

During the Fall of 1979, a group of physicians and other concerned citizens from Lincoln County, Oregon reported their belief that an excessive number of babies in that county were being born with birth defects. They linked these data with herbicide exposure (2,4-D) and called for a ban on the use of 2,4-D until more data are available. Because of these concerns, and the results of the EPA Study of abortions and 2,4,5-T in Alsea, Oregon, the Birth Defects Branch reviewed the data available through the National Birth Defects Monitoring Program. That review indicated that there were increases in the rates of anencephaly in Benton County (8 observed cases, 4 expected), and of hydrocephaly in Lane County (16 observed cases, 10 expected) between 1970 and 1977.

The BDMP findings, along with the concerns of the Lincoln County physicians led us to discuss these data with the Oregon Health Department. John Googin, M.D., State Epidemiologist, invited CDC to meet with the Oregon Pesticide Analysis Research Center (PARC) Board on November 21, 1979. The Board was formed to evaluate possible adverse health effects of chemicals used in agriculture. The PARC Board asked the Birth Defects Branch to review available data and make a recommendation about what kind of epidemiologic study should be done to evaluate the relationship between maternal exposure to herbicide spraying and birth defects.

Study Approach

A retrospective case-control study appeared to be the most appropriate type of study for several reasons. First because birth defects are rare events, it would be difficult otherwise to obtain enough cases for a study with sufficient statistical power. Second, the ban of 2,4,5-T in 1978 eliminated the source of exposure. In addition, a retrospective study would also allow the opportunity to evaluate possible increases in malformation rates from sources other than herbicides. The definition of cases and controls would be relatively straight forward. Cases would be identified as Oregon resident births identified with central nervous system defects and controls as normal Oregon infants matched on maternal race, place and date of birth. All cases would be identified, even those from urban areas, because the preliminary BDMP data found high CNS defect rates in counties predominantly urban as well as those predominantly rural. A reliable, unbiased estimate of exposure would be needed for both cases and controls. Determining this rate poses some difficulty. Because of obvious bias resulting from questioning individuals about spraying exposure and the unavailability of a retrospective biochemical test, we needed some other method of determining exposure. We undertook a pilot study to learn if it was feasible to obtain an unbiased estimate of exposure, and if it was, to learn the rate of exposure. The latter figure is necessary to determine an adequate sample size or to determine the statistical power of any smaller sample size.

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