

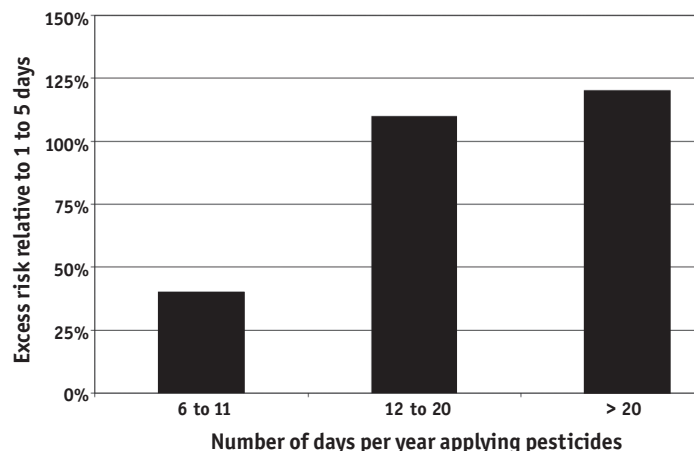
## High Pesticide Exposure Events Among Farmers

**F**armers are exposed to pesticides as a result of their day-to-day farming operations and may experience unusual events (spills and accidents) that cause high levels of exposure. Enrollment data from the Agricultural Health Study (AHS) indicated that 14 of every 100 applicators reported a high pesticide exposure event during their working lifetimes. AHS investigators also found that factors associated with a greater likelihood of self-reporting an unusually high pesticide exposure were: 1) delay in changing clothing or washing after pesticide application; 2) mixing pesticide application clothing with the family wash, 3) washing pesticide-contaminated hands inside the home after application, 4) applying pesticides within 50 yards of their well, 5) storing pesticides in the home, 6) self-repairing application equipment, and 7) using pesticides for more than 10 years.

High pesticide exposure events were further evaluated using information provided by AHS participants that completed the five-year follow-up questionnaire as of October 2000. The annual rate of a high pesticide exposure event was 6.5 per 1,000 applicators during the follow-up period. Of the 16,415 private pesticide applicators who had completed the first 5-year follow-up interview by October 2000, 306 responded “yes” to the question: “Since (the year of enrollment), did you have any incidents with fertilizers, herbicides or other pesticides that caused you an unusually high personal exposure?” These applicators were compared with 612 randomly selected applicators who had not reported such an event.

### The factors most strongly associated with a high pesticide exposure event in the 5-year follow-up period included:

- **Previous high pesticide exposure event:** Compared with applicators who did not report a high pesticide exposure event in the 5-year follow-up period, those applicators who did report these events were 3.8 times more likely to have reported experiencing these same types of events at enrollment into the AHS.
- **Storing pesticides in the home:** A 40% increased risk for a high pesticide exposure event was observed for applicators who stored pesticides in the home.
- **Types of chemicals:** Use of insecticides and herbicides.
- **State of residence:** Iowa applicators were almost twice as likely to report such an event in the previous five years than applicators in North Carolina.
- **Number of pesticide applications (days per year):** The chances of experiencing a high pesticide exposure event increased with the number of annual pesticide applications (see figure at right).
- **Younger Age:** Younger applicators (<45 years) were more than twice as likely to report a high pesticide exposure event in the previous five years than older applicators (>45 years).



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

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Other modifiable risk factors related to a high pesticide exposure event in AHS studies were washing work clothes with family clothes and scoring high on a risk-acceptance scale. The risk-acceptance scale consisted of responses to five questions that assessed a person's attitude toward risk. Scores of 3-5 on this scale were considered risk-accepting, whereas scores of 0-2 were considered as not risk-accepting, or risk averse.

### Although these characteristics do not cause high pesticide exposure events, they may be indicators of the care used when working with pesticides.

The 108 applicators who had experienced a high pesticide exposure event in the year prior to their interview were asked additional information about the event. They provided information such as whether or not symptoms occurred as a result of the high pesticide exposure event, what parts of their bodies were exposed, what type of pesticide was used at the time, what their activity was at the time, and whether they sought medical care. Fifty percent of these (n=54) reported symptoms, with 96% of those reporting multiple symptoms. The most common symptoms accompanying a high pesticide exposure event were:

- Skin irritation ..... 21%
- Eye irritation ..... 17%
- Headache or dizziness .... 16%
- Nausea ..... 10%
- Tearing or drooling ..... 9%
- Chest discomfort ..... 9%

Among the applicators who reported symptoms, 30% reported using insecticides at the time of the event, while only 6% of applicators without symptoms reported using insecticides. Applicators with symptoms were more likely to report exposure to the head and neck area than those without symptoms (32% versus 10%).

Only seven of the 54 applicators (13%) reporting a high exposure accompanied by symptoms in the previous 12 months made a health care visit after their high pesticide exposure event. Only one of these applicators was hospitalized. While this may suggest that the exposure events were not serious, it may also imply that farmers do not recognize certain symptoms as being related to pesticide exposure.

### Farmers who experience symptoms while applying pesticides—whether as a result of an accidental exposure or in the course of regular operations—may want to bring their exposure to the attention of their health care providers.

Pesticide accidents and spills cannot always be avoided. However, the results of these AHS studies suggest that some applicators are more likely to report high exposures than others.

For additional information, please go to [www.aghealth.org/publications.html](http://www.aghealth.org/publications.html) and identify the following:

- Bell EM et al. (2006). *Journal of Agricultural Safety and Health*, 12(2): 101-116.
- Alavanja MC et al. (1999). *Environ Res*, 80(2 Pt 1): 180-186.
- Alavanja MC et al. (2001). *Am J Ind Med*, 39(6): 557-563.

**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.

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EDC 0354  
AHS-IA-2006-3

