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**RACHEL'S HAZARDOUS WASTE NEWS #73**

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News and resources for environmental justice.

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**STUDY OF DIOXIN-EXPOSED HUMANS REVEALS CANCER, BIRTH DEFECTS, LIVER AND CARDIOVASCULAR DAMAGE.**

A new study of Vietnam veterans, conducted by Air Force physicians, links dioxin exposure to increases in cancer, birth defects, psychological damage, liver damage, cardiovascular deterioration, and degeneration of the endocrine system. The new work stops short of saying dioxin exposures CAUSED the observable health damage among dioxin-exposed vets, but it explicitly reverses the conclusions of a 1984 Air Force study which said dioxin exposures had been shown to be harmless.

The study is continuing, and will begin using sensitive new blood tests to determine past exposures to dioxin; future study may be able to pin down, or rule out, direct causal effects. In the meantime, advocates of mass burn incinerators and other dioxinproducing facilities can no longer claim lack of evidence that dioxin harms humans. There is now tangible cause for concern about serious effects of dioxin on humans.

The new work is part of the Air Force's ongoing study of Vietnam veterans who participated in Operation Ranch Hand, which was a military program spraying herbicides on the jungles of Vietnam from 1961 to 1972, to defoliate and thus eradicate Viet Cong hiding places. In manufacture, the herbicides (Agents Orange, Pink, Green and Purple) were contaminated with dioxin (33 ppm to 66 ppm [parts per million]).

The study compares two groups of Vietnam veterans--one group of 1045 Ranch Hands who definitely had dioxin exposures and another group of 773 veterans not known to have been exposed to dioxin. In addition, 2708 wives and former wives of veterans in the two groups participated in the study.

The study team first reviewed more than 400 published articles on the effects of dioxin on animals and humans; from this they derived a profile of 190 different health effects that might be expected to be

related to dioxin exposure. They examined the 1818 study participants for these 190 health effects.

## Cancer

The study found that 4.59% of the Ranch Hands have some kind of cancer, compared to 2.33% of the unexposed group. Thus the overall risk of cancer among the dioxin-exposed group is doubled (risk increased by a factor of 1.97). The greatest risk increase is for skin cancers (where the risk is increased by a factor of 2.6), whereas the risk of "systemic cancers" (non-skin cancers) is increased by a factor of 1.2; in other words, the dioxin-exposed group has a 20% greater chance of getting a non-skin cancer.

## Birth Defects

Analyzing for birth defects, the study looked at children born before the Vietnam experience and children born after Vietnam. Prior to Vietnam, the dioxin-exposed group had born 85% as many children with birth defects as the non-exposed group; after Vietnam, the exposed group bore 139% as many children with birth defects. The earlier Air Force study had said birth defects among dioxin-exposed families were limited to "minor skin lesions" but the new study reverses that conclusion; 32 children with severe defects were born to families in the exposed group, vs. 18 in the nonexposed group. The total number of birth defects in the two groups was: 80 with defects out of 917 total births in the exposed group vs. 48 with defects out of 744 total births in the non-exposed group.

## Psychological Damage

Psychological testing revealed significant increases in fatigue, anger, anxiety, and isolation among the dioxin-exposed group compared to the non-exposed group.

## Liver Functions

The new study looked at nine chemical measures of liver function and in three categories the dioxin-exposed group showed reduced liver functions, compared to the non-exposed group. In addition, among the exposed group, 16 showed enlarged livers, vs. six among the non-exposed group. Furthermore, 13 among the exposed group had a verifiable medical history of liver disorder other than hepatitis, jaundice, or cirrhosis, vs. only two with such histories among the non-exposed group.

## Cardiovascular system

Heart disease rates and heart attack rates did not differ among the two groups. However, during physical examination, 10 different heart pulse measurements were taken in the extremities (e.g., the ankle), and statistically significant abnormalities were found in one or more pulses in 12.8% of the exposed group vs. 9.4% of the nonexposed group. Abnormal pulses in the extremities are evidence of blood circulation problems.

## Endocrine system

The endocrine system is a body control system composed of a group of glands that maintain a stable internal environment by producing chemical regulatory substances called hormones. Glands that participate in the endocrine system include the pituitary, thyroid, parathyroid and adrenal glands, as well as the pancreas, ovaries and testicles. The new study looked at five chemical measures of endocrine system functions. In three of the five measures, the dioxin-exposed group showed abnormal functioning of the endocrine system, compared to the non-exposed group. Functioning of the endocrine system reduces with age, but the new study showed that, among the dioxin exposed group, functioning of the endocrine system is being reduced much faster than among the non-exposed group.

Thus the new study shows that, in six out of 11 areas of suspected dioxin effects, exposed Vietnam veterans have health problems in greater proportion than the comparison group.

The RANCH HAND STUDY (formally known as the Air Force Health Study [AFHS]) began in 1979 and is continuing. The most recent publication, reviewed above, is: Richard A. Albanese, UNITED STATES AIR FORCE PERSONNEL AND EXPOSURE TO HERBICIDE ORANGE, INTERIM REPORT FOR PERIOD MARCH 1984 -FEBRUARY 1988 (United States Air Force: Brooks Air Force Base, TX, Feb., 1988). The study is 34 pages long; it is available from Dr. Albanese, USAF School of Aerospace Medicine, Human Systems Division (AFSC), Brooks Air Force Base, TX 78235-5301; phone (512) 536-3884. Our thanks to Laura Petrou, legislative assistant to U.S. Senator Thomas Daschle (South Dakota) who made the study available to us. Ms. Petrou can be reached at (202) 224-2321. --Peter Montague, Ph.D.

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