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**Author** Lathrop, George D.

**Corporate Author**

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GEORGE D. LATHROP, M.D., Ph.D.

ABSTRACT

ASSESSMENTS OF A CONTROVERSY: AGENT ORANGE  
AND ITS ASSOCIATION WITH DIOXIN

Science Assessment

A convincing causal relationship between severe human health effects and exposure to Agent Orange and its Dioxin contaminant remains elusive. In over 50 relatively well conducted epidemiologic studies in the past six years, the results have largely been negative, mixed, and/or unconfirmed by comparable efforts. This situation is primarily due to fundamental scientific difficulties which embrace those studies, and may include: nonspecificity of alleged symptoms, and/or, paradoxically, the rareness of other proposed clinical endpoints; inherent limitations in epidemiologic methodology; a study sample size-exposure level reversal (i.e., large group but low exposure); and the traditional anathemas of bias, misclassification, and confounding. The pronounced focus on Vietnam Veteran study populations underscores the scientific requirement to resolve the true exposure circumstances to Agent Orange. Both the characteristics of aerial dissemination of Agent Orange, as documented by war records, and the lack of detection of chloracne in veterans, suggest that significant direct exposure to Agent Orange was uncommon, and contrast sharply with media promulgations and resulting public perceptions. The low and uncommon exposure condition for US ground personnel, if true, coupled with a likely resulting high degree of misclassification of exposure, point to the need for renewed traditional studies of industrial or industrial accident population groups.

The causal relationship between chloracne and exposure to Dioxin (and other compounds) is exceptionally well documented. The outlook for an epidemiologic solution for the other implicated diseases is less favorable. Because of

the confounding effects of multiple industrial chemical exposures, alcoholism, and genetic contributions, and the extreme rarity of porphyria cutanea tarda, attribution will not be made unless registry-based international collaborative studies are conducted. The suspect clinical conditions of excess generic mortality, soft tissue sarcoma, other cancers, fertility/reproductive abnormalities, neuroasthenia, psychological disturbances, etc., will eventually be reconciled with reasonable scientific consensus. However, the entire resolution process will continue to be slow and difficult, unfortunately lending further justification to the social/legal solution of an issue that heretofore resided in the scientific domain.