

Study Update 2006

A MESSAGE FROM OUR STUDY DIRECTOR...



Thank you for participating in the Agricultural Health Study for the past 13 years! We are pleased to report that we are making significant progress. Your continued participation is very important, even if you are no longer farming. The Agricultural Health Study (AHS) is recognized world-wide as a valuable resource for learning about the health of farmers and their families in agricultural communities.

Although the nearly 90,000 AHS participants are generally healthier than the average person in Iowa and North Carolina thanks to a healthy lifestyle, they are often at increased risk for certain diseases and injuries. We hope to find out why. In this newsletter we share some recent study findings. In the next few years we expect to share important new findings about other health conditions such as cancer, asthma, farm injuries, diabetes, and Parkinson's disease.

Be assured your confidentiality will always be protected. None of our reports identify individual participants. We only provide statistical summaries. If you have questions or concerns about the study, please call our toll-free number 1-800-217-1954. You can also visit our website at www.aghealth.org.

My sincere best wishes to you and your family,



Michael C. R. Alavanja, Dr.P.H.
Principal Investigator, Agricultural Health Study

Neurological Symptoms and Pesticide Use

PESTICIDES, ALTHOUGH USEFUL IN PROTECTING AGRICULTURAL CROPS, may have harmful effects when farmers come into contact with them. Exposure can occur from accidents involving skin contact with the chemical or inhalation of fumes from the concentrated product.

Previous studies by other researchers have found that high-level exposure to pesticides affects the nervous system, causing symptoms like those in the box on the next page. These symptoms may persist long after the initial reaction to the pesticide exposure gets better. It is important to realize that these symptoms may have many causes besides pesticide exposure. Other exposures or illnesses may be related to these same symptoms.

Always follow recommended safety precautions when handling or storing pesticides and wear the appropriate personal protective equipment.

AHS scientists wondered whether farmers in the study who had used *moderate* amounts of pesticides over a number of years experienced the same symptoms that may occur with high-level exposure.



www.aghealth.org

**The
Agricultural
Health Study
seeks to
identify
factors that
promote
good health.**

Iowa Office:

The University of Iowa
100 Oakdale Campus
Iowa City, IA 52242-5000
1-800-217-1954

North Carolina Office:

Battelle
100 Capitola Drive, Suite 301
Durham, NC 27713
1-800-424-7883

Collaborating Partners:

Iowa State University Extension
Iowa Department of Agriculture
and Land Stewardship

When participants enrolled in the Agricultural Health Study, they were asked whether they had experienced any of 23 symptoms (see box at right). These symptoms are sometimes associated with pesticide exposure but are not specific to pesticides. The most common of these symptoms are headache and fatigue. Participants were also asked about their use of 50 pesticides of interest to the study.

By studying the information provided at enrollment, we found that farmers who had used pesticides longer and more often said they had more neurological symptoms than those who had not used pesticides or who had used them less frequently and for fewer years. This was particularly true for insecticides and fumigants.

Farmers who had a history of pesticide poisoning, pesticide-related medical visits, and accidental high-exposure events also had more neurological symptoms than those who had never had an acute pesticide exposure event. In fact, we found that participants who had experienced a high personal exposure event, such as a spill, said they had more symptoms, even if they had never been diagnosed with pesticide poisoning.

If you have experienced neurological symptoms, you may want to talk with your doctor. If you work with pesticides, read the manufacturer's label and follow the safety precautions to minimize exposure. It's very important to wear the recommended personal protective equipment (PPE), especially chemically-resistant gloves, because this is the most effective way to reduce exposure.

Neurological symptoms that may sometimes be related to pesticide exposure:

- absentmindedness
- blurred or double vision
- changes in smell or taste
- depression
- difficulty concentrating
- difficulty speaking
- dizziness
- excessive sweating
- fast heart rate
- fatigue
- headache
- insomnia
- irritability
- loss of appetite
- loss of consciousness
- nausea
- numbness in hands or feet
- poor balance
- poor night vision
- tension
- tremor in hands
- twitches in arms or legs
- weakness in arms or legs

Pesticide Use among Farm Wives

UNTIL RECENTLY, limited research has been conducted about the role of farm wives in mixing and applying pesticides on the family farm. AHS scientists used the data provided by participants at enrollment in 1993-1997 to learn about the patterns of pesticide use by farm wives in the study.

Farm wives in the study: For this analysis, scientists looked specifically at information from the 31,173 women who enrolled as the *wife* of an applicator. Overall, the age of the wives in the study ranged from 17 to 96 years at enrollment; the median age was 46. Wives from North Carolina were older and had fewer young children compared to Iowa wives. Iowa wives lived on larger farms where grain and livestock are produced, while wives in North Carolina lived on farms that grew cotton, tobacco, and a wide range of other crops.

When they enrolled, more wives from North Carolina hand-picked crops in the last growing season, whereas wives in Iowa drove combines and harvesters more frequently than North Carolina women.

Use of pesticides: The AHS enrollment questionnaires asked applicators and their wives about 50 commonly-used pesticides. More than half of the wives said they had used one or more specific pesticides in their lifetimes. This included use of pesticides for home, lawn, garden, agriculture, or other purposes. The pesticides most commonly used by wives were glyphosate (RoundUp®), carbaryl (Sevin®), malathion, 2,4-D, and diazinon. Only a few farm women in the study were using other pesticides.

Almost a third of farm wives (28.5%) stated using only five common pesticides (see box), which are classified as general-use pesticides and may be used for residential applications as well as on the farm. In addition, 21.7% of the wives said they used one or more additional agricultural pesticides. Farm activities of these women were very similar to those of their husbands who are in the study.

Overall, the North Carolina wives were less likely to have ever mixed or applied pesticides; however, for those who had used pesticides, North Carolina wives used pesticides on more days in their lifetimes than Iowa wives. Many wives said they had applied pesticides but not mixed them.

The widespread use of pesticides by wives of applicators, including some pesticides used exclusively in agriculture, suggests that family members may also benefit from information on the safe handling of pesticides.

Additional findings: Younger wives, especially those with young children, were less likely to have used pesticides than women over 40. Wives who took an active role on the farm (for example, drove combines, planted crops, or applied fertilizer) used pesticides more often than wives who did not participate in field work. Similarly, wives who worked with livestock were more likely to use pesticides. One concern is that wives who applied pesticides, even for residential use only, were less likely than other women in the study to take precautions such as taking work boots off before entering the house and washing pesticide application clothing separately from the family wash. These precautions help to prevent pesticide contamination in the home.

The Agricultural Health Study was designed, in part, to bridge the gap in our current understanding of how farm families may be exposed to pesticides. Many farm wives in both states said they had direct contact with pesticides while mixing or applying these products or engaging in field work. Even women who did not use pesticides themselves may have been potentially exposed if their homes or drinking water wells are located near areas where pesticides are mixed or applied or if pesticides were tracked inside their homes.

Because a wide array of potential health effects have been linked to pesticide exposure and because some pesticides may affect women differently than men, we are examining any potential links between the work women do on farms and their health, focusing on reproductive health, as well as many of the same health outcomes we are studying among the applicators.

5 Most Commonly Used Pesticides by Farmers' Wives in the AHS

1. **Glyphosate (RoundUp®)**
2. **Carbaryl (Sevin®)**
3. **Malathion**
4. **2,4-D**
5. **Diazinon**

Breast Cancer Risk and Pesticide Use

AHS SCIENTISTS RECENTLY EXAMINED BREAST CANCER RISK among wives of private pesticide applicators (mostly farmers), focusing on the wives' personal use of pesticides as well as pesticides used by their husbands on the farm.

Women engaged in agricultural work or living in agricultural areas may be exposed to higher levels and different types of pesticides than the general population. Because some pesticides have properties similar to the body's own estrogen, scientists have wondered whether pesticide use increases the risk of breast cancer.

Among the 30,454 women in Iowa and in North Carolina who had no history of breast cancer prior to enrolling in the study, 309 women were diagnosed with breast cancer from the time of enrollment (1993-1997) through 2000. The researchers found that women in the study had slightly less breast cancer risk than expected when compared to other women in Iowa and North Carolina. Women in the study who live and work on farms—including those in the study who applied pesticides—may be more physically active or may have other healthy lifestyle practices that reduce their risk. The possible link between pesticides and breast cancer is controversial, and we plan to continue to monitor breast cancer risk in the AHS. We are especially interested in why farm wives may have less breast cancer than other women and will be looking more closely at the potential benefits of exercise and exposure to sunlight (which increases vitamin D levels).

On the other hand, among women who did not apply pesticides themselves, there was some suggestion of breast cancer risk associated with living close to fields where pesticides were applied and with having ever used specific insecticides

on the farm, including aldrin, carbaryl, chlordane, dieldrin, heptachlor, lindane, and malathion. Also, small increases in breast cancer were observed among women whose husbands used either the herbicide 2,4,5-TP or the fungicide captan. As in other studies, AHS scientists found that women with a family history of breast cancer were at about twice the risk of developing breast cancer themselves. Risk also increased for women who were overweight or obese.

The National Cancer Institute recommends that women age 40 and older should have mammograms every 1 to 2 years. Women who are at higher than average risk of breast cancer should talk with their health care providers about whether to have mammograms before age 40 and how often to have them.

No Longer Farming? We Still Need Your Participation

MANY OF THE MEN AND WOMEN WHO ARE PARTICIPANTS in the Agricultural Health Study have scaled down their farming activities, left farming for new occupations, or settled into fulltime retirement. As a result of these changes, some participants may feel that they have nothing more to contribute to the study and wonder why they are still included.

If that's true for you, please take note: ***Your participation in our telephone interviews is even more important than ever.***

Most chronic diseases like cancer take years to develop, and the links between exposures and disease may not be apparent until many years after exposures have ceased. Health symptoms may develop or continue long after exposures have ended.

In order to understand why some individuals develop health problems over time while others continue to enjoy good health, we need to periodically update your information.

If you are retired or no longer farming, your interview will probably be much shorter than for others—and by taking the time to update your information, you will help to significantly strengthen the study's results and impact.

Please be assured that *your* participation is very important to the success of the study - you cannot be replaced. Thank you for contributing and being a valued part of a study that will help not only you and your family, but future generations as well.

Upcoming in the Agricultural Health Study

OVER THE NEXT 12 MONTHS we will continue to complete follow-up telephone interviews with applicators and spouses. Several smaller studies of AHS subsets will be getting started, including a study of neurological function in applicators using specific pesticides and a pilot study focused on timing of puberty onset in children living on farms. In addition, we will continue to use the data we have already collected to address other important topics in agricultural health. We look forward to providing new information as articles are published in scientific journals. Check our website at www.aghealth.org for the latest results and publications.

The Agricultural Health Study is a long-term study to investigate the effects of environmental, occupational, dietary, and genetic factors on the health of the agricultural population. This study will provide information that agricultural workers can use in making decisions about their health and the health of their families. The study is conducted in Iowa by the Department of Epidemiology at the University of Iowa and in North Carolina by Battelle CPHRE. The study is directed by the National Cancer Institute, the National Institute of Environmental Health, and the US Environmental Protection Agency.

Michael C. R. Alavanja, Dr. P.H.
Project Officer
Occupational and Environmental
Epidemiology Branch
National Cancer Institute
Executive Plaza South, Room 8000
Rockville, MD 20852

Aaron Blair, Ph.D.
Assistant Project Officer
Occupational and Environmental
Epidemiology Branch
National Cancer Institute
Executive Plaza South, Room 8118
Rockville, MD 20852

Dale P. Sandler, Ph.D.
Chief
Epidemiology Branch
National Institute of Environmental
Health Sciences
111 T. W. Alexander Drive,
P.O. Box 12233
Research Triangle Park, NC 27709

Jane Hoppin, Sc.D.
Epidemiology Branch
National Institute of Environmental
Health Sciences
111 T. W. Alexander Drive,
P.O. Box 12233
Research Park Triangle, NC 27709

Kent Thomas, BSPH
Team Leader, AHS Pesticide
Exposure Study
National Exposure Research
Laboratory
US Environmental Protection Agency
MD 205-04
Research Triangle Park, NC 27711

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