

# The Certified Safe Farm Project in Nebraska: The First Year

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## Abstract

Potentially preventable death, disabling injury, and serious illness are very common secondary to work in production agriculture in Nebraska and elsewhere. The traditional approach to farm safety has consisted largely of education designed to prevent traumatic injury. While education is of critical importance, additional incentives may be needed to reduce fatal and non-fatal events to an acceptable level. The Certified Safe Farm concept was developed in collaboration with two Nebraska health insurance companies. The program consists of combining an on-farm safety assessment and occupational health screening with an education program. The incentive to complete this program is to be eligible for a reduction in health insurance premiums, which are a large expense for farmers. A Certified Safe Farm pilot program was established in a northeast Nebraska farm community with no prior occupational health services for farmers. A local nurse practitioner received agricultural health training and a local farmer was trained to perform the on-farm safety assessments. Eleven farms were enrolled in the program in the first year. While all passed the safety assessment process, a number of important safety problems were identified. Also, a surprising number of current health problems and risk factors for future illness were found. It is hoped that successful participation in the Certified Safe Farms program will be used in the future to offer Nebraska farm families reductions in their health insurance premiums.

*Keywords.* Farm safety, Occupational health, Production agriculture, Certified Safe Farm, On-farm safety assessment, Health screens, Insurance.

Working in production agriculture has long been one of the most dangerous occupations in the United States, Canada, and elsewhere (National Safety Council, 1996; Brison and Pickett, 1991; Von Essen and McCurdy, 1998). The majority of the fatalities occur while operating farm machinery and handling animals. Many persons of all ages suffer serious, disabling injuries from similar events. In addition, there are a number of fatal and nonfatal medical illnesses that are a direct consequence of handling chemicals, crops, and livestock. It is likely that a large share of these incidents could have been prevented.

Fatal and nonfatal injury is still a major problem on farms in Nebraska. According to the records compiled by the Cooperative Extension staff of the

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University of Nebraska, there have been a mean number of 35 deaths on Nebraska farms per year in the past 30 years, with the victims ranging in age from 1 to 90 years of age (Fiedler et al., 1998). The number of farm fatalities is decreasing in Nebraska and elsewhere (National Safety Council, 1996; Rivera, 1997). There were only 23 cases of fatal injury on Nebraska farms in 1998. The drop in farm fatalities may reflect in part the decrease in the number of farms in the state from 73,000 farms in 1970 to 55,000 farms in 1997. The reduction in fatal injury is a welcome change. However, there is still a need for innovative interventions that will further reduce the morbidity and mortality related to work in production agriculture. There is some evidence that education alone does not change farmers' attitudes about safety issues (Greenstein, 1998).

The dollar cost of farm injuries in Nebraska is difficult to quantify. Many injuries are treated locally on an outpatient basis. Those injuries that result in transfer to a referral center tend to generate large bills. The mean hospital charges alone from farm injuries treated at the University of Nebraska Medical Center between 1993 and 1996 were \$19,765 (Warren, personal communication). Other important negative outcomes from these injuries, which are difficult to measure, include emotional scars, time lost from work, and the effects of having a permanent disability.

Nebraska was one of the first states to initiate a farm safety education program through Cooperative Extension based at the University of Nebraska-Lincoln. Farm health and safety has been promoted in this state through other programs as well, including recent efforts funded by the W. K. Kellogg Foundation (Von Essen and Fredrickson, 1997). In spite of these efforts, injury and illness from work on the farm continue to be important problems in Nebraska.

The people working in the area of farm health and safety in Nebraska believe that many more injuries and illnesses related to production agriculture can be prevented. It was proposed that additional incentives were needed to increase participation in farm health and safety programs. The concept of the certified safe farm evolved in 1995 from discussions with two local health insurance companies who shared our interest in reducing the costs, both financial and social, of farm injury and illness. We devised a program, together with colleagues at the University of Iowa, that borrows concepts from safety and health programs that are already widely used in other industries such as manufacturing. This program, called Certified Safe Farms, consists of voluntary participation in farm health and safety education, occupational health services, and an on-farm safety assessment (Von Essen et al., 1997). The program centers on offering farmers a financial incentive to work more safely in addition to providing them information on how to do so.

This article reports on the implementation of the pilot project of the Certified Safe Farm project in a community in northeast Nebraska. It also describes the steps taken to develop occupational health services targeting both the family farm and those involved in corporate production agriculture in a community with no prior occupational health services of this type.

## Methods

This project was approved by the Institutional Review Board of the University of Nebraska Medical Center. It was funded by the National Institute of Occupational Safety and Health and the W. K. Kellogg Foundation. It was developed as a joint effort between the University of Iowa, the University of Nebraska Medical Center, and the University of Nebraska-Lincoln. Mutual of Omaha and Blue Cross/Blue

Shield of Nebraska, two of the largest health insurance companies in Nebraska, also participated actively in the design of the project. A representative from the insurance commission of the state of Nebraska was also involved in the planning process.

The project was conducted with the full support of and assistance from the administration of St. Francis Memorial Hospital in West Point, Nebraska. West Point, a community of 3,609 people, is the county seat of Cuming County and the site of the Cooperative Extension office. According to the 1992 Census of Agriculture, Cuming County ranked first in the state and 25th nationally in terms of market value of agricultural products sold. The average Cuming County farm operator was 49.6 years old and farmed 329 acres (U.S. Bureau of the Census, 1992). The major agricultural products included beef, pork, corn, and soy beans. The adjoining counties from which subjects were drawn are quite similar in terms of agricultural production.

The first step in developing the program consisted of providing specialized training in agricultural medicine to a nurse practitioner who was hired to develop an occupational health clinic at St. Francis Memorial Hospital. She participated in the agricultural nurses training course at the University of Iowa and received additional training in this area through the University of Nebraska Medical Center. Physicians and physician's assistants working in West Point were also provided with information on agricultural medicine.

Farmers were recruited from Cuming County (8 subjects) and adjoining counties (3 subjects). All were male and the mean age was 44 (range = 32 to 54). One subject left the project in March 1999 after selling his farm. Farmers were recruited in a non-random manner through the efforts of the project coordinator, a Cuming County farmer who is the Certified Safe Farm project coordinator. The Cuming County Cooperative Extension Educator also assisted with recruitment and promotion of the project. The project was publicized and farmers were invited to participate using the local newspaper and radio station as well as an area television station. No attempt was made to exclude farmers from a specific age group or to limit participation to those who resided in Cuming County. The on-farm safety assessments were performed by the project coordinator, who had received special training by agricultural engineers for this purpose. He engaged in safety and health education while he was conducting the assessment.

On-farm safety assessments were done in the spring of 1998 using an instrument containing 124 items developed by agricultural engineers at the University of Iowa and the University of Nebraska-Lincoln. It took approximately 2 h to complete each on-farm assessment. The farmers had an opportunity to see the instrument and make any corrections before the assessor's visit. The instrument included a checklist for each major area on the farm, including the machinery, shop, chemical storage and outdoor working environment. Relative value units had been assigned to the items on the checklist by the authors of the tool. The assessor then assigned a rating ranging from 0 = safe (no corrections needed) to 1 = borderline (needs moderate attention) or 2 = unsafe (needs immediate attention). The rating was multiplied by the relative value factor to generate the points for each item. The safety score was then calculated using the following formula: total points possible - points accumulated/total points possible. A passing score was 80% of possible points.

Health screenings and education were done by an occupational health nurse practitioner at St. Francis Memorial Hospital using a checklist developed at the University of Iowa for their Agrisafe clinics. The producers were asked to complete a questionnaire concerning health history and work practices before the visit. Points addressed in the history and physical examination included the presence of skin

cancer, hypercholesterolemia, poor vision, hearing loss, musculoskeletal problems, signs of psychological stress, and organophosphate pesticide exposure.

The participants were asked to complete a daily log in which they were to record farm-related injury, illness, and stress. This was done in order to collect information about injury and illness events from the participants. Logs were collected on a monthly basis for the duration of the first year and the findings are reported below. The logs will be revised during the second year of the project using the experience gained in the first year, including feedback from the subjects. Additional information will be collected from the participants during the second year using focus groups.

The financial incentive consisted of a payment of \$50 after 6 months of participation in the project. The farmers were informed that they would be paid a total of \$200 for participation throughout the two-year life of the project.

## Results

The summary results of the on-farm safety assessment are shown in table 1. The most commonly identified problem areas included the following: (1) lack of a rollover protective structure on all older tractors; (2) a lack of warning decals and tow chains on many gravity flow grain wagons; (3) failure to make most grain storage structures inaccessible to small children by raising the height of the ladder; and (4) unshielded augers.

The results of the health screening indicated that this group of farmers had a number of health problems and risk factors for future illness (table 2). The health assessment included the following areas: cholesterol >200 mg/dl, hypertension (diastolic blood pressure greater than 85 mm Hg and/or systolic blood pressure greater than 140 mm Hg, body mass index  $\geq 27$ , respiratory symptoms, inadequate

**Table 1. Results of on-farm assessment**

	Mean (%)	S.D.		Mean (%)	S.D.
Combines	97.9	3.8	Payloaders & skidloaders	84.1	23.7
Mowers	97.5	6.3	Manure spreaders	82.6	26
Other equipment	91.6	8.9	Augers	82.5	33.4
Livestock	9.2	9.7	Front end loaders	80.6	22.8
Shop	89	12.9	Storage structures	80.5	9.9
Outdoor work environment	88.2	12.8	Chemicals	78.1*	N.A.†
Tools	87.5	30.6	Gravity flow wagons	53.2	27.4
Tractors	82.9	10.2			

\* Value from one farm only.

† Not applicable.

**Table 2. Results of health screening**

	No.	(%)		No.	(%)
Drinks alcohol	10/11	(90)	Inadequate use of PPE for chemicals	4/8	(50)
Elevated serum cholesterol	9/11	(82)	Elevated blood pressure	5/11	(46)
Signs of stress	8/11	(73)	Respiratory symptoms	5/11	(46)
Handles pesticides	8/11	(73)	Musculoskeletal pain	4/11	(36)
Inadequate use of PPE* for sun	8/11	(73)	Skin lesions	3/11	(27)
Inadequate use of respiratory PPE	7/11	(63)	Hearing deficits	3/11	(27)
Body mass index >27 kg/m <sup>2</sup>	7/11	(63)	Smokes cigarettes	2/11	(18)
Inadequate use of PPE for hearing	6/11	(56)	Uncorrected vision defects	0/11	(0)
Family history of heart disease	6/11	(56)			

\* PPE = personal protective equipment.

use of respiratory PPE (failure to use PPE when handling grain or when working in hog confinement facilities), uncorrected vision defects, skin lesions suspicious for malignancy, inadequate use of PPE for sun exposure (failure to use sun screen or hats that protect the neck and ears from the sun), hearing deficits (decreased auditory acuity), inadequate use of hearing PPE (failure to wear ear plugs when using noisy machinery), handling of pesticides, inadequate use of chemical PPE (failure to wear suitable goggles, gloves and coveralls), musculoskeletal pain, smokes cigarettes, drinks alcohol, shows signs of stress as demonstrated in answers to the health questionnaire or in information volunteered spontaneously, and family history of cardiac disease. All subjects had five or more areas of concern. The only category in the physical exam where there were no deficits identified was uncorrected defects in visual acuity.

The amount of detail obtained from the daily injury and illness log varied greatly, potentially because some of the subjects did not feel comfortable revealing information of this nature in a written log. However, some information was obtained from all participants. Injuries recorded included six minor injuries requiring home first aid, and one laceration that was sutured in the emergency room. Illness complaints were more common than injuries. Complaints identified in the logs included headaches, fatigue, difficulty concentrating, moodiness, heat exhaustion, throat irritation, hearing loss, dry cough, and nausea. A section of the log that was set aside for additional comments yielded some interesting information. One of the producers volunteered information that his symptoms likely were caused by cleaning a grain bin without using a respirator.

## Discussion

Farming will always be a hazardous occupation because of the unpredictability of livestock, weather, and other elements of the working environment. However, it is likely that the health and safety risks inherent in farming could be further reduced, much as they have been in other industries. It is possible that the reduction in fatal injury rates seen in construction and manufacturing can be attributed in part to the efforts of the Occupational Safety and Health Administration (OSHA), which regularly conducts work-site inspections in interest of eliminating human health hazards. Most farms do not have enough workers to fall within the jurisdiction of OSHA. Very few larger farms are inspected by OSHA. Most farmers would prefer not to be subject to governmental farm safety and health regulation. However, this study suggests that farmers in this community accept an on-farm assessment conducted by a colleague. By participating in this program, they demonstrated concern about their health and willingness to allow the investigators to document health complaints that were caused by their work.

There is precedent in Europe and elsewhere in the United States for taking this type of approach to agricultural health and safety. The Swedish Farm Health model has offered on-farm advice on safety matters and occupational health services for farmers for a number of years as part of a comprehensive health insurance program for farm families (Höglund, 1998). Penn State University has pilot tested an agricultural health and safety best management practices manual using an on-farm audit which has some similarities to the checklist used in the Certified Safe Farms program (Legault, 1998).

A number of lessons were learned in the first year of Certified Safe Farms in Nebraska. This project demonstrated that a community hospital in a rural community was willing to expend resources on implementing an innovative farm

health and safety project with minimal assistance from universities, who only provided necessary training in farm safety and health. The community hospital is now serving as an area resource for farm safety and health information and clinical services. The findings suggest that a model of involving primary care providers in providing agricultural medicine services could be replicated elsewhere without a large investment of time or other resources. The amount of time spent building community support and conducting education could be devoted to replicating this project in other communities in future years. Finally, the incentive of a small cash payment and the opportunity to obtain some free health screening as outlined above proved to be adequate to convince area farmers to enroll in the program.

The results of the larger Certified Safe Farms pilot study being conducted in Iowa will be of great interest. If it is demonstrated that the farmers there have made changes to make their farms less hazardous and have fewer injuries and illness than the control farmers, then the stage will be set for another research project. In the second phase, actual reductions in health insurance premiums would be offered in exchange for meeting the safety standards of participation in the Certified Safe Farms program. The next phase of the program will include consideration of the data to be obtained from the controlled comparison research design of the Iowa Certified Safe Farms project, where an intervention group of 150 farms is to be compared to a control group of 150 farms (Thu et al., 1998). Relevant outcomes from that study will include serious injuries, near-misses, health symptoms, appropriate use of PPE, and farm hazards detected and corrected. If the Certified Safe Farms program can be shown to cause significant change in those areas, then the Nebraska area health insurance companies which have participated in the design of the Certified Safe Farms pilot projects will be approached regarding the feasibility of conducting a larger pilot project. Participants in this phase of the initiative would include farmers who have already purchased health insurance policies from these companies. Should the insurance companies agree to proceed, they will seek formal approval from the insurance commission of the state of Nebraska. Farmers would be offered a reduction in their health insurance premiums in return for participation in the program, including meeting the standards of the on-farm safety assessment. Different levels of certification could result in varying degrees of premium reduction. Health insurance claims data could possibly be used as one measure of efficacy of such a program. Possible benefits from the Certified Safe Farms program is not limited to health insurance. There is also the potential for other businesses that serve farmers, such as seed or farm chemical suppliers, to offer financial incentives for participation in the Certified Safe Farms program.

## References

- Brison, R. J., and C. W. L. Pickett. 1991. Nonfatal farm injuries in eastern Ontario: A retrospective survey. *Accid Anal Prev* 23: 585-594.
- Fiedler, D., S. Von Essen, D. Morgan, R. Grisso, K. Mueller, and C. Eberle. 1998. Causes of fatalities in older farmers vs. perception of risk. *J Agromed* 5(3): 13-22.
- Greenstein, D. B. 1998. It takes more than a "safety meeting" to change attitudes. Presented at the Fourth International Symposium *Rural Health and Safety in a Changing World*, 18-22 October 1998, Saskatoon, Canada.
- Höglund, S. 1998. Swedish farm health model. Presented at the Fourth International Symposium *Rural Health and Safety in a Changing World*, 18-22 October 1998, Saskatoon, Canada.

- Legault, M. L., and D. J. Murphy. 1998. Evaluating an agricultural safety and health best management practices manual. Presented at the Fourth International Symposium *Rural Health and Safety in a Changing World*, 18-22 October 1998, Saskatoon, Canada.
- National Safety Council. 1996. *Accident Facts*. Itasca, Ill.
- Rivera, F. P. 1997. Fatal and non-fatal injuries to children and adolescents in the United States 1990-1993. Sponsored by Farm Safety 4 Just Kids, University of Washington, Harborview Injury Prevention and Research Center and the Departments of Pediatrics and Epidemiology, Seattle, Wash.
- U.S. Bureau of the Census. 1992. *Census of Agriculture*, Vol.1. Washington, D.C.: GPO.
- Von Essen, S. G., and S. A. McCurdy. 1998. Health and safety risks in production agriculture. *West J Med* 169: 214-220.
- Von Essen, S., and R. Fredrickson. 1997. An interdisciplinary approach to teaching community oriented primary care and agromedicine to pre-health professions students planning rural practice. *J Agromedicine* 4(3/4): 369-372.
- Von Essen, S., K. Thu, and K. Donham. 1997. Insurance incentives for safe farms. *J Agromedicine* 4(1/2): 125-127.
- Warren, K. 1999. Personal communication with the University of Nebraska Trauma Registry coordinator.

