NIOSH Final Performance Report

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Certified Safe Farm: Prospective Research and Sustainability
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List of Abbreviations

CSF=Certified Safe Farm
PPE= personal protective equipment
CPHFI=Community Partners for Healthy Farming Intervention grant
USDA=United States Department of Agriculture
ODTS=Organic Dust Toxic Syndrome
ROPS=rollover protective structure

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Abstract

The Certified Safe Farm (CSF) Project was developed at the University of Iowa in 1996 in order to address the high rates of fatalities, injuries, and farm-related illnesses in the agricultural population. This multi-component, voluntary program consists of an agricultural occupational health screening conducted at an AgriSafe Clinic, general preventive health education and fit-testing of personal protective equipment, and an on-farm safety review. An intervention group began receiving the above services on a yearly basis in 1998. To test the effectiveness of the program, farm-related injuries, illnesses, and fatalities were tracked in the intervention group and in a control group through self-reports made on a yearly demographic information form and via a quarterly telephone questionnaire that occurred over a three-year time period. This self-reported data was analyzed for evidence that the CSF program reduced the number and costs associated with agricultural injuries and illnesses in the farmers who received the services.

In addition to reducing illnesses, injuries, and fatalities in participating farmers, CSF was designed with a built-in reward system that provides incentives to farmers who participate and sponsors who support the program. Because the majority of family farmers purchase individual health insurance coverage, and because they engage in a high-risk occupation, farmers often spend much of their disposable income on monthly premiums and out-of-pocket medical expenses. Health insurance costs continue to increase to levels that put a strain on the financial stability of farm families, notwithstanding the effect these costs have on access to preventive care. Farmers must also pay premiums for crop insurance, property/casualty insurance, and liability coverage, to name a few. Farmers who meet specified CSF standards of health and safety receive incentives for certification, with cash incentives having been awarded in the past. Now, through collaboration with a key health insurer in Iowa, CSF effectiveness will be tested by analyzing claims data. If claims are found to be lower in certified CSF farmers, future incentives may be subsidized through lower premiums on health, property/casualty, and liability insurances for farmers. Agribusinesses will also support the program by providing discounts on implement and seed/feed costs, in exchange for promotion of their products and services and a safer and healthier customer base.

This reward system is what makes CSF different than other incentive programs: CSF will be replicated and sustained by agribusinesses and insurers in the communities where farmers live and work.

Preliminary findings from focus groups, telephone calls, and personal conversations show that the program is welcomed and appreciated by farmers who would not ordinarily receive the services provided through the program. Farmers see this outreach program as something that is necessary and worthwhile.

Health and safety indicators have shown improvements in the areas of machinery safety, respiratory personal protective equipment use, self-reported illness and injury medical costs, and occupational disease-related respiratory symptoms.

Participating farmers have improved their farm review scores over the five years of the project, with scores averaging 82% (a passing score requires an 85%) in 1998-99, and increasing to 97% in 2002-2003. These improvements not only indicate the ongoing effort of the farmers to continue making safety improvements over time, but it has also been shown that the on-farm safety reviewers have made concerted efforts to assist the farmers in making these improvements.

The occupational health screenings, demographic information forms, and quarterly calls have shown that self-reported, farm-related illness and injury costs were lower in intervention farmers at a rate of $90/person/year. In addition, use of respiratory personal protective equipment (PPE) increased significantly in intervention farmers.

Support of the CSF program has been expressed in many ways: through the retention of enrolled farmers and their expression of appreciation and value in the program, through the dissemination of the key concepts of the program to rural AgriSafe health clinics throughout the state of Iowa, through multiple newspaper and farm journal publications, and through the support of key funders and business entities in the state of Iowa and in the nation, including: NIOSH, Iowa Pork Producers, National Pork Producers, Wellmark Foundation, Pioneer Hi-Bred, AgriSafe Network, and recently, Iowa Farm Bureau Federation and Wellmark Blue Cross Blue Shield of Iowa, a key health insurance organization in the state that provides insurance coverage to 40% of all Iowans.

Significant Findings
Significant findings from the CSF pilot program include the following:

1. The CSF program was intended to reduce illnesses and injuries in intervention farmers (as compared to control farmers) through the provision of three multifaceted interventions and through the provision of incentives for certification. There were no significant differences in the rates of self-reported illness and injury rates in the two groups. Although not expected, these results may be partially explained by the following:
    a) Self-reported illness and injury events may not have given us an accurate picture of health and injury status in this population of farmers. Reporting decreased over time in both groups of farmers, and the frequency with which reporting was done (the *yearly* occupational history forms versus the *quarterly* calling questionnaires) had an effect on the number of illnesses and injuries reported. These potential biases are to be addressed in a new CSF study looking at objective health insurance claims data to track illness and injury rates in CSF farmers.
    b) By making referrals during the clinical occupational health screenings, the CSF program may initially increase health care costs by identifying conditions that may otherwise have gone undetected. However, this may be of benefit to long-term health through a reduction in chronic diseases.

2. Although rates of illnesses and injuries were not statistically different in the two groups of farmers, the self-reported cost of all illnesses and injuries (combined) was 17% lower in intervention farmers than in control farmers. These self-reported costs will either be supported or rejected during the next phase of the CSF program.

3. Program satisfaction and impact was profound, as determined by focus group findings and mailout questionnaires. The quantitative data did not reflect the importance of these qualitative assessments. For example, when asked if they would recommend participation in the CSF program to any friends, family, or neighbors, 90 of 91 survey respondents (intervention farmers only) said yes. When asked whether they would continue to apply what they had learned about agricultural health and safety from the CSF program into their daily work life, 44 responded that it was very likely and 43 responded that it was highly likely. Zero said not at all likely, and three said it was somewhat likely. The CSF program emphasizes the importance of using both qualitative and quantitative data to evaluate program impact and effectiveness.

4. When determining the types of injuries that occurred on CSF farms, and comparing those injuries to the hazards addressed in the CSF farm safety review tool, we realized that certain injuries reported were not given adequate attention in the review tool. The CSF farm review tool and educational components will be modified to better address the injuries the occurred on CSF farms, like slips and falls, and welding torch burns.

Usefulness of Findings

Findings from the pilot CSF program will provide guidelines for a new CSF program. First, we believe that in order to obtain objective data, we need to replace the self-reported data with health insurance claims information. In this way, we hope to get a clearer and less biased account of farm-related injury and illness costs in the CSF population.

Second, when an intervention program includes visits to health care professionals, especially when the enrolled population is notorious for not seeking health care unless very ill, there will be instances when health care referrals will be made. These referrals may result in an initial increase in health care costs in the served population. However, although long-term chronic disease rates are as yet unknown, the CSF program may positively influence chronic disease rates.

In addition, we realize that in order to see a reduction in certain farm-related illnesses and injuries, several of our educational interventions need to be more focused and concentrated. For example, although there was a trend towards greater frequency of hearing protective equipment use in intervention farmers over time, the increase was not profound enough or of a great enough degree to actually prevent noise-induced hearing loss in this population. In year five, on average, intervention farmers used hearing protection on a monthly basis. This rate of use is negligible if the goal is to decrease hearing loss from loud noise. In the next phase of the CSF program, we will be providing more frequent and interactive educational interventions in order to try to improve compliance rates.

Scientific Report

Project Background

The voluntary, incentive-based (health insurance premium reduction) CSF system was developed in 1996 in order to address the high rates of fatalities, injuries, and farm-related illnesses in the agricultural population. Farmer focus groups were held in Nebraska and Iowa to assess the feasibility of the CSF program from the farmers' point of view. A multi component program was desired by the attending farmers, and the focus group participants expressed interest in premium discounts as one type of incentive. They also expressed the necessity of making the program voluntary. The criteria for farm certification were developed and nursing and farm safety personnel were trained to perform occupational health screenings and on-farm safety reviews, respectively. The CSF program officially began in Spring 1998 with recruitment of 150 intervention and 150 control farmers. Intervention farmers began receiving the three program components on a yearly basis. These components included: a preventive health screening, an on-farm safety review, and individualized education specific to the each farmer's operation. The initial pilot program was to last two years. The first Community Partners for Healthy Farming Intervention (CPHFI) grant was completed in 1999.

The second (and current) CPHFI grant was awarded in 1999, and with those funds, we were to continue providing CSF services to participating farmers for four years beyond the initial two-year implementation period, recruit new farmers to replace those that

wished to discontinue their participation, and work towards creating a sustainable implementation model for the CSF program. From 1999-2001, incentive funds for certified farmers were provided through NIOSH grant support. Beginning in 2001 and continuing to the end of the grant period in 2003, we were to gradually incorporate other financial incentives from agribusinesses and insurers to supplement and eventually replace the incentives that were being provided by NIOSH. This transition of CSF from a grant-funded program to a business-oriented program will ensure that CSF is a viable long-term program that is supported by mainstream industry.

Specific Aims

The three primary goals of the 1999-2003 CSF funding period were: 1) to evaluate the effectiveness of the CSF model through service provision and data gathering and analysis, 2) to gather input from program participants on how to improve the program so it can be efficiently implemented on a larger scale, and 3) to begin the transition of CSF from a grant-funded program to an agriculturally-based, industry funded program. The measurable objectives are listed below:

Objective #1, part one: to evaluate the effectiveness of the CSF model through service provision to participant farmers

a) maintain at least 125 farmers in the intervention group and 125 in the control group for four years
b) provide CSF services (screenings, education, and reviews) on a yearly basis to at least 125 farmers in the intervention group
c) provide specific consultation for farmers who have not passed, helping them to meet certification criteria
d) provide more detailed educational interventions for back-related disorders in intervention farmers (objective added in project year 5)

Objective #1, part two: to evaluate the effectiveness of the CSF model through data gathering and analysis, and the sharing of findings. Specifically:

e) measure injury and health symptoms experience between groups, determine if there are statistically significant differences between the two groups, and report the status yearly and cumulatively
f) measure the health/illness experience between groups
g) measure the number of CSF participants referred to mental health counseling services and analyze the effectiveness of the services
h) measure the number of preventable agricultural health problems detected by the preventive health screening program component
i) measure the use of personal protective equipment
j) measure the number of farm work environment problems detected and corrected through the on-farm safety component of the CSF program
k) analyze the characteristics of farmers who do not meet certification levels
l) measure health beliefs and stress in the study population to predict who is most likely to participate and become certified
m) analyze the personnel time and cost involved in providing CSF services

n) monitor the purchase of PPE at the AgriSafe clinic (this objective was added in project year three)

Objective #2: to gather input from program participants on how to improve the program so it can be efficiently implemented on a larger scale

a) conduct a focus group among at least 10 participating farmers and five service providers
b) examine the CSF services to see how they meet the specific needs of farm family members beyond the primary operator to include women, children, and elderly, as well as farm employees
c) conduct annual advisory board meetings to provide guidance to the project and to assist with implementation planning

Objective #3: to begin the transition of CSF from a grant-funded program to an agriculturally-based, industry funded program

a) hold a summit meeting (in 2001) with key stakeholders to develop a long-range implementation plan
b) work with the private sector to develop a portfolio of incentives for Certified Safe Farms
    - with assistance from a health care consultant, we were to have at least one insurer pledge incentive support for certified farmers, and to secure incentive support from at least one agribusiness
c) hold four follow-up workshops to continue program development work initiated in the summit meeting
d) train at least 30 occupational health nurses to conduct CSF health screenings and education
e) train at least 15 farmers to conduct farm safety audits
f) publish results in scientific and farm journals and provide information to stakeholders through personal communication
    - each CSF staff person at UI (LaMar Grafft, Sara Schneiders, Risto Rautiainen, and Kelley Donham) was to write and submit one scientific journal article by 2003

Procedures

At the time enrollment began in Spring 1998, a letter including a return postcard was mailed to 5,287 farms in Northwest Iowa as identified from the United States Post Office and other sources. Northwest Iowa was the chosen project location because of the presence of the AgriSafe Clinic in Spencer, Iowa, and because the nine-county project area was reflective of farm injury rates in the state as a whole. Those who returned the postage-paid card indicating their interest were called by CSF staff at the University of Iowa. Enrollment requirements were as follows: 1) the farmer had to earn at least $1,000 in agricultural products in one year's time (USDA definition of a farmer), and 2) the farmer had to plan on being an active, part or full-time farmer for the duration of the program. Respondents were contacted by telephone until a total of 300 farmers were recruited. The 300 farmers were pair-matched based on: 1) type of crop and number of acres planted; 2) number of livestock (cattle, hogs); 3) serious injury rate in the past 12

months, and 4) age. The pairs were then randomly assigned to the control and intervention groups.

When the farmers were asked to remain in the study for four years beyond the initial two-year program, 78% (n=102) of the original 130 control farmers chose to continue for the additional four years. Of the 135 intervention farmers remaining in the study in 2000, 91% (n=123) chose to continue. Fifty-seven additional farmers were recruited to replace those who chose to discontinue.

Intervention farmer procedure: Each intervention farmer was contacted by AgriSafe Clinic staff in Spencer, Iowa to schedule the yearly occupational health screening. Each farmer completed an Occupational Health History form prior to their yearly visit. The 2-hour occupational health screening took place at the AgriSafe Clinic in Spencer. The screening included:

- audiogram
- a pulmonary function test,
- blood pressure check,
- cholinesterase testing,
- height and weight measurements,
- skin cancer assessment
- tetanus immunization
- and cholesterol testing.

The attending occupational health nurse provided education regarding the screening results and what the findings indicated, along with general preventive education on use and care of various types of personal protective equipment. Referral criteria were followed for those requiring additional care.

The intervention farmer also received a yearly on-farm safety review which focused on 17 areas of the farm, including tractors, outdoor environment, machine shop, chemical storage, and others. The farmer received a score sheet (identifying whether the farmer became certified for that year), along with the corrective action sheet listing the hazardous items on the farm that should be corrected. If the farmer obtained an overall score of 85% or higher on the farm review, with no less than 75% score on any one section, then the farmer was a "Certified Safe Farmer" for that project year. This process was repeated each of the five project years. Injuries and illnesses were tracked through a monthly recording system (on a log sheet or a calendar provided by the University of Iowa) and quarterly telephone calls by the UI Social Science Institute.

Control farmer procedure: Control farmers did not receive any CSF services. However, they were asked to track farm-related illnesses and injuries via the monthly recording system, and they were asked to complete the Occupational Health History form on a yearly basis. Control farmers received $50 annually for their participation during project years one and two, and in project years three, four, and five, they received $75.

Methods

The primary analytic question in the CSF project was whether the CSF intervention group experienced fewer farm-related injuries and illnesses compared to a similar demographic cohort which did not receive CSF services.

Multivariate analysis was conducted to identify determinants of injury and illness. Differences in health conditions (hearing, respiratory, dermatological, stress, depression) were assessed over time and tested for significance.

Results and Discussion

Objective 1, Part 1

A minimum of 125 farmers in each cohort group has been maintained throughout the five years of the CSF study, and at least 125 intervention farmers have received CSF services each project year. Table 1 below shows the numbers of farmers enrolled each year and the number of farmers receiving services each year.

Table 1: Farmers Enrolled and Intervention Farmers Receiving Services

	Control	Intervention	# Farm Reviews Completed	# Health Screenings & Individual Education Provided
1999	150	150	134	135
2000	141	141	133	133
2001	140	140	133	135
2002	134	137	129	127
2003	128	137	131	128

In addition to the individual education provided during the occupational health screening, a group educational program for intervention farmers was held 3/4/2000, in Spencer, IA. Three hundred first aid kits donated from Pioneer Hi-Bred was given to the farmers, and instruction in how to use the kit was provided by a local paramedic at this luncheon meeting. A second Spencer meeting was held 8/23/2000 with 30 farmers and guests in attendance. We discussed CSF data analysis results and harvest hazards. A third group meeting was held 3/7/2001 with 40 intervention farmers and guests in attendance. We discussed the hazards of livestock farming, prostate cancer facts, and CSF data analysis results.

All CSF intervention farmers who received the on farm safety review were provided with corrective actions sheets and score sheets that listed the items on their farm that were deemed hazardous as determined by the scoring tool.

Although it was intended that we provide more thorough education to intervention farmers on safe lifting techniques and back-strengthening exercises during the occupational health screening, this task was not completed in project year five.

Objective 1, Part 2

Baseline health parameters for intervention farmers were determined through the clinical screening results. Health symptoms and use of personal protective equipment were measured through data gathered from the yearly Occupational Health History Form and quarterly calls. Injury status and farm-related health problems, including hearing problems, respiratory conditions, mental health issues, skin disorders, and back and musculoskeletal pain, were gathered from quarterly telephone questionnaires that occurred over a three-year time period.

Table 2 below outlines baseline health statistics of 150 intervention farmers in 1998.

Table 2: Clinical Occupational Health Screening Findings in 1998

Condition	Definition	% CSF farmers with this condition	General adult US population rates
High blood pressure	**140-159 systolic or 90-99 diastolic	30.7% have high BP	*22% have high BP or take medication for BP
Obesity	*BMI > 30	33%	*23%
High cholesterol	*total serum cholesterol >240 mg/dl	6.7%	*21%
Diminished lung auscultation		20.7% (31/150)	
Mild or moderate lung disease	***mild= FEV1/FVC ratio < or = 70% and FEV1 > 80% predicted value. Moderate= FEV1/FVC ratio < or = to 70% and FEV1 < or = to 80% predicted value	16% (24/150)	13.5%
Tetanus vaccination	last vaccination > 10 years prior	7.4% needed a booster (9/122)	
Musculoskeletal pain	Any current pain in back, arms, legs or other	36% (50/137)	
Use of assistive hearing device	N/A	4.7% (7/150)	
Use of corrective lenses	N/A	56.7% (85/150)	

* Source: Healthy People 2010

** Source: The Sixth Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure

***Source: Chronic Obstructive Pulmonary Disease Surveillance-United States, 1971-2000. Morbidity and Mortality Weekly Report. August 2, 2002/Vol. 51/No. SS-6

Injuries

During the three year tracking period, 318 injuries were self-reported by CSF intervention and control farmers (42/100 person-years), of which 112 (15/100 person-years) required professional medical care. The self-reported monetary cost of injuries was $51,764 ($68 per farm per year). There were no differences in the injury rates and costs between the intervention and control groups. Raising livestock, poor general health, and exposures to dust and gas, noise, chemicals and pesticides, and lifting were among risk factors for injury. Most injuries in this study were related to animals, falls from elevation, slips/trips/falls, being struck by or struck against objects, lifting, and overexertion. Hurry, fatigue, or stress was mentioned as the primary contributing factor in most injuries. The greatest proportion of injuries occurred in the months of October, August and May, and most injuries occurred before noon.

Hearing Problems

During the three-years that telephone call data was collected, 166 self-reported hearing problems were reported by 70 individual farmers (22% of total sample). Fifty-one farmers sought medical care for their hearing problems, for a total of 113 medical care visits. The farmers in the intervention group reported a significantly greater number of medical care visits for their hearing problems than did the control group. The greater number of medical care visits in intervention farmers may have been a result of educational cues given during the yearly clinical health screenings.

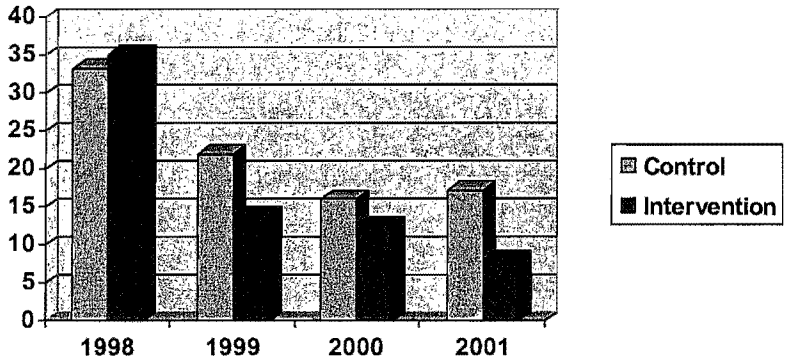
The self-reported monetary cost of all hearing problems was $47,562. Over 90% of all reported hearing problems were "old" problems at the time of questioning, indicating the largely chronic nature of hearing abnormalities. No difference in the number of hearing problems was found between control and intervention farmers. A significant difference in hearing protective device use in intervention and control treatment farmers was detected in project year five. Study findings are similar to other agricultural intervention programs in that the self-reported hearing protective device use was infrequent overall, with most farmers reporting hearing protective device use on a monthly or less frequent basis.

Respiratory Illnesses

During the three-years that telephone call data was collected, 130 self-reported respiratory problems were reported by 75 individual farmers (34 control farmers and 41 intervention farmers). Forty-seven of the respiratory events required medical care, with a total of 58 medical care visits. The self-reported monetary cost of all respiratory problems was $17,149. Sixty-two (48%) of the 130 respiratory events were reported to be new problems that surfaced for the first time immediately prior to the calling session. The most common symptoms reported following the respiratory illnesses were cough with phlegm, nasal irritation, and dry cough. There was no statistically significant difference in the rate of respiratory problems in control and intervention farmers. Statistically significant risk factors for respiratory symptoms included farm type (hog and cattle versus no livestock), any dust exposure (yes/no), and number of years of hog confinement exposure.

Figure 1 shows the percentage of control and intervention farmers who had three or more of the following symptoms after a dust exposure: fever, shivering, muscle/joint aches, tiredness, weakness, cough, chest tightness, shortness of breath, and headache. These symptoms, following a heavy dust exposure, may be indicative of Organic Dust Toxic Syndrome (ODTS).

Figure 1: Organic Dust Toxic Syndrome (ODTS) by Group



Clinical Screening Exam Referrals

The following table outlines the number of intervention farmers referred for various conditions through the yearly occupational health screening exam. A referral occurred any time the attending occupational health nurse: 1) sent a letter regarding a test result to the family physician or specialist, 2) verbally suggested that the farmer see his/her physician as a follow-up, or 3) scheduled a follow-up doctor's appointment.

Table 3: Clinical Screening Referrals*

	Year 1	Year 2	Year 3	Year 4	**Year 5
High or Borderline Blood Pressure	14	7	5	0	
Hearing	2	2	2	0	
Low Pulmonary Function Values	6	4	11	11	
Skin Conditions	3	3	1	1	
High or borderline cholesterol	9	2 (2 additional referred for low cholesterol)	34	44 (1 additional referred for low cholesterol)	
Cholinesterase	2	2	1	0	
Mental Health	1	5	5	2	
Vision	1	0	1	0	
Other	14-physical	6-physical, 16-		* all men over 40	

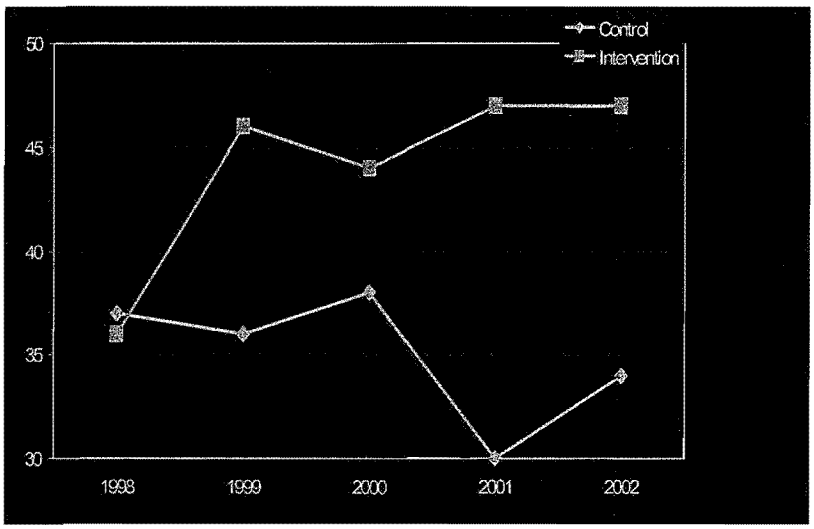
		prostate check		advised to have physical with prostate check	
TOTAL	52	49	60	59	

*Referrals are not mutually exclusive-ie. the same person may have been referred for the same condition in successive project years.
** Year five data not yet available as of 10/21/2003.

Although a formal tracking system for determining the number of farmers who saw a health care provider as a result of being referred was not implemented, a mailout survey sent on April 26th, 2003 asked this question of all intervention farmers. Of 130 forms mailed out, 91 were returned. Of the 91 farmers who responded, 69 said that they did not seek medical care as a result of a referral made during the CSF program. Twenty-two farmers said that they did seek care following a referral (24%). Eighteen people were referred once, three were referred twice, and one was referred three times. A total of 44 medical care visits were made.

Use of Personal Protective Equipment
Figure 2 shows the use of respiratory personal protective equipment as determined from responses to the yearly occupational health history questionnaire. Overall use of respiratory personal protective equipment was greater in intervention farmers (p=.003).

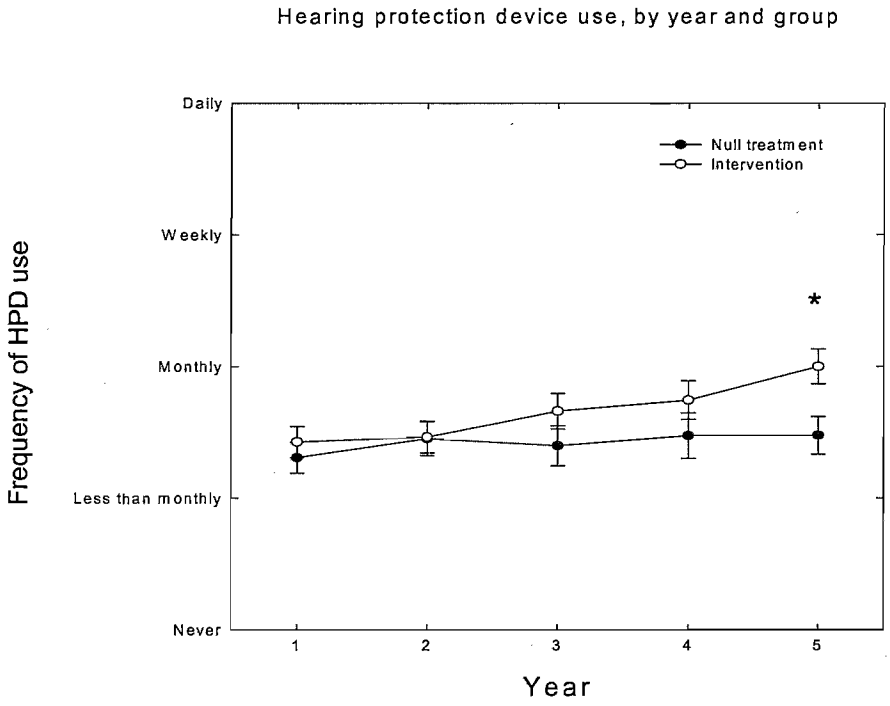
Figure 2: Percent of Farmers Who Use Respiratory Protection (> 75% time) When Working in Grain Dust



There was no difference in hearing protective device use in control and intervention farmers during project years 1-4 as determined from the occupational health history form. A significant difference in hearing protective device use was found in year five. However, that year, the question proposed to intervention farmers was altered to read "In the past 12 months, how often did you wear hearing protective devices *when you knew*

you should." Adding "when you knew you should" could have accounted for the significant difference in the findings.

Figure 3: Hearing Protective Device Use, by year and group



Error bars represent +/- 1 standard error of the mean. Difference at year 5 is significant at the 0.01 level (Mann-Whitney).

Of those farmers exposed to pesticides or chemicals (from the quarterly calls), control farmers on average reported that they used gloves 42% of the time, boots 19%, and protective clothing 10% of the time. Intervention farmers reported using gloves 53% of the time, boots 22%, and protective clothing 13% of the time. Use of personal protective equipment by intervention farmers showed a trend towards increased use in comparison to control farmers.

On-farm safety reviews

The number of farm work environment problems detected and corrected through the on-farm safety component of the program were measured yearly on the farms of the intervention farmers. From 1998-2001 (four years), five CSF farmers purchased a ROPS for a tractor. (5/131= 3.8%), 64 farmers improved their score at least once during the four years (49%), 21 farmers (16%) made corrective actions on their farm even after having

passed the review and receiving the incentive, and 124 farmers (95%) had made at least one corrective action on their farm from 1998-2001.

It is estimated that $130 per year per intervention farmer was spent on materials and labor to make safety improvements on the farm. The following list describes the changes made on the farm. Of the 1,292 improvements reported:

- 207 slow moving vehicle (SMV) signs were added
- 60 power takeoff shields (PTO) were added
- 32 driveline shields were put in place
- 77 machine guards and shields were placed
- 83 lockout/tagout systems were put in place to keep someone from turning on the electricity while someone else was in the bin
- 35 fire extinguishers were added to shops, etc.
- 139 lighting and marking items were added
- ROPS were added to 6 tractors
- 3 skid steer loaders were retrofitted with cages

Analyses on the characteristics of farmers who do not meet certification levels and health beliefs and stress levels in the study population have not been analyzed to date.

The purchase of personal protective equipment by CSF farmers at the time of the occupational health screening began being recorded in project year three.

Objective #2
A focus group of intervention and control farmers was held in Spencer, Iowa in September 1999, to detect areas where the project could be improved in order to best serve our study population. Study protocol changes resulted from this meeting.

In addition, two focus groups of intervention farmers (one group of nine, one of four) were conducted in August 2002 to discuss the experience of being enrolled in the program. Each program component was evaluated by the participants. Suggestions for program improvements were elicited. In addition, two additional focus groups were conducted with CSF on-farm safety reviewers and occupational health nurse providers.

CSF services have not been examined to determine how they meet the specific needs of farm family members, women, children, the elderly, and farm employees. The CSF farm safety review has been modified to address safety hazards on dairy farms, and this programmatic change is being tested on 25 dairy farms in Dubuque, Iowa.

Although annual advisory board meetings to assist in implementation planning have not been conducted, a monthly "informal" advisory board update has been circulated on a monthly basis beginning April 1, 2000, and continuing through January 1, 2002. A formal Certified Safe Farm Committee has been created as a part of the non-profit AgriSafe Network.

Objective #3
A summit meeting was to occur in project year four (2001) to help develop a long-range implementation plan with key stakeholders. This summit meeting did not occur, but several small planning meetings did take place. These meetings included a Certified Safe Farm (CSF) Advisory Committee Meeting at the National Pork Producers Council (NPPC) in Des Moines, IA on August 22nd, 2000. Eight attendees from NPPC, the University of Iowa, Iowa Farm Bureau Federation, and the Wellmark Foundation presented ideas on how to proceed with organizing a CSF Summit Meeting. A second CSF Committee Meeting took place at the Wellmark Foundation in Des Moines, IA on November 29th, 2000. Thirteen attendees met to discuss business plan options for CSF.

With assistance from Paul von Ebers, and Healthcare Consultant in Des Moines, Iowa, one major health insurance organization and one agribusiness organization in Iowa have pledged support for Certified CSF farmers. These pledges were made in 2003.

To date, at least 30 occupational health nurses and 26 on-farm safety reviewers have been trained to perform CSF services.

Since January 1999, six scientific journal articles, six newspaper articles, two news releases, two newsletters, and two farm journal articles have been published on the CSF program in Iowa.

Conclusions
Since CSF began in 1998, a group of approximately 150 farmers in Northwest Iowa has received an occupational health screening, an on-farm safety review, and education on a yearly basis. The purpose of the program was to reduce farm-related illnesses and injuries in those enrolled. To detect changes in health and safety status, those farmers who received program services were compared to farmers who did not receive services (control farmers).

Although a significant difference in the rate of self-reported illnesses (hearing, respiratory, back/musculoskeletal, skin, stress/depression) and injuries in intervention and control farmers was not detected in the three years of quarterly call follow-up, symptoms related to ODTS decreased in intervention farmers, and use of respiratory protection increased significantly over time in intervention farmers. Chemical PPE and hearing PPE use showed trends toward increased use in intervention farmers over time.

Additionally, 24% of CSF intervention farmers sought medical care as a result of a referral made during the clinical occupational health screening. Those farmers who sought medical care as a result of CSF may have not done so if not for this program. The CSF program may reduce chronic conditions in farmers.

On-farm safety hazards have been reduced for farmers in the program, and based on quantitative provided during focus groups and mailout questionnaires, CSF farmers have been very pleased to be a part of the program and hope that it will continue.

Great strides have been made in regards to program expansion and sustainability. CSF has been expanded to communities outside the original 9 counties in Northwest Iowa. Farmers living in 15 counties in the state (100 counties total) have been enrolled.

Acknowledgements
The Certified Safe Farm study was funded by NIOSH (#U06/CCU712913), Pioneer Hi-Bred International Inc., National Pork Producer's Council, Iowa's Injury Prevention Research Center, Iowa Pork Producer's Council, and the Wellmark Foundation. NIOSH has been the primary source of funding throughout the entire CSF study. AgriSafe Clinic of Spencer Hospital staff, including Carolyn Sheridan, Maureen Christensen, Kristi Fisher, and Deb Abel, were responsible for conducting the study in Northwest Iowa. Special thanks to Maureen Christensen, who conducted all the occupational health screenings and who provided education and assistance to CSF farmers. Mike McMullen, Carolyn Jones, and Jamie Abel performed the on-farm safety reviews. University of Iowa investigators including Kendall Thu, Kelley Donham, Natalie Roy, Risto Rautiainen, Carol Hodne, LaMar Grafft, and Paul Whitten initiated the program, obtained funding, and trained health care providers and farm safety consultants. The quarterly phone interview questions were developed by the authors of this paper. Additional contributions were made by Natalie Roy, Paivikki Susitaival, Phoebe Juel, Mollie Marty, and Lisa Werner. The Iowa Social Science Institute, based at the University of Iowa, performed the quarterly call questionnaires.

Publications
Present Journal Articles:

1. Hodne CJ, Thu K, Donham KJ, Watson D, Roy N: Development of the Farm Safety and Health Beliefs Scale. Journal of Agricultural Safety and Health 5(4): 395-406, 1999
2. Jaspersen J, List P, Howard L, Morgan D, Von Essen S: The Certified Safe Farm Project in Nebraska: The First Year. Journal of Agricultural Safety and Health 5(3): 301-307, 1999
3. Rautiainen RH, Lange JL, Hodne CJ, Schneiders SL, Donham KJ: Injuries in the Iowa Certified Safe Farm Study. Journal of Agricultural Safety and Health, in press, 2003
4. Schneiders SL, Donham KJ, Hilsenrath P, Roy N, Thu K: Certified Safe Farm: Using Health Insurance Incentives to Promote Agricultural Safety and Health. Journal of Agromedicine 8(1): 25-36, 2001
5. Thu K, Pies B, Roy N, Von Essen S, Donham KJ: A Qualitative Assessment of Farmer Responses to the Certified Safe Farm Concept in Iowa and Nebraska. Journal of Agricultural Safety and Health 4(3): 161-171, 1999
6. Von Essen S, Thu K, Donham KJ: Insurance Incentives for Safe Farms. Journal of Agromedicine 4(1/2):125-28, 1997

Present Thesis:

1. Schneiders SL: An Examination of Health Insurance Coverage in an Iowa Agricultural Population, MS Thesis, University of Iowa, 1999

Anticipated Future Journal Articles:

1. Schneiders SL, Flamme G, Lange JL, Christensen M, Rautiainen RH, Donham KJ: Farm-Work Related Hearing Problems in the Certified Safe Farm Program. Journal of Agricultural Safety and Health
2. Donham KJ, Lange JL, Schneiders SL, Rautiainen RH. Respiratory Disease in Certified Safe Farmers
3. Rautiainen, RH, Grafft L, Donham KJ: Development of the Certified Safe Farm On-Farm Safety Review Tool.

Title:	Community Partners for Healthy Farming Intervention Research
Investigator:	Kelley Donham
Affiliation:	University of Iowa
City & State:	IA
Telephone:	(319) 335-4190
Award Number:	5 U60 CC717552-04
Start & End Date:	8/1/1999–8/31/2003
Total Project Cost:	$720,000
Program Area:	Intervention Effectiveness Research Methods
Key Words:	intervention, education, agriculture

Final Report Abstract:

Abstract

The Certified Safe Farm (CSF) Project was developed at the University of Iowa in 1996 in order to address the high rates of fatalities, injuries, and fam1-related illnesses in the agricultural population. This multi-component, voluntary program consists of an agricultural occupational health screening conducted at an AgriSafe Clinic, general preventive health education and fit-testing of personal protective equipment, and an on-fam1 safety review. An intervention group began receiving the above services on a yearly basis in 1998. To test the effectiveness of the program, faml-related injuries, illnesses, and fatalities were tracked in the intervention group and in a control group through se1f-reports made on a yearly demographic information form and via a quarterly telephone questionnaire that occurred over a three-year time period. This self-reported data was analyzed for evidence that the CSF program reduced the number and costs associated with agricultural injuries and illnesses in the fam1ers who received the services.

In addition to reducing illnesses, injuries, and fatalities in participating farmers, CSF was designed with a built-in reward system that provides incentives to farmers who participate and sponsors who support the program. Because the majority of family farmers purchase individual health insurance coverage, and because they engage in a high-risk occupation, farmers often spend much of their disposable income on monthly premiums and out-of-pocket medical expenses. Health insurance costs continue to increase to levels that put a strain on the financial stability of farm families, notwithstanding the effect these costs have on access to preventive care. Farmers must also pay premiums for crop insurance, property/casualty insurance, and liability coverage, to name a few. Farmers who meet specified CSF standards of health and safety receive incentives for certification, with cash incentives having been awarded in the past. Now, through collaboration with a key health insurer in Iowa, CSF effectiveness will be tested by analyzing claims data. If claims are found to be lower in certified CSF farmers, future incentives may be subsidized through lower premiums on health, property/casualty, and liability insurances for farmers. Agribusinesses will also support the program by providing discounts on implement and seed/feed costs, in exchange for promotion of their products and services and a safer and healthier customer base.

This reward system is what makes CSF different than other incentive programs: CSF will be replicated and sustained by agribusinesses and insurers in the communities where farmers live and work.

Preliminary findings from focus groups, telephone calls, and personal conversations show that the program is welcomed and appreciated by farmers who would not ordinarily receive the services provided through the program. Farmers see this outreach program as something that is necessary and worthwhile.

Health and safety indicators have shown improvements in the areas of machinery safety, respiratory personal protective equipment use, self-reported illness and injury medical costs, and occupational disease-related respiratory symptoms.

Participating farmers have improved their farm review scores over the five years of the project, with scores averaging 82% (a passing score requires an 85%) in 1998-99, and increasing to 97% in 2002-2003. These improvements not only indicate the ongoing effort of the farmers to continue making safety improvements over time, but it has also been shown that the on-farrm safety reviewers have made concerted efforts to assist the farmers in making these improvements.

The occupational health screenings, demographic information forms, and quarterly calls have shown that self-reported, farm-related illness and injury costs were lower in intervention farmers at a rate of $90/person/year .In addition, use of respiratory personal protective equipment (PPE) increased significantly in intervention farmers.

Support of the CSF program has been expressed in many ways: through the retention of enrolled farmers and their expression of appreciation and value in the program, through the dissemination of the key concepts of the program to rural AgriSafe health clinics throughout the state of Iowa, through multiple newspaper and farm journal publications, and through the support of key funders and business entities in the state of Iowa and in the nation, including: NIOSH, Iowa Pork Producers, National Pork Producers, Wellmark Foundation, Pioneer Hi-Bred, AgriSafe Network, and recently, Iowa Farm Bureau Federation and Wellmark Blue Cross Blue Shield of Iowa, a key health insurance organization in the state that provides insurance coverage to 40% of all Iowans.

Publications:

Schneiders S, Donham KJ, Hilsenrath P, Roy N, Thu K: Certified Safe Farm: Using Health Insurance Incentives to Promote Agricultural Safety and Health. J Argomedicine 8(1), 2001

Hodne CJ, Thu K, Donham KJ, Watson D, Roy N: Development of the Farm Safety and Health Beliefs Scale. Journal of Agricultural Safety and Health 5(4): 395-406

Jaspersen J., List P, Howard L, Morgan D, Von Essen S: The Certified Safe Farm Project in Nebraska: The First Year. Journal of Agricultural Safety and Health, 5(3): 301-307, 1999

Rautianen RH, Lange JL, Hodne CJ, Schneiders SL, Donham KJ: Injuries in the Iowa Certified Safe Farm Study. Journal of Agricultural Safety and Health, in press.

Thu K, Pies B, Roy N, Von Essen S, Donham KJ: Aqualitiative Assessment of Farmer Responses to the Certified safe Farm Concept in Iowa and Nebraska. Journal of Agricultural Safety and Heath 4(3): 161-171, 1999

Von Essen S, Thu K, Donham KJ: Insurance Incentives for Safe Farms. Jornal of Agromedicine 4(1/2): 125-28, 1997

Memorandum

Date: November 5, 2003

From: Adele M. Childress, Ph.D., Program Official AMC
Office of Extramural Programs, NIOSH, E-74

Subject: Final Report Submitted for Entry into NTIS for Grant 5 U60 CC717552-04.

To: William D. Bennett
Data Systems Team, Information Resources Branch, EID, NIOSH, P03/C18

The attached final report has been received from the principal investigator on the subject NIOSH grant. If this document is forwarded to the National Technical Information Service, please let us know when a document number is known so that we can inform anyone who inquires about this final report.

Any publications that are included with this report are highlighted on the list below.

Attachment
cc: Sherri Diana, EID, P03/C13

List of Publications

Rautianen RH, Lange JL, Hodne CJ, Schneiders SL, Donham KJ: Injuries in the Iowa Certified Safe Farm Study. Journal of Agricultural Safety and Health, in press.

Schneiders S, Donham KJ, Hilsenrath P, Roy N, Thu K: Certified Safe Farm: Using Health Insurance Incentives to Promote Agricultural Safety and Health. J Argomedicine 8(1), 2001

Thu K, Pies B, Roy N, Von Essen S, Donham KJ: Aqualitiative Assessment of Farmer Responses to the Certified safe Farm Concept in Iowa and Nebraska. Journal of Agricultural Safety and Heath 4(3): 161-171, 1999

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Von Essen S, Thu K, Donham KJ: Insurance Incentives for Safe Farms. Jornal of Agromedicine 4(1/2): 125-28, 1997

THE UNIVERSITY OF IOWA

COLLEGE OF PUBLIC HEALTH
Iowa's Center for Agricultural Safety and Health

October 22nd, 2003

Linda Franklin
Office of Extramural Programs
Centers for Disease Control
1600 Clifton Road
Atlanta, GA 30333

Re: Final Performance Report for grant U06/CC717552-04

Dear Linda:

Please find attached the Final Performance Report for the project titled: Certified Safe Farm: Prospective Research and Sustainability.

This project was highly productive and I am pleased to present to you a summary of the results. The project resulted in one thesis, six published peer reviewed articles, over 35 presentations at scientific meetings, and 12 trade journal and newspaper articles.

This project involved collaboration between the University of Iowa and the AgriSafe Network. This research has led to an expanded program with over four times as many farmers participating, and new partnerships with Iowa Farm Bureau Federation and Wellmark Blue Cross Blue Shield of Iowa. NIOSH/CDC has been instrumental in the success and fulfillment of this program.

There were no inventions conceived under this grant.

I would be pleased to provide further information as needed. My phone number is: 319-335-4065, and my e-mail address is: sara-schneiders@uiowa.edu.

I look forward to future research and collaborative opportunities with NIOSH/CDC.

Sincerely,

Sara Schneiders

Sara L. Schneiders, MS
Project Coordinator
College of Public Health
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