

## Health effects

**What are the health effects of exposure to Agent Orange/dioxin?** Dioxin even in tiny amounts (parts per trillion) is associated with severe health damage that can shorten the lives of people exposed to it, and potentially that of their offspring and future generations.

- The U.S. Institute of Medicine's July 2009 report cited sufficient evidence of association between exposure to Agent Orange/dioxin and five illnesses: soft-tissue sarcoma, non-Hodgkin's lymphoma, chronic lymphocytic leukemia (including hairy-cell leukemia), Hodgkin's disease, and chloracne.<sup>i</sup>
- The report also found evidence suggesting an association with prostate cancer, multiple myeloma, amyloidosis (abnormal protein deposits), Parkinson's disease, porphyria cutanea tarda (a blood and skin disorder), ischemic heart disease, hypertension, Type 2 diabetes, peripheral neuropathy, and cancer of the larynx, lung, bronchea or trachea, as well as spinal bifida in exposed people's offspring.
- In Vietnam, the Vietnamese Red Cross also associates the following with exposure to dioxin: liver cancer; lipid metabolism disorder; reproductive abnormalities and congenital deformities such as cleft lip, cleft palate, club foot, hydrocephalus, neural tube defects, fused digits, muscle malformations and paralysis; and some developmental disabilities.

**Why is Agent Orange/dioxin so dangerous?** Dioxin is a persistent organic pollutant that is toxic over many decades, is not water-soluble and does not degrade easily. Clinging to soil particles carried by water runoff from spills or sprayed areas downstream into the sediments of lakes or streams, it is consumed by mollusks, fish and waterfowl, easily entering the human food chain.

- Chemically stable and retained in human fatty tissue, dioxin alters the complex cellular and chemical balances involved in bodily functioning and reproductive processes.
- Its adverse effects can be ameliorated by surgery, medication or rehabilitation therapy in most cases if detected early, but some effects cannot be corrected by any amount of time or money.
- The genetic effects may skip a generation and reappear in third or subsequent generations.

**How many people have been exposed?** Between 2.1 and 4.5 million Vietnamese civilians lived in areas sprayed with dioxin-contaminated herbicides at the time of spraying.<sup>ii</sup> The U.S. Veterans Administration presumes that any of the 2.8 million U.S. veterans who had "boots on the ground" in Vietnam from 1962 to 1975 were exposed to dioxin-contaminated herbicides, including Agent Orange.

- These numbers do not include the U.S. civilians or others who traveled through sprayed regions, Vietnamese who worked on bases where herbicides were stored and handled; or Vietnamese who were exposed after the war at "hot spots" of dioxin residue in southern Vietnam.
- The numbers also do not include the millions of North and South Vietnamese and Viet Cong armed forces members who were exposed to spraying during and after their time of military service.
- The numbers also do not include U.S. Navy veterans who served off the Vietnamese coast, those who flew over sprayed areas from carriers or bases outside the country, or veterans or civilians who were in other areas of use, testing or spraying (e.g., Korea, Thailand, Cambodia, Laos, Puerto Rico.)
- Many people still live in or near some of the "hot spots," where their exposure continues.<sup>iii</sup>

**Did all those people suffer health effects?** No accurate numbers exist for those who were affected. The Vietnamese Red Cross estimates that up to three million Vietnamese have suffered health effects from dioxin exposure, of whom 150,000 are children with birth defects.<sup>iv</sup> The U.S. government provides health care and compensation on a humanitarian basis to Vietnam veterans suffering from any condition on a list of illnesses associated with Vietnam service. [See *Meeting the U.S. Need* fact sheet.]

**What about Vietnamese-Americans living in the United States?** No studies have yet documented the extent of possible Agent Orange/dioxin-related health effects among these 1.4 million people.

**What are standard limits for dioxin exposure?** The World Health Organization recommends a monthly limit of 70 picograms per kilogram of body weight,<sup>v</sup> or 0.07 ppt [parts per trillion] in blood.

- The general environmental limit in most countries is 1,000 ppt TEQ (toxic equivalent) in soils and 100 ppt in sediment. Most industrialized countries have dioxin concentrations in soils of less than 12 ppt.<sup>vi</sup>
- The U.S. Agency for Toxic Substance and Disease Registry has determined that levels higher than 1,000 ppt TEQ in soil require intervention, including research, surveillance, health studies, community and physician education, and exposure investigation.<sup>vii</sup>
- The U.S. Environmental Protection Agency is considering reducing these limits to 72 ppt TEQ. This change would significantly increase the potential volume of contaminated soil requiring treatment.

**What Agent Orange/dioxin exposure levels have been found in the Vietnamese?** The highest level recorded was in a person fishing in the lake on the Da Nang airbase, over 1,000 ppt. In comparison, people in industrial nations such as the United States have a baseline of 3-7 ppt of dioxin in their blood.<sup>viii</sup>

**How can affected people be helped?** First, the sources of exposure must be detected, evaluated, controlled and eliminated. Then the food supply must be protected through systems for monitoring and dealing with contamination. Health care systems can provide and subsidize comprehensive care for affected individuals, including education, genetic counseling about possible impacts on offspring, training, medications, surgery and rehabilitation, as needed.

**What is being done for the affected Vietnamese?** Programs reach only a small number of those in need.

- The Vietnamese government provides a monthly stipend of about \$17 to more than 200,000 Vietnamese believed affected by the toxic herbicides.<sup>ix</sup> In 2008 alone this totaled \$40.8 million.
- The Vietnam Association of Victims of Agent Orange has raised support since 2004 for those affected by Agent Orange and is conducting a survey to identify others affected nationwide.
- The Vietnam Red Cross has raised more than \$22 million to assist the ill or disabled.
- With funding from the Ford Foundation and other donors, some rehabilitation, education and other services to the disabled are provided by the War Legacies Project, the Vietnam Veterans of America Foundation, the East Meets West Foundation, The Da Nang-Quang Nam Fund, Catholic Relief Services, CHEER Vietnam, Children of Vietnam and Vietnam Assistance for the Handicapped.
- The Ford Foundation, seven other foundations, three European governments, UNICEF and the UN Development Programme have given a total of \$23 million for cleanup, health care and other services to people with Agent Orange/dioxin-related disabilities in Vietnam, including advocacy for greater attention and resources.
- The U.S. Congress has allocated \$9 million over four years for “hot spot” remediation and health programs. So far, \$2 million has been allocated to three U.S. non-governmental organizations for programs to support and care for those with disabilities in Da Nang.

---

<sup>i</sup> National Academies of Science, *Veterans and Agent Orange: Update 2008*, National Academies Press, Washington DC 2009, p. 7  
[http://books.nap.edu/openbook.php?record\\_id=12662&page=7](http://books.nap.edu/openbook.php?record_id=12662&page=7)

<sup>ii</sup> Stellman, J. et al, “The Extent and Pattern of Usage of Agent Orange and other Herbicides in Viet Nam,” *Nature*, 422 (2003): p. 684-685  
<http://www.warlegacies.org/nature01537.pdf>

<sup>iii</sup> Boi, Phung Tuu: *Agent Orange and the Environment: From Research to Remediation*. Powerpoint presentation, American Association of Asian Studies, Boston, MA, March 2008, p 28 <http://www.warlegacies.org/Agent%20Orange/Boi.pdf>

<sup>iv</sup> Fawthrop, Tom, “Vietnam’s War against Agent Orange,” BBC News story, June 14, 2004: <http://news.bbc.co.uk/2/hi/health/3798581.stm>

<sup>v</sup> World health Organization, “Dioxin and Its Effects on Human Health,” Fact Sheet #225, Geneva, November 2007  
<http://www.who.int/mediacentre/factsheets/fs225/en/index.html>

<sup>vi</sup> Agency for Toxic Substances & Disease Registry, *Dioxin Policy Guidelines*, U.S. Department of Health and Human Services, Washington DC, November 2008, p. 380 <http://www.atsdr.cdc.gov/toxprofiles/tp104-c5.pdf>

<sup>vii</sup> Hatfield Consultants, “Summary of Dioxin Contamination at Bien Hoa, Phu Cat and Da Nang Airbases, Viet Nam,” PowerPoint presentation for the U.S.-Vietnam Dialogue Group On Agent Orange/Dioxin, Washington, DC, compiled Vancouver, Canada, June 2009.  
<http://www.warlegacies.org/Hatfield-Dioxin-Presentation-DC-052809.pdf>

<sup>viii</sup> Hatfield Consultants, “Summary...” slide 27

<sup>ix</sup> Statement by Ambassador Ngo Quang Xuan to the House Subcommittee of Asia, Pacific and Global Environment. June 2009: Page 3.  
<http://www.internationalrelations.house.gov/111/xua060409.pdf>