

## Study Update 2005

The Agricultural Health Study is a long-term study of health associated with agricultural and lifestyle factors in Iowa and North Carolina. We are in the 13<sup>th</sup> year of the study.

Between 1993 and 1997, 89,658 participants (58,564 in Iowa and 31,094 in North Carolina) enrolled in the study. In Iowa, this included 31,877 private applicators, 21,711 spouses of private applicators, and 4,916 commercial applicators. The Iowa Department of Agriculture helped in enrolling participants through their Pesticide Applicator Certification Program. Iowa State University Extension also assisted greatly. Participation has been excellent.

From 1998-2003, we interviewed 57,253 private applicators and spouses to update information on agricultural activities and diseases that had been doctor-diagnosed since study enrollment. Participants also contributed 32,853 cheek cell samples, and 33,401 dietary questionnaires. In the fall of 2005 we completed this second phase of the study with 2,810 interviews from Iowa commercial applicators who also provided 1,687 cheek cell samples and 1,620 dietary questionnaires.

In November 2005 we began the third round of telephone interviews focusing on agricultural activities and changes in health since the last interview with private applicators and spouses.

Each year we track mortality in the cohort using state and national vital records. A report of the initial mortality findings was published in April 2005 (see Publications in [www.aghealth.org](http://www.aghealth.org) to review the entire manuscript).

### Mortality in the Cohort through 2000 for Selected Causes of Death

Cause of Death	Private Applicators		Spouses of Private Applicators	
	Observed Number of Deaths	Ratio of Observed Deaths to Expected Number of Deaths <sup>a</sup>	Observed Number of Deaths	Ratio of Observed Deaths to Expected Number of Deaths <sup>a</sup>
All causes	1,558	0.5 <sup>b</sup>	497	0.6 <sup>b</sup>
All cancers	514	0.6 <sup>b</sup>	239	0.7 <sup>b</sup>
Breast	3	0.9	54	0.9
Colon	56	0.7	31	1.2
Lung	129	0.4 <sup>b</sup>	29	0.3 <sup>b</sup>
Non-Hodgkin lymphoma	33	0.9	16	1.2
Prostate	48	0.7 <sup>b</sup>	0	0
Heart disease	537	0.5 <sup>b</sup>	82	0.4 <sup>b</sup>
Chronic respiratory disease	35	0.2 <sup>b</sup>	15	0.3 <sup>b</sup>
Diabetes	26	0.3 <sup>b</sup>	18	0.6
Motor vehicle accidents	56	0.8	14	0.8
Non-motor vehicle accidents	74	1	8	0.6

<sup>a</sup> Expected is the number of deaths predicted in the study groups based on the age, sex, and race-specific mortality rates of the statewide populations of Iowa and North Carolina. A value of 1.0 indicates that the mortality rate is similar to that of the general population; less than 1.0 indicates it is less than expected; and greater than 1.0 indicates it is more than expected.

<sup>b</sup> Observed number of deaths is significantly less than what was expected.



[www.aghealth.org](http://www.aghealth.org)

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

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#### Collaborating Partners:

Iowa State University Extension  
Iowa Department of Agriculture  
and Land Stewardship

## Private applicators and their spouses in the Agricultural Health Study live longer than the general population. This may be due to a healthier lifestyle.

The cohort is experiencing a very low mortality rate. Mortality from all causes, heart disease, diabetes, chronic respiratory disease, and lung cancer was about 50% that of the general population for both private applicators (farmers) and their spouses. These deficits varied little by farm size, type of crops or livestock on the farm, years of handling pesticides, or holding a non-farm job.

Several factors may contribute to the lower mortality observed in the cohort, including lower rates of smoking and alcohol consumption and higher levels of physical activity on the farm. The cohort includes participants who were fairly healthy at the start of the study since they were still actively farming. It may be too soon to see an increased number of deaths related to specific agricultural exposures.

## An excess of prostate cancer has been observed among private applicators in the Agricultural Health Study. This may be occupationally related.

Between enrollment and 2002, private applicators and their spouses have been diagnosed with 3,699 cancers, which are less than expected when compared to the statewide populations. However, an excess of prostate cancers has been observed among private applicators and an excess of melanoma among spouses. An excess of ovarian cancer was also observed among applicators, but it is based on only eight cases.

### Selected New Cancers Diagnosed in the Cohort between Enrollment and 2002

Type of Cancer	Private Applicators		Spouses of Private Applicators	
	Observed Number of Cancers	Ratio of Observed Deaths to Expected Number of Cancers <sup>a</sup>	Observed Number of Cancers	Ratio of Observed Deaths to Expected Number of Cancers <sup>a</sup>
All types	2,587	0.9 <sup>b</sup>	1,112	0.8 <sup>b</sup>
Female Breast	27	1.1	474	1
Colon	208	0.9	87	0.9
Lung	266	0.5 <sup>b</sup>	68	1.1
Non-Hodgkin lymphoma	114	1	42	0.9
Ovary	8	3.0 <sup>c</sup>	32	0.6 <sup>b</sup>
Prostate	1,046	1.3 <sup>c</sup>	5	1.2
Melanoma	100	1	67	1.6 <sup>c</sup>

<sup>a</sup> Expected is the number of new cancers predicted in the study groups based on the age, sex, and race-specific cancer incidence rates of the statewide populations of Iowa and North Carolina. A value of 1.0 indicates that the observed cancer experience is similar to that of the general population; less than 1.0 indicates it is less than expected; and greater than 1.0 indicates it is more than expected.

<sup>b</sup> Observed number of new cancers is significantly less than what was expected.

<sup>c</sup> Observed number of new cancers is significantly more than what was expected.

**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 CPRE. The study is directed by the National Cancer Institute, the National Institute of Environmental Health, and the US Environmental Protection Agency.

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