

The story of Agent Orange

Agent Orange was sprayed in Vietnam from 1965-71 to remove leaves from trees and to destroy crops. Many Americans exposed to dioxin, Agent Orange's cancer-causing byproduct, suffer health problems. The Veterans Administration will release new regulations for damage suits this fall. Here is a look at the Agent Orange story.

■ Black areas on map show where Agent Orange was sprayed

How much Agent Orange was used

The Air Force's Operation Ranch Hand sprayed 11.3 million gallons of Agent Orange from 1965-71. The Army, Navy and Marines also sprayed an undetermined amount of Agent Orange.

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Agent Orange timeline

Major events over the last 27 years.

- 1962 U.S. military test sprays Agents Pink and Purple in Vietnam
- 1965 U.S. military begins spraying Agents Orange, White and Blue
- 1966 U.S. troops told Agent Orange is non-toxic
- 1968 U.S. military sprays 12,000 gallons of Agent Orange in Korea
- 1977 Vietnam veteran sues manufacturers of Agent Orange; stockpile burned over the Pacific Ocean
- 1978 TV program discusses Agent Orange
- 1979 Environmental Protection Agency bans dioxin; Congress begins hearings on involuntary exposure; bill passed to design Agent Orange study
- 1980 VA starts Exposure Validation Study
- 1981 President signs bill expanding VA study to include other environmental hazards in Vietnam
- 1982 Centers for Disease Control (CDC) start Vietnam Experience Study on health
- 1983 VA transfers Exposure Validation Study to CDC; President signs \$54 million funding bill; Air Force releases report on spraying missions
- 1984 Dioxin manufacturers settle out of court; \$180 million fund created for veterans
- 1987 CDC cancels Exposure Validation Study after spending \$43 million
- 1988 CDC completes Vietnam Experience Study
- 1989 Congress investigates CDC's cancelling Exposure Validation Study

Other methods of spraying



Vehicles

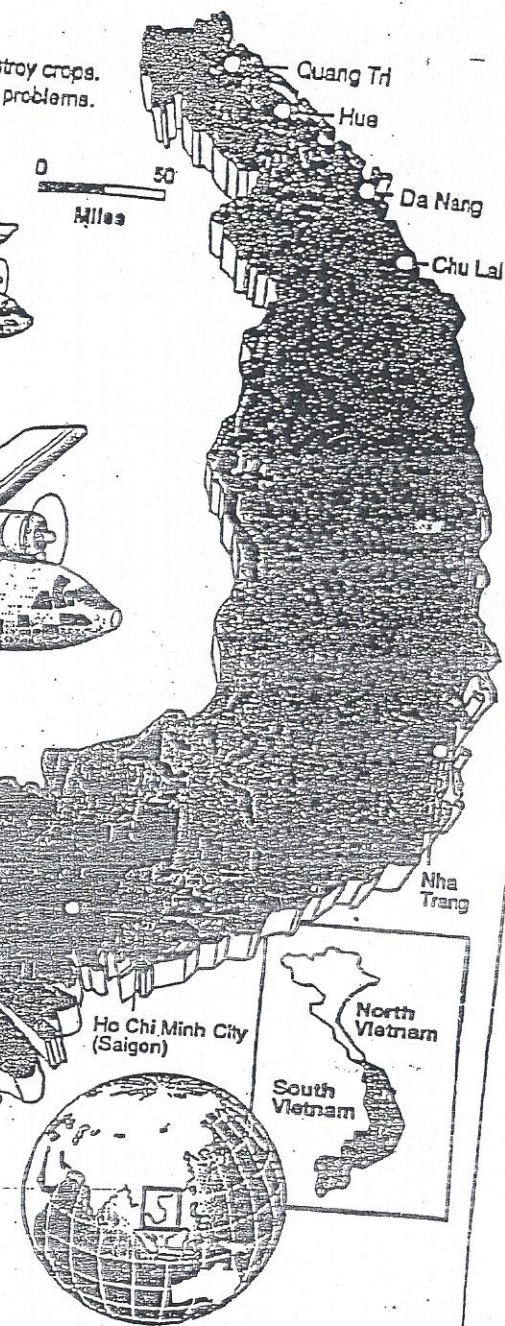
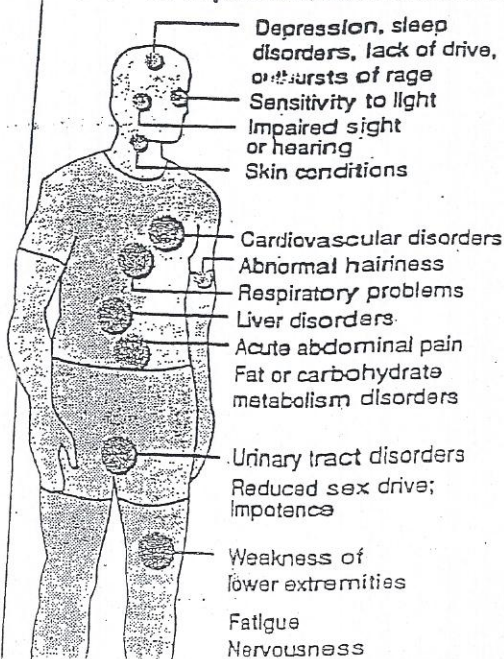


Helicopter



Troops

Symptoms of possible contamination



Herbicides used

- | | | |
|----------------|------------|----------------|
| ■ Agent Pink | ■ Diquat | ■ Dalapon |
| ■ Agent Purple | ■ Bromacil | ■ Agent Orange |
| ■ Agent Green | ■ Tandex | ■ Agent White |
| ■ Dinoxol | ■ Monuron | ■ Agent Blue |
| ■ Trinoxol | ■ Diuron | |

Phased testing

- 1962-64: 11 chemicals tested in Corps IV
- 1965-68: Tactic for warfare
- 1968-71: Used in war zones, not population centers

Vietnam veteran facts

- 2.5 million exposed to dioxin
- 255,000 filed damage claims against Agent Orange manufacturers
- 230,000 requested the VA to examine them for dioxin poisoning
- 35,000 filed claims with the VA, citing Agent Orange

Did you know?

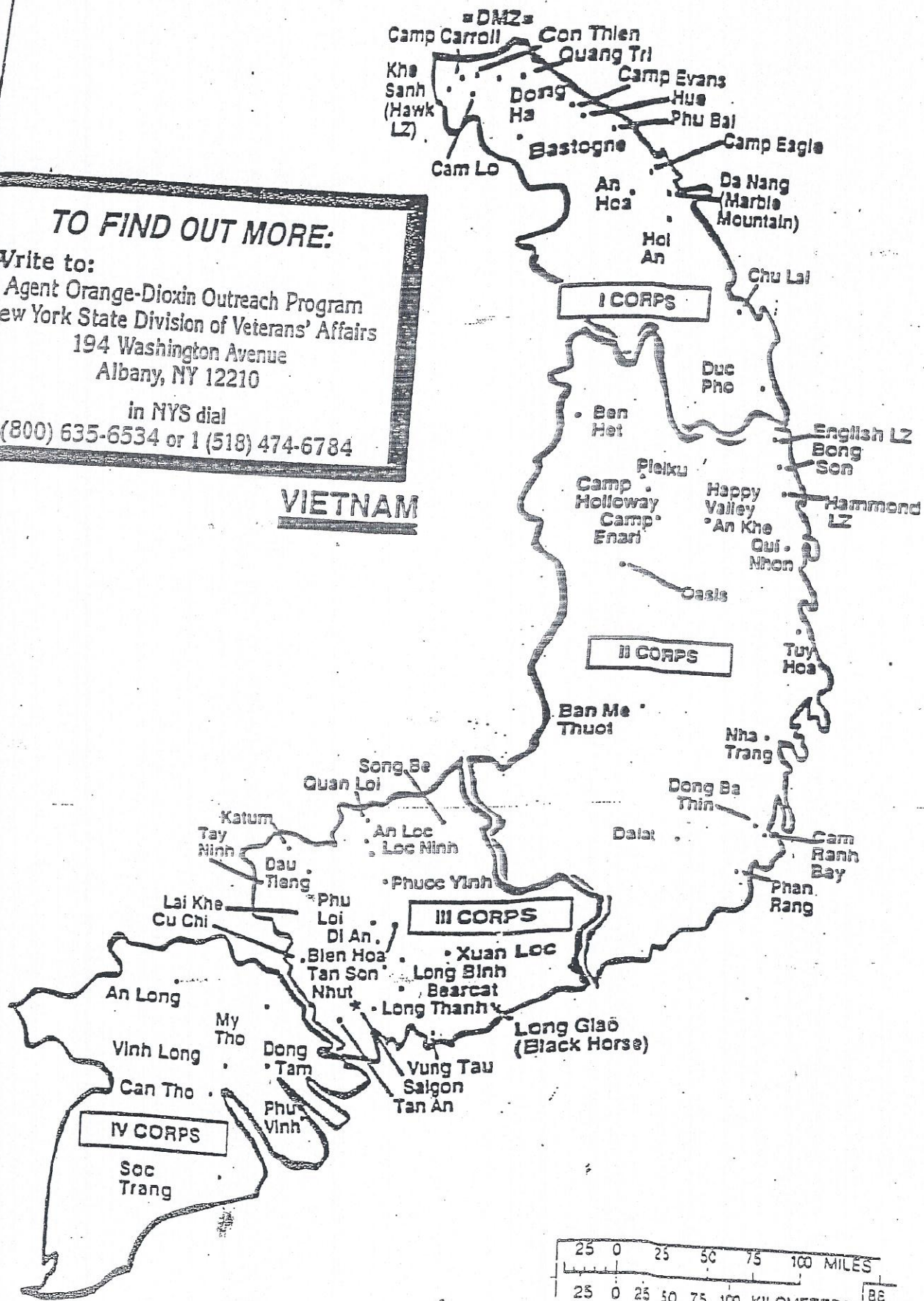
- FDA banned hexachlorophene in soaps and deodorants in 1972 because it contained dioxin

Map of South Vietnam

TO FIND OUT MORE:

Write to:
 Agent Orange-Dioxin Outreach Program
 New York State Division of Veterans' Affairs
 194 Washington Avenue
 Albany, NY 12210
 in NYS dial
 1(800) 635-6534 or 1 (518) 474-6784

VIETNAM



25 0 25 50 75 100 MILES
 25 0 25 50 75 100 KILOMETERS
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HERBICIDE MISSIONS IN THE REPUBLIC OF SOUTH VIETNAM

DIOXIN OUTREACH PROGRAM

Military Region

Dates

Amounts in gallons

I CORP MILITARY REGION

		Orange	Blue	White
Province 1 Quang Tri	9/11/66 to 9/9/70	515,615		
Province 2 Thua Thien	2/10/66 to 9/22/70	753,335	25,790	111,410
Province 3 Quang Nam	2/17/66 to 2/24/70	352,945	78,367	186,751
Province 4 Quang Tin	2/9/66 to 10/14/70	173,275	19,450	63,200
Province 5 Quang Ngai	2/12/66 to 10/15/70	219,460	44,770	50,470
Province 91 Hua	No Information Available		86,737	40,770
Province 92 Da Nang	No Information Available			

II CORP MILITARY REGION

Province 6 Kontum	8/2/65 to 9/20/70	910,415	74,700	131,340
Province 7 Binh Dinh	9/6/65 to 12/8/71	497,952	97,242	64,711
Province 8 Pleiku	10/14/65 to 5/8/70	197,585	14,190	191,363
Province 9 Phu Ben	10/29/65 to 10/22/70	12,300	10,900	21,600
Province 10 Phu Yen	10/7/65 to 11/17/70	207,707	58,120	19,831
Province 10 Dar Lac	9/12/67 to 12/16/70	217,900	23,119	37,590
Province 12 Khanh Hoa	8/28/65 to 1/7/70	132,596	45,591	77,215
Province 13 Ninh Thuan	4/13/66 to 10/7/71	104,815	33,100	2,075
Province 14 Tuyen Duc	10/5/68 to 10/5/70	485	4,540	0
Province 15 Quang Duc	6/24/67 to 3/26/70	277,575	12,500	135,400
Province 16 Lan Dong	5/18/67 to 7/28/70	32,400	49,735	2,890
Province 17 Binh Thuan	6/14/66 to 8/28/70	119,565	14,420	47,910
Province 93 Can Raah	8/4/68 to 5/30/70	3,915	0	1,320

III CORP MILITARY REGION

Province 18 Binh Tuy	5/18/66 to 2/10/70	294,360	33,500	86,640
Province 19 Long Khanh	10/21/65 to 3/28/70	983,562	16,745	612,356
Province 21 Phuoc Long	10/20/65 to 5/9/70	1,607,235	56,450	1,143,565
Province 22 Binh Long	10/29/65 to 12/1/69	139,740	0	209,735
Province 23 Dinh Ducang	1/9/65 to 4/9/70	395,835	40,510	373,973
Province 24 Tay Ninh	9/24/65 to 2/28/71	511,740	74,495	476,849
Province 25 Hay Nghia	1/25/65 to 1/17/70	483,215	10,345	51,273
Province 26 Bien Hao	7/21/65 to 4/3/70	425,037	8,950	386,985
Province 27 Phuoc Tuy	1/10/65 to 2/13/70	202,910	2,700	156,750
Province 28 Long An	11/28/65 to 2/13/70	109,090	0	28,300
Province 29 Gia Dinh	1/5/66 to 11/25/70	532,685	43,400	225,485

IV CORP MILITARY REGION

Province 95 Vung Tan	No Information Available			
Province 96 Saigon	No Information Available			
Province 30 Go Cong	7/31/68 to 5/5/69	6,000	0	3,095
Province 31 Kien Thong	3/7/67 to 4/9/69	59,020	11,300	54,260
Province 32 Kien Phong	6/6/67 to 2/4/70	13,760	990	4,895
Province 33 Dinh Tuong	8/16/68 to 4/13/70	8,720	965	7,316
Province 34 Kien Hoa	12/7/65 to 2/18/70	225,390	0	56,070
Province 35 Vinh Binh	10/2/66 to 3/31/70	174,595	5,000	17,360
Province 36 Vinh Long	10/17/68 to 12/5/69	5,490	1,180	12,735
Province 37 An Giang	No Information Available			
Province 38 Kien Giang	8/4/66 to 2/16/71	30,895	0	21,190
Province 39 Chamong Thien	8/7/66 to 2/19/71	23,220	0	2,225
Province 40 Phong Dinh	12/14/65 to 6/27/70	30,775	12,700	15,722
Province 41 Ba Xuyen	6/17/66 to 3/27/70	27,800		

WHAT IS AGENT ORANGE?

WHAT WERE VIETNAM VETERANS EXPOSED TO?

The term Agent Orange, 2,4,-D and 2,4,5-T a (50% 2,4,5-Trichlorophenoxy-Acetic Acid (2,4,5-T) and 50% 2,4-Dichlorophenoxy-Acetic Acid (2,4-D) an unavoidable contaminant of 2,4,5-T, is the dioxin 2,3,7,8-TCDD (Tetrachlorodibenzo-Para-Dioxin) said to be the most toxic synthetic substance known, was coined by the veterans of Vietnam, based on the color code stripes on the various chemical drums. i.e. (Agent Orange, White, Blue, Green, Pink or Purple)

AGENT WHITE (commercially known as TORDON. Chemically, it was 80% 2,4,-Dichlorophenoxy-Acetic Acid and 20% Picloram). Formal chemical name: 4-Amino-3,5,6,-Trichloropicolinic Acid.

AGENT BLUE (commercially known as Phytar. Chemically known as Cacodylic Acid and Organic Arsenic or 100% sodium salt of Cacodylic Acid).

PICLORAM - Very few studies have been done with this combination of herbicides and none of these explain the joint problems reported by exposed people.

Mutagenicity of picloram has not been tested for in any mammalian cells. Oncogenicity of picloram has been clearly demonstrated in the liver of female rats, and a re-study of the tissue slides by a more experienced pathologist determined the chronic feeding of picloram caused tumors of endocrine organs and liver in rats and tumors of the spleen in mice. Toxic changes seen included atrophy of the testes in both rats and mice.

The tumors found in the livers of female rats have been reported as benign, and this has been interpreted by some persons to imply lack of oncogenic risk. However, the prevailing opinion of scientists is that such benign appearing chemically-induced tumors are actually pre-malignant lesions and the inducing chemical must be considered oncogenic.

Cacodylic Acid and sodium cacodylate, have been subjected to less-than-minimal testing for health effects, but since these compounds are inter-converted in the animal body and in the environment to other compounds which have a larger data base, such tests can be used to infer their effects. Cacodylic acid is rapidly absorbed through the lungs. It caused marked sterility in treated male fruit flies, was mutagenic in five different non-bacterial test systems. No testing for oncogenicity has been reported, but there is evidence for contamination and inter-conversion with trivalent inorganic arsenic which has been strongly correlated with human cancer. It is a suppressant of the immune system and causes crippling neuropathy. Cacodylic acid is converted in the environment to volatile and highly toxic arsine gases.

MALATHION and DIAZINON are organophosphate insecticides which primarily inhibit cholinesterase enzymes necessary for proper functioning of the nervous system. Subclinical enzyme inhibition is

common in exposed persons and may be associated with measureable neuropathy or neuropsychological dysfunction. Chronic exposure can lead to psychiatric illness of surprisingly long duration. Long lasting (73 years) sequelae of acute organophosphate poisoning include intolerance to very slight contact with these compounds or their solvents.

MALATHION causes allergic contact dermatitis and asthmatic bronchitis in humans, and inhibits both the primary and secondary immune responses in rabbits. It has been shown to break DNA or chromosomes in four tests, and to be carcinogenic in rats and mice.

DDT is toxic to the testes of rats but this may be caused by hormonal alteration rather than mutagenesis. DDT is oncogenic in the mouse liver. It has caused allergic contact dermatitis in humans and immunosuppression in rabbits.

LINDANE- is a neurotoxic insecticide. Persisting alterations in neurological and psychological function of exposed workers have been reported. Lindane is oncogenic in mice, and studies in other species have been deemed inadequate. A lindane metabolite, 2,4,6-trichlorophenol, is oncogenic in rats and mice. Lindane blocks proliferation of human lymphocytes in culture, suggesting that it may be immunotoxic.

CHLORDANE- damages DNA in human cells in culture. It is oncogenic in mice and probably in rats.

DIELDRIIN - is a neurotoxic insecticide which causes changes in the electro-encephalogram tracings of exposed humans which may take up to a year to normalize. Dieldrin causes DNA damage in human cells in culture, and is oncogenic in mice, and rats, producing tumors in many organs.

MONURON and BROMACI have mutagenic activity in multiplegenon-bacterail test systems. Monuron is oncogenic. Diuron has not been tested for oncogenicity or mutagenicity in any assay acceptable to EPA. EPA has ordered oncogenicity testing in two species and testing for mutagenicity of all three types. EPA considers diuron a suspect oncogen because of its structural similarity to linuron, a known inducer of liver and testicular tumors in rats. EPA's review of bromacil in 1982 identified data gaps for tests of chronic health effects, oncogenicity, and teratogenicity.

Solvents a major component of petroleum distillate, is n-hexane, which has been shown to induce peripheral neuropathy in humans and animals. This is synergized by toluene exposure by increasing damage to major nerves and decreasing sensory effect.

Ref: Ruth Shearer, Ph.D, Consultant in Genetic Toxicology,
Issaquah, WA

On April 28, 2006, the U.S. District Court for the Northern District of California (*Nehmer v. Dept of Veterans Affairs*, No. C-86-6160 (TEH)) held that the provisions of the *Nehmer* class-action suit apply to disability or death claims based on chronic lymphocytic leukemia (CLL). In compliance with this court order, if you meet the eligibility requirements and follow the procedures described below, VA will determine whether you are entitled to retroactive benefits.

What is Chronic Lymphocytic Leukemia?

Chronic lymphocytic leukemia (also called CLL) is a slow progressing cancer of the blood in which too many white blood cells (lymphocytes) are produced by the bone marrow and by organs of the lymph system. This diagnosis does not include acute lymphocytic leukemia, acute or chronic myeloid (or granulocytic) leukemia, or the numerous subtypes of these diseases.

Eligibility Requirements

If you are a veteran or survivor of a deceased veteran and meet the below eligibility requirements, you may request a review under this court order for entitlement to retroactive service-connected disability or death compensation. Additionally, if you are a survivor (surviving spouse, child, parent, or heir) of such veteran or survivor, you may request a review for benefits based on a prior claim by the veteran, you, or another eligible survivor. The evidence of record must show the following:

- the veteran had a diagnosis of chronic lymphocytic leukemia,
- the veteran served in the Republic of Vietnam during the period beginning on January 9, 1962, and ending on May 7, 1975, and
- a claim for disability or death benefits due to CLL was filed or denied between September 25, 1985, and October 16, 2003.

What Do We Need From You?

If you wish to file a claim for entitlement to retroactive benefits based on the above-mentioned eligibility requirements, you must submit a written request. For your convenience, we have enclosed VA form 21-4138, "Statement In Support of Claim" for your use. A review of the claims file will be conducted only if a specific request is received.

The following is a list of diseases alleged to be caused by Agent (Dioxin) exposure as presented by the plaintiffs in the "Agent Orange" action suit, MDL No. 381, 79-C-747, in the United States District Eastern District, New York.

Source: Ford v. U.S., MDL 381 (E.D.N.Y. Eighth Amended Complaint filed June 23, 1980)

- | | | |
|--|--|---|
| <ul style="list-style-type: none"> chloracne porphyria cutanea tarda hyperpigmentation of skin - hyperkeratosis of skin hirsutism ① - discoloration of skin - various other skin conditions asthenia - weakness of extremities - loss of strength - easy fatigability - fatigue ② - headaches (including migraines) - peripheral neuropathy polyneuropathy ③ - intolerance to cold - loss of sensation - other neurological deficits irritation to eyes hepatitis ④ - impairment of sight impairment of hearing ? impairment of smell impairment of taste ⑤ - impairment of touch - weight loss ⑥ - weight gain loss of appetite anorexia loss of libido ⑦ - loss of sex drive ⑧ - sleep disturbances orthostatic hypotension hypertension ⑨ - abdominal pain - nausea - vomiting - diarrhea ⑩ - rectal bleeding - other gastrointestinal disorders neurasthenia ⑪ - depression ⑫ - violent behavior - uncontrolled behavior - other psychobehavioral disorders - myocardial infarction atherosclerosis other cardiovascular disorders - liver damage | <ul style="list-style-type: none"> pancreatic dysfunction ⑬ - kidney disorders ⑭ - urinary tract disorders - bladder disorders pulmonary pathologies pulmonary fibrosis ⑮ - other respiratory disorders cholangiocarcinoma other liver cancers kidney cancer bladder cancer pancreatic cancer ⑯ - colon cancer stomach cancer other gastrointestinal cancers lung cancer leiomyosarcoma liposarcoma rhabdomyosarcoma myofibrosarcoma brain cancer multiple sclerosis testicular cancer testicular atrophy DNA disturbances RNA disturbances - skin eruptions and cysts - slowing of nerve impulses - elevated blood lipid levels - elevated cholesterol levels prediabetic and diabetic states - abnormal cell proliferations organ enlargements cellular atrophy decreased cell proliferation - birth defects in offspring - miscarriages - spontaneous abortions neo-natal deaths ⑰ - increased white blood cell counts elevation of eosinophil decreased in IgM and IgD alteration in B-cell and T-cell capabilities ⑱ - skin rash scalp tumors neurofibrosarcoma fibrous histiocytoma retroperitoneal neurogenic | <ul style="list-style-type: none"> fibrosarcomatous mesothelioma other soft-tissue sarcoma leukemia angiosarcoma other blood cancers hepatoma lymphoma ? squamous cell carcinoma skin other skin cancers thyroid cancers other glandular cancers cancer of tongue cancer of hard palate other cancers of mouth chronic lymphocytic leukemia various brain cancers ischemic heart disease loss of lymphoid tissue atrophy of thymus tissue - increased sensitivity and susceptibility to infection - immune system disturbance ⑲ - aching muscles blepharoconjunctivitis porphyria epithelial hyperplasia and metaplasia various hemorrhages increased serum triglyceride level abnormal sperm development chromosomal gaps, breaks, rings and other aberrations cleft palate spina bifida - club foot - skeletal abnormalities - other reproductive defects and abnormalities other organ damages other central nervous system damage other peripheral nervous system damage other types of cancer and increased risk of all forms of cancer |
|--|--|---|



Department of
Veterans Affairs

Agent Orange Brief

Prepared by the Environmental Agents Service

(131)

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VA Central Office, Washington, DC 20420

October 2003

AGENT ORANGE AND CHLORACNE

What is chloracne?

Chloracne is a skin condition that looks like common forms of acne that often affect teenagers. Chloracne is the most well established long-term effect of exposure to TCDD or dioxin, the contaminant found in one of the ingredients of Agent Orange.

It is important to note that overall skin disorders are among the most common health problems experienced by combat forces. Because of the environment and living conditions in Vietnam, veterans developed a variety of skin problems, ranging from bacterial and fungal infections to a condition known as "tropical acne." However, the only skin disorder consistently reported to be associated specifically with Agent Orange and other herbicides is chloracne.

What does chloracne look like and where does it appear?

The first sign of chloracne may be excessive oiliness of the skin. This is accompanied or followed by the appearance of numerous blackheads. In mild cases the blackheads may be limited to the area around the eyes extending along the temples to the ears. In more severe cases blackheads may appear in many places on the body, especially over the malar (or cheek bone) area, other facial areas, behind the ears, and along the arms. The blackheads are usually accompanied by fluid-filled cysts and by an increased or darker growth of body hair. The skin may become thicker and flake or peel. In severe cases, the acne may result in open sores and permanent scars. The condition fades slowly after exposure. Minor cases may disappear altogether, but more severe cases may persist for years after the exposure.

Physicians, even dermatologists, sometimes have difficulty in distinguishing chloracne from other more common skin disorders. While chloracne may be a sensitive indicator of exposure to dioxins in some people, it may not be in other individuals who had equal or greater exposure to dioxins. The absence of chloracne is not necessarily a reliable basis for concluding that a person has not been exposed to a chemical, which is known to cause chloracne.

Has chloracne been a problem for a large number of Vietnam veterans?

No, it has not. Of course, many veterans have complained of skin problems. Skin ailments are a common medical problem in veteran and non-veteran

populations. After traumatic injuries, skin disorders are among the most common health problems encountered in combat.

What did Public Law 102-4, the Agent Orange Act of 1991, do for Vietnam veterans with chloracne?

Section 2, Public Law 102-4, enacted February 6, 1991, established by statute the presumption of service connection for certain diseases -- including chloracne or another acne form disease consistent with chloracne manifested to a degree of disability of 10 percent or more within a year after military service in Vietnam -- associated with exposure to certain herbicide agents.

In July 1992, a proposed rule implementing the presumptions established by this law was published in the Federal Register for public comment. (See 57 Fed. Reg. 30707, July 10, 1992). In May 1993, the rule was finalized and published in the Federal Register. (See 58 Fed. Reg. 29107, May 19, 1993).

VA had recognized chloracne as service connected for Vietnam veterans based on exposure to Agent Orange for many years prior to the enactment of this legislation.

What did the National Academy of Sciences conclude about chloracne in its 1993 report, entitled Veterans and Agent Orange - Health Effects of Herbicides Used in Vietnam?

The 832-page report included the following statements:

In summary, chloracne has been linked to TCDD exposure in numerous epidemiologic studies of occupationally and environmentally exposed populations. The data on Vietnam veterans potentially exposed to Agent Orange and other herbicides are less convincing....

Evidence is sufficient to conclude that there is a positive association between exposure to herbicides (2,4-D; 2,4,5-T and its contaminant TCDD; cacodylic acid; and picloram) and chloracne....

Because TCDD-associated chloracne becomes evident shortly after exposure, there is no risk of new cases occurring long after service in Vietnam.

What has the NAS concluded about chloracne in its subsequent updates?

In the 1996, 1998, 2000, 2002, and 2004 updates, the NAS reviewers (different individuals for each of these reports) essentially reached the same conclusion as the initial report.

What should a Vietnam veteran do if he or she thinks his or her skin condition may be chloracne?

A great deal of information can be obtained at our website: www.va.gov/AgentOrange. Contact the nearest VA medical center for a medical examination and possible treatment and file a claim for disability

compensation at the nearest VA medical center or regional office. For many years, VA has recognized chloracne as a service-connected disability based

on the results of scientific research that links this condition with exposure to dioxin. For information about the VA examination and treatment programs, see **Agent Orange Brief, B1 and B2**. For information regarding disability compensation, see **Agent Orange Brief, B3**.

Where can a veteran obtain additional information about Agent Orange-related issues?

The Agent Orange Brief fact sheets (including the one you are reading) are on the World Wide Web at www.va.gov/AgentOrange. They also can be obtained from local VA medical centers or from the VA Central Office at the Environmental Agents Service (131) Department of Veterans Affairs, 810 Vermont Avenue, N.W., Washington, DC 20420. The following Briefs are available: **A1**.Agent Orange - General Information; **A2**.Agent Orange Class Action Lawsuit; **B1**.Agent Orange Registry Program; **B2**.Agent Orange - Health Care Eligibility; **B3**.Agent Orange and VA Disability Compensation; **B4**.VA Information Resources on Agent Orange and Related Matters; **C1**.Agent Orange - The Problem Encountered in Research; **C2**.Agent Orange and Vietnam Related Research - VA Projects; **C3**.Agent Orange and Vietnam Related Research - Non-VA Projects; **D1**.Agent Orange and Birth Defects; **D2**.Agent Orange and Chloracne; **D3**.Agent Orange and Non-Hodgkin's Lymphoma; **D4**.Agent Orange and Soft Tissue Sarcomas; **D5**.Agent Orange and Peripheral Neuropathy; **D6**.Agent Orange and Hodgkin's Disease; **D7**.Agent Orange and Porphyria Cutanea Tarda; **D8**.Agent Orange and Multiple Myeloma; **D9**.Agent Orange and Respiratory Cancers; **D10**.Agent Orange and Prostate Cancer; **D11**.Agent Orange and Spina Bifida; **D12**.Agent Orange and Diabetes; and **D13**.Agent Orange and Chronic Lymphocytic Leukemia.

At the same site you will find copies of past and current issues of the "Agent Orange Review" newsletter and other items of interest.

This fact sheet was prepared in August 2005 and does not include any subsequent developments.