

THE AGRICULTURAL HEALTH STUDY: COLLABORATIVE HEALTH AND EXPOSURE RESEARCH FOR THE AGRICULTURAL COMMUNITY

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THE AGRICULTURAL HEALTH STUDY



- The AHS is a collaborative research effort sponsored by several federal agencies with support from academic institutions and research organizations
- The AHS is a comprehensive prospective epidemiological study on agricultural populations that is designed to:
 - Measure cancer and non-cancer health risks in the agricultural community
 - Examine associations between use of agricultural chemicals, other agricultural exposures, and disease
 - Determine factors that promote good health in the community
- Over 55,000 licensed pesticide applicators and 34,000 spouses were enrolled in Iowa and North Carolina from 1993 to 1997
- Follow-up of health and agricultural practices in the cohort is ongoing



AGRICULTURAL HEALTH STUDY COLLABORATORS

Leading the Epidemiological Studies

National Cancer Institute
National Institute of Environmental Health Sciences
University of Iowa – Iowa AHS Field Station
Battelle CPHRE – North Carolina AHS Field Station
Westat – AHS Coordinating Center

Leading the Exposure Studies

U.S. EPA, ORD, National Exposure Research Laboratory
National Institute for Occupational Safety and Health
Battelle Columbus and CPHRE University of Iowa
RTI International Southwest Research Institute

Supporting the Epidemiological and Exposure Studies

U.S. EPA Office of Pesticide Programs, Health Effects Division

SCIENCE ISSUES AND RESEARCH IMPACT

Epidemiological Studies

Science Issues

Despite low mortality and cancer incidence rates overall, farmers may experience excess risk of specific cancers and other adverse health outcomes. Farmers, their families, and other pesticide applicators may have contact with a variety of potentially hazardous substances (e.g., pesticides, solvents, fuels, oils, exhaust, dust). Previous epidemiologic studies in agricultural populations have been limited by inadequate or retrospective exposure information. Limitations of these previous studies are being addressed through the Agricultural Health Study.

Anticipated Impact

The Agricultural Health Study is designed to identify occupational, lifestyle, and genetic factors that may affect the rate of diseases in agricultural populations. This study will provide information that agricultural workers can use in making decisions about their health and the health of their families. Results from the study will inform risk assessments and mitigation decisions, and will provide information for agricultural safety training and education. The impact will extend beyond agricultural populations to other populations where pesticide exposures may occur.



Exposure Studies

Science Issues

Information derived from the epidemiological study questionnaires is used to investigate associations between pesticide exposure and specific diseases. Exposure measurement data are needed to assess and refine these questionnaire-based exposure classification procedures. Identifying and understanding key exposure factors can also guide development of improved exposure reduction strategies.

Anticipated Impact

This research will improve exposure and health risk assessments in the AHS epidemiological study. The results may also provide information on how pesticides can be handled more safely to reduce the exposures to farm-workers and their families.

AHS RESEARCH RESULTS

Health Outcome Results

AHS researchers are examining health outcomes and their possible associations with agricultural exposures. Many health outcome studies have been published in peer-reviewed scientific journals. More information about these results can be found at www.aghealth.org.

Examples of findings to date:

- Members of the AHS cohort experienced a 50% lower mortality rate compared to the general population in Iowa and North Carolina over a follow-up period of about 5 years (Blair et al., 2004)
- The AHS cohort experienced a lower rate of overall cancer incidence; rates of a few cancers appear elevated, including multiple myeloma and cancers of the lip, gallbladder, ovary, prostate, and thyroid, but numbers for many of these cancers are small (Alavanja et al., in press)
- The incidence of prostate cancer among pesticide applicators in the AHS is slightly higher (14%) than it is for other men in North Carolina and Iowa; the risk increased with increasing use of methyl bromide (Alavanja et al., 2003)
- Exposure to diesel exhaust and solvents are the strongest risk factors for wheeze in the AHS cohort while raising farm animals, particularly poultry, and the use of several pesticides are also associated with wheeze (Hoppin et al., 2002, 2003, and 2004)



Exposure Study Results

The U.S. EPA led the AHS Pesticide Exposure Study which examined exposure to 2,4-D or chlorpyrifos for 84 AHS pesticide applicators in Iowa and North Carolina, and for a subset of participating applicator family members. Some preliminary results are described below; data analysis is ongoing.

The NIOSH led the Orchard Fungicide Exposure Study which examined the exposure to selected fungicides for 74 AHS participants from farms in North Carolina and Iowa. Data collation and analysis is currently underway.

Some preliminary results from the EPA Pesticide Exposure Study:

- Significant correlations were found between measured exposures and exposure intensity derived from questionnaire information
- Chlorpyrifos exposures were higher for liquid products compared to granular products.
- Differences in exposure were observed for different work practices
- Significant correlations were found between urinary biomarker concentrations and dermal exposure levels
- Low urinary biomarker concentrations were found for most applicator spouses and children; significant correlations were observed between applicator and spouse urine concentrations for 2,4-D

COMMUNICATING WITH THE AGRICULTURAL COMMUNITY AND STAKEHOLDERS

Research scientists from federal agencies and the Iowa and North Carolina AHS Field Stations have developed and implemented plans for communicating with study participants and other stakeholders using a variety of products and dissemination methods to reach a wide audience.

Disclaimer: Although this work was reviewed by the U.S. EPA and approved for publication, it may not necessarily reflect official Agency policy. The findings and conclusions in this report are those of the authors and do not necessarily represent the views of the National Institute for Occupational Safety and Health.



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