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Agent Orange Research in Vietnam

The Vietnamese have been investigating the environmental and medical effects of herbicidal defoliants since 1966. The early investigations were based on clinical observations made by Vietnamese physicians. During the same period, American biologists began to comment on the destruction of plant life resulting from the Hader and Ranch Hand defoliation operations.

In 1970 the effects of phenoxy herbicides and their dioxin contaminants were debated at a scientific conference in Orsay, France. Soon afterward the defoliation missions were discontinued, or at least sharply curtailed.

Following the end of the Vietnam War in 1975, the Vietnamese continued their studies. In January, 1983, an international symposium was held in Ho Chi Minh City. The work done by the Vietnamese was presented and debated for several days. The participants concluded that the results obtained by the Vietnamese were generally consistant with studies done in other countries.

The complexity of the problems under study in Vietnam was explicitly recognized. Recommendations were made which may further improve the methodology of future studies. There was also an interest in applying methods which might develop a causal (as opposed to statistical) link between dioxin exposure and the medical and environmental problems which have been identified.

The Environment

A series of ecological studies has been completed. Additional studies in other areas of the country are in the planning stages. The environmental impact of phenoxy herbicide application has been convincingly demonstrated in:

1) The Ma Da forest, located about 100 kilometers northeast of Ho Chi Minh City.
2) The Ca Mau region, located in the southeastern tip of the Mekong Delta. This is largely mangrove forest.
3) Areas of Quang Tri province
4) The A Luoi region, about 60 kilometers from Hue.

A number of environmental effects has been noted. The physical characteristics and chemical composition of soil has been drasticly altered. In mountainous areas extensive erosion and flooding has resulted. Because the defoliated and eroded mountainsides can no longer contain moisture, evaporation of streams and rivers during the dry season has been accelerated. This had led in turn to the death of many aquatic and forest animals.

In most heavily defoliated areas the natural flora has not yet returned. Sparse grasses now grow in areas which were once heavily forested. This profound change in habitat, together with the direct toxic effect of the chemicals, has resulted in the local and regional disappearance of many species of large predatory animals and birds.

Small rodents survived the environmental changes well, and the elimination of natural predators led to an increase in their numbers. In south Vietnam, an increased number of rats and an increased incidence of plague has been correlated with the defoliation.

In some areas reforestation work has begun. There have been some initial successes in the mangrove forest of the Mekong Delta, but it is too early to know just how successful these efforts will ultimately be.

Reproductive Effects

A number of detailed epidemiologic studies have been carried out which indicate that the effect of chemical exposure on normal human reproduction has been profound. Much of the evidence suggests that the primary mechanism involves mutation (alteration of genetic material) rather than teratogenesis (in-utero injury of the embryo or fetus). In practical terms this means:

1) Effects on reproduction can result from exposure of either the male or the female parent.
2) Abnormalities in reproduction may occur many years following exposure.
3) The possibility exists that defective genetic material may be passed on to succeeding generations.

A large number of specific reproductive abnormalities have been observed in exposed male and female Vietnamese. These include:

1) An increased rate of spontaneous abortion
2) An increase in molar pregnancies
3) An increased number of still-born children
4) High rates of sterility in exposed males; as high as 21% in one study.

Vietnamese physicians and researchers say that prior to the defoliation, Vietnam had a low rate of birth defective children. Since that time the number of birth defective children has increased, although the precise parameters of that increase are not clear.

The types of defects encountered include cranio-facial abnormalities, malformations of the extremities, neural tube malformations, malformations of the trunk, and conjoined twins. A large number of non-viable "monsters" have been collected by Vietnamese researchers. We saw such a display at the obstetric-gynecologic hospital in Ho Chi Minh City.

I must say that the malformations we saw were very bizarre. Despite several years of involvement with neo-natal surgery and neonatal intensive care, I had never before seen such astounding fetal malformations.

Some additional evidence has been collected, further implicating herbicide use as a cause of mutation and reproductive problems. Well controlled studies have shown an increased incidence of chromosomal damage in those exposed to spraying and in the children of those exposed. Testicular biopsies carried out in some exposed males showed a failure of normal germ cell maturation.

The quality of the reproductive studies was generally good. Improvements are always possible, but I believe that improved studies will further refine the information thus far developed. It is not likely that improvements in methodology will alter the basic content of that devolping fund of information.

Carcinogenic Effects

Primary cancer of the liver has been extensively studied. The increased incidence of that particular tumor in Vietnamese exposed to defoliants was first reported in 1973. Subsequent studies have strengthened the correlation. Studies in the West have not focused on this type of cancer.

Chorio-carcinoma, probably related to the increased occurence of hydatiform mole, also seems to be increasing in frequency. The extent of increase of this highly malignant reproductive cancer is far from clear.

General Health Effects

Other less specific, but nevertheless serious, health effects have been observed at an increased rate in the exposed population. These include gastric disorders, chronic hepatitis, dental and oral diseases, and psychological disorders.

Few studies have been done on these more general health effects. It would require additional, larger samples to confirm the initial impressions and to sort out the causative factors.

Conclusions and Recommendations

Relevance of the Vietnamese work to the concerns of American veterans and the general American public should be clear. The effects of dioxin on humans and on the environment is a major national issue.

VVA should now take the lead in organizing the necessary scientific cooperation between Vietnamese researchers and American scientists. The Vietnamese are eager to cooperate simply because the resolution of existing medical and environmental problems (and the prevention of future damage) is a major point in their national reconstruction. The valuable information which could be available to American veterans and the American public will simply be lost if effective scientific cooperation is not initiated.

Additionally it is clear that, in certain specific and focused areas, the studies being conducted on Vietnamese veterans are superior to any similar studies now being conducted in the United States. VVA should undertake consultations with leading medical researchers in the United States to determine the relevance of portions of the Vietnamese protocols to research currently underway on veterans in the United States.

I hope that VVA Directors and other individuals receiving this report will feel free to communicate directly to me their comments and questions.

Submitted 4-26-84

Jim Rogers, M. D.