

## Risk Factors for Injury from Livestock and Farm Machinery

*Hearing loss is leading risk factor for both types of injury.*

**A**lthough farmers are at risk for injuries, few studies have examined risk factors for animal-related and machinery-related injuries. In 1997 and 1998, Agricultural Health Study researchers screened 6,999 farmers from Iowa for injuries in the previous 12 months and obtained more detailed information from 431 who reported a farmwork-related injury. These data were compared to 473 farmers who reported no injury.

Among the 431 injured farmers, 116 were livestock farmers who sought medical treatment for animal-related injuries; these farmers had a total of 124 injuries. There were 205 (48%) who reported 228 machinery-related injuries. Cuts/lacerations, sprains/strains/tears, and fractures were the most frequent injuries in both groups of injured farmers. The most frequent part of the body injured was the back for animal-related injuries and the fingers for machinery-related injuries. Hospitalization was required for 11 (9%) farmers with animal-related injuries and 23 (11%) farmers with machinery-related injuries. Cattle and hogs were the major sources of animal injury, whereas tractors and combines were the major causes of machinery injury.

Farmers with animal-related injuries and farmers with machinery-related injuries were each compared to farmers who were not injured during the prior year. The relationship was assessed between injuries and 37 characteristics of farmers for the injuries that were in six categories: 1) demographic features, 2) personal habits, 3) farming factors, 4) workload factors, 5) medical conditions, and 6) risk attitudes and stress. Of these characteristics, significant associations with animal and machinery injuries are presented in Figures 1 and 2, respectively.

Hearing loss was associated with both animal-related injury and machinery-related injury. This risk was 5.4 times higher among livestock farmers wearing a hearing aid compared with livestock farmers without a hearing aid and was 4.4 times higher for machinery-related injuries. Possible explanations include:

1) an inability to hear warning leads to more animal and machine injuries; and 2) increased cumulative exposure to farm machinery may be a cause of both hearing impairment (through noise exposure) and machinery-related injury (through increased contact with machinery).

There was also an association between arthritis and animal-related injuries. A possible explanation is that arthritis limits lower or upper extremity movement, which leads to injury through reduced ability to control or avoid large livestock.

Problem drinking was associated with a 2.5 times greater risk of machinery injuries. Farmers with less than 25 years of farming experience had a 1.8 times increased risk of machinery injury. Lack of experience, pace of work, and other factors may contribute to this relationship. Higher education is not likely a direct risk factor for animal-related injury.

Farmers working off the farm 12 or more weeks per year reported fewer large livestock-related injuries. The likely explanation is decreased contact time with animals on the farm.

This is the first study to show a relationship between animal-related injury and the risk factors of hearing difficulties, doctor-diagnosed arthritis, and younger age. It is also the first to evaluate medical conditions such as asthma, arthritis, problem drinking and difficulties



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**The Agricultural  
Health Study  
seeks to identify  
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**Iowa Office:**

The University of Iowa  
100 Oakdale Campus  
Iowa City, IA 52242-5000

**1-800-217-1954**

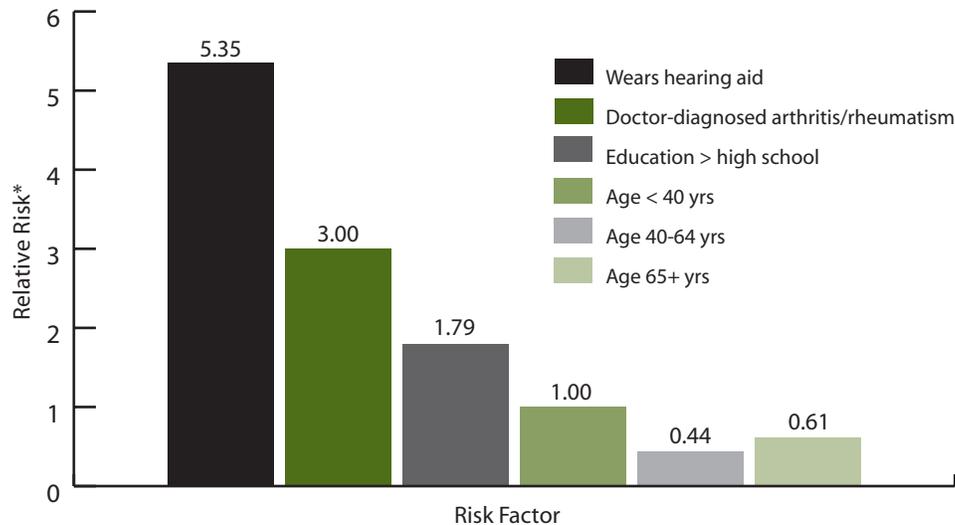
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and Land Stewardship

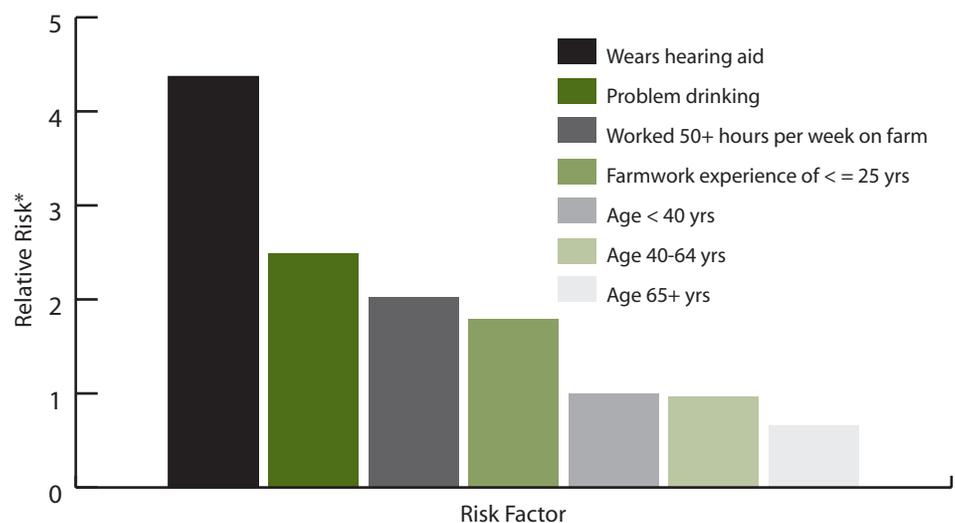
with vision and hearing as risk factors for farm machinery injuries. Hearing problems and arthritis may be particularly important to address in future preventive studies, since farmers have more hearing loss and arthritis compared to other workers.

More specifics regarding the publications that were the source of these findings are available through our website at: [www.aghealth.org](http://www.aghealth.org).

**Figure 1. Factors significantly associated with animal-related injury among 116 farmers and 342 uninjured farmers, all with large animals on the farm, Iowa, 1997**



**Figure 2. Factors significantly associated with machinery-related injury among 205 farmers and 473 uninjured farmers, Iowa, 1998**



\*Each relative risk has been adjusted for all other factors in each figure. If the relative risk is greater than 1.00, it indicates the factor is harmful or increases risk of injury. If the risk factor is less than 1.00, it indicates the factor is protective or decreases risk of injury. For example, the relative risk of 4.37 for wearing a hearing aid means that those farmers with this factor had 4.37 times higher risk of machinery-related injury than farmers who did not wear a hearing aid.

**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  
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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