

## Current Research in Rural Health

### Perspective on Farm Accident Statistics\*

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**ABSTRACT:** *The frequently cited statistics on farm accidents are based on definitions of farms accidents and on sources of data that exclude some events that could be called farm accidents and that represent only some of all the defensible perspectives on health risks in farming. As a contribution to exploring alternative perspectives on farm accident statistics, mailed surveys of 2,016 Iowa farm operators provided information on accidental injuries in their farm operations during the year preceding the survey. The majority of injuries were home treated, and hence were not events that would be reflected in accident statistics based on medical records. The data allow a breakdown by age, thus enabling an estimate of farm accident rates for children, youth, and the elderly, people whose accidents are typically excluded from farm accident statistics. Data are also presented that provide a farm operator's perspective on farm accidents, showing that many farm operators had knowledge about accidents through their own close calls and through their efforts to assist others who had farm accidents. The farm operator's perspective is also reflected in data indicating greater concern about chemical and air quality health risks than about risks from farm machinery and livestock.*

Although estimates of injuries in farming vary widely, farming is by any standard a hazardous occupation (Kraus, 1985). Conventional statistics on occupational accidents are an important starting place in depicting the risks in farming. However, the conventional statistics are social constructions, not absolute truths. They are based only on *some* of the range of defensible definitions and data sources. For example, the definitions used in generating the conventional statistics exclude some victims of accidents on farms and count as farm accidents events that some people would not consider farm accidents. The research reported here provides a perspective on the conventional statistics by documenting accident events and views of health risks in

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Perspective on Farm Accident Statistics

farming that are not reflected in conventional statistics. This new perspective is provided by four kinds of data: (1) data on farm accidents that are treated at home and, hence, are excluded from statistics based on physician, clinic, and hospital reports; (2) data on accidents to people who are not always considered in reports of farm accident statistics—e.g., children and the elderly; (3) data on what might be called the data base of the average farm operator—knowledge of the farm accidents of others and of the farm operator's own "close calls;" and (4) data on how farm operators rate the hazards of common farm accident sources, such as tractors and harvesters, in comparison to other health hazards in farming that are not ordinarily thought of as accident risks.

The most frequently quoted farm accident statistics come from the National Safety Council (e.g., National Safety Council, 1988), the U.S. Bureau of Labor Statistics, and the National Health Interview Survey of the National Center for Health Statistics. The statistics from these three sources are not comparable to one another, but have in common a focus on "workers." That means, they exclude accidents to persons age 14 and younger. The statistics that are reported must also be interpreted in light of the definitions and reporting methodologies that underlie them. Some of the National Safety Council analyses, for example, exclude accidents on farms to people who do not reside on farms (1988, p. 97)—excluding agricultural workers not living on farms and farm family members who live in town. The National Safety Council statistics also include accidents to farm workers that occurred off the farm (for example, an auto accident in town), household injuries on the farm (for example, a slip in the shower), and accidents in forestry and fishing (1988, p. 97).

### Home Treatment

Farm accident statistics often come from hospital, clinic, and doctor's office records (e.g., Cogbill, Busch, & Stiers, 1985; Rivara, 1985; Swanson, Sachs, Dahlgren, & Tinguely, 1987). Such studies are useful and important, but they provide no information about injuries treated *only at home*. It may be that a great deal of treatment is done at home—for financial reasons, because of the press of work that has to be done immediately, because of cultural acceptance of pain and cultural norms that treat bodies as expendable, because of the practice in farm families of doing as much as possibly can be done without outside assistance, or because of the distance that must be traveled to reach medical care. This study provides an estimate of the proportion of farm injuries that are treated at home.

### Accidents to Children and the Elderly

Interpretation of the national estimates of farm accident rates often do not take into account the ways in which farming is not comparable to other

occupations (Mutel & Donham, 1985). About 5 million Americans living on farms are children and youth under the age of 18, and more than 10 million, thus, past the conventional age of retirement (U.S. Bureau of the Census, 1989). Farming is a major occupation for children and youth under the age of 18, and a significant source of retirement. Moreover, farm work is a major occupation for children and the elderly who are not in the labor force. Considerable evidence that farming is a major source of accidents (Cogbill, Busch, & Stiers, 1985; Fiebert, 1985). This report provides an estimate of the proportion of accidents involving children, youth, and the elderly in most other occupations in comparison to commonly cited statistics on farm

### Farm Operator Knowledge

The conventional statistics on farm accidents take the view that makes sense to occupational safety experts, insurers, legislators, and the public. The insider's view, the view of farm operators may take into account the knowledge of farm operators that was almost a serious accident for them or someone they know. Their close calls and accidents of others may be factors affecting their safety. To make farming safer, there has been a focus on farm safety, through school-based programs and agricultural extension programs and accident reduction arise from the insider's view. Farm safety practices may reflect farm operator self-education. Through their own accidents and close calls, farm operators have about the accident reduction and how those forms of knowledge affect their farm safety practices.

### Accidents versus Other Health Hazards

Finally, although this study focuses on farm accidents, livestock, and power hand tools, the context of risk in farming. There is a concern about farm equipment, but is equipment safety a concern of farm operators? Do

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occupations (Mutel & Donham, 1983; Rosenblatt & Anderson, 1981). Of the 5 million Americans living on farms, roughly 25 percent are children and youth under the age of 18, and roughly 13 percent are older than 65 and, thus, past the conventional age of retirement in many other occupations (U. S. Bureau of the Census, 1989). Farm work may be carried out by children and youth under the age of 18, and by people past the conventional age of retirement. Moreover, farm work may be carried out in close proximity to children and the elderly who are not directly engaged in the work. There is considerable evidence that farming is hazardous to children and the elderly (Cogbill, Busch, & Stiers, 1985; Field & Purschwitz, 1987; Stallones, 1989). This report provides an estimate of the incidence of farm accidents that involve children, youth, and the elderly, people who are not at risk for accidents in most other occupations and whose accidents are not represented in commonly cited statistics on farm accidents.

### Farm Operator Knowledge of Accident Risks

The conventional statistics on farm accidents provide an outsider's view, the view that makes sense to occupational safety and other public health experts, insurers, legislators, and others not directly involved in farming. The insider's view, the view of farm operators, may be different. Farm operators may take into account their own close calls (something happened that was almost a serious accident but was not) in farming and the accidents of people they know. Their close calls and their knowledge of the accidents of others may be factors affecting their farm safety practices. In attempting to make farming safer, there has been considerable educational focus on farm safety, through school-based agricultural education and through agricultural extension programs and publications. However, accidents and accident reduction arise from the interplay of many factors (Waller, 1987). Farm safety practices may reflect not only safety education but also farm operator self-education. Through their knowledge of the accidents of others and their own accidents and close calls, farm operators may learn how to farm more safely. This study provides data on the knowledge that farm operators have about the accidents of others, their own close calls, and on how those forms of knowledge are perceived by farm operators to affect their farm safety practices.

### Accidents versus Other Health Risks

Finally, although this study focuses on accidents involving machines, livestock, and power hand tools, these accident sources are part of a larger context of risk in farming. There is justifiable concern about the safe use of farm equipment, but is equipment safety the greatest occupational health concern of farm operators? Do conventional statistics on farm accidents

reflect farm operator perspectives on the risks of farming? This study compares farm operator concern about accident risks to concern about other health risks in farming.

## Methods

In February 1989, questionnaires were mailed to a random sample of 3,270 Iowa farm operators through an agreement between the Iowa Department of Agriculture and Land Stewardship, and the Iowa State University Cooperative Extension Service. The 3,270 farm operators constituted a random, nonstratified 3 percent sample of all farm operators in the state. In addition to the mailed questionnaire, two follow-up contacts were made: (1) a reminder postcard one week after the questionnaire; and (2) a replacement questionnaire sent two weeks after the initial mailing to those who had not responded. This survey is part of an ongoing panel study of Iowa farm operators. Initiated in 1982, the project has focused on many important rural and farm issues. Of the 3,270 questionnaires sent out, 2,016 were returned in usable form and in time to be analyzed—a return rate of 62 percent. When the characteristics of the respondents returning questionnaires in the 1989 survey are compared with the population parameters provided by the 1987 Census of Agriculture, the returned questionnaires provide a representative cross section of the diversity of Iowa agriculture except that the very smallest farms (down to \$1,000 in sales) are under-represented, and, as a result, the larger commercial farms are over-represented.

Included in the questionnaire were 29 questions concerning accident experiences and perceived risks on the farm. Some of the questions were used in a 1981 farm accident survey as part of a larger National Safety Council study (National Safety Council, 1981; Williams, 1983), and some were new for the 1989 study. There were questions on perceptions of health and safety hazards of nine different aspects of farm technology (e.g., tractors, grain dust), experience with the risks of farming in six different areas (e.g., worked in an area where air quality affected breathing, had a close call, helped someone get medical care after a farm accident), and response to farm risks in two areas (not using a chemical thought to be too dangerous, changed farming practices after learning of someone else's accident). There were 16 questions on accidental injuries occurring on the respondent's farm in the past 12 months—whether there were such injuries; where the most serious one was treated; where and when the most serious one occurred; the role and age of the person(s) to whom it occurred; the estimated cost of the most serious accident; the number of days spent in the hospital, not being able to work, and requiring replacement work; severity of the accident; perceived accident causes; and whether there was still a physical effect of the accident. To minimize the reporting of on-farm accidents that were not a result of agricultural activity, the accident ques-

tions, that referred to accidents a series of questions about farming were also demographic questions about household (age, education), and operation (acreage, crops, livestock).

In the 2,016 farm households returned, there was a total of 5,802 assuming two people in the 39 household enumeration of residents. The farm average of 53 years old. Only 9 percent were age 36, and 16 percent were age 65 or older. Only 14 percent had a high school diploma; 14 percent had a college education, and 37 percent had more than a high school education. 7 percent of the spouses had fewer than a high school education. 45 percent had gone beyond high school. 45 percent had an off-farm job, as did 16 percent of the farm operators.

Ninety-three percent of the respondents reported a mean of 354 acres and a median of 200 acres. 20 percent of the farms were grown, by far the largest acreage. Two thirds of the respondents had a median of 87 acres. Beef cattle were reported on 73 percent of the farms, with a median of 31 head; feeder cattle on 68 percent of the farms, with a median of 40 head. Swine were reported on 68 percent of the farms, with a median of 50 sows. Dairy cows, ewes, laying hens, or turkeys were reported on 68 percent of the farms.

## Results

In total, 519 (26%) of the 2,016 respondents reported at least one accident on the farm. Of these, 170 (33%) reported two reports of farm accident fatal farm accident injuries of the past year. Of the 519 accidents, 519 were treated at a doctor's office or a hospital, the 519 were listed a total of 170 separate accidents. The other 459 accidents (88%) were treated only at home. Thus, 63 percent of the accidents were treated at home.

The respondents indicated that 63 percent of the accidents or injuries occurred in a barnyard, 16 percent in some other farm building, 11 percent on a road. Sixty-nine percent of the accidents were reported by the farm operator, with the others divided among the operator's spouse, offspring of the operator, or other employees.

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tions, that referred to accidents and injuries "on your farm," followed a series of questions about farming practices and farming hazards. There were also demographic questions about the respondent and the respondent's household (age, education), and questions about the nature of the farm operation (acreage, crops, livestock).

In the 2,016 farm households for which usable questionnaires were returned, there was a total of 5,802 residents (2.33 persons per household), assuming two people in the 39 households for which there was not a full enumeration of residents. The farm operators who responded were an average of 53 years old. Only 9 percent of the respondents were under age 36, and 16 percent were age 65 or older. Fifty percent of the farm operators had a high school diploma; 14 percent had fewer than 12 years of formal education, and 37 percent had more. Spouses averaged 51 years of age. Only 7 percent of the spouses had fewer than 12 years of formal education, and 45 percent had gone beyond high school. Twenty-eight percent of the farm operators had an off-farm job, as did 44 percent of the spouses.

Ninety-three percent of the respondents had acreage in crops, with a mean of 354 acres and a median of 270 acres. Although a wide range of crops were grown, by far the largest acreage was devoted to corn and soybeans. Two thirds of the respondents had acreage in pasture and hay, with a mean of 87 acres. Beef cattle were reported on 35 percent of the farms, with a median of 31 head; feeder cattle were also reported on 35 percent of the farms, with a median of 40 head. Sows were reported on 31 percent of the farms, with a median of 50 sows. Fewer than 10 percent of the farms had dairy cows, ewes, laying hens, or turkeys.

## Results

In total, 519 (26%) of the 2,016 respondents returning questionnaires reported at least one accident on their farms in the past year. Included were two reports of farm accident fatalities. In responding to questions about farm accident injuries of the past year that received medical attention at a doctor's office or a hospital, the 519 farm operators who reported injuries listed a total of 170 separate accidents involving medical treatment of 179 people. The other 459 accidents (involving injuries to 476 people) were treated only at home. Thus, 63 percent of the reported farming injuries were treated at home.

The respondents indicated that 27 percent of the most serious accidents or injuries occurred in a barnyard, 19 percent in a livestock facility, 31 percent in some other farm building, 22 percent in a field, and 1 percent on a road. Sixty-nine percent of the most serious injuries were to the farm operator, with the others divided in a fairly balanced way among the operator's spouse, offspring of the operator, other family members, and employees.

**Table 1. Accidents by Age of Victim.**

Age Category	Percentage of Victims			
	Physician Treated (N = 179)		Home Treated (N = 354*)	
	N	%	N	%
Below Age 18	16	9	21	6
Age 18-65	148	83	312	88
Over Age 65	15	8	21	6

\* Because respondents who reported a physician-treated accident did not also report a home-treated accident, these data exclude reports from 110 respondents who described a physician-treated accident.

The data in Table 1 indicate that a substantial proportion of the most serious injuries reported were to children and youth under age 18 or to adults over age 65. Because respondents were asked to give details of the "most serious accident or injury," there are no data on home-treated injuries in households that also reported a physician or hospital-treated injury. It is possible that the cases excluded are in some way different from the cases for which there are data. With that caution, it can be seen in Table 1 that 9 percent of the physician-treated injuries and 6 percent of the home-treated injuries were to children under age 18, and 8 percent of the physician-treated injuries and 6 percent of the home-treated injuries were to people over age 65.

The severity of the "most serious" injuries that were reported is reflected in data on estimated costs of the accidents, number of days spent in the hospital, number of days the injured person could not work, and the use of replacement labor. Three hundred and sixty-five of the respondents provided a dollar estimate of the cost of the most serious accident of the past year. The range was from \$1 to \$100,000, with a median of \$150 and a mean of \$1,447. Hospitalization was required in 60 cases, with a range from one to 180 days, a median of three days, and a mean of nine days. Following 219 of the accidents, the injured person was unable to work at least one day. The number of days the injured person was unable to work ranged as high as 260, with a median of six days, and a mean of 24 days. Ninety-nine of the most serious accidents required replacement labor, with a median of 10

**Table 2. Experience with Accidents.**

Type of Experience
Knew someone with a serious farm injury
Had a close call (something happened that almost was an accident)
Changed safety practices as a result of an accident
Helped neighbor do farm chores after a farm accident
Helped someone get medical care after a farm accident

days, a mean of 26 days, and a range from one to 260 days. It should be pointed out that the data on costs of accidents, number of days required to work, and number of days required in the hospital, are for the most serious accidents that occurred in the past 12 months. These data are not a measure of the yearly burden of accidents. The burden of accidents, in terms of hospitalization, days unable to work, and days required to be reached for most of the accidents, is likely to be much higher.

The data set lacks a complete list of farms where injuries were reported. This makes it difficult to compute age-specific accident rates for farm operators and the operator's spouse. For those farms where data were provided for the most serious accident, it would be a physician-treated accident in 65 percent of the cases for accidents to the farm operator and 50 percent for farm work involvement with visitors. This suggests that farm operators may farm far fewer hours than visitors. Operators may farm far fewer hours because of safety precautions, estimated accident rates, or other factors. These rates can be compared with estimated rates for other farm operators. The rate of "most serious accidents" for farm operators 65 and younger (20% report farm injury) is higher than for those over age 65 (10% report farm injury). The rate of "most serious" accidents for farm operators is slightly higher (10% in past year) than for those 65 and younger (8% in past year).

Respondents were asked about their experience with farm safety education. The data in Table 2 illustrate that many respondents who provided farm safety education

Percentage of Victims

Home Treated (N = 354*)	
N	%
21	6
312	88
21	6

accident did not also report a home-treatment by a physician who described a physician-

stantial proportion of the most serious accidents occurred among youth under age 18 or to those who were asked to give details of the accident. The data on home-treated injuries and hospital-treated injury. It is possible that the cases may differ from the cases for which data are available. As can be seen in Table 1 that 9 percent of the home-treated accidents and 8 percent of the physician-treated injuries were to people

that were reported is reflected in the number of days spent in the hospital, the number of days unable to work, and the use of medical services. The average of the respondents provided for the most serious accident of the past year. The mean cost was \$150 and a mean of \$1,447. The range was from one to 180 days, with a median of 219 of the days. Following 219 of the respondents were unable to work at least one day. The number of days unable to work ranged as high as 180 days. Ninety-nine of the respondents were unable to work, with a median of 10

Table 2. Experience with Accidents.

Type of Experience	Percentage of Farm Operators
Knew someone with a serious farm injury	83
Had a close call (something happened that was almost a serious accident)	68
Changed safety practices as a result of learning about someone else's accident	67
Helped neighbor do farm chores after a farm accident in neighbor's family	49
Helped someone get medical care after a farm accident	30

days, a mean of 26 days, and a range from one to 260 days. It should be pointed out that the data on costs, hospitalization, number of days unable to work, and number of days requiring replacement labor underestimate the yearly burden of accidents. The questions were about farm accidents that occurred in the past 12 months. The year-long costs, days of hospitalization, days unable to work, and days requiring replacement labor had yet to be reached for most of the accidents.

The data set lacks a complete log of the injuries of the past year for the farms where injuries were reported, and it also lacks the detail needed to compute age-specific accident rates for people other than the farm operator and the operator's spouse. For the operator and spouse, accident rates can be provided for the most serious accident experienced. In some cases that would be a physician-treated accident, and in other cases it would not. Even for accidents to the farm operator and spouse, there are no data on extent of farm work involvement with which to evaluate accident rates. Older operators may farm far fewer hours than younger operators. Spouses of operators may farm far fewer hours than do the operators. With these cautions, estimated accident rates for operators and spouses over age 65 can be compared with estimated rates for those 65 and under. Among farm operators the rate of "most serious" accidents is twice that among those age 65 and younger (20% report farm injuries in the past year) than among those over age 65 (10% report farm injuries in the past year). By contrast, the rate of "most serious" accidents for spouses is only a fraction of that for operators, and is slightly higher for spouses older than age 65 (3% injured in past year) than for those 65 and under (2% injured in past year).

Respondents were asked about experiences with farm accidents. The data in Table 2 illustrate that many farm operators have had life experiences that provided farm safety education. Eighty-three percent of the respon-

Table 3. Farmer Perceptions of Dangers in Farm Work.

Type of Hazard	Mean Perceived Hazard*
Insecticides	4.2
Augers	4.0
Confinement building air quality	3.9
Herbicides	3.8
Grain dust	3.7
Front-end or skid loader	3.4
Balers	3.3
Combines	3.2
Tractors	2.8

\* Ratings on a scale from 1 = not at all hazardous, to 5 = very hazardous.

dents reported that they knew somebody who had a farm accident, and 68 percent of the respondents said that they had a close call at some time (something happened that was almost a serious accident). Sixty-seven percent reported that their own farming practices had been affected by their knowledge of the accidents of others.

Despite the significance of farm accidents in the lives of the respondents, farm accidents were not their greatest perceived health threat. They were asked to "indicate how hazardous you feel each of the following are," with ratings on a five-point scale from "not at all hazardous" to "very hazardous." In their ratings, tabulated in Table 3, chemical and air quality hazards were rated as more hazardous than all accident hazards except grain augers. Although in the survey only about 1 percent of the accidents for which sources or mechanisms were reported involved agricultural chemicals, the surveyed farm operators worried much more about chemicals (and air quality) than about machinery.

## Discussion

The data should be interpreted cautiously. The data lack the detail of intensive interviews. Farm operators may not recall all of the accidents and injuries of the past year, may think some events that occurred more than a

year ago were more recent, and many accidents and injuries experienced may be biased toward ignoring or belittling.

Nonetheless, it is useful to note that a substantial majority of farm injuries are these injuries may have been slight (a question about "a minor accident at home") or serious. There are anecdotal reports, even broken backs, are treated on the farm. It is likely that the farm accident statistics underestimate the incidence of all accidents, and the incidence of serious farm accidents.

Self-treatment for illness occurs frequently (Haug, Wykle, & Namazi, 1989; Research is needed on why farmers do what they do, and whether they differ from other workers). Home care may be a major factor in home remedies (1989) found only a slight relationship between severity of illness. Home treatment is care is affordable and available, and for many problems, the sense that pain and discomfort and the availability of substitutes are important. In some counts, people in farming may be more likely to seek care may be less often affordable and available. Home-based solutions to problems may be more common. People feel the press of work and lack of time.

Whatever the factors underlying farm accidents, data suggest that it would be important to study triage and treatment of farm accidents. Access to health care for farm families includes the role of physicians, hospitals, paraprofessionals, and insurance might be to miss the impact on the farm family life.

In these Iowa data, 17 percent of farm accidents required hospital or physician treatment. In other studies, 10 percent of those treated only a few days. The finding of a lower accident rate in Iowa is consistent with data reported by Geller, Ludtke, and others (1989) that accident rates were lower in Iowa than in other states. Accident rates where data for children and the elderly are not ordinarily victimized. It is important to know the risk to adult workers and the elderly. To compare farm accident rates with the elderly to accident rates in industrial settings.



Farm Work.

Mean Perceived Hazard*
4.2
4.0
3.9
3.8
3.7
3.4
3.3
3.2
2.8

= very hazardous.

who had a farm accident, and 68 had a close call at some time (serious accident). Sixty-seven practices had been affected by their

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year ago were more recent, and may not have been aware of some of the accidents and injuries experienced by others on the farm. They may also be biased toward ignoring or belittling injuries.

Nonetheless, it is useful to note that in this sample of Iowa farmers, a substantial majority of farm injuries were treated only at home. Many of these injuries may have been slight, because people were responding to a question about "a minor accident or injury on your farm (requiring medical attention at home)." But some of the home-treated injuries may have been serious. There are anecdotal reports that some quite serious farm injuries, even broken backs, are treated only at home (Kohn, 1988, p. 12). It seems likely that the farm accident statistics based on medical records greatly underestimate the incidence of all farm accidents, and even underestimate the incidence of serious farm accidents.

Self-treatment for illness occurs commonly in modern society (e.g., Haug, Wykle, & Namazi, 1989; Segall, 1990; Segall & Goldstein, 1989). Research is needed on why farm families engage in home remedy when they do, and whether they differ from other populations. Severity of injury may be a major factor in home remedy; however, Haug, Wykle, and Namazi (1989) found only a slight relationship between self-treatment and perceived severity of illness. Home treatment may reflect the extent to which health care is affordable and available, the valuing of home-based solutions to problems, the sense that pain and injury are part of life, the press of work, and the availability of substitute workers. It is possible that on all these counts, people in farming may be pushed to home remedy. For them, health care may be less often affordable and less available. They may value home-based solutions to problems more than other people, and may more often feel the press of work and lack substitute workers.

Whatever the factors underlying the high level of home treatment, the data suggest that it would be important to evaluate the adequacy of home triage and treatment of farm accidents. To put all planning energy devoted to health care for farm families into safety education, public health concerns, physicians, hospitals, paraprofessionals, emergency response, and health insurance might be to miss the importance of home triage and treatment in farm family life.

In these Iowa data, 17 percent of farm accident victims who received hospital or physician treatment were minors or the elderly, and roughly 12 percent of those treated only at home were minors or the elderly. (The finding of a lower accident rate for older farm operators is consistent with data reported by Geller, Ludtke, and Stratton, 1990). To compare farm accident rates where data for children, youth, and the elderly have not been removed with accident rates in occupations where children, youth, and the elderly are not ordinarily victims would be misleading if one wanted to know the risk to adult workers who were below the standard retirement age. To compare farm accident rates without data on children, youth, and the elderly to accident rates in industries without risks to children, youth,

or the elderly would also be misleading and would make it more difficult to address the full range of agricultural safety and health needs. The factors underlying accidents to children, youth, and the elderly may differ to some extent from those underlying other farm accidents. These factors may include the nature of farm activities that put people in different age categories at risk, such as physical size and strength of children, the availability of child care to farm families, the clothing worn by children and the elderly, factors affecting retirement in farming, and reaction times in the elderly.

The data on perceptions of risk may reflect safety education programs. Although newspaper reports of farm accidents, word-of-mouth reporting about them, and direct experience with accidents and close calls may be crucial, it is impossible to separate the interacting factors in the perception of technological risk (Nelkin, 1989). Nonetheless, the data on accident experiences and knowledge and the answers to a single question on changes in farming practices as a result of learning of somebody else's accident indicate that it might be fruitful to carry out further research on the "safety education" provided by one's own close calls and knowledge of the accidents and close calls of others. That 83 percent of the respondents knew someone who had a serious accident, 68 percent had a close call, and 30 percent helped someone get medical care after a farm accident, indicates an impressive amount of exposure to experiential education and the potential for a high level of awareness about accident hazards.

The fact that people primarily reported accidents involving machinery and livestock, but worried as much or more about farm chemicals and air quality, could be taken to indicate that farmers are misinformed about the true day-to-day risks of farming. Perhaps farmers worry more about agricultural chemicals and air quality when the hazards of farm machinery are far more likely to make something happen that requires immediate medical attention. Alternatively, farm operators may make a distinction between "accidents" and "agricultural health problems." What they reported when they told of accidents was not the affects of agricultural chemicals that they can perceive (coughing, itching, tingling), though 58 percent of the sample said that they had been affected in at least one of those ways by agricultural chemicals. Nor did they report that air quality in a work area seemed to have affected their breathing, though 73 percent said that they had that experience. They primarily reported accidents involving machinery or livestock. Thus, asking about "accidents" may miss a great deal of what farm operators experience as health problems.

That farm operators perceive insecticides, air quality in confinement buildings, and herbicides to be greater hazards than combines and tractors probably does not mean that they underestimate the hazards of tractors or combines. Rather, it means that they know less about how to defend against the hazards of insecticides, confinement building air, and herbicides. These hazards are harder to defend against because there are so many routes by

which they can affect one (e.g., ch water), because the precautions follow, and because so many pote damage, birth defects, or farmer's or physician.

Overall, the data reported he conventional farm accident statis farm accident rates on medical re at home. The data show that basi "workers" and excluding childre the rate of accidents in farming operator's perspective on accide accidents to others in the comm statistics that reflect health risks o data on the health affects of aq confinement buildings.

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- Cogbill, T.H., Busch, H.M., Jr., & Stiers, C. 562-566.
- Field, W.E., & Purschwitz, M.A. (1987). *C* 102, 642-644.
- Geller, J.M., Ludtke, R.L., & Stratton, T. sociological analysis. *The Journal of R*
- Haug, M.R., Wykle, M.L., & Namazi, K.F. *and Medicine*, 29, 171-183.
- Kohn, H. (1988). *The last farmer*. New Yor
- Kraus, J.F. (1985). Fatal and nonfatal injuri *of Public Health*, 6, 401-418.
- Mutel, C.F., & Donham, K.J. (1983). *Me* Springer-Verlag.
- National Safety Council. (1981). *Iowa stan*. National Safety Council.
- National Safety Council. (1988). *Acciden* Council.
- Nelkin, D. (1989). Communicating technu tion. *Annual Review of Public Health*, 1
- Rivara, F.P. (1985). Fatal and nonfatal far States. *Pediatrics*, 76, 567-573.
- Rosenblatt P.C., & Anderson, R.M. (1981) R. T. Coward & M. W. Smith (Eds.), ? Westview.
- Segall, A. (1990). A community survey of
- Segall, A., & Goldstein, J. (1989). Exploring *Social Science and Medicine*, 29, 153-16
- Stallones, L. (1989). Fatal unintentional in *The Journal of Rural Health*, 5, 246-256.
- Swanson, J.A., Sachs, M.I., Dahlgren, K.A children. *American Journal of Diseases* U.S. Bureau of the Census. (1989). *Statistic*

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es, air quality in confinement ds than combines and tractors mate the hazards of tractors or ss about how to defend against ding air, and herbicides. These se there are so many routes by

which they can affect one (e.g., chemical residues on clothing or in drinking water), because the precautions that must be taken are very difficult to follow, and because so many potential adverse effects (such as neurological damage, birth defects, or farmer's lung disease) cannot be healed by nature or physician.

Overall, the data reported here provide an alternative perspective on conventional farm accident statistics. They show that basing estimates of farm accident rates on medical records misses injuries that are treated only at home. The data show that basing farm accident statistics on accidents to "workers" and excluding children and the elderly greatly underestimates the rate of accidents in farming. The data further show that the farm operator's perspective on accidents may reflect personal close calls and accidents to others in the community. And, finally, the data show that statistics that reflect health risks of concern to farm operators would include data on the health affects of agricultural chemicals and air quality in confinement buildings.

#### REFERENCES

- Cogbill, T.H., Busch, H.M., Jr., & Stiers, G.R. (1985). Farm accidents in children. *Pediatrics*, 76, 562-566.
- Field, W.E., & Purschwitz, M.A. (1987). Cost of farm and rural injuries. *Public Health Reports*, 102, 642-644.
- Geller, J.M., Ludtke, R.L., & Stratton, T. (1990). Nonfatal farm injuries in North Dakota: A sociological analysis. *The Journal of Rural Health*, 6, 185-196.
- Haug, M.R., Wykle, M.L., & Namazi, K.H. (1989). Self-care among older adults. *Social Science and Medicine*, 29, 171-183.
- Kohn, H. (1988). *The last farmer*. New York, NY: Summit.
- Kraus, J.F. (1985). Fatal and nonfatal injuries in occupational settings: A review. *Annual Review of Public Health*, 6, 401-418.
- Mutel, C.F., & Donham, K.J. (1983). *Medical practice in rural communities*. New York, NY: Springer-Verlag.
- National Safety Council. (1981). *Iowa standardized farm accident reporting program*. Chicago, IL: National Safety Council.
- National Safety Council. (1988). *Accident facts, 1988 edition*. Chicago, IL: National Safety Council.
- Nelkin, D. (1989). Communicating technological risk: The social construction of risk perception. *Annual Review of Public Health*, 10, 95-113.
- Rivara, F.P. (1985). Fatal and nonfatal farm injuries to children and adolescents in the United States. *Pediatrics*, 76, 567-573.
- Rosenblatt P.C., & Anderson, R.M. (1981). Interaction in farm families: Tension and stress. In R. T. Coward & M. W. Smith (Eds.), *The family in rural society* (pp. 147-166). Boulder, CO: Westview.
- Segall, A. (1990). A community survey of self-medication activities. *Medical Care*, 28, 301-310.
- Segall, A., & Goldstein, J. (1989). Exploring the correlates of self-provided health care behaviour. *Social Science and Medicine*, 29, 153-161.
- Stallones, L. (1989). Fatal unintentional injuries among Kentucky farm children: 1979 to 1985. *The Journal of Rural Health*, 5, 246-256.
- Swanson, J.A., Sachs, M.L., Dahlgren, K.A., & Tinguely, S.J. (1987). Accidental farm injuries in children. *American Journal of Diseases of Children*, 141, 1276-1279.
- U.S. Bureau of the Census. (1989). *Statistical abstract of the United States, 1988*. Washington, DC:

Government Printing Office.

Waller, J.A. (1987). Injury: Conceptual shifts and preventive implications. *Annual Review of Public Health*, 8, 21-49.

Williams, D.L. (1983). *Iowa agricultural accident and illness study, 1981*. Ames, IA: Cooperative Extension Service, Iowa State University.



Recent studies reveal that farming is the most dangerous occupation in America. Sadly, farmers and farmworkers often have the poorest access to health care services.

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Stueland, Lee, and Layde

## Surveillance of Agriculture in Wisconsin: Epidemiologic Characteristics of Injuries

Dean Stueland, Barbara Lee

**ABSTRACT:** We implemented a surveillance system in central Wisconsin in November 1987. The county is heavily agricultural, with a predominant epidemiologic characteristics of the surveillance system. The majority of injuries were to men aged 19 and 65 years of age (68.4%), and 50% were to the spouse of the owner/operator of the farm. The majority of injuries in children younger than 18 years of age were to the child while animals were the most frequent cause of injury. Injuries were most frequent in August, which together accounted for 25% of the total. Despite the limitations of the descriptive information, such information may be useful for identifying high risk areas and suggesting hypotheses to account for occupational injury.

According to National Safety Council (1990), farming is among the most dangerous occupations in America (National Safety Council, 1990). Each year, approximately 10,000 injuries are attributed to agricultural injury. For every 100,000 worker-years of 40 deaths per 100,000 worker-years, the NSC estimates there are 100,000 injuries per year that require medical attention from work.

The high occupational injury rate is due to the unique working conditions of farming, including long hours, fatigue, and isolation (Cohen, Moll, Maley, & Linn, 1987). The diversity of the risks in agricultural work is reflected in the diversity of the work force involved in farming.

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