



## **The Agricultural Health Study – 2008 Update<sup>1</sup>**

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This document summarizes the most recent findings from The Agricultural Health Study (AHS) in the following areas:

- Pesticide residues in homes
- Pesticides and colorectal cancer
- Pesticides and diabetes

### **Background**

The AHS explores potential causes of cancer and other diseases among farmers and their families and among commercial pesticide applicators. Current medical research suggests that while agricultural workers are generally healthier than the general US population, they may have higher rates of some cancers, including leukemia, myeloma, non-Hodgkin's lymphoma, and cancers of the lip, stomach, skin, brain, and prostate. Other conditions, like asthma, neurologic disease, and adverse reproductive outcomes may also be related to agricultural exposures. The AHS is designed to identify occupational, lifestyle, and genetic factors that may affect the rate of diseases in farming populations.

The AHS began in 1994, and will continue for a number of years to periodically gather information about the health of pesticide applicators and their families, their occupational practices, and their lifestyles and diets. The study results are reported as statistical summaries only. To date, more than 89,000 individuals have participated in the study.

North Carolina and Iowa were selected for the study based on their strong agricultural sectors and diverse production methods, commodities, and products. Information learned from these two states will be helpful to farmers throughout the United States and other countries that use modern agricultural technologies.

The study is sponsored by the National Cancer Institute, the National Institute of Environmental Health Sciences, and the Environmental Protection Agency. It is being carried out through the efforts of collaborators at the University of Iowa and Battelle Centers for Public Health Research and Evaluation. The goal is 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.

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1. This document is PI180, one of a series of the Agronomy Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Original publication date, May 2009. Visit the EDIS Web site at <http://edis.ifas.ufl.edu>.  
2. Frederick M. Fishel, associate professor, Agronomy Department, and director, Pesticide Information Office, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, FL.

## Pesticide Residues in Homes

A study of homes of AHS participants in Iowa indicates that pesticide residues find their way into homes on the clothes and shoes of family members who work with chemicals. Researchers collected dust samples on two occasions in 25 farm homes and 25 non-farm homes in two counties. In some cases, the researchers visited the farm homes soon after pesticides had been applied and again four weeks later. On other occasions, pesticides had not been applied recently when samples were collected. Dust samples were taken from carpets. Wipes were used to collect samples from hard surfaces in kitchens, entranceways, laundry areas, living rooms, children's playrooms and bedrooms. Pesticides that were tested for were the insecticide chlorpyrifos and the herbicides atrazine, metolachlor, glyphosate, acetochlor, alachlor, and 2,4-D.

The study concluded that farm homes had higher amounts of pesticide residues than non-farm homes. On farms where atrazine and metolachlor had been applied to crops, higher amounts of these pesticides were found in rooms where dirt was tracked in or where work clothes worn during chemical application were left. Glyphosate and 2,4-D, which are used in both residential and agricultural settings, were found in dust samples in most farm and non-farm homes. Chlorpyrifos, which has not been registered for residential use since 2000, was also found in dust samples. The average amount of pesticide concentration in dust for farms that sprayed a particular pesticide ranged from 94 to 1,300 parts per billion (ppb) compared with 12 to 1,000 ppb for farms that did not spray a particular pesticide, and 2.4 to 320 ppb for non-farms.

## Pesticides and Colorectal Cancer

Although farmers have a lower rate of colorectal cancer than the general population, research suggests a possible link between the disease and certain chemicals. AHS scientists compared information from 305 private applicators who were diagnosed with colorectal cancer during a seven-year period with information from those who did not develop the disease. A few pesticides, including the insecticides chlorpyrifos and aldicarb, were associated with the

risk of developing rectal or colon cancer. The researchers were surprised by the evidence related to aldicarb because such a link had not previously been reported. This link will be further evaluated because results indicating a link were based on a relatively small number of cases. The finding related to chlorpyrifos was not entirely unexpected because a previous study of AHS users of that insecticide also found an increased risk of rectal cancer.

## Pesticides and Diabetes

Research involving pesticide applicators in the AHS shows that exposure to some agricultural chemicals may increase the risk of diabetes. The study, involving nearly 1,200 participants in Iowa and North Carolina, found a link between diabetes and seven pesticides: aldrin, chlordane, heptachlor, dichlorvos, trichlorfon, alachlor, and cyanazine. The strongest association with the disease was found for trichlorfon, although the number of applicators who heavily used that pesticide was small. Although three of the pesticides studied, chlordane, aldrin, and heptachlor, are no longer on the market, measurable levels of these and other pollutants are still detectable in the general population and in food products.

Participants who had used the herbicides alachlor and cyanazine had a higher risk for developing diabetes, particularly those participants who had used these chemicals repeatedly over their lifetimes. As in other studies, AHS results confirmed the known link between obesity and diabetes. The strongest associations were found among overweight and obese participants.

## Additional Information

The Agricultural Health Study  
<http://aghealth.nci.nih.gov/> (accessed April, 2009).