Rural Youth Disability Prevention Project Survey: Results from 169 Iowa Farm Families

Cheryl Hawk, Jane Gay, and Kelley J. Donham

ABSTRACT: *Agriculture is now the most hazardous occupation in the United States and it is the only one in which children not only comprise a significant part of the work force, but also live and play at the work site. Annually, 23,500 pediatric agricultural injuries are reported, with nearly 300 fatalities (Rivara, 1985). The Rural Youth Disability Prevention Project was designed to use innovative, community-oriented methods to address the unique problems of child safety in agriculture. Toward this end, a survey instrument was designed to gather data both to assist in program development and to serve as a pretest for the subsequent evaluation. Analysis of these data indicated several issues to target for intervention efforts. One is lack of supervision—more than 40 percent of children who operate equipment do so unsupervised. Approximately 30 percent of children more than 3 years old play alone in work areas, and 80 percent of these children play near machinery in operation. Another issue is operation of farm machinery by very young children—respondents' children began operating equipment at an average age of 12 years. Coupling this with the finding that the parents believe their children are not capable of operating equipment until age 15 exemplifies the most important issue, the disparity between parents' levels of safety knowledge and safety behavior. Using the survey data to increase local involvement, efforts are being directed toward facilitating an ongoing, community-sponsored intervention program to empower farm families to effect their own solutions.*

The Rural Youth Disability Prevention project (RYDP) was designed to serve as a pilot program that could, if successful, be implemented in other farm communities. The most important underlying principle of this program is community involvement and ownership. The survey was designed to function as an integral part of the intervention program by providing local data from the targeted community to assist in both program development and subsequent evaluation. The project was administered in cooperation with Agri-Care at the Marshalltown Medical and Surgical Center in Marshalltown, Iowa, a program affiliated with the Iowa Agricultural Health and Safety Service Project (IA-HASSP). The University of Iowa assists rural hospitals in establishing and maintaining comprehensive occupational

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health services for family farms and agricultural business through IA-HASSP (Gay, Donham, & Leonard, 1990).

Because of the nature of the agricultural workplace, in which there is no clear distinction between home and work site, data on injuries and illnesses in both adults and children are incomplete or lacking, making the task of finding out exactly what is taking place on farms very difficult (Harner, 1987). Also, data collection methods that will assist in identifying risk factors and aid in developing intervention programs are a necessary part of injury prevention (Rivara, 1985; Layde, 1988; Rosenberg, Graitcer, & Waxweiler, 1989). The RYDP survey was implemented to gather this type of data directly from local farm families, partially because many existing systems which depend on medical records alone are biased toward severe trauma, thus missing the full spectrum of childhood injuries (Boenning, 1988), as well as to further community ownership of the project.

Methods

The surveillance tool was designed to collect a broad range of data on attitudes, knowledge, and behavior directly from local farm families. Thus the survey instrument functioned not only as an evaluation tool, but also as an independent research tool to increase available data on risk factors for injury, as well as less severe or medically untreated trauma.

Survey Design. The survey had the following specific aims: (1) to gather information on the attitudes, behavior, and knowledge of farm families regarding their children's health and safety; (2) to collect data on specific risk factors of farm children for injury, e.g., driving tractors, operating machinery, not using personal protective equipment, or working without supervision (Swanson, Sachs, Dahlgren, & Tinguely, 1987; Salmi, Weiss, Peterson; Spengler, Sattin, & Anderson, 1989); (3) to collect data on the number and type of agricultural injuries in children; and (4) to evaluate the efficacy of a program designed to change health and safety practices regarding farm children in the targeted population with the ultimate goal of reducing agricultural illnesses and injuries.

Toward this end, a detailed survey instrument was designed to be administered to a group of approximately 250 Iowa farm families. The questionnaire was modeled partially on a survey administered by *Successful Farming* magazine to its national panel and partially on one administered by the University of Iowa to more than 800 farm families in four states. The first version of the RYDP survey was reviewed by agricultural medicine and occupational health staff and faculty, as well as by a research scientist specializing in health education and survey evaluation in the university's Department of Medical Education. It was then pilot tested on approximately 20 individuals, and revised in accordance with their responses. The final

version was approved by the original group of faculty and staff.

A three-tiered experimental design was chosen to maximize assessment of the intervention program's impact on the community. An intervention group of approximately 50 participants received the surveys. Two comparison groups were used, one in Marshall County—the location of the IA-HASSP hospital—and another in Cerro Gordo County, a comparable county 60 miles away, without an IA-HASSP program. The intent was to be able to assess the impact of diffusion of the program into Marshall County. Both were drawn from a random sample of county farms stratified by farm size. One year after the initial survey, and following the implementation of the intervention program, all three groups were to be re-surveyed to assess any changes.

Recruitment of Participants. Inclusion criteria were living and/or working on a farm and having one or more children age 18 or younger living at home. A sampling list of the county's farms was obtained from Pioneer Hi-Brid International, whose field representatives maintain a listing of active area farmers. Random numbers were assigned to the list to facilitate formation of a random sample. Phone recruitment, using a written phone protocol, was employed to maximize response because it was estimated that at least one half of the farm families in the aging rural Iowan population did not meet the inclusion criteria. The female head of the household was recruited as the respondent to eliminate gender as a possible confounding factor in analysis of the results. Phone follow-up was used when subjects who had agreed to participate did not respond within two weeks of the requested return date; two weeks after that date, a personally addressed reminder letter was sent to those who had still not responded.

Additionally, an abbreviated form of the survey was administered on a national basis by *Successful Farming* magazine. This sample was a 456-member subset of their randomly recruited permanent panel of farm families in 35 states, chosen to meet the inclusion criteria. The information provided by their data served as an ancillary assessment of the representativeness of the RYDP's smaller sample, and provided national comparisons to the local Iowa sample. Because of the differing methods of sample selection, however, *Successful Farming*'s survey results were not combined with the RYDP's.

Data Analysis. All returned questionnaires were coded to preserve confidentiality, and responses were then encoded and data entered in the computer system using the Paradox data management software system. Frequencies or means of each question were compiled and compared among the three groups.

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and thus help to define the direction of community efforts toward farm children's health and safety by targeting areas of special concern. The intervention program was centered on the "Farm Family Walkabout," an activity in which participants would use the guidebook provided to them to identify hazards and hazardous practices on their farms. This structured activity was to serve as a prelude to participants' interaction with community groups in designing programs directed toward correcting the specific areas they defined. By combining the input from the walkabout with the survey data, community actions appropriate to specific local conditions could be planned.

Postintervention evaluation of the program was a primary consideration built into the questionnaire. Because the number of participants was small, it was not anticipated that objective measures such as changes in injury incidence rates could provide statistically significant results. Consequently, a section on knowledge containing safety-related information to be covered in the walkabout sessions was included to provide preassessment and postassessment of changes in people's knowledge. Additionally, comparisons in behavior and attitude regarding children's farm activities could be assessed and compared among participants and controls, and preintervention and postintervention in participants.

Results

Results of the survey are presented here, with data from the study group and comparison groups combined to give a composite picture of the attitudes and behavior of farm families in these two Iowa counties. After completion of the intervention program and administration of the second questionnaire, the groups will be analyzed separately to assess the effect of the project.

Sample Representativeness and Response Rate. The final numbers of participants were 64 for Marshall County, 64 for Cerro Gordo County, and 41 for the intervention group. The overall response rate to the survey was 77 percent, with 76 percent response in the control groups and 82 percent in the study group. As shown in table 1, the basic demographics were similar to those in the *Successful Farming* survey noted above.

Parents' Attitudes toward and Knowledge of Child Safety. Respondents were asked to rate various items individually, on a scale of 1 to 5, with 1 being "most important" (RYDP survey) or "very important" (*Successful Farming* survey). In tables 2 and 3, the percentage of respondents rating an item 1 was calculated and items were ranked accordingly. By this method, in both the Iowa counties and in the national survey conducted by *Successful Farming*, farm machinery ranked as parents' first safety concern (Table 2).

Table 1. Comparison of Demographic Characteristics of Rural Youth Disability Prevention Project and *Successful Farming* Samples.

	Rural Youth Disability Prevention Project	*Successful Farming* Sample
Number of Respondents	169	342
Response Rate	77%	75%
Sample Area	2 Iowa counties: Marshall and Cerro Gordo	National: 35 states
Survey Type	Mail, stratified random sample	Mail, panel
Respondent Sex	87% female	100% male
Respondent Age	38	37-44
Total Number of Children	344	692
Mean Number of Children Per Household	2.1	2.0
Gender of Children	53.5% male	51.3% male
Mean age of Children	9.1	9.9

In terms of prevention factors, safety education and machinery shielding were given first priority in both surveys, with prohibiting children from farm work until age 16 ranked lowest (Table 3). In the section on knowledge (data not reported), respondents scored high on the most basic and practical questions about safety. More than 90 percent correctly identified farm machinery—tractors or other equipment—as the greatest hazard to children. Almost all (96%) knew that accidents are the leading cause of death in children. More than 90 percent of respondents correctly identified symptoms of pesticide poisoning and their usual routes of entry, and recognized methods of avoiding tractor rollover. On the more theoretical questions, such as knowledge of injury control methods and child development, they scored lower. These questions were included to provide some means of evaluating the educational component of the program and will be discussed more fully after the project is concluded.

Supervision of Children on the Farm. Because supervision of children may be affected by availability of a parent, percentages of off-farm employment of parents were determined. It was found that 53 percent of

Table 2. Farm Safety Concerns of P versus National Data.[1]

	Iowa[2]
Farm Machinery Accidents	91%
Chemical/Pesticide Exposure	76%
Breathing Problems	49%
Skin Cancer	42%
Stress	40%
Hearing Loss	39%
Injury by Animals	38%

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2. Data from RYDP and *Successful Farming*

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Chemical/Pesticide Exposure	76%	Chemical/Pesticide Exposure	75%
Breathing Problems	49%	Breathing Problems	57%
Skin Cancer	42%	Skin Cancer	49%
Stress	40%	Hearing Loss	48%
Hearing Loss	39%	Injury by Animals	46%
Injury by Animals	38%	Stress	41%

1. Concerns are listed in rank order by percentage of respondents rating each one with a "1"; percentage figures are listed in corresponding columns.
2. Data from RYDP and *Successful Farming* surveys.

female respondents worked off the farm, 60 percent of those were employed part time, while 30 percent of their spouses worked off the farm, approximately half full time and half part time.

Next, supervision of children on the farm was assessed. The survey showed that 40 percent of children who operated farm equipment did so without supervision. About 30 percent of children older than age 3 were reported to play alone in work areas, and 80 percent of these children were playing in an area with machinery in operation (data not shown).

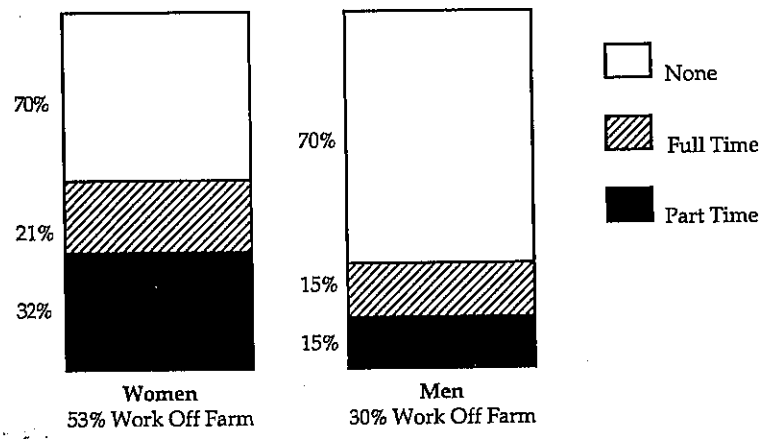
Participation of Children in Farm Work. Children began to operate farm equipment at an average age of 12. For specific machines, the ages varied: tractors, 11.4 years; power take-offs, 12.1 years; combines, 12.3 years, and pick-up trucks, 12.2 years. Parents were also questioned about the age at which they believed children to be capable of operating various farm machines; this average was age 15, with specific ages of 12.7 years for tractors, 15 years for power take-offs, 16.5 years for combines, and 14.7 years for pickup trucks. Additionally, data were collected on the age at which children began to accompany an adult while doing various types of farm work. They began to ride with an adult on the tractor at an average age of 3.4, although many respondents specified that this activity had begun when the child was still an infant. They began to accompany an adult operating other machinery at age 4.6, and to accompany an adult applying chemicals at age 4.7.

Table 3. Parents' Rating of Prevention Factors for Farm Children's Safety—Two Iowa Counties versus National Data.[1]

Iowa[2]		National[2]	
Safety Education	90%	Machine Safety Shielding	78%
Machine Safety Shielding	83%	Safety Education	73%
Seat Belts in Car	80%	Seat Belts in Car	60%
No Play in Work Areas	77%	No Play in Work Areas	56%
ROPS on Tractors	70%	ROPS on Tractors	52%
Warning Signs on Machines	43%	Hearing/Eye Protection	31%
Hearing/Eye Protection	41%	Warning Signs on Machines	27%
Day Care	36%	Seat Belts in Tractors	15%
Seat Belts in Tractors	28%	Day Care	14%
No Farm Work until Age 16	9%	No Farm Work until Age 16	11%

1. Concerns are listed in rank order by percentage of respondents rating each one with a "1;" percentage figures are listed in corresponding columns.
2. Data from RYDP and *Successful Farming* surveys.

Figure 1. Off-Farm Employment: Women versus Men.



Source: Iowa data from RYDP survey.

Figure 2. Farm Machinery Operatio
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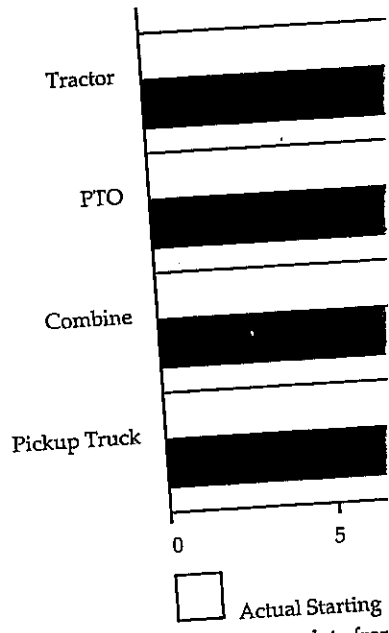

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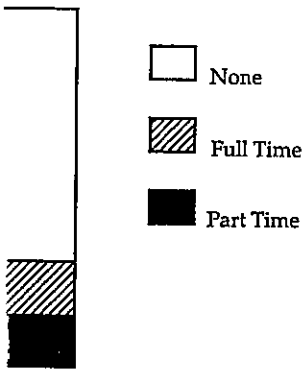

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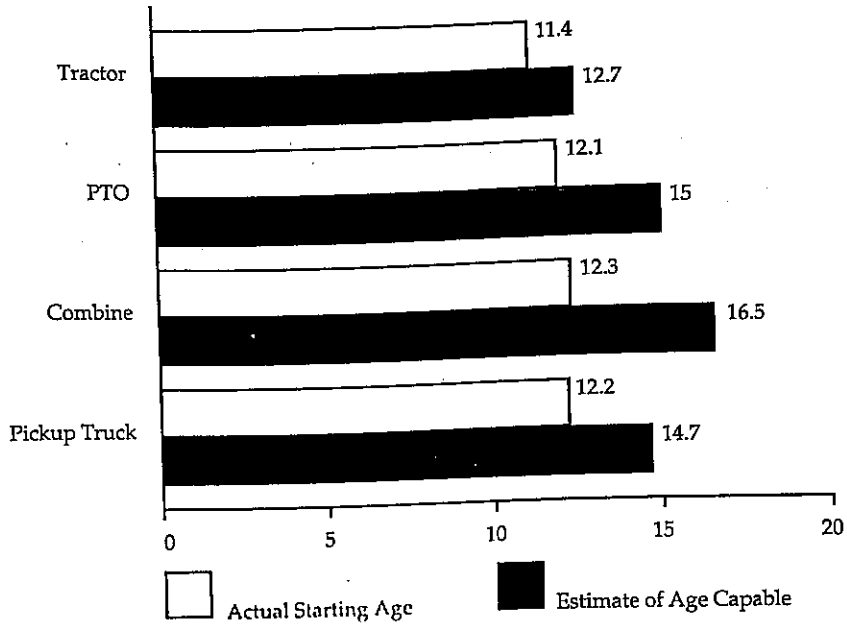
Figure 2. Farm Machinery Operation: Actual Starting Age versus Parents' Estimate of Age Capable of Operating.



Source: Iowa data from RYDP survey.

Farm-Related Injuries. Although the data are not included in a table, the farm-related injuries are as follows. Fourteen farm-related injuries were reported in the past 12 months among 344 children and 169 families. Distribution was 79 percent male, average age of 7.8 years (minimum two years, maximum 15 years); more than 60 percent occurring after 4 p.m. between May and July. Four (29%) were said to be working at the time of injury; two (14%) were observing farm work; eight (57%) were playing. Five (36%) involved cuts and bruises; four (29%) were puncture wounds; there was one fracture and one sprain. More than one half (57%) of the injuries involved the extremities; three (21%) involved the head or neck; two (14%) involved the eye. Four (29%) of the children were alone at the time of injury. Five (36%) of the injuries involved machinery. Of the seven cases in which personal protective equipment was applicable, two were using it. Thirteen (93%) of the injuries required medical treatment; four (29%) in an emergency room. All but one (93%) resulted in restricted activity, for an average of 14.4 days (minimum one day, maximum 60 days).

General Safety-Related Behaviors. Fifty-six percent of respondents' tractors have rollover protective structures (ROPS), and they rated ROPS fairly low in safety importance (Table 3). Most (82%) of their power take-offs

were shielded. Fifty-eight percent of families have a poison control number available, 52 percent have a family member trained in cardiopulmonary resuscitation (CPR), and 58 percent with first aid training in the family.

Discussion

The Rural Youth Disability Prevention project was structured in a flexible manner to meet the needs of each community in which it was implemented. The survey's results were to be used as an integral part of this structure to monitor the needs of local farm families, as well as to evaluate the response to the intervention. By integrating the input of farm families with that of local businesses, farm organizations, and health professionals, injury prevention may be addressed at the level at which it can be most readily effected, and participants will experience their concerns directly translated into community action.

Survey results may be used to target specific areas for intervention and future research. The issue of off-farm employment and supervision of children needs further exploration to determine the adequacy of available child care arrangements for farm families (Purschwitz, 1990). The ages at which children are participating in farm work raises questions not only about child care issues, but about the need for education of parents concerning children's developmental stages (Zuckerman and Duby, 1985). Parents' ranking of desirable preventive measures gave highest priority to safety education, and lowest to excluding their children from farm work. In response to this, and to ranking farm machinery accidents as their greatest concern, a children's "Farm Safety Camp" has been conducted. This is important because age-appropriate safety training is crucial for all family members (Rhodes, 1990).

Personal involvement of the local community may be stimulated by feeding back survey results to participants. For example, when local farm families were told that only 52 percent of families had someone with CPR training, and 58 percent with first aid training, they requested assistance in setting up a workshop to increase their emergency medical knowledge. This workshop was well attended, and as a consequence, greater use of the survey in this interactive manner is planned in the future.

Although the pediatric injuries reported showed approximately the same distributional characteristics as larger studies, the rate of emergency room-treated injuries compared to other injuries (4:14) suggests that actual numbers of child injuries may be far higher than those cited in currently available studies based solely on emergency room data (Salmi et al., 1989; Rivara, 1985). This observation indicates a need for further investigation of the extent of underreporting of pediatric farm injuries, as well as more complete data on risk factors such as lack of supervision and personal protective equipment. Currently, a larger survey being conducted in four

Iowa counties is addressing this is

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Iowa counties is addressing this issue.

The survey data showed a disparity between parents' generally higher level of safety knowledge and lower level of safety behavior. This emphasizes that knowledge alone is not sufficient to motivate a change in behavior. The RYDP project in progress investigates ways to use the survey, as well as other methods, to increase participants' motivation to change safety behavior.

At this time, there have been requests from several other communities to establish local RYDP projects. The pilot RYDP project will be evaluated by comparing the results of the survey described above with a posttest survey. If the combination of the survey and the intervention program demonstrate a positive impact, it can be used to provide a means for farm families to begin to rebuild the much needed sense that they count—that their ideas, attitudes, and behavior are important to society and can influence not only the well-being of their families, but of the community as a whole.

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