

# **A case-control study of non-Hodgkin's lymphoma and the herbicide 2,4-dichlorophenoxyacetic acid (2,4-D) in eastern Nebraska.**

[Zahm SH](#)<sup>1</sup>, [Weisenburger DD](#), [Babbitt PA](#), [Saal RC](#), [Vaught JB](#), [Cantor KP](#), [Blair A](#).

## **Author information**

- <sup>1</sup>Environmental Epidemiology Branch, National Cancer Institute, Rockville, MD 20892.

## **Abstract**

To evaluate the role of the herbicide 2,4-dichlorophenoxyacetic acid (2,4-D) in the development of non-Hodgkin's lymphoma (NHL), we conducted a population-based, case-control study in 66 counties in eastern Nebraska. Telephone interviews were conducted with 201 white men diagnosed with NHL between July 1, 1983, and June 30, 1986, and with 725 controls. There was a 50% excess of NHL among men who mixed or applied 2,4-D (odds ratio [OR] = 1.5; 95% confidence interval = 0.9, 2.5). The risk of NHL increased with the average frequency of use to over threefold for those exposed 20 or more days per year ( $p$  for trend = 0.051). Adjusting for use of organophosphate insecticides lowered the risk estimate for frequent users (OR = 1.8), but adjustment for fungicide use increased the risk estimate (OR = 4.5). Simultaneous adjustment for organophosphates and fungicides yielded an OR of 3.1 for farmers who mixed or applied 2,4-D more than 20 days per year. Risk also increased with degree of exposure, as indicated by application method and time spent in contaminated clothing, but not with the number of years of 2,4-D use or failure to use protective equipment. Although other pesticides, especially organophosphate insecticides, may be related to NHL, the risk associated with 2,4-D does not appear to be explained completely by these other exposures.

<http://npic.orst.edu/factsheets/2,4-DTech.pdf>

Descriptions of these chemicals come from the Report on Carcinogens, Twelfth Edition; United States Department of Health and Human Services, Public Health Service, National Toxicology Program (NTP), Japanese Bioassay Research Center

United States National Cancer Institute's  
Agricultural Health Study.