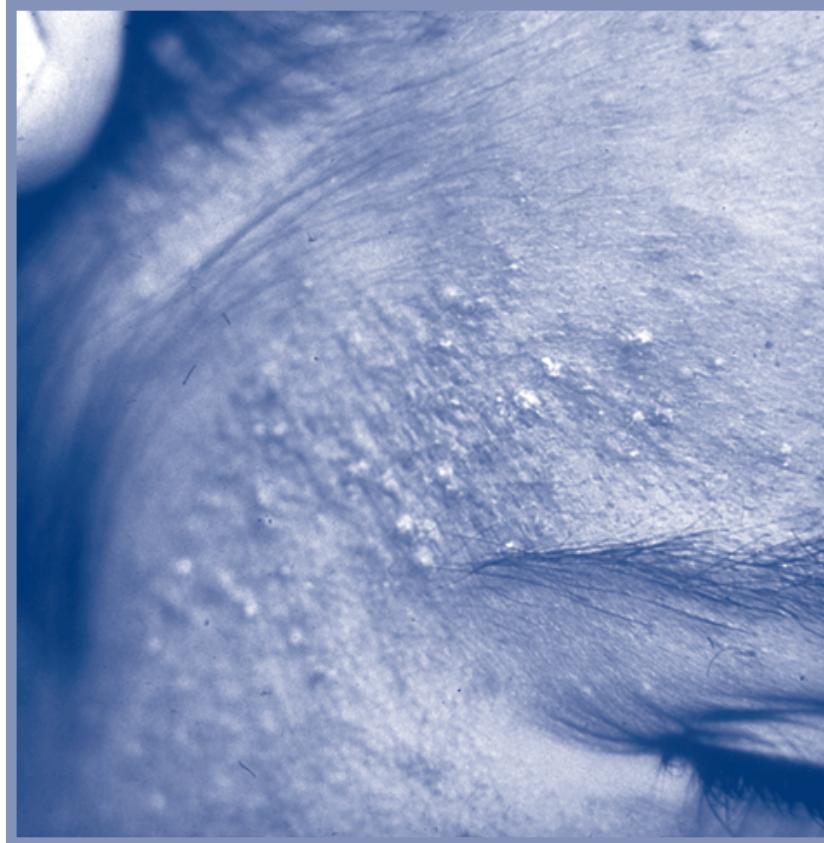


# Vietnam Veterans and Agent Orange Exposure

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## Chloracne

A skin disorder caused by exposure to dioxin that was contained in Agent Orange.



Chloracne was the first condition recognized as linked to dioxin exposure. For information about this condition, see the Agent Orange Brief, D2, at [www.va.gov/agentorange/default.htm](http://www.va.gov/agentorange/default.htm).





# Vietnam Veterans and Agent Orange Exposure

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Many years before the IOM started issuing its evaluations of Agent Orange health effects, VA began recognizing illnesses as service-connected for Vietnam veterans. Indeed, for more than 20 years, VA has recognized the well established cause and effect relationship between exposure to Agent Orange and its dioxin contaminant and the skin disorder chloracne. The relationship is documented in the medical literature.

In 1984, Public Law 98-542, the Veterans' Dioxin and Radiation Exposure Compensation Standards Act, authorized VA to provide "interim benefits" through September 30, 1986, for disability or death for Vietnam veterans due to chloracne or porphyria cutanea tarda.

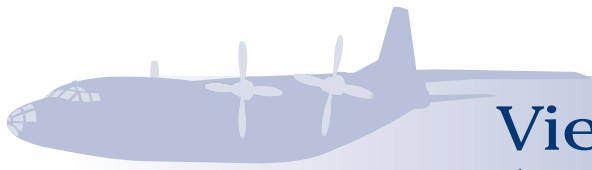
In 1990, responding to a finding of the Centers for Disease Control (CDC) Vietnam Experience Study, VA recognized non-Hodgkin's lymphoma for presumptive service connection for Vietnam veterans. The following year, VA recognized soft tissue sarcoma after the Veterans' Advisory Committee on Environmental Hazards, an independent statutory group managed by VA, concluded that an association exists between a dioxin-containing herbicide used in Vietnam and soft tissue sarcoma.

The IOM review process confirmed the validity of all these decisions and added more conditions to those considered service-connected for Vietnam veterans.

The number of diseases that VA has recognized as associated with Agent Orange exposure has expanded considerably during the 1990's. The following conditions are now presumptively recognized for service connection for Vietnam veterans based on exposure to Agent Orange or other herbicides:

- chloracne,
- porphyria cutanea tarda (PCT),
- acute or subacute transient peripheral neuropathy,
- several cancers [non-Hodgkin's lymphoma, soft tissue sarcoma, Hodgkin's disease, multiple myeloma, prostate cancer and respiratory cancers (including cancers of the lung, larynx, trachea, and bronchus)].
- Type 2 diabetes

For compensation purposes, chloracne and PCT must have occurred, to a degree, at least 10 percent disabling within one year of exposure to Agent Orange. The term acute and subacute transient peripheral neuropathy means temporary peripheral neuropathy that appears within one year of exposure to an herbicide agent and resolves within two years of the date of onset. The respiratory cancers must occur within thirty years of exposure to Agent Orange. The 30-year deadline is being reconsidered by Congress and may soon be



# Vietnam Veterans and Agent Orange Exposure

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eliminated. The definition of soft tissue sarcoma does not include osteosarcoma, chondrosarcoma, Kaposi's sarcoma or mesothelioma for compensation purposes.

Public Law 102-4, the Agent Orange Act of 1991, established in law with minor modifications, presumptions of service connection for certain diseases associated with herbicide exposure or military service in Vietnam that VA had previously developed on its own authority. Based upon that law, a Vietnam veteran with non-Hodgkin's lymphoma, soft tissue sarcoma or chloracne (within one year of exposure) was presumed to have incurred the disease while on active duty.

The Veterans' Benefits Improvements Act of 1994, Public Law 103-446, established in law a presumption of service connection for certain diseases associated with herbicide exposure in Vietnam that VA had previously recognized. Specifically, Public Law 103-446 codified presumptive service connection for a Vietnam veteran disabled by (1) Hodgkin's disease manifested to a degree of disability of 10 percent or more; (2) PCT manifested to a degree of 10 percent or more within a year of military service in Vietnam; (3) respiratory cancers manifested to a degree of 10 percent or more within 30 years of military service in Vietnam; and (4) multiple myeloma manifested to a degree of 10 percent or more.

Under Public Law 104-204, Vietnam veterans' children with the birth defect spina bifida are eligible for certain benefits and services (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. Regulations implementing the benefits and services authorized under this legislation should be published by December 2, 2001.

## **The National Academy of Sciences and VA Compensation Policy**

VA disability compensation for Vietnam veterans has continued to evolve based on new scientific and medical evidence. Thus, Public Law 102-4 also established a mechanism whereby VA would presumptively recognize certain illnesses in Vietnam veterans for service connection. That legislation required VA to enter into an agreement with the National Academy of Sciences (NAS) for a comprehensive review and analysis of scientific literature on Agent Orange at least every two years.

According to the provisions laid out in this law, the Secretary of Veterans Affairs must take into account the reports received from the Academy and all other available sound medical





# Vietnam Veterans and Agent Orange Exposure

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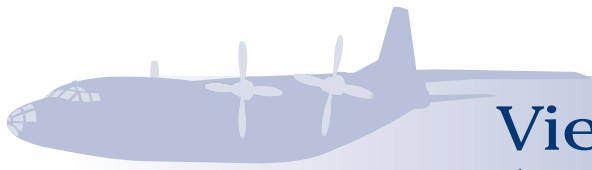
and scientific information in determining whether a “positive association” exists between exposure of humans to an herbicide agent and the occurrence of a disease in humans. If so, he must prescribe regulations providing that a presumption of service connection is warranted for that disease.

It has been suggested that by focusing on the questions of the possible long-term health effects of Agent Orange exposure, VA and others concerned about the well being of Vietnam veterans may overlook the Vietnam “In-Country Effect,” if it exists. 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 matter. 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.

*For information regarding the National Academy of Sciences’ reports and VA responses, see Chapter 5.*

**To receive disability compensation, the veteran must file an application for such benefits. For information or assistance in applying, the 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.**

While VA provides billions of dollars to veterans and their survivors in disability compensation each year, VA does not approve every claim. When a claim is denied, VA provides the applicant with the reason for this action as well as detailed information regarding appeal rights.



## CHAPTER 7 RESEARCH EFFORTS

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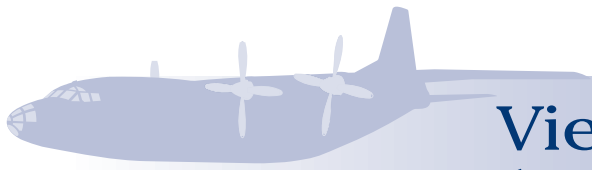
The two-and-a-half decades following the end of the Vietnam War have seen a tremendous amount of research on health effects from exposure to Agent Orange and on its key contaminant dioxin. Responding to the concerns of returning Vietnam veterans, their families, Congress and the American public, various studies were initiated to evaluate health risks associated with Vietnam service and Agent Orange exposure.

These studies generally focused upon the post-Vietnam service morbidity or 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 to learn more about the health effects of Agent Orange and other herbicides used in Vietnam. 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.

Although many studies are completed, the research effort is ongoing, even 25 years after the final American troops left Vietnam and nearly 30 years since herbicide spraying ceased. However, from the beginning, the lack of good exposure data has frustrated researchers in their attempts to conduct large-scale scientific investigations on long-term health consequences of veterans exposed to Agent Orange. This limitation in evaluating health effects also has frustrated Vietnam veterans and their families, personnel in the Department of Veterans Affairs (and earlier in the Veterans Administration) and other governmental departments and agencies, veteran service organizations, Congress, the news media and other interested parties.

### **Lack of Exposure Data**

The absence of useful exposure data for individual veterans exposed to Agent Orange and other herbicides used in Vietnam remains a major obstacle in conducting relevant health studies. In fact, most of our information on human health effects from Agent Orange or dioxin exposure comes from studies on groups other than Vietnam veterans. Those studies are largely based upon occupational exposures and exposure due to industrial accidents occurring in developed countries with adequate public health surveillance programs, including the United States. Those groups have provided the basis of our understanding of the human health effects associated with dioxin exposures because they can provide key exposure data.



# Vietnam Veterans and Agent Orange Exposure

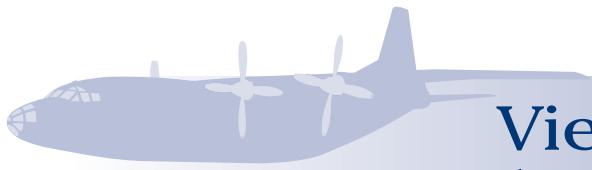
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One method of assessing Agent Orange exposure is measuring residual dioxin in the body by analyzing adipose tissue or serum. However, Vietnam veterans who were categorized as having had higher opportunities for Agent Orange exposure by virtue of their military occupation or location of their units were generally not found to have increased levels of dioxin in their adipose tissue (1, 2).

Despite past difficulties with exposure evaluation, some investigators believe that a general index of Agent Orange exposure for all ground troops who served in Vietnam may be feasible. In July 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 (3). The IOM further recommended that an independent non-governmental scientific panel evaluate these models established for this purpose.

In response, VA contracted with the IOM to attempt to develop a historical exposure reconstruction model for Agent Orange. The IOM took the lead for this project and issued a call for proposals to develop the exposure model. Dr. Stellman at Columbia University was selected by IOM for this effort. The IOM will review the results and report to VA on the feasibility and validity of the proposed exposure reconstruction model. This project is expected to be completed in 2001 or 2002. Nevertheless, at this point, investigators have been unable to develop a model that will estimate the Agent Orange exposure of individual U.S. service members in Vietnam.

One of the criticisms of studies assessing health effects associated with Agent Orange exposure in Vietnam veterans is that the average Vietnam veteran was unlikely to have experienced significant dioxin exposure. However, certain groups of Vietnam veterans have been identified as possibly having significantly greater than average Agent Orange exposure. One such group includes Air Force personnel who participated in Operation Ranch Hand, which was the primary aerial herbicide spraying operation in Vietnam (summarized in **Tables 4-5**). A second group is the Army Chemical Corps, who was 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 so as to increase security surveillance. Agent Orange was applied either from aircraft or from ground equipment. Certain epidemiological studies, described later in detail, have focused on these two unique high exposure groups of Vietnam veterans.



# Vietnam Veterans and Agent Orange Exposure

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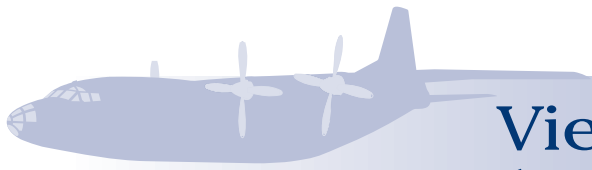
## Morbidity and Mortality Studies on Vietnam Veterans

Both VA and non-VA scientists have completed many morbidity and mortality studies on Vietnam veterans. This research is summarized in **Tables 4 through 7** and includes a brief description of each study's methodology and findings. Although some of these studies focus upon Agent Orange health effects, most focus more broadly on the "Vietnam experience" because of the lack of good Agent Orange exposure information described earlier. For research purposes, VA defines "Vietnam 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 July 4, 1965 and March 28, 1973 and who were **not** stationed in Vietnam or off the coast of Vietnam during this period. "Vietnam-era veterans" are individuals who served in the U.S. military anytime between July 4, 1965 and March 28, 1973.

In December 1979, Congress directed the Veterans Administration, now known as the Department of Veterans Affairs (VA), to conduct a large-scale epidemiologic study to determine if Agent Orange has caused health problems in Vietnam veterans. For approximately three years, VA and its contractor struggled to develop an appropriate protocol or study design, despite the lack of exposure data. At a congressional hearing in September 1982, an official from the Centers for Disease Control (CDC) told a frustrated Congressional committee that CDC had the expertise to conduct the epidemiologic study that Congress had ordered in 1979 (Public Law 96-151). VA, at the suggestion of Congress, then transferred responsibility of the study to the CDC.

Unfortunately, after several years of effort, CDC found that the relevant military records were not adequate for identifying individuals who were exposed to Agent Orange in Vietnam. The absence of exposure data stymied any proposed Agent Orange health studies. CDC next attempted a special Agent Orange Validation Study (1) to determine the feasibility of conducting an Agent Orange study by using indirect estimates of exposure to Agent Orange from military records (and self reports) and by comparing such measures with serum levels of 2,3,7,8-TCDD (dioxin). However, CDC reported that, based upon the findings of the Agent Orange Validation Study, neither military records nor veterans' self reports of exposure to Agent Orange were adequate for identifying exposed individuals who would be needed for a full-scale study.

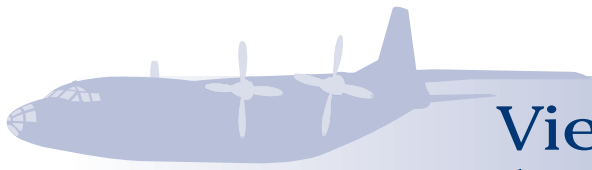
Based largely upon these problems with developing adequate exposure data, a CDC advisory group, the Science Panel of the Domestic Policy Council Agent Orange Working Group and the Agent Orange Advisory Panel of the Congressional Office of Technology Assessment came to a consensus that the hoped-for Agent Orange study was not feasible.



# Vietnam Veterans and Agent Orange Exposure

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Subsequently, that study was canceled. Nevertheless, although the CDC Agent Orange Study could not be successfully completed, many related research efforts have been completed and published, while scientific studies of other populations exposed to Agent Orange or dioxin are ongoing.

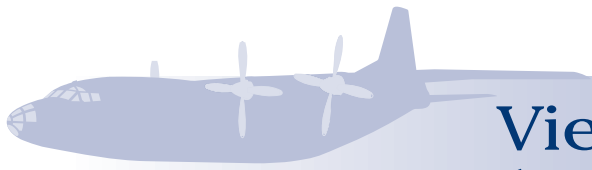


# Vietnam Veterans and Agent Orange Exposure

## VA's Studies on Morbidity of Vietnam Veterans

**TABLE 4**  
**VA CONDUCTED VIETNAM VETERAN MORBIDITY STUDIES**

Authors and Year	Study Design	Description	Results
Kang, et al., 1986 <sup>4</sup>	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 <sup>5</sup>	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 <sup>6</sup>	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 <sup>7</sup>	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 <sup>8</sup>	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 <sup>9</sup>	Case Control	Compared military service characteristics, including surrogate 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.	No association between either Vietnam service or surrogate measures of Agent Orange exposure and risk of lung cancer.



# Vietnam Veterans and Agent Orange Exposure

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## VA's Studies on Morbidity of Vietnam Veterans (Summarized in Table 4)

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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 (10-13), VA conducted several case-control studies to assess the risk of those cancers associated with Vietnam service in general and in some cases, Agent Orange in particular. In summary, the case-control studies of Vietnam veterans for cancer conducted by VA do not provide evidence of an association between either service in Vietnam or 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. The odds ratios of cancers 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 4 and Appendix C**.

The absence of a possible positive association might be explained by several factors. First, the observation period was insufficient. All of the case-control studies selected cases and controls that were hospitalized or examined up to 1991. This would allow only 12 to 27 years of observation between first possible exposure and diagnosis, possibly an insufficient latent period for any carcinogenic effects. A second factor may be that the Vietnam veterans examined in this study had relatively low Agent Orange exposure. Another possibility is that although Agent Orange or dioxin can induce these cancers in exposed humans, the proportion of veterans with high exposures was so small that VA's studies did not have a sufficient statistical power to detect the excess risk. Therefore, the possibility of a modestly increased risk of several types of cancer associated with Agent Orange exposure in Vietnam among select groups of Vietnam veterans can be neither confirmed nor ruled out, based upon these studies.





# Vietnam Veterans and Agent Orange Exposure

**TABLE 5**  
**VA VIETNAM VETERAN MORTALITY STUDIES**

<b>Authors and Year</b>	<b>Study Design</b>	<b>Description</b>	<b>Results</b>
Breslin, et al., 1988 <sup>14</sup>	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 <sup>15</sup>	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, 05% CI 1.03 - 1.09). This excess was due to motor vehicle accidents and accidental poisonings.
Watanabe, et al., 1991 <sup>16</sup>	Cohort	Follow-up to earlier study. Significant (Breslin, et al., 1988) 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 <sup>17</sup>	Cohort	Follow-up study of two prior studies (Breslin, et al., 1988 and Watanabe, et al., 1991) 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 <sup>18</sup>	Cohort	Compared cause-specific mortality of 10,716 Marine Vietnam veterans to that of 9,346 Marine non-Vietnam veterans.	Marine Vietnam veterans had statistically significant 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).

*Table continued on next page*

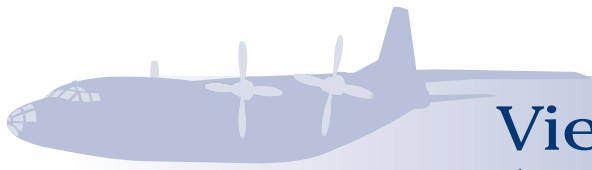




# Vietnam Veterans and Agent Orange Exposure

**TABLE 5**  
*continued*  
**VA VIETNAM VETERAN MORTALITY STUDIES**

<b>Authors and Year</b>	<b>Study Design</b>	<b>Description</b>	<b>Results</b>
Thomas, et al., 1990 <sup>19</sup>	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 <sup>20</sup>	Cohort	Follow-up study to earlier Chemical Corps study (Thomas, et al., 1990). 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 <sup>21</sup>	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.	Women Vietnam veterans had statistically significant increased risk of deaths due to motor vehicle accidents compared to women non-Vietnam veterans with statistically significant excesses of deaths (RR, 3.19 due to cancers of the pancreas and uterine corpus compared to U.S. women (SMRs of 3.27 and 4.05, respectively).
Dalager, et al., 1995 <sup>22</sup>	Cohort	Follow-up study of earlier women Vietnam veterans mortality (Thomas, et al., 1991) 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 <sup>23</sup>	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 <sup>24</sup>	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 Veterans and Agent Orange Exposure

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## VA's Studies of Mortality in Vietnam Veterans (Summarized in Table 5)

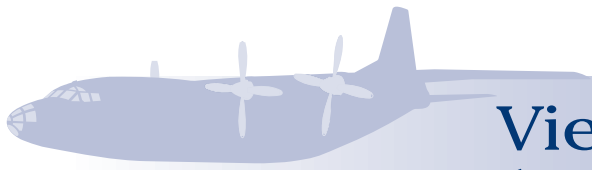
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Studies conducted by VA on mortality in Vietnam veterans suggest an increased risk of death among Vietnam veterans compared to non-Vietnam veterans for several cancers such as lung cancer, laryngeal cancer, Hodgkin's disease, non-Hodgkin's lymphoma, pancreatic cancer, skin cancer, and uterine cancer for women. Because of the uncertainty of exposure to Agent Orange, the extent of risk likely to have been experienced by Vietnam veterans from their exposure to Agent Orange in Vietnam is unknown. The most consistent finding from the mortality studies is the increased risk of death from accidents, especially motor vehicle accidents, during the first five years. Similar observations have been made with veterans from other wars, including World War II and more recently with Gulf War veterans. The underlying reasons for the increased risk still is not fully understood and warrants further study.

Most mortality studies have focused specifically on male Vietnam veterans. The exact number of women who served in Vietnam is unknown; estimates place it between 5,000 to 10,000 (25, 26). Within the context of the 2.5 million veterans who served in Vietnam, clearly women Vietnam veterans comprise a small proportion of Vietnam veterans accounting for approximately 7,000 of those "in country." Compared to their non-Vietnam women counterparts, the only statistically significant increased risk in cause-specific mortality among women Vietnam veterans was all motor vehicle accidents (Relative Risk, 3.19; 95% Confidence Interval, 1.03-9.86).

A related study assessed the risk of traumatic deaths in Vietnam veterans associated with having PTSD (27). Various studies have reported that various groups of Vietnam veterans are at increased risk of PTSD (28-31). Other studies have reported that 70 percent to 94 percent of PTSD cases have comorbid mental disorders, including depression and alcohol and drug dependency (32-34). 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. 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.

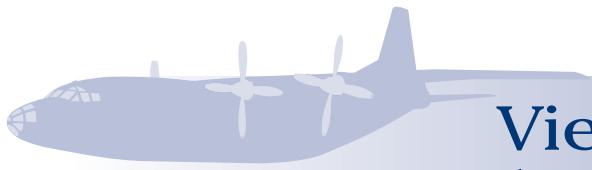
A study of wounded Vietnam veterans also addressed the reported excess of traumatic deaths among Vietnam veterans. Veterans who experienced trauma are at increased risk for PTSD, while in turn, veterans with PTSD are at increased risk for subsequent traumatic



# Vietnam Veterans and Agent Orange Exposure

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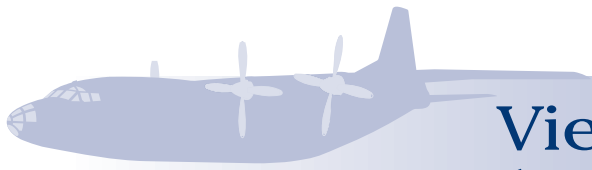
deaths. This study, while having no diagnostic data regarding PTSD, assessed the risk of traumatic deaths associated with experiencing trauma while in Vietnam, i.e., being wounded (24). Subjects were randomly sampled from the 70,000 Army Vietnam veterans who received a non-lethal wound(s) between 1969-1973 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**.



# Vietnam Veterans and Agent Orange Exposure

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

Authors and Year	Study Design	Description	Results
CDC - 1988 <sup>27</sup>	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 <sup>28</sup>	Cohort	Companion study to 1988 study.	Vietnam veterans were more likely than non-Vietnam veterans to self-report health problems.
Wolfe, et al., 1990 <sup>29</sup>	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. Ranch Hand veterans had significant more basal cell carcinomas than their non-Ranch Hand counterparts.
Henriksen, et al. 1997 <sup>30</sup>	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 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 <sup>31</sup>	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 <sup>32</sup>	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 <sup>33</sup>	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.



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

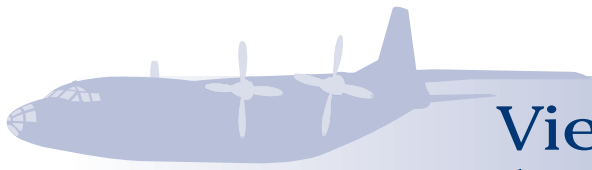
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Both the CDC and DoD (Air Force) have conducted major studies on the general health of Vietnam veterans and the risks of selected cancers associated with Vietnam service. CDC conducted the bulk of these studies as part of their “Vietnam Experience 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 (27). 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 (28). While Vietnam veterans reported more health problems than their non-Vietnam peers, subsequent medical exams indicated no difference between the two groups.





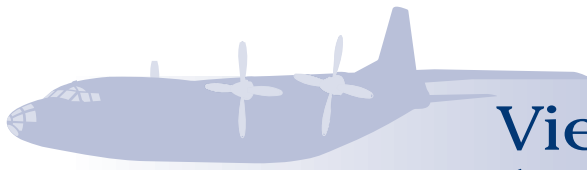
# Vietnam Veterans and Agent Orange Exposure

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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 (29).

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 (30). This study used the same 989 Air Force Ranch Hand Vietnam veterans and 1,276 Air Force non-Ranch Hand Vietnam previously described (29). 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. In May 1999, VA requested the NAS to review this information to determine if it supported a presumption of service connection for diabetes in Vietnam veterans. For additional information, see **Appendix E**.



# Vietnam Veterans and Agent Orange Exposure

**TABLE 7**  
**NON-VA VIETNAM VETERAN MORTALITY STUDIES**

<b>Authors and Year</b>	<b>Study Design</b>	<b>Description</b>	<b>Results</b>
Anderson, et al., 1985 <sup>34</sup>	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 <sup>35</sup>	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 <sup>36</sup>	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 <sup>37</sup>	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 <sup>38</sup>	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).





# Vietnam Veterans and Agent Orange Exposure

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## Non-VA Mortality Studies of Vietnam Veterans (Summarized in Table 7)

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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 compared to 78,840 non-Vietnam veterans (34). The only statistically significant excesses in cause-specific mortality for Wisconsin Vietnam veterans were 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 (35). 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. Throughout the entire follow-up, Vietnam veterans were at increased risk for motor vehicle accidents (Relative Risk, 1.48; 95% Confidence Interval, 1.04-2.09).

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 (29, 36). They reported no statistically significant excess in any cause-specific mortality.

The New York Department of Health reported 555 Vietnam veterans deaths and 941 non-Vietnam veterans were 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 (37). 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 and identified 840 Vietnam veteran deaths and 2,515 non-Vietnam veteran deaths (38). 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**.





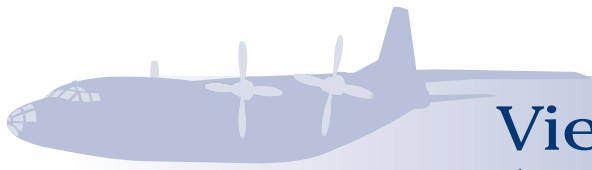
# Vietnam Veterans and Agent Orange Exposure

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## Summary of Other Studies on Vietnam Veterans

Collectively, these morbidity studies suggest that Vietnam veterans are at increased risk for alcohol abuse, anxiety disorder and depression compared to non-Vietnam veterans (36). Regarding physical health, as determined by medical exams, Vietnam veterans as a group did not appear to be at increased risk for health problems. Examining physical health of Vietnam veterans who handled Agent Orange, i.e., Ranch Hand veterans, there was no increased risk of health problems, except for skin cancer. However, Ranch Hand veterans were found to have increased levels of dioxin compared to non-Ranch Hand veterans (39), and as levels of dioxin increased, so did the apparent risk of diabetes mellitus. Finally, addressing the risks of selected cancers, only the risk of non-Hodgkin's lymphoma increased with Vietnam service (40).

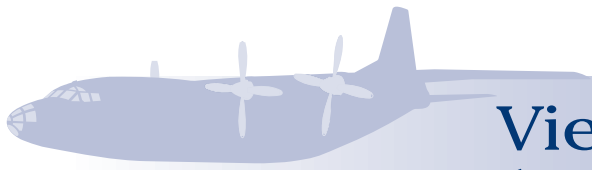
Consistent with VA's mortality study of Vietnam veterans, these non-VA mortality studies consistently report that Vietnam veterans are at increased risk for traumatic deaths compared to non-Vietnam veteran groups. This excess is due primarily to motor vehicle and other accidents. Unlike the studies of Vietnam veterans who were wounded (24) or had PTSD (23), none of the veteran cohorts in the non-VA studies were at increased risk for suicide. Examining cancer risks, the Massachusetts study reported an excess of soft tissue sarcoma among Vietnam veterans. This finding was not replicated in the other mortality studies. However, a series of VA mortality studies suggested that Vietnam veterans may be at increased risk for respiratory and other cancers.



# Vietnam Veterans and Agent Orange Exposure

**TABLE 8**  
**VIETNAM VETERANS REPRODUCTIVE HEALTH STUDIES**

Authors and Year	Study Design	Description	Results
Erickson, et al., 1984 <sup>39</sup>	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 <sup>43</sup>	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 <sup>44</sup>	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 <sup>40</sup>	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 & Monson <sup>41</sup> 1990	Case-Control	Compared paternal military 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 & Monson <sup>42</sup> 1989	Case-Control	Compared paternal military 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 <sup>54</sup>	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).



# Vietnam Veterans and Agent Orange Exposure

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## Vietnam Veterans Reproductive Health Studies (Summarized in Table 8)

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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 in the United States over the past two decades.

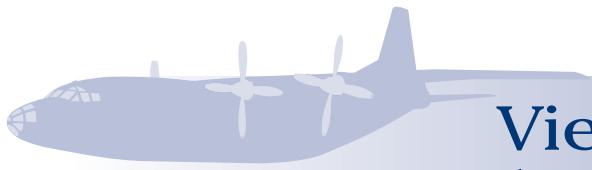
For male veterans, the studies have been mostly negative, in that service in Vietnam was not associated with the risk of fathering a child with birth defects, spontaneous abortion, stillbirth or neonatal death (39-43). However, in the recent “Ranch Hand Study,” neural tube defects (spina bifida, anencephaly) were reported in four children of U.S. Air Force personnel who sprayed Agent Orange and other herbicides in Vietnam, while none was observed among children of “control” veterans (41). There also was a higher than expected number of children born with cleft lips.

Furthermore, when the CDC birth defects study was reanalyzed using the exposure opportunity index based upon interview data, the risk of spina bifida was significantly associated with the highest estimated level of Agent Orange exposure (39). Based on these data and others, an Institute of Medicine panel suggested an association between herbicide exposure in Vietnam and an increased risk of spina bifida in children (45).

Although results for male Vietnam veterans are potentially useful in assessing health consequences of Vietnam service for women, a further study of gender-specific health outcomes for women was desired. Public Law 99-272 mandated that a comprehensive epidemiologic study be done, if scientifically feasible, of any long-term adverse health effects (particularly gender-specific health effects) which have been experienced by female Vietnam veterans. The study was to evaluate the health effects that may have resulted from exposure during Vietnam service to certain herbicides (including Agent Orange), chemicals or medications that may have deleterious health effects, or to other environmental hazards or other experiences or exposures during such service.

The comprehensive study envisioned by Congress was determined not to be feasible by the congressional Office of Technology Assessment (OTA), VA and congressional staff. As an alternative, three research projects were proposed by VA and approved by the OTA and congressional staff.

The three efforts are: (1) a study of post-service mortality among female Vietnam veterans; (2) a further analysis of psychological health outcome data already collected for female Vietnam veterans in the National Vietnam Veterans Readjustment Study (NVVRS); and (3) a study of reproductive outcomes among female Vietnam veterans.



# Vietnam Veterans and Agent Orange Exposure

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Maternal exposures to toxicants are more directly associated with adverse pregnancy outcomes, while evidence for effects of paternal exposure on pregnancy outcomes is very limited and indirect (46-47).

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 (48-50). 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 (51-53).

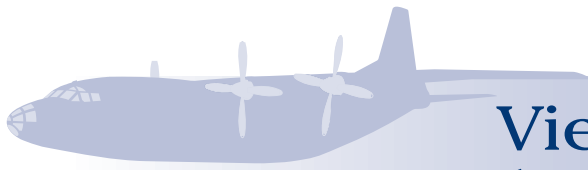
A recent study of 8,280 female veterans, comparing the pregnancy outcomes of 4,140 female Vietnam veterans with an equal number of non-Vietnam veterans in the military during the same era, reported that the risk of birth defects among children was significantly associated with mother's military service in Vietnam (54). Due to difficulty in identifying a large number of women exposed to any particular aspect of Vietnam service with any degree of certainty, the study was a "Vietnam experience" type of study rather than of specific exposures.

In summary, among male veterans, Vietnam service was not associated with adverse reproductive outcomes, except for spina bifida, while among female veterans, Vietnam service was significantly associated with the risk of having children with birth defects.

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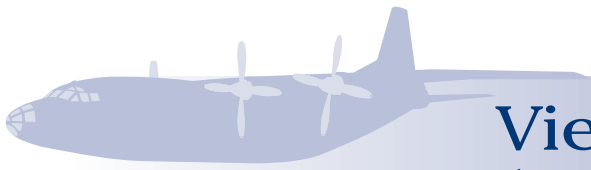
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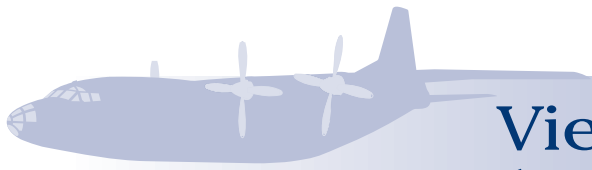
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## CHAPTER 8 THE ROLE OF THE VET CENTER PROGRAM

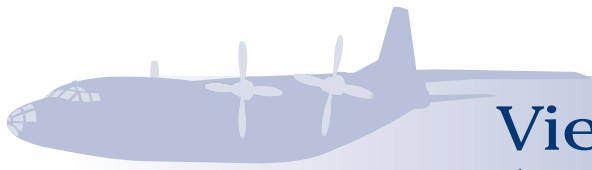
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The mission of the Department of Veterans Affairs (VA) is to “Care for him who shall have borne the battle, and his widow and his orphan.” VA’s efforts to provide clinical services for veterans suffering from the psychological wounds of war were inaugurated with the establishment of the Vet Center program in 1979. The authorizing legislation, Public Law 96-22, restricted eligibility for Vet Center services to Vietnam veterans, the population of war veterans seen as at greatest risk at the time. Even before the diagnosis of post-traumatic stress disorder (PTSD) had appeared in the American Psychiatric Association’s Diagnostic and Statistical Manual of Mental Disorders in 1980, the Vet Centers, functionally linked to, but operating outside the larger VA medical facilities, were focusing on the specific psychological symptoms and social readjustment problems that arose from the veterans’ traumatic combat experiences in Vietnam.

As defined in the law, the Vet Center service mission is unique in VA. It is designed as a non-medical readjustment counseling program, rather than a medical treatment program. The Vet Centers are located in the community, outside of the larger medical facilities, in easily accessible, consumer-oriented facilities designed to be highly responsive to the needs of the local veterans. 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 which emphasize 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 clinically assist veterans resolve war-related traumas and to help them attain an improved post-war work and family life. Effective achievement of this goal entails an appreciation and understanding of the veteran’s traumatic war experiences and an understanding of the veteran’s local community, its cultural organization and its economic and human service resources to be responsive to various geographic, economic and social barriers to care, Vet



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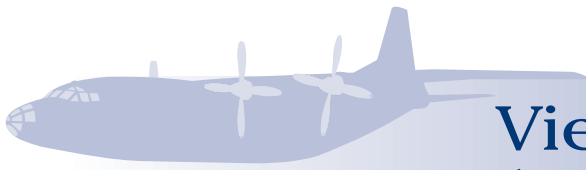
Center counselors are strategically located and specifically skilled in engaging veterans in or near their communities. Specific Vet Center services include:

- 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.

Public Law 98-528, passed in 1984, included several provisions related to VA's ability to treat veterans with war-related PTSD. One of these provisions established the first VA medical center based PTSD program. Specifically, the law authorized 12 Special Inpatient PTSD Units. In the ensuing collaboration for treating veterans with PTSD in VA, the Vet Centers early became a main source of veteran referrals for in-patient PTSD treatment. It is now generally understood that readjustment counseling and mental health programs for PTSD are central to the mission of VA and vital to the health care of combat theater veterans of all wars and hostile actions. Currently, VHA has identified Vet Center-based readjustment counseling and VAMC-based PTSD programs as two of 12 special emphasis programs having particular relevance to veterans' health care and rehabilitation.

The Vet Center program has significantly broadened its focus to include veterans from military conflicts other than Vietnam. 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 Gulf War. Following 12 years of service exclusively for Vietnam veterans, legislation was enacted in 1991, opening the Vet Centers to veterans of Lebanon, Grenada, Panama, and the Gulf War.

Utilizing clinical experience gained with Vietnam veterans, VA's extension of services to post-Vietnam war veterans ensured early access to readjustment counseling and helped to prevent possible development of delayed and chronic forms of war-related PTSD.



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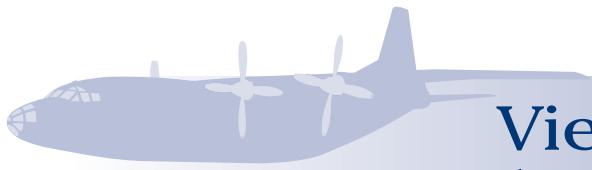
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As of April 1994, this authority was again extended to veterans from the peacekeeping mission in Somalia. Current law has further extended eligibility for readjustment counseling at Vet Centers to any veteran who served in the military in a theater of combat operations during any period of war, or in any area during a period in which armed hostilities occurred. VA is now authorized to provide timely outreach and counseling, through its Vet Centers, to any veteran exposed to war-zone stress in any war, conflict and/or peacekeeping mission. Since the Vet Centers have received authority to serve veterans of other than the Vietnam era, they have provided outreach and care to over 101,000 Gulf War veterans, over 4,000 Somalia veterans, and approximately 39,000 Korean and World War II veterans combined.

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 report to the Chief Readjustment Counseling Officer at VA Headquarters and collaborate locally in full partnership with other VHA medical facilities to effect 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.

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. 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 to include PTSD. On an annual basis, between 70 and 80 percent of veterans visits to Vet Centers are for counseling for war-related PTSD.

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. The Vet Centers also have continuously provided Vietnam veterans with available information about the



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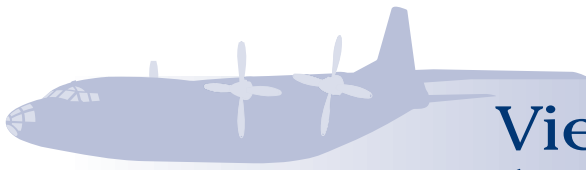
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possible medical consequences of exposure to Agent Orange and provided veterans with referrals to VA medical centers for Agent Orange examinations and treatment.

Vet Center community outreach and brokering of care also provide the means for (a) delivering timely and effective services to new eras of war veterans, and (b) 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. Vet Centers track veteran demographics to ensure high-risk veterans are treated at levels equal to or higher than their respective levels in the local veteran population.

Vet Center staff also accommodates service delivery to meet the cultural and psychological needs of the high-risk veteran population. For example, the avoidance symptoms of PTSD comprise significant psychological barriers to care often requiring the service provider to engage the veteran at or near his home community to initiate trauma services. In this vein, the Vet Centers pioneered the 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 RCS advanced this effort by opening its 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/or 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. This initiative 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 to serve African American, Hispanic and other veterans.

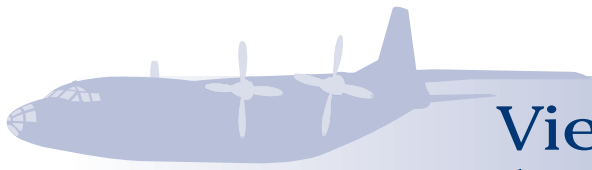


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A major goal of VA's health care system is to develop and maintain an increasingly more complete inventory of war-zone conditions that are understood to have adverse consequences for veterans' post-war health and level of functioning. Such an inventory now would include life threatening, stressful combat experiences, exposure to toxic environmental agents, physical wounds and amputations and/or other illnesses and injuries specific to the geographical area and/or 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 can 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. They responded that they would recommend the Vet Center to other veterans. This is the highest level of veteran satisfaction recorded for any VA program.

To refer an eligible veteran for readjustment counseling, call your nearest Vet Center. Nationwide, there are 206 Vet Centers located in all 50 states, Puerto Rico, the Virgin Islands, the District of Columbia and Guam. The Vet Centers are listed in the local telephone directory under the United States Government, Department of Veterans Affairs. Since the Vet Centers do not have waiting lists, veterans can be seen the same day they call for an appointment. The Vet Centers also maintain some nontraditional evening hours to accommodate working veterans. If the situation warrants, a Vet Center counselor will travel to the medical center to meet with a veteran in need of readjustment counseling.



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## CHAPTER 9 OUTREACH AND EDUCATION – RESOURCES FOR VETERANS AND VA’S HEALTH CARE PROVIDERS

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VA has communicated with Vietnam veterans concerned about Agent Orange through many different means, including an Agent Orange Web site, a national toll-free telephone number, the best-selling *Federal Benefits for Veterans and Dependent* booklet, a national Agent Orange newsletter, a series of Agent Orange fact sheets, an Agent Orange brochure, Agent Orange videotapes, Agent Orange posters, discharge briefings, town meetings and public service announcements.

VA’s Web site for Agent Orange-related matters is <http://www.va.gov/agentorange>.

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 very 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 about 10 million calls annually, including many regarding Agent Orange. In March 2001, VA established a national toll-free telephone help line, 1-800-749-8387, by expanding the 6-year-old Gulf War help line.

The *Federal Benefits for Veterans and Dependents* booklet, which is updated by VA annually, includes sections on the benefits and services available from VA for veterans concerned about Agent Orange exposure. This book is available from the U.S. Government Printing Office. It is among the most popular government publications. It can also be read on-line at <http://www.va.gov/>.

In November 1982, VA released the first issue of the *Agent Orange Review*. This national newsletter covers Agent Orange health information, and compensation and benefits updates of interest to Vietnam veterans and their families. More than thirty issues have been released to date. In recent years, approximately 400,000 copies of each issue were produced with more than 200,000 Vietnam veterans receiving the newsletter at their home via the Postal Service. The remaining issues are distributed at VA medical centers, regional offices, vet centers and other locations. In March 2001, VA added 387,000 Vietnam veterans to the mailing list.

The *Agent Orange Brief* fact sheet series, originated in 1988, has been updated and expanded considerably since then. At present, there are 21 stand-alone fact sheets covering general information, VA programs (registry health examinations, health care, disability compensation, information resources and research). Updated fact sheets are included on the Agent Orange Web site mentioned above.





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Current and many back issues of the Agent Orange Review and the current edition of the Agent Orange Briefs now are available on-line at VA's Web site at the address cited in the second paragraph of this chapter. The Agent Orange brochure, originally published in September 1999 and subsequently updated, is a six-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 is modeled on *Agent Orange Brief A1 – Agent Orange – General Information*. The brochure has been translated into Spanish.

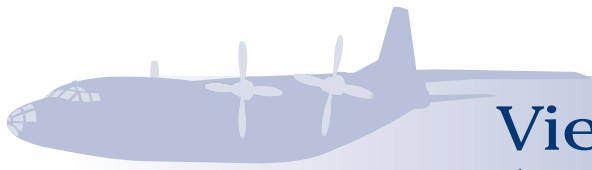
In the 1980's, VA produced three videotapes regarding Agent Orange that were distributed nationally for patient and staff education. The initial program, *Agent Orange: A Search for Answers*, earned a number of awards, including an Emmy. It was released in 1981. The second general information videotape, *Agent Orange: An Update*, was released in 1987. The other program, *Agent Orange Registry Program for Medical Administration Service Employees*, released in 1986, provided information for the medical administration regarding how to handle questions about Agent Orange and the Registry. Library Service maintains these tapes in VA medical centers nationwide. While these videotapes are significantly outdated, they still provide useful information about Agent Orange, including its composition, how and why it was used in Vietnam and other interesting and valuable information. A new training film for Registry coordinators is in production.

Agent Orange posters were prepared in March 1989 and updated in February 2000, to alert Vietnam veterans concerned about Agent Orange to contact the nearest VA medical center or regional office for assistance. Two different posters, both in two sizes (11" x 17" and 18" x 24") were developed in 2000. These posters have been 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.

The VA Office of Public Affairs maintains current fact sheets on Agent Orange issues and periodically produces national news releases updating pertinent research, legislation and benefit changes. Discharge briefing, town meetings and public service announcements also have been effectively used to inform and educate Vietnam veterans and their families about the benefits and services available to them, including those related to Agent Orange.

In addition, this CME should enhance outreach/education initiatives in that it should result in better informed, more knowledgeable VA health care providers.



## CHAPTER 10 CONCLUSIONS AND FUTURE ACTIVITIES

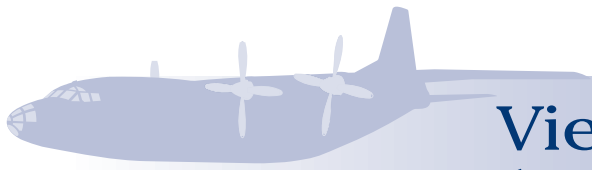
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This CME package briefly describes the tremendous efforts carried out by many individuals and institutions in response to concerns raised by Vietnam veterans, their families, veterans' service organizations and others about long-term health consequences of exposure to Agent Orange in Vietnam. From early efforts shortly after the end of the Vietnam War, the Department of Veterans Affairs has evolved an effective process for identifying those illnesses associated with Agent Orange, for providing fair compensation to those affected, for responding to the health and readjustment needs of returning veterans and for conducting further needed research. This process has proven extraordinarily effective in establishing a fair and sound VA policy for helping Vietnam veterans. As a testimonial to the acknowledged effectiveness of this process, it was recently adopted in response to the health need of veterans from the 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 health effects is generated. Other federal agencies have adopted other means for achieving 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 a decade in the making. Other governments, especially 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. On this issue, however, U.S. VA has had a major responsibility.

An equally important component of VA's response has been the high quality primary health care provided by VA to Vietnam veterans. In this regard, VA's Agent Orange Registry has played a critical role as a key entry into VA health care and as an ongoing surveillance system for veterans' health. Twenty-five years after the end of the Vietnam War, more than 300,000 Vietnam veterans have been examined under this protocol, and more are coming in every day. The most common diseases identified in 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



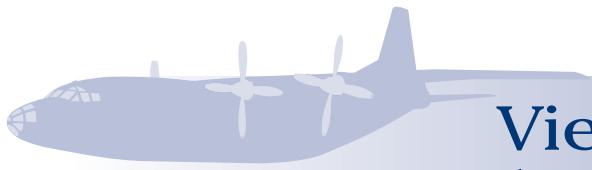
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readjustment needs of veterans that it has naturally expanded to cover similar issues with many other groups of veterans. Many U.S. veterans from future conflicts and peacekeeping missions will benefit from a program developed for an earlier generation of veterans.

Epidemiological research on the health of Vietnam veterans conducted both within and outside of VA also has 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 ability to provide appropriate health care for veterans, but further, it has proven invaluable for uncovering those illnesses that initially were not obviously service-connected. This served as the basis for providing fair and appropriate compensation for Vietnam veterans with those illnesses.

Sometimes, with the pace of American life, it is 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 here will certainly all continue into the foreseeable future. Nevertheless, it is the hope of all who helped to prepare this CME package that those in VA, who today or in the past, have been a part of this effort can take pride in what we have accomplished for these veterans.



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## CHAPTER 11 SUPPLEMENTAL READING

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**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. For additional information on this subject, see the entire chapter. The book is maintained in most VA Medical Center libraries. Further information about the Institute of Medicine report is available on-line at <http://books.nap.edu/books/0309048877/html/23.html>. Readers also are welcome to contact the Environmental Agents Service (131), VA Central Office for additional information. The office telephone number is 202-273-8580.

### History of the Controversy Over the Use of Herbicides

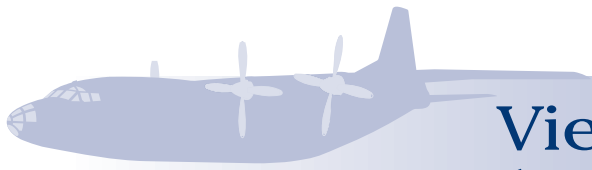
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The United States has been involved for more than two decades in a controversy over the military use of herbicides in Vietnam during the Vietnam era. The controversy centers around both the use of herbicides in Vietnam and the purported health problems 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<sup>1</sup> (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 govern-

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<sup>1</sup> 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.



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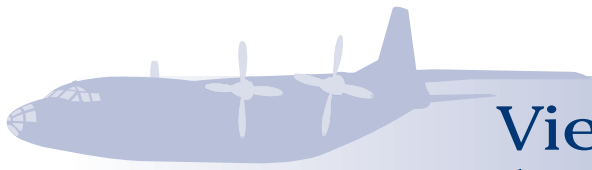
ments, veterans organizations, and others. The events and issues surrounding the domestic use of 2,4-D (2,4-dichlorophenoxyacetic acid) and 2,4,5-T (2,4,5-trichlorophenoxyacetic acid) and occupational exposure to 2,4,5-T and its dioxin contaminant also are addressed in this chapter. As a result of several 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; Alesa, 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.



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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, anticrop 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 aerially-dispersed herbicides in improving visibility





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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 regrowth 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).





# Vietnam Veterans and Agent Orange Exposure

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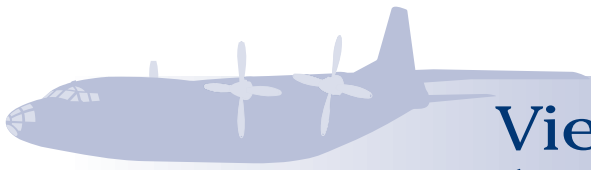
## Use of Herbicides in Vietnam

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 aerially 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.



# Vietnam Veterans and Agent Orange Exposure

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## **Early Concerns About the Use of Herbicides in Vietnam**

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### **Early Accounts of Dioxin (TCDD)**

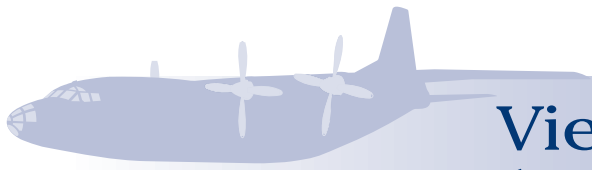
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Dioxin (TCDD) arises during the hydrolysis of tetrachlorobenzene to form 2,4,5-trichlorophenol, the industrial precursor of 2,4,5-T. TCDD is a solid that is insoluble in water and slightly soluble in fats or hydrocarbons. TCDD decays slowly in the 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



# Vietnam Veterans and Agent Orange Exposure

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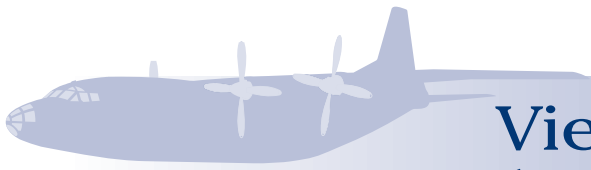
conclusive. The lethal dose in humans is not known, nor is that required to cause birth defects, if indeed there is such an activity. TCDD is strongly implicated as the main cause of chloracne, a disease that has affected employees in some plants manufacturing 2,4,5-T or its precursor, 2,4,5-trichlorophenol”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



# Vietnam Veterans and Agent Orange Exposure

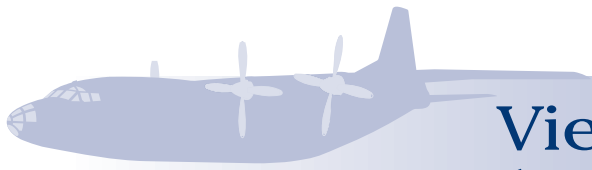
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would have a long-term ecological impact. The MRI assessment did not include field studies or trips to Vietnam, but involved a review of approximately 1,500 scientific papers. The study, *Assessment of Ecological Effects of Extensive or Repeated Use 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.



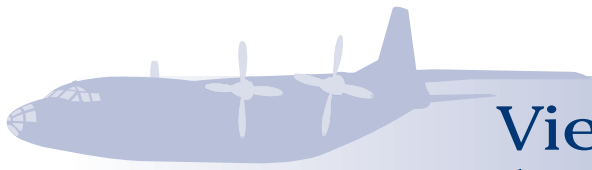
# Vietnam Veterans and Agent Orange Exposure

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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 . . .” (Wofle, 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” (Wofle, 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 (Wofle, 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 phaseout 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.



# Vietnam Veterans and Agent Orange Exposure

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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**

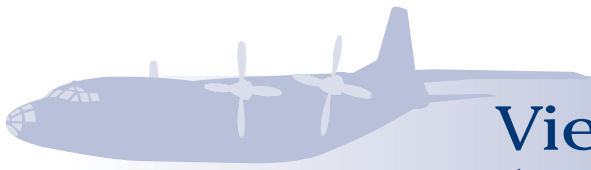
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### **Vietnam Veterans Return Home**

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).





# Vietnam Veterans and Agent Orange Exposure

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## 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).





# Vietnam Veterans and Agent Orange Exposure

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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.

## **Agent Orange Handbook**

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Excerpt from the Agent Orange Handbook, dated September 29, 2000 – The following describes the policies and procedures for the VA Agent Orange Registry Health Examination Program and VA medical treatment for Vietnam veterans with medical problems possibly related to Agent Orange exposure. The Handbook restates, clarifies and elaborates the policies and procedures in VA Manual M-10, Part I, which it supercedes. The full handbook is on-line on our Web site: <http://www.va.gov/agentorange>. Readers with questions about the handbook can contact the National Registry Coordinators in the Environmental Agents Service (131) in VA Central Office. The telephone number is 202-273-8580.

## **VHA Handbook 1302.1**

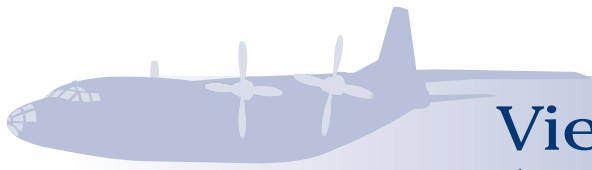
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On August 17, 2001, the handbook was expanded to provide registry examinations not only to the veterans who served in Korea between 1968 and 1969, but all other U.S. veterans who may have been exposed to dioxin or other toxic substance in a herbicide during the conduct of, or as a result of testing, transporting or spraying of herbicides for military purposes. The following is language from the earlier version.

### **1. Purpose and Authority**

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a. This Veterans Health Administration (VHA) Handbook sets forth clinical and administrative policies related to the maintenance of the VHA Agent Orange 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 U. S. (United States) veterans, male or female, 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 testing, transporting or spraying of herbicides for military purposes.



# Vietnam Veterans and Agent Orange Exposure

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b. Registry Examinations are authorized under section 703 of Public Law 102-585 (1992), whereby 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 that is similar to the Persian Gulf War Veterans Health Registry. Accordingly, the Department of Veterans Affairs (VA) will provide veterans who served in Korea in 1968 or 1969, and/or any U.S. veteran, male or female, 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 testing, transporting or spraying of herbicides and who requests an AOR examination with such an examination and will include the results of such examination in the AOR.

c. Furthermore, Public Law 100-687, “Veterans’ Judicial Review Act of 1988,” requires the Secretary of the Department of Veterans Affairs (VA) to organize and update the information contained in the VA AOR to enable 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 will continue to meet this mandate and extend it to include all other veterans who qualify for inclusion and participation in the AOR.*

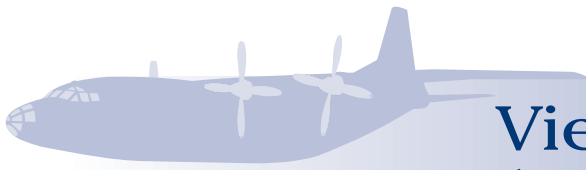
## d. Treatment Authority and Scope for Vietnam Veterans

(1) Congress granted special eligibility for VA care to qualifying Vietnam veterans possibly exposed to dioxin during their service in Vietnam. In accordance with Title 38 United States Code (U.S.C.) 1710(a)(2)(F) and 1710(e)(1)(A), Vietnam veterans exposed to dioxin are eligible for hospital care, medical services and nursing home care for any disability, notwithstanding that there is insufficient medical evidence to conclude that such disability may be associated with dioxin exposure. Thus, veterans who are not entitled to a presumption of service connection for a disability(s) may nonetheless have mandatory eligibility for VA health care for the disability if it is found by VA to be possibly associated to dioxin exposure during service in Vietnam.

(2) The special treatment authority is limited by statute to those veterans who:

(a) Served on active duty in the Republic of Vietnam during the period beginning on January 9, 1962, and ending on May 7, 1975.

(b) The Secretary of Veterans Affairs finds may have been exposed to dioxin and/or were exposed during such service to a toxic substance found in an herbicide or defoliant used for military purposes during such period; and



# Vietnam Veterans and Agent Orange Exposure

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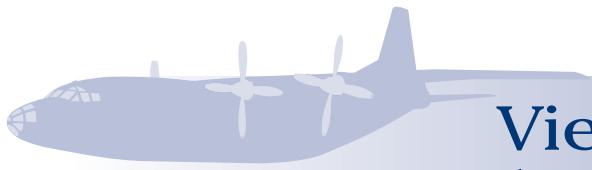
(c) Have conditions for which the National Academy of Sciences (NAS) found evidence of a possible association with herbicide exposure excluding gastrointestinal tumors (stomach cancer, pancreatic cancer, colon cancer and rectal cancer); and brain tumors for which the NAS found limited evidence of no association.

It is VHA policy that registry examinations will be provided to any 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 will be 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.*

## 2. Registry Examinations for Eligible Veterans

The registry examination protocol for veterans exposed to dioxin or other toxic substance in an herbicide or defoliant is described as follows:

- a. It is essential that a complete medical history, physical examination and interview be performed and documented on appropriate medical record standard forms, by or under the direct supervision of the Registry Physician (RP). A digital rectal examination (DRE) of the prostate should be included as part of the physical examination of a male veteran, if the veteran makes an informed decision to undergo prostate cancer screening.
- b. The person actually performing the physical examination will be identified by signature and title (Doctor of Osteopathy (D.O.), Doctor of Medicine (M.D.), Physician's Assistant (P.A.), Nurse Practitioner, etc.). Examinations completed by someone other than a physician must be completed by medical personnel privileged to do physical examinations. A physician's countersignature (preferably the RP's) is required on all examinations completed by an individual other than a physician.
- c. When an AOR examination is done as part of a compensation and pension (C&P) examination, the physical examination will be done by or under the direct supervision of the RP.
- d. Special attention will be given to those organs and/or systems that may be affected by exposure to herbicides containing Agent Orange. Particular attention will be paid to:



# Vietnam Veterans and Agent Orange Exposure

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## (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) **Porphyria Cutanea Tarda (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**

(b) **Hodgkin's disease**

## (4) **Respiratory System**

(a) **Cancer of the lung**

(b) **Cancer of the larynx**

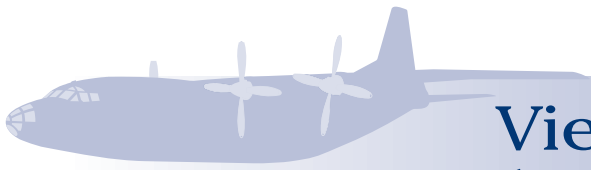
(c) **Cancer of the trachea**

(d) **Cancer of the bronchus**

## (5) **Hematologic System and Bone/Multiple myeloma**

(6) **Prostate Cancer** – Screening of Vietnam veterans for prostate cancer:

(a) “Veterans and Agent Orange: Health Effects of Herbicides Used in Vietnam (1994),” “Veterans and Agent Orange: Update 1996,” and “Veterans and Agent Orange: Update 1998,” 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 will seek advice about screening for prostate cancer.



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(b) 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 regarding prostate cancer screening differ.

(c) For instance, digital rectal examination (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.

(d) 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.

(e) 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.

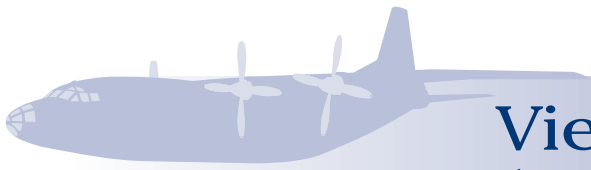
(f) If a Vietnam veteran requests a prostate cancer screening exam (DRE, transrectal ultrasound and/or PSA) after the controversy regarding the value of such testing has been explained to him, it is recommended that the RP honor the veteran's request.

(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)

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

(1) the time of onset of the veteran's symptoms or conditions,



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- (2) intensity,
  - (3) degree of physical incapacitation, and
  - (4) details of any treatment received.
- h. Each veteran will be given the following base line laboratory studies:
- (1) chest X-ray (as determined to be medically necessary),
  - (2) complete blood count,
  - (3) SMA-6, SMA-12, or equivalent blood chemistries and enzyme studies, and
  - (4) urinalysis

(5) **Hepatitis C** screening, with the patient's consent. *NOTE: Hepatitis C has particular import for VA because of its prevalence in VA's service population. (See Appendix G for Hepatitis C Standards for Evaluation and Testing)*

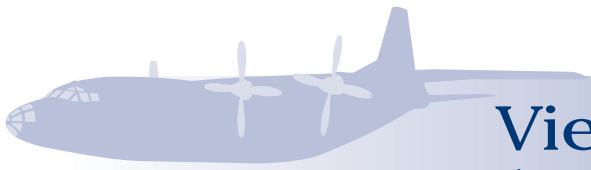
i. Appropriate additional diagnostic studies will be performed and consultations obtained as indicated by the patient's symptoms, the physical examination and the laboratory findings.

j. Non-routine diagnostic studies, such as sperm counts, will be performed only if medically indicated.

k. Laboratory test results must be filed in the CHR.

*NOTE: RPs should not obtain blood or serum and/or adipose tissue for analysis of TCDD. Surgical procedures will 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.*

*NOTE: Veterans eligible for inclusion in the AOR do not need to be enrolled in VA health care to receive the registry examinations. No copayments are required for the standard examination protocol or any associated medically appropriate follow-up diagnostic evaluations.*



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## 3. Evaluation of Condition (Vietnam Veterans)

a. Registry Examinations Findings. Where the findings of the registry examination reveal a condition requiring treatment, it is essential that the responsible staff physician make a determination and document whether the condition is possibly related to Agent Orange exposure or resulted from a cause other than the specified exposure.

b. Treatment. Vietnam veterans claiming health conditions related to Agent Orange exposure will be evaluated clinically by means of a physical examination and appropriate diagnostic studies (see par. 15).

(1) In making this determination, the physician will consider that the following types of conditions are not ordinarily considered to be due to such exposure:

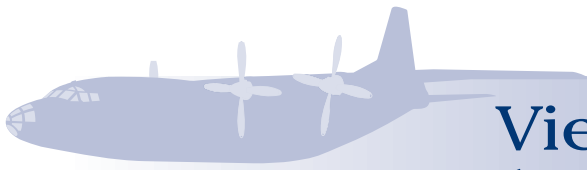
- (a) congenital or developmental conditions; e.g., scoliosis,
- (b) conditions which are known to have existed before military service,
- (c) conditions resulting from trauma; e.g., deformity or limitation of motion of an extremity,
- (d) conditions having a specific and well-established etiology; e.g., tuberculosis, gout, and
- (e) common conditions having a well-recognized clinical course; e.g., inguinal hernia, acute appendicitis, etc.

(2) Although the types of conditions listed above are not ordinarily considered to be due to Agent Orange exposure, if the staff physician finds that a veteran requires care under this provision for one or more of those conditions, the physician is to seek guidance from the facility Chief of Staff (COS) and the Registry Physician (RP) regarding the authorization for treatment. The decision and its basis will be clearly documented in the medical record and chart by the RP.

## 4. Eligibility Criteria

a. Any U.S. veteran, male or female, who may have been exposed to dioxin or other toxic substances in an herbicide or defoliant during the conduct of, or as a result of testing, transporting or spraying of herbicides for military purposes, expressing a concern relating to exposure to herbicides, is encouraged to participate in the AOR Program, which includes a thorough medical examination.





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b. Veterans are 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 will not in and of itself be considered such a claim. Veterans are advised of the routine procedure to file a claim through the Veterans Benefits Counselor (VBC) at the nearest VA facility, medical center or regional office.

## 5. Special Health Care Benefits for Children of Vietnam Veterans

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

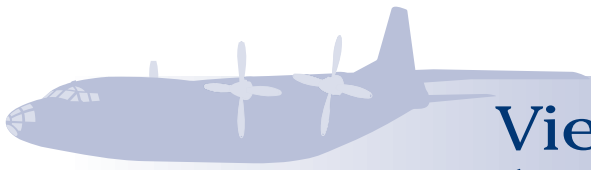
b. Title 38 U.S.C. Section 1803, provides benefits for children of Vietnam veterans who are born with spina bifida. VA must provide health care benefits for a child born with spina bifida or any disability that is associated with such condition. The term “child,” with respect to a Vietnam veteran, means 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. 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 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, contact the local regional office at 1-800-827-1000.*

## 6. Program Management

**NOTE:** *The Registry Physician (RP), Registry Coordinator (RC) and health administration staff of each VA facility often are the first points of contact for veterans requesting 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 should be well informed of the policies and procedures of this Agent Orange Program to provide good management and quality health care for this veteran population.*

a. **RP.** An RP and one or more alternates will be designated by the COS and approved by the Director at each facility.

b. **RC.** An RC and alternate(s) will be designated by administrative staff assigned by the facility Director. Final approval rests with the facility Director’s office.



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## **7. Responsibilities of Registry Physician (RP) and Registry Coordinator (RC)**

The RP is responsible for clinical management and will serve in an advisory capacity for the administrative management of the program conducted by the RC described in detail in the VHA Handbook 1302.1. The major responsibilities of the RP include:

a. counseling. The RP 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 registry examination as long as the demographic and medical information is sufficient to adequately complete the AOR code sheet for submission to the Austin Automation Center (AAC). The RP must:*

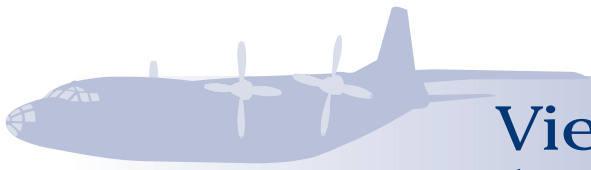
(1) conduct and document the physical examination in the medical record and/or in the Consolidated Health Record (CHR) at the time of the visit.

(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 physician must encourage the veteran to contact a VA medical center to include the diagnoses in the CHR and AOR. This diagnosis must be submitted over a non-VA physician's signature and on official letterhead paper.

(c) A code sheet identified as a "Type P," performed by a private physician for an examination conducted by a VA physician, will be completed with this diagnosis and subsequently forwarded to the AAC for inclusion in the AOR.



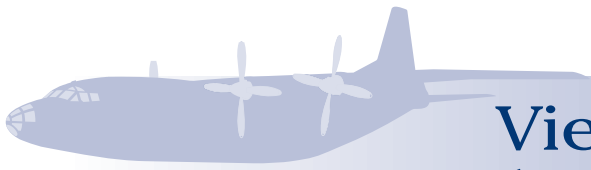
# Vietnam Veterans and Agent Orange Exposure

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- (2) Review and complete Part I of VA Form 10-9009 (May 2001), Agent Orange Registry Code Sheet, if necessary (see App. E).
- (3) Complete Part II of VA Form 10-9009 (May 2001) (see App. E).
- (4) Review the records of every veteran examined to ensure that a complete physical examination was performed and documented.
- (5) Personally discuss with each veteran the:
  - (a) findings of the physical examination and completed diagnostic studies. *NOTE: The interview will 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 will be documented in the veteran's CHR.*
  - (b) need for follow-up examination either recommended by the RP or requested by the veteran.
  - (c) preparing and signing follow-up letter. The RP will 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 within two weeks of the initial examination appointment. (see App. A and App. B of VHA Handbook 1302.1). *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 should be exercised in the preparation of this correspondence.*
  - (d) reviewing records. The RP 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.

## 8. Active Duty Military Personnel

When active duty members of the uniformed services apply to VA facilities for an Agent Orange examination, the Department of Defense (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.* The procedures for processing the examination are the same as those for a veteran participating in this program. A military facility may perform the Agent Orange examination according to VA instructions.



## 9. Incarcerated Veterans

While VA does not have to provide health care to incarcerated veterans, it does have an obligation to provide registry examinations to those veterans. Examinations can be provided in VA facilities, assuming VA can provide this service safely and without disrupting care to other veterans at that facility, or by contracting out. VA will not bill the Bureau of Prisons for the AOR examinations of incarcerated veterans. For purposes of entry into the AOR, VA medical facilities can provide assistance to penal authorities or institutions agreeable to providing examinations at the penal institution, without VA reimbursement.

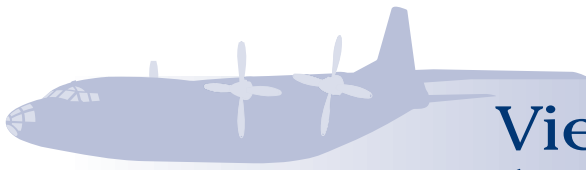
## 10. Veterans with Other Than Honorable Discharges

The requirements of M-1, Part I, Chapter 4, para. 4.38, or appropriate Handbook and Directive, apply to veterans with other than honorable discharges applying for AOR examinations.

## 11. 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), veteran's service organizations 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.* Historical videotapes may be utilized in orienting new employees, physicians and any other personnel with this program responsibility. VA Agent Orange Briefs and Agent Orange Reviews, prepared and distributed periodically to all VA facilities by EAS, VHA Headquarters, are another training resource. Current and back issues of this material are available on-line at <http://www.va.gov/agentorange/default.htm>.

b. Telephone conferences with VA medical facilities are held periodically by EAS, VHA Headquarters. NOTE: Minutes of these telephone conferences, research journal reprints, current Agent Orange Briefs and Reviews and other education items are distributed to all VA facilities by EAS, VHA Headquarters. In the near future, a Continuing Medical Education (CME) program guide for Agent Orange veterans' health will be issued. This will ensure that VA physicians are well informed regarding the latest developments of veterans' health issues.



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## **12. General Instruction for Completing VA Form 10-9009 (May 2001)**

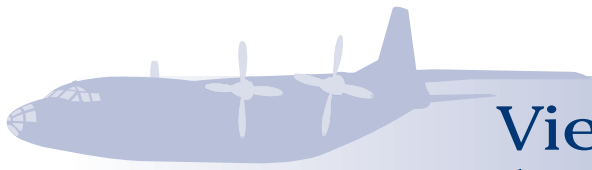
a. All items 1- 37 are described in detail in VHA Handbook 1302.1, with a sample code sheet for review.

b. A legible copy of the original code sheet or questionnaire contains both demographic and medical data and must be prepared and submitted to the Austin Automation Center (AAC), Austin, TX, in the initial and the first follow-up examinations (if required). The original code sheet will be filed in the medical record after verification for correctness by the AAC. Additional follow-up examinations, as required, will continue to be documented and filed in the Consolidated Health Record (CHR). A code sheet will be prepared for the first follow-up examination and a copy submitted to the AAC. All subsequent code sheets for follow-up examinations will not be submitted to the AAC, unless a diagnostic code differs from previously submitted code sheets. In that case, a code sheet will be prepared and submitted for entry into the Agent Orange Registry (AOR).

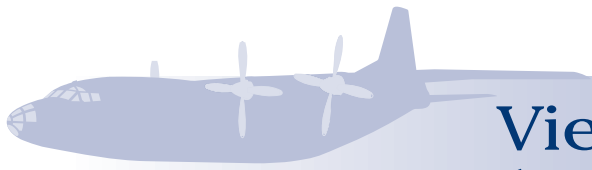
- (1) Part I of the code sheet should be completed in the presence of the veteran and in most cases, completed by the Registry Coordinator.
- (2) The Registry Physician (RP) should complete Part II of the code sheet at the time of the examination. A completed Part II will be returned to the coding clerks or other appropriate staff for assignment of the ICD-9-CM codes to Items 22, 28-29.

***NOTE:** Careful attention should be paid to assigning the correct code for both complaints (Item 22) and diagnosis (Items 28-29). Code 78999, for uncodable complaints (symptoms), is to be assigned only after all coding possibilities have been thoroughly explored. The indiscriminate use of 78999 may result in skewed or misleading statistics of minimal value.*

*The processing of the Agent Orange code sheets is the responsibility of the registry coordinator and instructions are included in the VHA Handbook 1302.1*



# APPENDICES



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## APPENDIX A

### AGENT ORANGE BRIEF FACT SHEET SERIES

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Fact sheets also are available from the office that produced them. Write to the Environmental Agents Service, (131) VA Central Office, 810 Vermont Avenue, N.W., Washington, DC 20420. The telephone number is (202) 273-8580. The fax number is (202) 273-9080, 9079, and 9078. The author's e-mail address is [d.j.rosen@hq.med.va.gov](mailto:d.j.rosen@hq.med.va.gov)





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## APPENDIX B

**IL 10-97-001**

In Reply Refer To: 13

• **January 8, 1997**

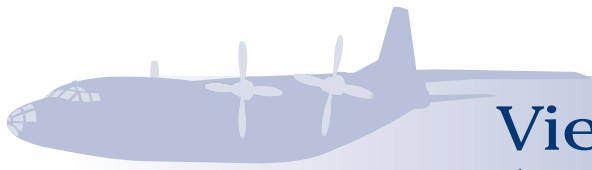
## **UNDER SECRETARY FOR HEALTH INFORMATION LETTER RECOMMENDATIONS FOR PROSTATE CANCER SCREENING OF VIETNAM VETERANS**

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### **1. Background**

a. Recently, the Institute of Medicine (IOM) of the National Academy of Sciences (NAS) released its report “Veterans and Agent Orange: Update 1996.” In this report, the IOM committee concluded that there is “limited/suggestive evidence of an association” between exposure to herbicides used in Vietnam and the development of prostate cancer. These conclusions were based on occupational epidemiological studies in which subjects were exposed to a variety of herbicides and herbicide components. Most of the agricultural studies showed some elevation in risk of cancer of the prostate. The three major studies in production workers showed a slight increased risk. However, most of the associations were relatively weak with a relative risk of less than 1.5. Studies among veterans and following environmental exposures have not shown an increased risk, although it also was noted in the report that most Vietnam veterans have not reached the age when this cancer tends to appear. According to the IOM’s calculations, if there were no increased risk of prostate cancer among Vietnam veterans, 179 cases would be expected among male Vietnam veterans in 1995. For the year 2000, the expected number would be 855.

b. Public Law 102-4 mandated that VA contract with NAS to obtain an independent scientific review of the evidence regarding associations between diseases and exposure to herbicides used in Vietnam. Whenever a positive association between a disease and exposure to Agent Orange is determined, the Secretary of Veterans Affairs is required by the law to establish a presumption of service connection for that disease. To be considered a “positive association,” the credible evidence in favor of an association must be equal to or greater than the credible evidence against an association. The law does not require that a cause and effect relationship be proved. Because of the provisions of the law and the findings of the IOM, the Department of Veterans Affairs (VA) has established a presumption that prostate cancer is related to exposures to herbicides in Vietnam. The specific section of VA 1996 Agent Orange Task Force report to the Secretary that dealt with this issue is as follows:



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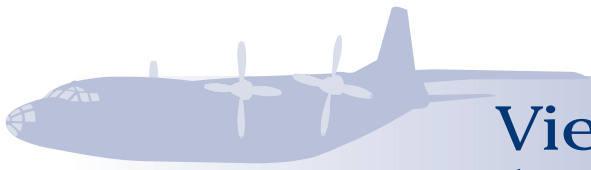
“The National Academy of Sciences (NAS) concluded that there was limited/suggestive evidence of an association between herbicide exposure and prostate cancer. NAS noted that two studies (Blair et al., 1993 and Morrison et al., 1993) showed statistically significant increased risks and that a number of others showed weak and statistically insignificant increased risks. The Task Force has certain reservations regarding the applicability of the Morrison and Blair studies. The Morrison study showed an overall decreased risk of prostate cancer in Canadian farmers and a decreased risk of prostate cancer in Saskatchewan, the province in which use of phenoxy herbicides was most prevalent. However, the Morrison study did find statistically significant increased risk of prostate cancer among several subgroups of farmers correlating to herbicide use on their farms (although actual exposure of such farmers was assumed rather than verified). Further, the Morrison study observed an increased risk associated with the number of acres sprayed, which may suggest an exposure-response relationship, if the study’s assumption of exposure is valid.

The Blair study found an increased prostate proportionate cancer mortality ratio (PCMR) among farmers in 22 of 23 states. Due to the reduction in deaths due to other cancers (e.g., lung cancers) in the subject populations, the increased PCMRs for prostate cancer do not necessarily indicate an increased prostate cancer risk among these populations. Further, the study did not specifically examine herbicide exposure, but encompassed farmers, generally, including livestock farmers whose use of herbicides is indeterminate. Also, no statistically significant increased PCMR for soft tissue sarcomas was found (despite the strong link between these malignancies and herbicide exposure found in numerous other studies) and a statistically significant increased PCMR for non-Hodgkin’s lymphoma (also previously linked to herbicide exposure) was found in only one of four regions. Those findings suggest that confounding factors might account for the results.

While the study’s deficiencies lessen its value in demonstrating an association between herbicide exposure and prostate cancer, the study does tend to corroborate the Morrison findings.

Most of the other studies identified by the NAS show slightly increased risks of prostate cancer among persons exposed or presumably exposed to herbicides of dioxin, although the risks generally are not statistically significant. The Task Force felt that prostate cancer presented a particularly close call as to whether the evidence supported a finding of a positive association, but ultimately concluded that the credible evidence for an association was at least equal to the credible evidence against an association.”

c. As a result of the establishment of service connection for prostate cancer in Vietnam veterans, it is anticipated that many Vietnam veterans will seek advice from their care providers about the disease, especially about screening for prostate cancer.



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d. While prostate cancer is one of the most serious malignancies for American men in terms of 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.

e. For instance, digital rectal examination 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 prostatic conditions. More definitive evaluation of individuals with positive screening tests, such as by performance of transrectal biopsies, carries the risk of morbidity from the procedure as well as causing anxiety for the patient.

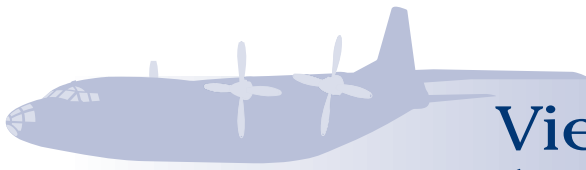
f. The ultimate benefit of early detection and treatment of prostate cancer in asymptomatic men also is unclear. Prostate cancer may not become clinically important in many afflicted individuals; surgery and other treatments all carry significant risks of untoward complications, and optimal therapy of the disease is uncertain.

g. The United States Preventive Services Task Force concluded that: “Routine screening for prostate cancer with digital rectal examinations (DRE), serum tumor markers (e.g., PSA), or transrectal ultrasound is not recommended.”

h. Other authorities offer differing opinions on the issue. Citations in several medical textbooks endorse screening using techniques such as digital rectal examination. The American Cancer Society, American Urological Association and the American College of Radiology offer similar recommendations. Others such as the Canadian Task Force on the Periodic Health Examination recommend against routine use of screening for prostate cancer. Perhaps the best summary was offered by the Office of Technology Assessment, which concluded that research to date had not determined whether or not systematic early screening for prostate cancer would save lives and that the choice to have screening or forego it would depend on patient values.

## 2. Conclusions

When dealing with values, health care clinicians must respond to the background, experience and perspective of the patient. Although epidemiological studies can yield recommendations that are true in the aggregate, individual patients are faced with a difficult decision since they have but one life to live. For them, the value of seeking cancer and destroying it may be worth any risk imposed by a therapy. Many Vietnam veterans may be entitled to disability compensation if they are diagnosed with prostate cancer. There may be considera-



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tions other than purely clinical considerations that may be important for these veterans. 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.

### **3. Recommendations**

a. Clinicians providing care to Vietnam war veterans need to be prepared to discuss the risk of prostate cancer in males in the United States and the evidence for increased risk in Vietnam veterans; they need to be able to discuss the risks and benefits of screening for the disease.

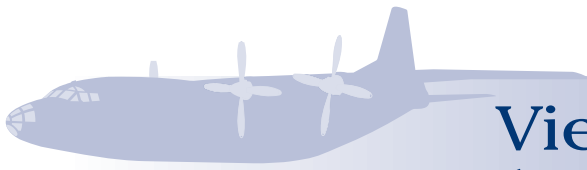
b. If a Vietnam veteran requests a prostate cancer screening examination (DRE, transrectal ultrasound and/or PSA), it is recommended that the controversy regarding the value of such testing be explained to him. Although screening tests have adequate sensitivity to detect clinically important cancers at an early stage, they are likely to detect a large number of cancers of uncertain clinical significance. The natural history of prostate cancer is currently too poorly understood to determine which cancers are destined to produce clinical symptoms or affect survival. More fundamentally, there is no evidence to determine whether or not early detection and treatment improves survival. Widespread screening will subject many men to anxiety from abnormal test results and the discomfort of prostate biopsies. Aggressive treatment for screen-detected cancers will expose thousands of men to risks of incontinence, impotence and death without clear evidence of benefit. Decision-analysis models suggest that the negative impact of these complications on quality of life may outweigh the potential benefits of treatment. The references listed in Paragraph 4 provide detailed information in this regard. If the patient still desires to have these tests performed, it is recommended that the VA facility honor the patient's request.

### **4. References**

a. U.S. Preventive Services Task Force. Guide to Clinical Preventive Services. 2nd ed. Baltimore: Williams and Wilkins, 1996.

b. Office of Technology Assessment. Costs and Effectiveness of Prostate Cancer Screening in Elderly Men. Washington, D.C., U.S. Government Printing Office, 1995. (Publication No. OTA-BP-H-145).

c. Veterans Health Administration. Preventive Medicine Program Information Bulletin IB-11-89 August 1996 (Pending).



# Vietnam Veterans and Agent Orange Exposure

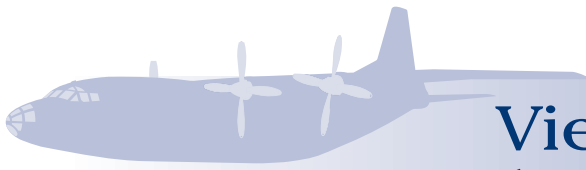
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- d. Veterans and Agent Orange: Update 1996. IOM Report, 1996, pages 217-223.
- e. Voss JD, Prostate “Cancer, Screening, and Prostate-specific Antigen: Promise or Peril,” Journal of General Internal Medicine, 1994;9:468-474.
- f. Gohagan JK, Kramer BS, and Greenwald P, “Screening for Prostate Cancer,” American Journal of Preventive Medicine. 1994;10:245-246.
- g. Litwin MS, Hays RD, Fink A, et. al. Quality-of-Life Outcomes in Men Treated for Localized Prostate Cancer,” Journal of the American Medical Association. 1995;273:129-135.
- h. Krahn MD, Mahoney JE, Eckman MH, et al. “Screening for Prostate Cancer: A Decision-Analytic View,” Journal of the American Medical Association .1994;272:773-780.
- i. Aronowitz R, “To Screen or Not to Screen: What is the Question?” Journal of General Internal Medicine. 1995;10:295-297.

## 5. Patient Education Materials

Veterans interested in learning more about prostate cancer will find an excellent review in the April 1, 1996, issue of Time magazine. Other materials include:

- a. Korda, Michael. Man to Man: Surviving Prostate Cancer, Random House; New York, NY: 1996.
- b. Marks, Sheldon, M.D. Prostate and Cancer, Fisher Books; Tuscon, AZ: 1996.
- c. Walsh, Patrick, and Worthington, Janet. The Prostate: A Guide for Men and the Women Who Love Them, Johns Hopkins Press; Baltimore, MD: 1995.
- d. Scardino Peter, M.D. Straight Talk on Prostate Health, Video produced by Warner Vision Health Studios; 1996.
- e. Prostate Cancer, Video produced by Time Life Medical: 1996.
- f. When Someone You Love Has Prostate Cancer, Video produced by MedCom, Inc.: 1995.
- g. World Wide Web site: <http://oncolink.upenn.edu/disease/prostate/>.



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## **6. Additional Information**

For questions or additional information about issues relating to prostate cancer screening in VHA facilities, contact Robert J. Sullivan Jr., M.D., M.P.H., Director of the VA National Center for Health Promotion and Disease Prevention at FTS (700) 671-5880, extension 222 or at (919) 416-5880, extension 222. For questions or additional information concerning Vietnam veterans and Agent Orange, contact the Office of Public and Environmental Hazards at (202) 273-8580.

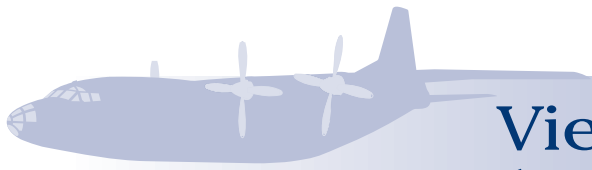
Kenneth W. Kizer, M.D., M.P.H.

Under Secretary for Health

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## APPENDIX C

### SUMMARY OF VA MORBIDITY STUDIES ON VIETNAM VETERANS

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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.).

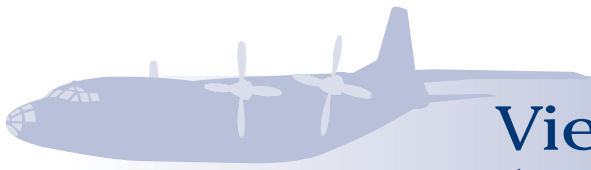
One of the first morbidity studies to be conducted by VA (**Table 4**) compared 234 Vietnam-era veterans with soft tissue sarcoma to 13,496 Vietnam-era veterans with other diagnoses. Both groups were selected from the VA's database of inpatient hospitalizations, known as the Patient Treatment Files (PTF). 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 (4).]\*

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.

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\*For references in Appendices C-F, see footnotes at the end of Chapter 7.





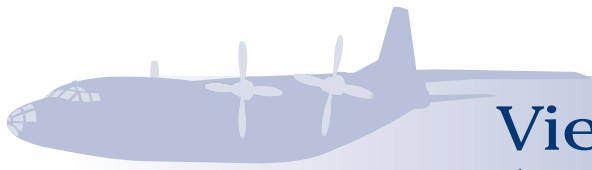
# Vietnam Veterans and Agent Orange Exposure

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 (5).

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 (6). 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 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 (7).



# Vietnam Veterans and Agent Orange Exposure

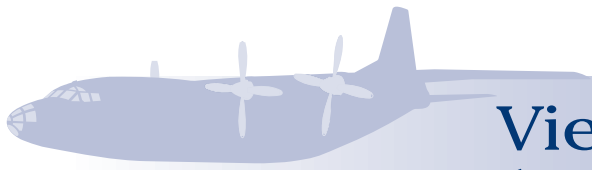
As all cases and controls were Vietnam veterans, the risk of testicular cancer was assessed relative to surrogate measures of Agent Orange exposure. Among these surrogate measures were branch of service, serving as a ground troop, geographical area of Vietnam service and type of duty in Vietnam (combat vs. non-combat). Military service characteristics for each veteran was 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 (8).

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



# Vietnam Veterans and Agent Orange Exposure

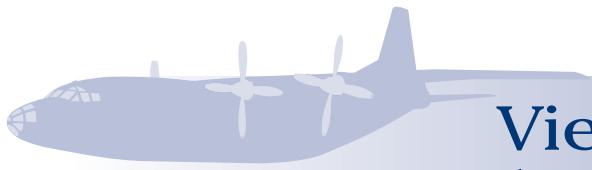
was an increased risk of Hodgkin's disease associated with Vietnam service in general, it was not statistically significant (OR, 1.28; 95% C.I. 0.94-1.76). There also was no increased risk of Hodgkin's disease associated with the surrogate measures of Agent Orange exposure.

A 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. Colon cancer veterans were selected as an additional control group to reduce the bias possibly caused by the potential preferential admission by VAMCs of Vietnam veterans with cancer. If Vietnam veterans with cancer were admitted to VAMCs more readily than other veterans, this would tend to bias the study to find an increase risk of cancer associated with Vietnam service (9).

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. The feasibility (pilot) study analyzed response rates, availability of medical records to validate veterans-reported health history and other study requirements to show that a large-scale study is feasible.

For the pilot study, letters were sent to 500 randomly selected veterans, inviting them to participate in this investigation. The results of 405 telephone interviews and 95 serum dioxin measurements conducted during the pilot study demonstrated that the Army Chemical Corps Vietnam era veterans could be located and were willing to participate in the larger telephone health survey. Further, these men, often with assistance from their wives, were able to provide considerable detail on the reproductive history for pregnancies of offspring they had fathered. Serum concentrations of dioxins were found to be significantly correlated with self-reported history of participants in the spraying of herbicides during their Vietnam service.



## APPENDIX D

### SUMMARY OF VA MORTALITY STUDIES ON VIETNAM VETERANS

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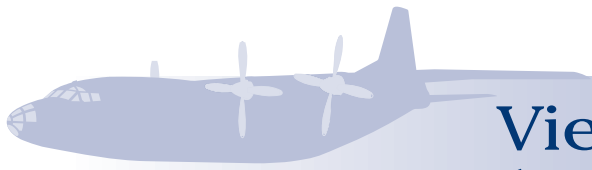
These studies (**Table 5**) were carried out to more completely assess possible long-term health consequences of serving in Vietnam. Much of this research used a retrospective cohort study design, comparing the cause-specific mortality of groups of Vietnam veterans to that of control or reference groups 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 (15). 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



# Vietnam Veterans and Agent Orange Exposure

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).

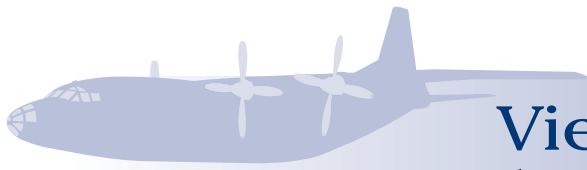
Adding 11,325 deaths through 1984, this study was the third companion study to the 1988 mortality study (16). Comparing 24,145 Army Vietnam veteran deaths to 27,917 deaths among Army non-Vietnam veterans, there were statistically significant excesses of deaths due to laryngeal cancer (PMR, 1.69), all 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 (17). 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 (18). 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





# Vietnam Veterans and Agent Orange Exposure

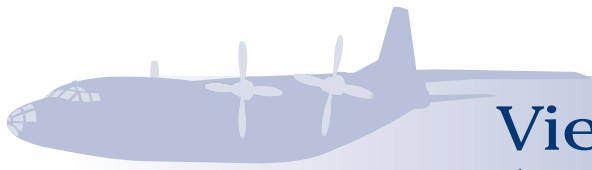
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89.6 percent of Vietnam veteran deaths and 92.5 percent of non-Vietnam veteran deaths. Assessing the relative risk of cause-specific mortality associated with Vietnam service, there were increased risks of overall mortality (RR, 1.15; 95% C.I. 1.02-1.29). 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 (19). 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 (20). 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).



# Vietnam Veterans and Agent Orange Exposure

## VA's Study on Morbidity in Women Vietnam Veterans

The first study of women Vietnam veterans consisted of 4,582 women Vietnam veterans and a comparison group of 5,324 non-Vietnam women veterans (21). 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 (22). 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).





# Vietnam Veterans and Agent Orange Exposure

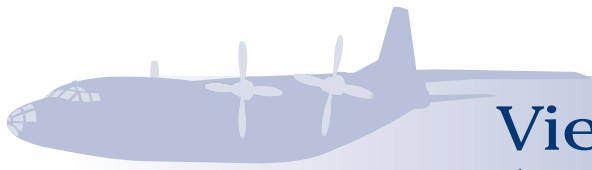
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## VA's Studies on PTSD in Vietnam Veterans

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 (23). 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 comorbid mental disorders recorded on the Agent Orange Registry, while the other group had no recorded comorbid 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 comorbid disorders were much higher.



## APPENDIX E

### SUMMARY OF NON-VA MORBIDITY STUDIES OF VIETNAM VETERANS

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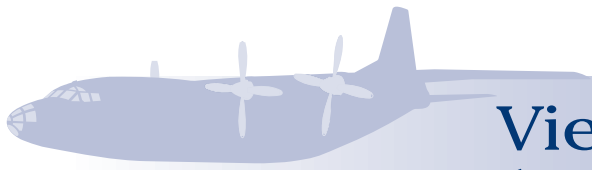
CDC conducted the bulk of these studies, as part of their “Vietnam Experience Study.” The other CDC studies were part of the “Selected Cancers Cooperative Study Groups,” designed to address the risk of cancers reported to be associated with herbicides exposure, but were of too-low incidence for a cohort study to examine.

#### Other non-VA morbidity studies

These studies, while presented separately in **Table 6**, are discussed collectively as all were part of the CDC’s Selected Cancers Cooperative Study (31-33). 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). 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 Agent Orange exposure specifically.



# Vietnam Veterans and Agent Orange Exposure

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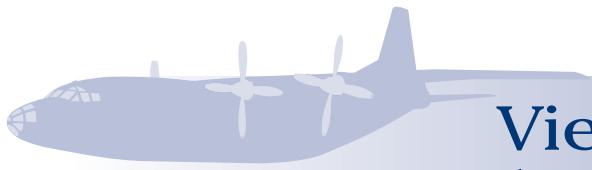
## APPENDIX F

### SUMMARY OF NON-VA MORTALITY STUDIES OF VIETNAM VETERANS

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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. The Vietnam veterans were compared to 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) (34).

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) (35).



## APPENDIX G

### INFORMATION ABOUT HEPATITIS C SCREENING

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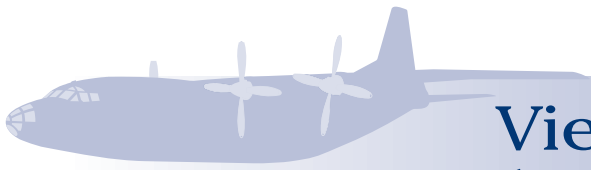
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**June 11, 1998**

#### **UNDER SECRETARY FOR HEALTH'S INFORMATION LETTER**

#### **HEPATITIS C: STANDARDS FOR PROVIDER EVALUATION AND TESTING**

- 1. Background:** Hepatitis C virus (HCV) infection was first recognized in the 1970's, when the majority of transfusion-associated infections were found to be unrelated to hepatitis A and B, the two hepatitis viruses recognized at the time. This transmissible disease then was simply called "non-A, non-B" hepatitis. Sequencing of the HCV genome was accomplished in 1989, and the term hepatitis C was subsequently applied to infection with this single strand ribonucleic acid (RNA) virus. The genome of HCV is highly heterogeneous and, thus, the virus has the capacity to escape the immune surveillance of the host; this circumstance leads to a high rate of chronic infection and lack of immunity to reinfection. Reliable and accurate (second-generation) tests to detect antibody to HCV were not available until 1992, at which time an effective screening of donated blood for HCV antibody was initiated.
2. HCV infection is now recognized as a serious national problem. Nearly 4 million Americans are believed to be infected, and approximately 30,000 new infections occur annually. Only about 25 to 30 percent of these infections will be diagnosed. HCV is now known to be responsible for 8,000 to 10,000 deaths annually, and this number is expected to triple in the next 10 to 20 years.
3. Hepatitis C has particular import for the Department of Veterans Affairs (VA) because of its prevalence in VA's service population. For example, a 6-week inpatient survey at the VA Medical Center, Washington, DC, revealed a prevalence of 20 percent antibody positivity. A similar investigation at the VA Medical Center San Francisco, CA, found 10 percent of inpatients to be antibody positive. Veterans Health Administration (VHA) Transplant Program data reveal that 52 percent of all VA liver transplant patients have hepatitis C. An electronic survey of 125 VA medical centers conducted by the Infectious Disease Program Office from February through December of 1997 identified 14,958 VA patients who tested positive for hepatitis C antibody. Clearly, HCV infection is becoming a leading cause of cirrhosis, liver failure and hepatocellular carcinoma. The incidence and prevalence rates are higher among nonwhite racial and ethnic groups.



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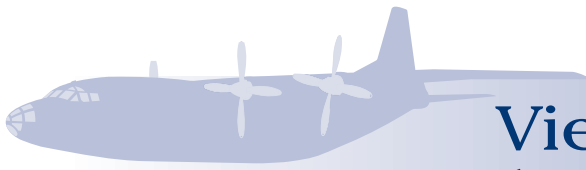
4. HCV is transmitted primarily by the parenteral route. Sources of infection include transfusion of blood or blood products prior to 1992, injection drug use, nasal cocaine, needlestick accidents, and, possibly tattooing. Sexual transmission is possible, and while the risk is low in a mutually monogamous relationship, persons having multiple sexual partners are at higher risk of infection.

5. After infection, 90 percent of HCV infected patients will develop viral antibodies within three months. The disease becomes chronic in 85 percent of those infected, although one-third will have normal aminotransferase levels. The rate of progression is variable, and chronic HCV infection leads to cirrhosis in at least 20 percent of infected persons within 20 years; one to five percent of those infected will develop hepatocellular carcinoma.

6. At present, treatment for HCV infection is limited, consisting primarily of administration of interferon alpha, with or without the addition of ribavirin. The treatment benefits some patients and appears to alter the natural progression of the disease, although evidence is lacking that it will translate into improvements in quality of life or reduction in the risk of hepatic failure. Current regimens include the use of six or 12-month courses of interferon alpha, with or without ribavirin. The recent National Institutes of Health Consensus Statement on Hepatitis C concluded that liver biopsy should be performed prior to initiating treatment. If little liver damage is apparent, therapy need not be initiated; treatment is probably appropriate for those with significant histologic abnormalities. However, data presented at this Consensus Conference indicated that significant uncertainty remains regarding indications for treatment. Treatment options and a listing of VA protocols will be the subject of a separate Information Letter.

7. A number of serologic tests are available for diagnosis and evaluation of HCV infection. Enzyme immunoassays (EIA) are “first line” tests and are relatively inexpensive. They contain HCV antigens and detect the presence of antibodies to those antigens. Recombinant immunoblot assays (RIBA) contain antigens in an immunoblot format, and are used as supplemental or confirmatory tests. Viral RNA can be detected by reverse-transcription polymerase chain reaction (PCR) testing. Quantitative HCV RNA testing uses target amplification PCR or signal amplification (branched deoxyribonucleic acid (DNA)) techniques.

8. The EIA tests have sensitivities in the range of 92 to 95 percent. Specificities depend upon the risk stratification pre-testing. That is, in blood donors with no risk factors, 25 to 60 percent of positive EIA also are positive by PCR for viral RNA. About 75 percent of low risk donors with positive EIA and RIBA will be positive by PCR. Positive EIA tests should be confirmed by RIBA. If that also is positive, the patient has, or has had, HCV infection. In high-risk patients who are EIA positive, particularly if there is evidence of



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liver disease, supplemental testing with RIBA or HCV RNA analysis is probably unnecessary. Quantitative RNA tests may be useful in the selection and monitoring of patients undergoing treatment.

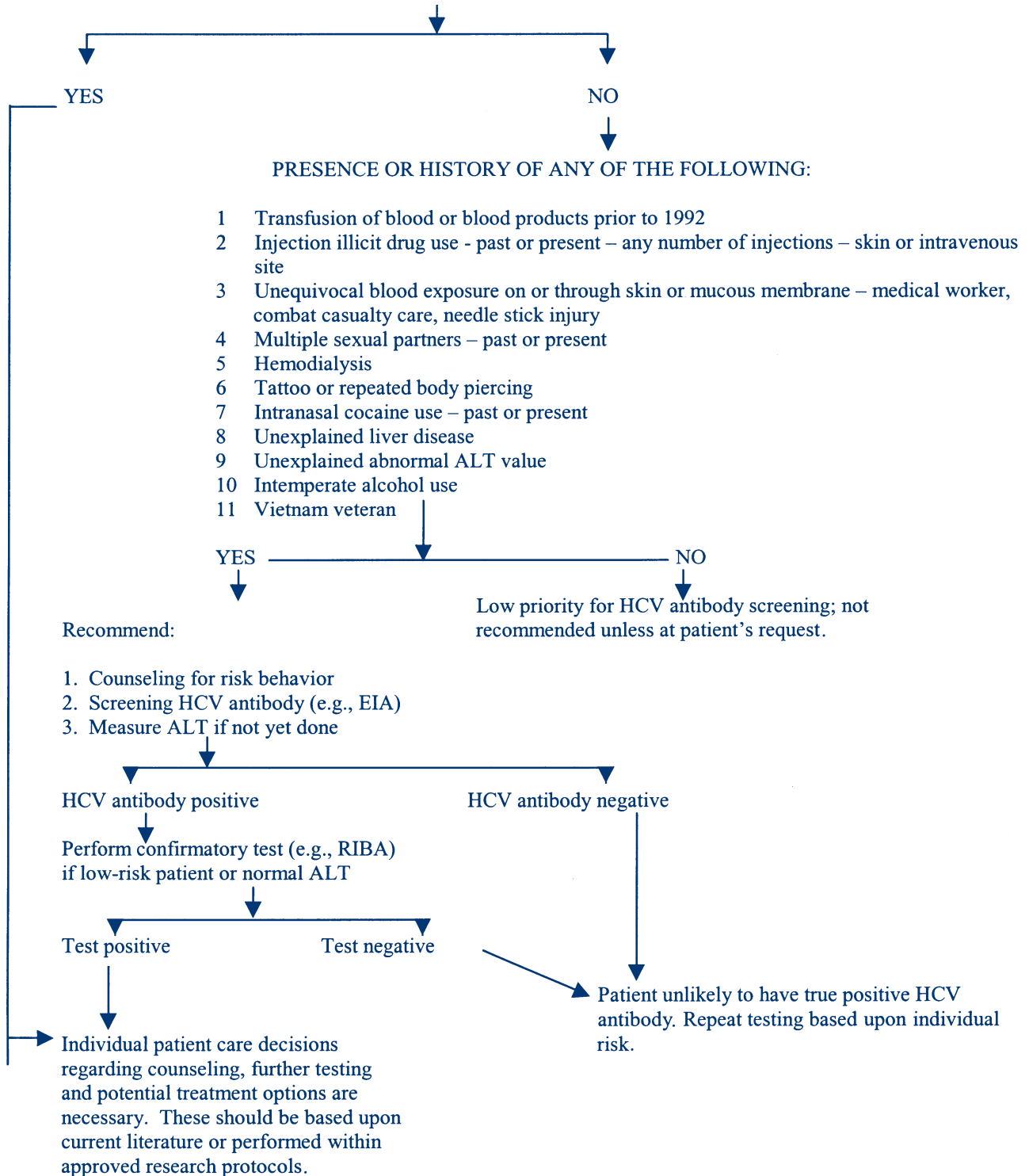
9. All patients will be evaluated with respect to risk factors for hepatitis C, and this assessment documented in the patient's chart. Based upon those risk factors, antibody testing should be utilized as elaborated on in the algorithm found in Attachment A.

S/Kenneth W. Kizer, M.D., M.P.H.  
Under Secretary for Health

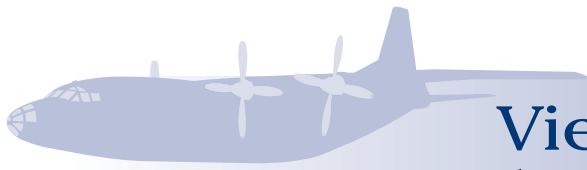
Attachment

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**ATTACHMENT A  
HEPATITIS C VIRUS ANTIBODY SCREENING  
FOR THE VETERAN POPULATION  
HISTORY OF POSITIVE TEST FOR HEPATITIS C VIRUS ANTIBODY**







## APPENDIX H

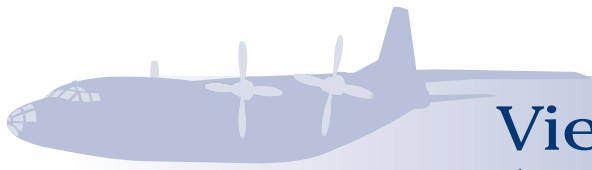
### ADDITIONAL REFERENCES

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In addition to the six dozen references cited in Chapters 7 and 8 and the information resources identified in Chapter 9, we recommend the series of herbicide literature analyses produced by the National Academy of Sciences' Institute of Medicine (IOM). Four comprehensive volumes of *Veterans and Agent Orange* have been produced to date (published in 1994, 1996, 1998 and 2000), with additional updates planned. Readers with a special interest in diabetes also may wish to obtain the IOM report *Veterans and Agent Orange: Herbicide – Dioxin Exposure and Type 2 Diabetes*, published in 2000.

These reports are available for purchase from the National Academy Press, 2101 Constitution Avenue, NW, Box 285, Washington, DC 20055. For additional information or to order, call toll-free 1-800-624-6242, or 202-334-3313 in the Washington metropolitan area.

Copies of these reports also were sent to all VA Medical Center libraries. Some IOM publications may be available on-line at the National Academy Press Web site at <http://www.nap.edu/>.



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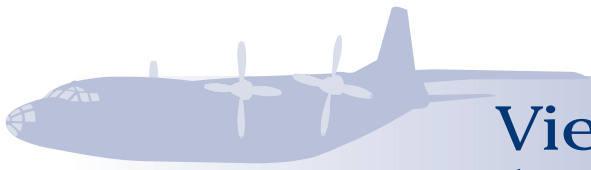
## Vietnam Veterans and Agent Orange Exposure

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### Independent Study Test Questions for CME Credit

Select the best answer for each question

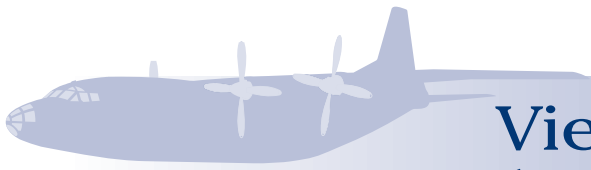
1. **Approximately how many U.S. personnel served in Vietnam?**
  - a) 300,000
  - b) 1,000,000
  - c) 3,000,000
  - d) 10,000,000
  
2. **Which U.S. department or agency has a roster of nearly all U.S. Vietnam veterans?**
  - a) DoD
  - b) VA
  - c) EPA
  - d) None
  
3. **Which U.S. veterans does the VA presume were 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.



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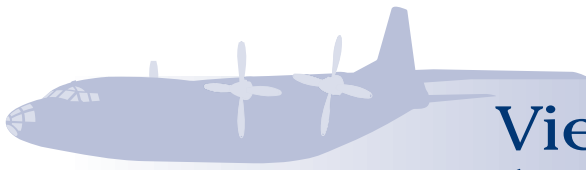
5. **Children of both male and female Vietnam veterans with which birth defect currently may receive VA benefits?**
  - a) Spina bifida
  - b) Down's syndrome
  - c) Cerebral palsy
  - d) Cleft palate
  
6. **Which of the following respiratory tract malignancies currently is not presumed to be due to herbicide exposure in Vietnam veterans?**
  - a) Pharynx
  - b) Larynx
  - c) Trachea
  - d) Lung
  
7. **Which of the following hematological and lymphoid malignancies currently is not presumed to be due to herbicide exposure in Vietnam veterans?**
  - a) Hodgkin's disease
  - b) Non-Hodgkin's lymphomas
  - c) Lymphoid leukemia
  - d) Multiple myeloma
  
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 veterans should receive blood dioxin determinations?**
  - a) All Vietnam veterans.
  - b) Those in the "brown water" navy.
  - c) Participants in special research studies.
  - d) Those who also served in Korea.



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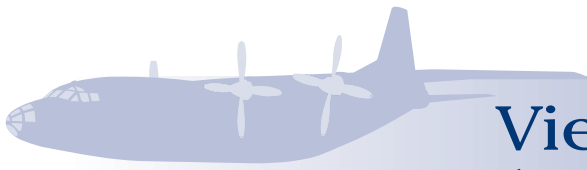
10. **Which external advisory body currently is utilized by VA to provide periodic comprehensive reviews of the medical and scientific literature regarding possible health effects from herbicide exposures?**
  - a) The National Institutes of Health
  - b) The National Academy of Sciences
  - c) The Centers for Disease Control and Prevention
  - d) The Veterans Advisory Committee on Environmental Hazards
  
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) 13
  - b) 25
  - 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.



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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 doesn't the Federal Government conduct 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. **How can Vietnam veterans learn more about possible Agent Orange health effects?**
  - 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: <http://www.va.gov/agentorange>
  - d) All of the above.



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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 claim by a Vietnam 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 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 veterans
  - b) All veterans who served in Korea in 1968 and 1969 or 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 1302.1):**
  - a) describes policies and procedures for implementation of the VA Agent Orange 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 veterans and their families.





