Certified Safe Farm: Evaluating Health Insurance Claims

NIOSH Final Progress Report

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List of Abbreviations

CSF= Certified Safe Farm
CPHFI= Community Partners for Healthy Farming Intervention
PPE= Personal Protective Equipment
NASS= National Agricultural Statistics Service
UI= The University of Iowa

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 multicomponent, 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. The first large study began in 1998 in NW Iowa consisting of 150 intervention farmers and was expanded in 2003 through this grant to include more participants throughout Iowa bringing the CSF population to 300 farmers.

In addition to reducing illnesses, injuries, and fatalities in participating farmers, CSF was designed with built-in incentives for 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. One of the research questions of this project is to determine if CSF farmers experience reduced claim numbers and costs.

Initial analyses show trends that favor the intervention group in areas of increased personal protective equipment use (PPE), reduced out-of-pocket costs, and a reduction in overall claims costs.

Highlights/Significant Findings

Evaluation of the program design and components indicate that the program can be effectively managed and delivered in varying agricultural communities and settings using local resources and infrastructure. Further, the vast majority of farmers who have participated have expressed their appreciation and support for this program and have credited it for making a difference in their health and working habits. Additionally, the use of independent auditors conducting the on-farm safety reviews has been confirmed as the preferred method by CSF farmers as a self review cannot be completed as objectively and thoroughly as an independent review. All components of the program are found to be valuable, but the occupational health screening is deemed the most valuable component of the program to participating farmers. The ability to speak to a trained agricultural health nurse, who understands their work and exposures, has been invaluable in creating a sense of ownership within CSF farmers regarding their health and safety. This is, in fact, a point of entry into the healthcare system, as farmers rarely seek out providers for routine preventive procedures.

The analysis of the insurance claims data is still in progress, as negotiations with Wellmark and their legal representation regarding the protection of human subjects has yet to be concluded satisfactorily. However, initial results show encouraging signs towards the effectiveness of the intervention. The results show a cost savings in the intervention group's claims costs even though the intervention group had more reported claims. Additional analysis is in progress to examine outliers in the data and to control for reporting bias that is often found early in intervention programs.

A survey was developed and administered to the CSF intervention group and a randomly selected farm comparison group using the National Agricultural Statistics Service (NASS). When comparing these self reported outcomes, we see trends showing the following advantages for the intervention:

1. Intervention farmers are more likely to use personal protective equipment than the comparison population.
2. Intervention farmers have less occupational respiratory conditions, including organic dust toxic syndrome, asthmatic symptoms, and acute bronchitis
3. Intervention farmers have a higher general feeling of wellness
4. Intervention farmers report fewer depressive symptoms
5. Intervention farmers have reduced stress levels
6. Out-of-pocket healthcare expenses for occupational illnesses and injuries were less than the comparison population
7. Intervention farmer's general health status was better than the comparison population including self-rating of health and a higher percentage of use for preventive health services.

Translation of Findings

Similar to the initial CSF project (1999-2003), it appears there are significant behavior changes that include a more frequent use of preventive health services and a more frequent use of PPE. Further, the intervention appears to spare participants from one of the most common and important afflictions to affect the health of agricultural workers – respiratory problems. The implications of these findings is that we feel there is data that supports working with health insurance and workman's compensation insurance companies in providing incentives for farmers to become "Certified Safe Farms". At this time, we are in the discussion phase with a large workman's compensation company about incorporating the CSF into their business structure.

Outcomes/Relevance/Impact

Our initial findings support some of the findings from the initial CSF project – the forerunner of the current project. There is evidence that the program has been effective in changing behaviors such as PPE use, especially respiratory PPE. The findings also suggest fewer occurrences of respiratory conditions in the intervention farmers. Additionally, general wellness traits appear to be improved in the intervention group. The impact of this research now lies in the greater probability of gaining support for integration into the fabric of workman's compensation and health insurance companies.

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 farmer's 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 each farmer's operation. The initial pilot program was to last two years. The first Community Partners for Health Farming Intervention (CPHFI) grant was completed in 1999.

The second 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.

The third CPHFI grant was awarded in 2003, and with those funds, we were to expand the CSF project from the nine county area in northwest Iowa to across the state, centered in ten different locations that had access to a local AgriSafe clinic. This project expanded upon the goals of the previous projects and included the support of Iowa Farm Bureau and the Wellmark insurance company. This CSF project was to enroll 300 active farmers who were Iowa Farm Bureau members and had insurance through Wellmark. The enrolled farmer's insurance claims data was to be compared to an identified control population to determine if the CSF intervention reduced injuries and illnesses as determined by claims data.

In addition the CPHFI CSF projects listed previously, there were two additional CSF studies ongoing concurrently with the third CPHFI project. One project was to examine the special risk population of senior farmers and develop a program tailored for this population. The other project tailored the CSF program to the unique risks associated with dairy farming.

Specific Aims

The main research questions addressed in this project include:

- Are there pre-existing differences in demographic, farm, and claims characteristics between CSF farms and control farms (a possible self-selection effect)?
- Will the number and cost of health insurance claims be reduced among CSF farms after enrollment into CSF program relative to control farms?
- Are health insurance claims associated with demographic, farm production, insurance, health status, and farm hazard characteristics?

Specific Aim #1: Enroll 600 intervention farmers into CSF program

a. Obtain Human Subjects (IRB) approval for new project
b. Revise current tools and data collection instruments
c. Prepare recruitment materials
d. Prepare AgriSafe clinics for service provision (incl. site visits)
e. Conduct on-farm safety review trainings
f. Create web-based recruitment materials via Farm Bureau
g. Enroll 600 farmers at four AgriSafe locations
h. Create an educational intervention protocol for the clinics and UI outreach staff

Specific Aim #2: Provide CSF services to participants

a. Provide occupational health screenings
b. Provide on-farm safety reviews
c. Provide one-on-one education

Specific Aim #3: Provide education on a continual basis

a. Provide educational sessions (1 per year per site) as part of Farm Bureau meetings
b. Distribute newsletters, alerts, brochures, safety articles

Specific Aim #4: Analyze program effectiveness

a. Choose a control cohort of 2,400 FB/Wellmark insurees. Demographically match with intervention farmers
b. Conduct retrospective analysis of claims data on the 600 int. and 2,400 control farmers
c. Conduct prospective analysis of program effectiveness

Specific Aim #5: Analyze association of health outcomes and covariates

Specific Aim #6: Build on-going CSF program in collaboration with insurance and agribusiness

a. Seek agribusiness and insurer funding for CSF farm reviews, administrative costs, and incentives for certification
b. Consult with all project stakeholders to discuss project success, future collaboration, and program dissemination

Procedures

Intervention Recruitment

Initial enrollment criteria as of 1/21/2004:

1. Iowa FB Federation member
2. Wellmark BC/BS health insurance coverage
3. Principle farm operator
4. Lives in selected project locations
5. Farms at least 20 hrs/wk on average (at least part-time farmer)

All project locations were selected based on the presence of an AgriSafe Clinic with staff interested and capable of providing the program services to farmers. Locations included the following AgriSafe Clinic sites: Spencer, Ida Grove, Dubuque, Keosauqua, and Oskaloosa.

Enrollment began in January 2004 at a summary meeting for farmers who participated in the previous CSF study (1998-2003) in a nine-county area near Spencer, Iowa. Approximately 100 control and intervention farmers and spouses attended the meeting.

MAILINGS: The primary form of recruitment was through several mass mailings.

The first mailing was sent to 60 county FB board members in NW Iowa on *5/26/2004*. It included an introductory letter, a CSF brochure, and a telephone number for follow-up contact. Follow-up calls to those who did not reply to the letter were made by the CSF project coordinator.

The second mailing was sent in the Spencer, Iowa area on *August 6th, 2004*. The mailing was coordinated through the local Farm Bureau office, and each packet included a color brochure, an introductory letter, and a postage-paid return postcard to the project coordinator. FB identified 1,057 FB "regular" members who received the mailing. Criteria for receiving the mailouts were: 1) age 60 or younger, 2) Wellmark health insurance coverage through Farm Bureau as the primary contract holder, and 3) residence within the 10-county target area (Clay, O'Brien, Palo Alto, Cherokee, Buena Vista, Pocahontas, Osceola, Kossuth, Emmet, and Dickinson). Those who were interested in learning more about the program were asked to return the postcard. They were then contacted via telephone by the CSF project coordinator, who described the study in more detail. Informed Consent documents were sent to those who wanted to join.

The third mailing was done in the Dubuque, Iowa project location on *September 9th, 2004*. The items included in the packets were the same as those included in the second Spencer mailing. The same protocol was followed for this mailing as the second mailing. FB identified 1,100 regular members with the same criteria (1& 2) as listed in mailing two, above. Members from the following counties were included in the mailing: Clayton, Delaware, Fayette, Allamakee, and Winneshiek.

Iowa Agricultural Statistics Service (IASS) in Des Moines sent out the fourth mailing on *January 10th, 2005*. The mailing was done in five target locations, and included farmers living in the following areas:

1. AgriSafe clinic in **Spencer**, Iowa (entire Clay County), which also included all of eight additional surrounding counties: O'Brien, Palo Alto, Cherokee, Buena Vista, Pocahontas, Emmet, Osceola, and Dickinson.
2. AgriSafe Clinic in **Dubuque**, Iowa (entire Dubuque County), and including select portions of Clayton, Delaware, Jackson, Jones, Fayette, Allamakee, & Winnishiek counties
3. AgriSafe Clinic in **Ida Grove**, Iowa (entire Ida County), and including select portions of Crawford, Monona, Woodbury, and Sac counties (n=1,132 in IG)
4. AgriSafe Clinic in **Keosauqua**, Iowa (entire Van Buren county), and including the entirety of Davis county
5. AgriSafe Clinic in **Oskaloosa**, Iowa (entire Mahaska county), and including the entirety of Marion, Monroe, Keokuk, Wapello, Poweshiek, and Jasper counties

Those who were sent the introductory mailings included those who were age 18 or older, and those whose principal occupational was farming or those who operated > or = to 100 acres of land in 2003. The total number of farmers who lived in the entire proposed locations who met the above criteria was 6,448 (this included those age 60+). These farmers were mailed the introductory letter, CSF color flyer, and postage-paid return postcard. Those who returned the postcard to IASS (IASS made copies of the returned postcards and sent the copies to the CSF project coordinator) were called by the CSF project coordinator, at which time the program was explained in more detail. Informed Consent documents were sent to those who were eligible and interested in joining.

IASS made follow-up calls to all those who received the mailing, but who did not respond by returning their postage-paid postcard. Follow-up calls started on the eve of January 24th, 2005 in Oskaloosa and Keosauqua, and in Spencer, Ida Grove, and Dubuque on eve of January 25th, 2005.

Enrollment criteria for farmers who enrolled in the program via the fourth mailing included:

1. Wellmark BC/BS health insurance coverage for those age 62 or younger (coverage through self or spouse, from on or off-farm source)
2. Lived in selected project locations
3. Principle farm operators and their spouses who farmed at least 20 hrs/wk on average (at least part-time farmer)

Iowa Agricultural Statistics (IASS) did a second recruitment mailing on *June 3rd, 2005*. Those who got the introductory letter, postcard, and CSF brochure included those who were age 18 and older, whose principal occupation was farming **OR** who operated 100 of more acres of land in 2003. Letters were sent to farmers in five counties, based on the criteria listed above:

1. Plymouth (entire county), included 771 farmers
2. Davis (entire county-repeat mailing in Keosauqua area), included 385 farmers

3. Lee (entire county-added county in Keosauqua area), included 413 farmers
4. Butler (entire), included 643 farmers
5. Grundy (entire), included 365 farmers

Total number of farmers sent information=2,577.

Butler, Grundy, and Plymouth counties were newly added sites at the time of this mailing.

SELF-RECRUITMENT:

Lastly, we opened up CSF recruitment to the rest of the AgriSafe Network clinics in the summer of 2005. Two additional sites decided that they would like to provide CSF in their area. Those sites were Britt and Sioux Center, thus making the total number of participating sites=10. No mass mailings occurred in Britt or Sioux Center. All recruitment was done locally by the AN nurses, Becky Finch, and Lori Kleyer, respectively. Becky recruited a total of 12 farmers and Lori recruited one.

Summary of intervention farmer enrollment: We had enrolled a total of 307 Wellmark farmers. Enrollment was completed, as of February 1st, 2006. Recruitment effectively lasted two full years, beginning with the CSF summary meeting in January 2004, and ending with the self-recruitment in Britt and Sioux Center. There were several recruitment methods, including three mailings initiated by Farm Bureau (on 5/26/2004, 8/6/2004, and 9/9/2004), targeting just the Spencer and Dubuque areas. These three mailings garnered 46 recruits. Then we had two mailings initiated by IASS, which got us an additional 163 recruits. Aside from the five mailings, recruitment also occurred through the CSF summary meeting, the Clay County Fair, local self-recruits/referrals, Farm Progress Show, Hay Expo, FB annual meeting in 2004, local FB meetings, and through CSF dairy study carryovers.

Control Recruitment

A group of control farmers was selected for the purposes of: 1) analyzing baseline health insurance claims information of Iowa farmers in order to provide a description of insurance coverage and illness and injury cases in this population, and 2) to determine if intervention farmers experience a reduction in claims costs pertaining to farm-related illnesses and injuries in comparison to the control group of farmers who did not receive the intervention.

In order to identify current farmers in the control group the following steps were taken:

1. IFBF copied their membership database for the purposes of this study. They checked this db and eliminated from it all those who did not meet all of the following conditions: 1) age < or = 60, 2) status as a regular member, and 3) being an individual Wellmark health insurance coverage policyholder, and having purchased their coverage through a IFBF agent. 10,000 FB members met all three conditions listed above.
2. Farm Market iD was contacted to identify and compile a database of all current (2003) farmers in Iowa.
3. Farm Market iD provided the name, address, phone number, type of crops farmed, # of acres of crops, types of livestock farmed, and # livestock for each of 70,000 Iowa farmers to Iowa Farm Bureau Federation (IFBF). All of the 70,000 were identified as having farmed in the year 2003.

4. IFBF then compared their list of 10,000 members (from #1 above) to the list of farmers provided by Market iD (n=70,000).
5. 2,655 of the 10,000 farmers from IFBF's db matched with the list of farmers provided by Market iD. This means that only 2,655 of 10,000 FB members who were considered to be farmers at some point in time during their membership in IFBF actually farmed in 2003. (IFBF does not keep up-to-date records of current farmers).
6. IFBF kept the SSN on all 2,655 files and then passed along the files to Wellmark Inc. for the purposes of claims analysis. The 2,655 farmers come from all over the state of Iowa, not just from the specified study locations.

Intervention Farmer Procedure: Each intervention farmer was to receive one occupational health screening and if any areas of this screening were deemed necessary for a referral, those farmers would be invited back for one modified health screening during the study period. The intervention farmers were contacted by their local AgriSafe clinic to schedule their occupational health screening. Each farmer completed an occupational health history form prior to their clinic visit. The screening took place at their local AgriSafe clinic. The screening includes:

- audiogram
- a pulmonary function test
- blood pressure check
- cholinesterase testing, if they work with chemicals
- height and weight measurements
- skin cancer assessment
- tetanus immunization
- cholesterol testing
- vision testing
- musculoskeletal exam

The 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. In addition, a personalized PPE prescription was provided for the farmer indicating the specific PPE to be used on their operation. The final step in the screening process was to develop several health and safety goals for the farmer to strive towards in the coming year.

The intervention farmer also received two on-farm safety reviews during the study period which focused on 17 areas of the farm, including tractors, outdoor environment, machine shop, chemical storage, and others. The farmer accompanied the farm reviewer during the course of the reviewer and was educated on the findings of the review and the specific hazards identified on that farm. The farm review booklet was sent to the UI for data entry and the score along with blank corrective action sheets were sent to the farmer. If the farmer received a score of 85% or higher on the farm review then the farmer was a "Certified Safe Farmer" until the next review was conducted. If the farmer scored less than 85%, they

were to make corrections within three months and record the changes on the corrective action sheets and return to the UI.

Control Farmer Procedure: Control farmers did not receive any CSF services. This study consisted of two different control populations. The first population was described in the control farmer recruitment section and was to be used in the comparison of claims analyses. The second control population was created through a survey sent to a random selection of Iowa farmers identified through the National Agricultural Statistics Service (NASS).

Methods

The primary analytic questions in the CSF project were:

- Are there pre-existing differences in demographic, farm, and claims characteristics between CSF farms and control farms (a possible self-selection effect)?
- Will the number and cost of health insurance claims be reduced among CSF farms after enrollment into CSF program relative to control farms?
- Are health insurance claims associated with demographic, farm production, insurance, health status, and farm hazards characteristics?

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

Results and Discussion

Aim #1. Enroll 600 Iowa farmers into the CSF program who are members of Iowa Farm Bureau Federation with Wellmark insurance coverage through Farm Bureau.

Item #1: Human subject's approval was granted on November 20th, 2003 and renewed each project year until the project was officially closed in August 2008.

Item #2: The CSF Occupational Health and History Form, the Clinical Screening Form, and On-Farm Safety Review Tool were revised and modified for the purpose of this study. A new color, easy to use on-farm review checklist was printed for use during this study. In addition, the Occupational Health and History Form was revised between Round 1 and Round 2 to reflect the inclusion of the modified health screening for those participants deemed "high risk".

Item #3: Recruitment materials consisting of a introductory letter, a CSF brochure, and a return postcard were developed to be used in the five mailings conducted between May 2004 and June 2005. Other recruitment materials and events have included regional advertisements in the Farm Bureau Spokesman, a poster presentation at the Iowa Farm Bureau annual meeting, a poster presentation at the Excel Meat Solutions annual health fair day in Ottumwa, Iowa, a statewide-distributed article in Iowa Farmer Today, several local advertisements, and many local presentations at pesticide applicator training meetings. No web-based recruitment materials were developed.

Item #4: The project protocols, methods, and procedures were explained to potential participating AgriSafe clinics. If the clinic decided to participate in the CSF program, a site visit was conducted by Carolyn Sheridan, AgriSafe Clinical Director, or Kristi Fisher, AgriSafe Communications Director, to ensure that the clinics had all necessary equipment and materials for implementing the program. Additionally, site visits were conducted every two years to ensure project protocols were in place and being followed.

Item #5: Two farm safety reviewer trainings were held in Iowa City, IA on December 6th and 7th, 2004 and May 12th and 13th, 2005, to train people to do on-farm safety reviews for the program. One additional farm reviewer was trained one-on-one in July 2007, to replace a farm reviewer who could no longer perform the reviews.

Item #6: No web-based recruitment materials were developed via Farm Bureau.

Item #7: The original project called for the enrollment of 600 Iowa farmers from four AgriSafe locations in the study but due to unforeseen circumstances, recruitment was delayed and proved more difficult than expected thus our enrollment numbers were lowered to 300 Iowa farmers. Recruitment was expanded from four AgriSafe locations to ten to assist in meeting our enrollment numbers. A total of 300 farmers were enrolled in the program but through attrition, a total of 284 persons were enrolled in the study at the time of project closure.

Item #8: An educational intervention protocol for the clinic staff and UI outreach staff (farm safety reviewers) has been created.

Aim #2. Provide CSF services to each of the enrolled farmers twice during the four-year project period.

Item #1: First round occupational health screenings were provided to 282 enrolled participants. Second round, modified occupational health screenings were provided to 105 enrolled participants. Protocols for the project were shifted midway to provide second round modified health screenings to those deemed high risk patients ie. were given a referral during the first screening.

Item #2: First round on-farm safety reviews were provided to 275 farms (some farms had two participants per farm ie. couples or father/son combination). Second round on-farm safety reviews were provided to 254 farms. There was some difficulty at two sites with the local farm safety reviewer being able to complete all second round farm reviews for their areas.

Item #3: One-on-one education was provided to each participant during both the occupational health screenings and on-farm safety reviews.

Aim #3. Provide education on a continual basis.

Item #1: In January 2006, a group educational meeting (and focus groups) were held at Ida Grove, LeMars, Spencer, Keosauqua, and Oskaloosa. A sixth meeting took place in Peosta, IA, on February, 14th, 2006. Topics included farm-related respiratory diseases, and results from the previous CSF program. A total of one-hundred fifty-five farmers (including one guest per person) attended the educational meetings, and 48 enrolled farmers participated in five focus groups.

Item #2: All CSF participants received the quarterly Alive and Well Newsletter (jointly published between Iowa's Center for Agricultural Safety and Health and the Great Plains Center for Agricultural Health) with an additional one-page color insert with targeted safety messages such as tractor rollovers,

safe chemical handling, and harvest time safety preparations. Additionally, the participants have been permanently added to the distribution list and will continue to receive this newsletter after the conclusion of the CSF program.

Aim #4. Analyze program effectiveness

Item #1: A control group of farmers has been identified, and health insurance claims data will be analyzed on the control farmers and compare to the claims data of the intervention farmers.

Item #2: Unfortunately, the process of working with the Wellmark insurance company has been tenuous at best. The original proposal to work with the UI College of Public Health dataset provided by Wellmark to the University of Iowa has fallen through due to Wellmark's legal department's concern of protecting privacy. We are currently working with Wellmark to outline a system that will satisfy our research questions while satisfying the Wellmark legal team's concerns. We have been provided a cursory analysis from Wellmark but further investigation is required. Further analysis will commence once a workable solution has been agreed upon, even though this is outside the original grant timeline.

Item #3: Prospective analysis of program effectiveness will commence once we are able to evaluate the health insurance claims data from Wellmark. We conducted a survey through the National Agricultural Statistics Service to evaluate a second control population vis-à-vis our intervention farmers. This survey has allowed us to determine whether our CSF-enrolled farmers are demographically and behaviorally similar to or different from the general Iowa population.

Aim #5. Analyze association of health outcomes and covariates

Analysis of health outcomes and covariates has not yet taken place. As recruitment proved more difficult than expected, we were delayed in implementing the program. This delay in implementation and the addition of extra site locations, has set back the onset of detailed multivariable analysis. In addition, the analysis of claims data has been delayed due to negotiations with Wellmark. This is still an ongoing process and will be completed in the future, even without further grant support.

Aim #6. Build on-going CSF program in collaboration with insurance and agribusiness.

Item #1: Without the results from the analysis of claims data, we have not aggressively approached insurance and agribusiness to support the program. With that said, we are continually promoting the program to potential funders. We have been in discussion with one national insurance company about incorporating the CSF program into their business structure and have submitted a proposal for their consideration. We will continue to follow-up on this avenue of future funding and dissemination.

Item #2: Meetings with Farm Bureau have continued throughout the grant cycle with meetings held in October, 2005, and November, 2006. Farm Bureau indicated their continued willingness to support the CSF program, with potential for financial support beyond the grant-funded period a possibility, pending study findings.

Meetings with Wellmark were held in December, 2005 and October 2007. At the 2005 meeting, Wellmark confirmed their plan to remain a partner in this research through their provision of a coded (de-identified) classification for control and intervention farmers. Following this meeting, we were

informed that Wellmark's legal team raised concerns about providing this information to our research group as they felt privacy may be compromised. During the 2007 meeting, we believed we had reached a workable solution where Wellmark would conduct the analysis of the data based on code provided by the UI research team. This agreement is still in negotiation with the details being agreed upon currently.

Comparison of Intervention vs. Control – National Agricultural Statistics Service Survey
(Survey was conducted for use in this grant and an additional CSF grant thus the total responders in the intervention group is greater than the 300 enrolled in this study)

Intervention	Control
n=355	n=411

1. **How do you classify yourself in relation to your farm operation?**

Classification	Intervention	Control
Principal Operator	280	341
Co-operator/manager	46	56
Spouse	22	5
Other family	1	5

2. **In the past 12 months, has the principle owner/operator of your farm had any farm-related injuries that required medical attention?**

	Intervention	Control
Yes	31	23

3. **How many injuries required medical attention?**

	Intervention	Control
Number of Injuries	45	42

4. **As a result of all farm-related injuries to the principal operator in the past 12 months, please estimate how many office visits to a healthcare provider did the principal operator make?**

	Intervention	Control
Number of injuries requiring office visits	28	23
Number of office visits (total)	256	113

5. **As a result of all farm-related injuries to the principal operator in the past 12 months, please estimate how many trips to the emergency room did the principal operator make?**

	Intervention	Control

Number of individuals requiring an ER trip	11	9
Number of trips to ER (total)	15	10

6. **As a result of all farm-related injuries to the principal operator in the past 12 months, please estimate how many nights in the hospital did the principal operator spend?**

	Intervention	Control
Number of individuals requiring a hospital visit	6	2
Number of days in hospital (total)	67	6

7. **Please estimate your out-of-pocket costs for all farm-related injuries that occurred to the principal operator within the past 12 months (exclude insurance premiums)**

	Intervention	Control
Total out-of-pocket	$25,140	$30,136

	Intervention (by person)	Control (by person)
Out-of-pocket	30	124
	500	7000
	1500	200
	100	5000
	9	20
	200	125
	2000	17
	1141	1000
	100	250
	4000	1500
	25	2000
	100	50
	1400	500
	3000	4500
	150	20
	20	2000
	6000	4500
	450	30
	1000	1050
	30	250
	45	
	640	
	1000	
	1500	
	200	

8. **Please estimate what your insurer paid for all farm-related injuries that occurred to the principal operator within the past 12 months.**

	Intervention	Control
Total insurer paid	$726,479	$98,653

	Intervention (by person)	Control (by person)
Insurer paid	170	1360
	1000	1000
	500	2500
	1000	200
	70	160
	24000	2600
	1749	315
	150	12000
	5500	250
	1500	6000
	300	500
	240	2500
	148000	20000
	3000	18
	165000	40000
	4000	8000
	150	700
	200	50
	150	
	4000	
	5000	
	800	
	10000	
	350000	

9. **In the past 12 months has any family member or employee working on your farm had any farm-related injuries that required medical attention?**

	Intervention	Control
Yes	20	4

10. **How many injuries required medical attention?**

	Intervention	Control

Required medical attention	30	4

11. As a result of all farm-related injuries to your family members or employees in the past 12 months, please estimate how many office visits to a healthcare provider did your family member make?

	Intervention	Control
Number of injuries requiring office visits	17	3
Number of office visits (total)	89	5

12. As a result of all farm-related injuries to your family members or employees in the past 12 months, please estimate how many trips to the emergency room did your family member make?

	Intervention	Control
Number of individuals requiring an ER trip	8	3
Number of trips to ER (total)	8	4

13. As a result of all farm-related injuries to your family members or employees in the past 12 months, please estimate how many nights in the hospital did your family member make?

	Intervention	Control
Number of individuals requiring a hospital visit	0	0
Number of days in hospital (total)	0	0

14. Please estimate the <u>out-of-pocket costs</u> for all farm-related injuries that occurred to your family member or employee within the past 12 months (*exclude insurance premiums)*

	Intervention	Control
Total out-of-pocket	$3,146	$1,280

	Intervention (by person)	Control (by person)
Out-of-pocket	1000	200
	500	100
	35	980
	100	
	400	
	15	
	25	
	100	
	650	

	200	
	80	
	41	

15. Please estimate <u>what your insurer paid</u> for all farm-related injuries that occurred to your family member or employee within the past 12 months.

	Intervention	Control
Total insurer paid	$5,983	$4,200

	Intervention (by person)	Control (by person)
Insurer paid	500	350
	1000	250
	350	3600
	33	
	350	
	2000	
	100	
	350	
	500	
	800	

16. During the past 12 months, have you experienced two or more flu-like symptoms (fever, shivering, muscle or joint aches, tiredness, chest tightness, wheezing, or headache) after an extra heavy dust exposure on the farm, such as cleaning a grain bin, moving or sorting hogs, or opening a silo?

	Intervention	Control
Yes	41	56

17. Did these flu-like symptoms require medical attention?

	Intervention	Control
Required medical attention	7	6

18. For these flu-like symptoms, please estimate how many office visits to a healthcare provider did you make?

	Intervention	Control
Number of persons requiring office visits	7	7
Number of office visits (total)	20	21

19. **For these flu-like symptoms, please estimate how many trips to the emergency room did you make?**

	Intervention	Control
Number of individuals requiring an ER trip	3	1
Number of trips to ER (total)	3	1

20. **For these flu-like symptoms, please estimate how many nights in the hospital did you spend?**

	Intervention	Control
Number of individuals requiring a hospital visit	0	1
Number of days in hospital (total)	0	13

21. **Excluding the flu-like illnesses listed above; please consider other farm-related health conditions you have had in the past 12 months such as occupational causes of skin diseases, eye injuries, respiratory conditions, infections, and toxic exposures (pesticides), how many office visits to a healthcare provider?**

	Intervention	Control
Number of injuries requiring office visits	53	54
Number of office visits (total)	159	126

22. **Excluding the flu-like illnesses listed above; please consider other farm-related health conditions you have had in the past 12 months such as occupational causes of skin diseases, eye injuries, respiratory conditions, infections, and toxic exposures (pesticides), how many trips to the emergency room did you make?**

	Intervention	Control
Number of individuals requiring an ER trip	11	6
Number of trips to ER (total)	13	8

23. **Excluding the flu-like illnesses listed above; please consider other farm-related health conditions you have had in the past 12 months such as occupational causes of skin diseases, eye injuries, respiratory conditions, infections, and toxic exposures (pesticides),**

	Intervention	Control
Number of individuals requiring a hospital visit	4	2
Number of days in hospital (total)	45	7

24. Please estimate your <u>out-of-pocket</u> costs for all other farm-related health conditions that occurred to you within the past 12 months *(exclude insurance premiums)*

	Intervention	Control
Total out-of-pocket	$6,054	$16,545

	Intervention (by person)	Control (by person)
Out-of-pocket	30	100
	65	500
	500	85
	1000	60
	100	100
	200	200
	9	580
	40	200
	200	50
	20	700
	250	20
	250	30
	30	100
	2150	10
	30	1000
	60	200
	200	200
	100	2800
	110	1200
	105	300
	225	600
	30	50
	80	200
	140	250
	100	20
	10	400
	20	400
		800
		300
		1000
		200
		20
		100
		100
		25
		1050

		100
		45
		250
		2000
		200

25. Please estimate what your <u>insurer</u> paid for all other farm-related health conditions that occurred to you within the past 12 months

	Intervention	Control
Total insurer paid	$381,940	$14,991

	Intervention (by person)	Control (by person)
Insurer paid	100	500
	45	100
	100	400
	250	600
	4000	300
	70	100
	210	100
	300	500
	400	500
	325	200
	150	511
	500	250
	15000	300
	300	200
	200	2000
	1000	500
	240	50
	800	50
	1000	1200
	1500	800
	80	150
	600	180
	500	3000
	130	2000
	100	500
	50	
	700	
	90	
	500	
	200	

	2500	
	350000	

26. In the past 12 months, have you personally applied pesticides?

	Intervention	Control
Yes	184	172

27. When applying pesticides, how often do you use eye protection? (1=always, 2=sometimes, 3=never)

Intervention (mean)	Control (mean)
1.92	2.00

28. When applying pesticides, how often do you wear chemical resistant gloves? (1=always, 2=sometimes, 3=never)

Intervention (mean)	Control (mean)
1.36	1.44

29. When applying pesticides, how often do you wear chemical resistant boots? (1=always, 2=sometimes, 3=never)

Intervention (mean)	Control (mean)
2.41	2.49

30. When applying pesticides, how often do you wear chemical resistant disposable overalls? (1=always, 2=sometimes, 3=never)

Intervention (mean)	Control (mean)
2.77	2.74

31. When applying pesticides, how often do you wear respirators? (1=always, 2=sometimes, 3=never)

Intervention (mean)	Control (mean)
2.61	2.72

32. When you work with power tools, how often do you wear the following types of eye protection – goggles? (1=always, 2=sometimes, 3=never)

Intervention (mean)	Control (mean)

2.01	2.10

33. **When you work with power tools, how often do you wear the following types of eye protection – safety glasses? (1=always, 2=sometimes, 3=never)**

Intervention (mean)	Control (mean)
1.77	1.79

34. **When you work with power tools, how often do you wear the following types of eye protection – face shield/face mask? (1=always, 2=sometimes, 3=never)**

Intervention (mean)	Control (mean)
2.18	2.20

35. **When you work with power tools, how often do you wear the following types of eye protection – welding mask/welding glasses? (1=always, 2=sometimes, 3=never)**

Intervention (mean)	Control (mean)
1.37	1.41

36. **When you work with power tools, how often do you wear the following types of eye protection – other? (1=always, 2=sometimes, 3=never)**

Intervention (mean)	Control (mean)
2.29	2.36

37. **In the past 12 months, have you done any welding?**

	Intervention	Control
Yes	242	266

38. **When welding, how often do you use welding mask/goggles? (1=always, 2=sometimes, 3=never)**

Intervention (mean)	Control (mean)
1.02	1.03

39. **When welding, how often do you use apron or welding jacket? (1=always, 2=sometimes, 3=never)**

Intervention (mean)	Control (mean)
2.56	2.58

40. When welding, how often do you use long leather gloves? (1=always, 2=sometimes, 3=never)

Intervention (mean)	Control (mean)
1.85	1.82

41. How often do you experience ringing in the ears? (1=always, 2=sometimes, 3=never)

Intervention (mean)	Control (mean)
2.42	2.49

42. How often do you experience dizziness? (1=always, 2=sometimes, 3=never)

Intervention (mean)	Control (mean)
2.81	2.81

43. How often do you experience difficulty in hearing conversation? (1=always, 2=sometimes, 3=never)

Intervention (mean)	Control (mean)
2.46	2.54

44. When exposed to loud noise on the farm (working with hogs, driving tractors, or combines, drying grain) how often do you use hearing protection (ear muffs or plugs)? (1=always, 2=sometimes, 3=never)

Intervention (mean)	Control (mean)
2.06	2.35

45. When outside, how often do you use a hat with wide brim hat in the summer? (1=always, 2=sometimes, 3=never)

Intervention (mean)	Control (mean)
2.14	2.10

46. When outside, how often do you use sunscreen? (1=always, 2=sometimes, 3=never)

Intervention (mean)	Control (mean)

2.28	2.37

47. **When exposed to dusty activities, how often do you use respiratory protection (disposable mask or cartridge mask)? (1=always, 2=sometimes, 3=never)**

Intervention (mean)	Control (mean)
1.84	2.03

48. **Which statement best describes your smoking behavior? (1= I have never smoked regularly, 2= I used to smoke but not anymore, 3=I currently smoke)**

Intervention (mean)	Control (mean)
1.25	1.37

49. **In general, how would you rate your health, as compared to others your age? (1=poor, 2= fair, 3=good, 4=very good, 5=excellent)**

Intervention (mean)	Control (mean)
3.83	3.54

50. **How would you rate your overall stress level during the past year? (1=very low, 2=low, 3=medium, 4=high, 5=very high)**

Intervention (mean)	Control (mean)
2.89	2.97

51. **Has poor appetite been a problem for you in the last 6 months?**

	Intervention	Control
Yes	12	14

52. **Has feeling lonely been a problem for you in the last 6 months?**

	Intervention	Control
Yes	44	44

53. **Has blaming yourself for things been a problem for you in the last 6 months?**

	Intervention	Control

Yes	85	90

54. Has feeling hopeless about the future been a problem for you in the last 6 months?

	Intervention	Control
Yes	27	42

55. Has worrying too much about things been a problem for you in the last 6 months?

	Intervention	Control
Yes	116	161

56. Have you ever been diagnosed with skin cancer?

	Intervention	Control
Yes	53	45

57. Do you have any suspicious areas on your skin that you are concerned about?

	Intervention	Control
Yes	66	63

58. During the past 12 months, have you had any aches, pain, or discomfort in your neck?

	Intervention	Control
Yes	169	191

59. During the past 12 months, have you had any aches, pain, or discomfort in your shoulder?

	Intervention	Control
Yes	189	205

60. During the past 12 months, have you had any aches, pain, or discomfort in your upper back?

	Intervention	Control
Yes	94	118

61. During the past 12 months, have you had any aches, pain, or discomfort in your elbow?

	Intervention	Control
Yes	65	75

62. During the past 12 months, have you had any aches, pain, or discomfort in your lower back?

	Intervention	Control
Yes	232	257

63. During the past 12 months, have you had any aches, pain, or discomfort in your wrist/hand?

	Intervention	Control
Yes	105	139

64. During the past 12 months, have you had any aches, pain, or discomfort in your hip/thigh?

	Intervention	Control
Yes	120	127

65. During the past 12 months, have you had any aches, pain, or discomfort in your knee?

	Intervention	Control
Yes	174	177

66. During the past 12 months, have you had any aches, pain, or discomfort in your feet?

	Intervention	Control
Yes	112	144

67. Have any of the aches, pains, or discomforts listed before prevented you from performing your normal work in the past 30 days?

	Intervention	Control
Yes	31	41

68. Did the aches, pains, or discomforts listed before motivate you to see a healthcare provider?

	Intervention	Control

Yes	28	36

69. For these aches and pains, please estimate how many office visits to a health care provider you made.

	Intervention	Control
Number of aches requiring office visits	136	135
Number of office visits (total)	611	662

70. For these aches and pains, please estimate how many trips to the emergency room you made.

	Intervention	Control
Number of aches requiring ER trips	10	11
Number of ER trips (total)	11	15

71. For these aches and pains, please estimate how many nights in the hospital you spent.

	Intervention	Control
Number of nights in hospital due to aches	7	6
Number of nights in hospital (total)	52	12

72. Please estimate your <u>out-of-pocket</u> costs for all farm-related, muscle or joint problems that occurred to you within the last 12 months *(exclude insurance premiums)*

	Intervention	Control
Total out-of-pocket	$27,438	$26,207

	Intervention (by person)	Control (by person)
Out-of-pocket	100	280
	60	1950
	120	50
	500	200
	50	700
	200	500
	45	300
	180	2500
	180	50
	300	140
	100	500
	200	2000
	30	200
	100	60
	120	30
	100	30

	120	100
	10	100
	60	30
	100	50
	9	580
	80	100
	82	39
	200	100
	60	28
	2000	200
	30	10
	150	50
	4000	30
	90	100
	50	60
	80	125
	75	500
	75	60
	100	400
	200	100
	25	25
	300	90
	250	500
	100	150
	6000	1000
	125	500
	300	300
	500	250
	100	1000
	60	240
	300	36
	500	2800
	100	9
	30	240
	90	2000
	100	50
	200	50
	80	80
	50	100
	100	300
	100	1000
	110	150
	100	60

	100	300
	15	30
	800	100
	30	40
	105	1500
	35	30
	80	60
	250	50
	45	400
	15	120
	150	150
	200	100
	1500	400
	20	25
	50	100
	90	20
	20	45
	60	125
	240	430
	1500	240
	4000	100
	40	30
	20	75
	60	240
	400	200
	100	15
	15	310
	2	100
	400	150
	45	200
	60	210
	100	50
	30	60
	100	100
	400	100
	50	22
	50	200
	1250	25
		15
		40
		500
		30
		150

		150

73. Please estimate what your <u>insurer</u> paid for all farm-related, muscle or joint problems that occurred to you within the past 12 months

	Intervention	Control
Total insurer paid	$442,830	$168,870

	Intervention (by person)	Control (by person)
Insurer paid	250	100
	1000	2500
	200	20
	100	2400
	200	3000
	540	300
	1000	500
	300	7000
	200	1000
	30	500
	100	20
	120	280
	300	1000
	400	20000
	200	6000
	600	150
	75	20
	70	200
	24000	100
	175	400
	250	90
	5500	100
	100	1000
	30	50
	300	250
	200	100
	200	300
	200	2600
	1000	500
	500	2
	300	100

	16000	45
	50	1500
	12000	200
	250	6000
	500	200
	250	3000
	250	350
	1700	360
	248	200
	2000	200
	220	81
	150	6000
	400	150
	200	200
	200	150
	200	400
	120	500
	600	100
	45	150
	87	250
	200	150
	100	500
	35	6000
	200	250
	80	1000
	150	30000
	125	300
	700	40000
	500	240
	405	15
	1000	30
	3000	50
	50	300
	800	100
	5000	500
	250	18
	270	155
	2000	75
	500	60
	3000	400
	70	160
	80	500
	300	60

	40	350
	160	250
	80	500
	500	100
	150	1000
	30	60
	100	60
	60	240
	1000	15000
	200	140
	3000	500
	300	240
	350000	
	200	
	4000	

74. In the past 12 months, how often have you experienced dry cough as a result of an on-farm exposure (such as dust, fumes, and vapors)? (1=never, 2=less often than monthly, 3=monthly, 4=weekly, 5=daily)

Intervention (mean)	Control (mean)
1.63	1.65

75. In the past 12 months, how often have you experienced chest tightness as a result of an on-farm exposure (such as dust, fumes, and vapors)? (1=never, 2=less often than monthly, 3=monthly, 4=weekly, 5=daily)

Intervention (mean)	Control (mean)
1.29	1.32

76. In the past 12 months, how often have you experienced cough with phlegm as a result of an on-farm exposure (such as dust, fumes, and vapors)? (1=never, 2=less often than monthly, 3=monthly, 4=weekly, 5=daily)

Intervention (mean)	Control (mean)
1.94	1.76

77. In the past 12 months, how often have you experienced throat irritation as a result of an on-farm exposure (such as dust, fumes, and vapors)? (1=never, 2=less often than monthly, 3=monthly, 4=weekly, 5=daily)

Intervention (mean)	Control (mean)

1.51	1.49

78. **In the past 12 months, how often have you experienced wheezing chest as a result of an on-farm exposure (such as dust, fumes, and vapors)? (1=never, 2=less often than monthly, 3=monthly, 4=weekly, 5=daily)**

Intervention (mean)	Control (mean)
1.30	1.31

79. **In the past 12 months, how often have you experienced sinus problems as a result of an on-farm exposure (such as dust, fumes, and vapors)? (1=never, 2=less often than monthly, 3=monthly, 4=weekly, 5=daily)**

Intervention (mean)	Control (mean)
1.91	1.77

80. **In the past 12 months, how often have you experienced stuffy nose as a result of an on-farm exposure (such as dust, fumes, and vapors)? (1=never, 2=less often than monthly, 3=monthly, 4=weekly, 5=daily)**

Intervention (mean)	Control (mean)
2.00	1.86

81. **In the past 12 months, how often have you experienced headache as a result of an on-farm exposure (such as dust, fumes, and vapors)? (1=never, 2=less often than monthly, 3=monthly, 4=weekly, 5=daily)**

Intervention (mean)	Control (mean)
1.62	1.66

82. **In the past 12 months, how often have you experienced ear popping as a result of an on-farm exposure (such as dust, fumes, and vapors)? (1=never, 2=less often than monthly, 3=monthly, 4=weekly, 5=daily)**

Intervention (mean)	Control (mean)
1.32	1.28

83. **When did you last receive a routine check-up/physical? (1=less than 1 year, 2=1-3 years, 3=3-10 years, 4=never)**

Intervention (mean)	Control (mean)
1.45	1.67

84. When did you last receive a blood pressure check? (1=less than 1 year, 2=1-3 years, 3=3-10 years, 4=never)

Intervention (mean)	Control (mean)
1.12	1.30

85. When did you last receive a cholesterol check? (1=less than 1 year, 2=1-3 years, 3=3-10 years, 4=never)

Intervention (mean)	Control (mean)
1.35	1.76

86. When did you last receive an eye exam? (1=less than 1 year, 2=1-3 years, 3=3-10 years, 4=never)

Intervention (mean)	Control (mean)
1.58	1.74

87. When did you last receive a dental exam? (1=less than 1 year, 2=1-3 years, 3=3-10 years, 4=never)

Intervention (mean)	Control (mean)
1.34	1.57

	Intervention	Control
Total	355	411
Sex		
Male	328	378
Female	27	29
Age		
< 35	11	18
35-49	72	95
50-64	149	163
65 +	122	133

Farm work per week		
< 40	135	234
40 or more	220	177
Acres		
<500	167	255
500 or more	173	141
Swine farm		
Yes	82	98
No	261	278
Dairy farm		
Yes	35	12
No	301	351

While multivariable analysis has yet to be conducted on the survey results, several things warrant mentioning. Several key demographics stand out when comparing the two groups; first, CSF farms are larger on average; second, CSF farmers work more hours per week than their counterparts in the control population. These demographics suggest that CSF farmers have more exposure to hazards than the control group. Additionally, while the significance has yet to be determined, it appears that the intervention group uses personal protective more often than the control group, respiratory conditions appear to be decreased in the intervention group, and overall wellness indicators appear to be higher in the intervention group.

Conclusions

This study demonstrated the following:

1. A comprehensive, multifaceted agricultural occupational health intervention that includes on farm inspections can be carried out with local services conducted by trained auditors from the local community, and local nurses trained as part of the AgriSafe Network.
2. The intervention appears to facilitate the increased use of PPE in its participants.
3. There is evidence of decreases occupational respiratory conditions in the intervention group.
4. There is evidence of lower out-of-pocket medical expenses for occupational illnesses and injuries.
5. This evidence should assist us in advancing the project with insurance companies
6. We are currently working with a large workman's compensation company to insert this program into their preventive programming.
7. There is evidence this program can successfully be implemented in large multi-employee farms. We are currently working with a large production agricultural farm to obtain CSF status. They

already have shown a reduction in workman's compensation claims (personal communication with firm's safety director)

Publications

Kline A, Leedom-Larson K, Donham KJ, Schneiders S, Rautiainen R: [2007] Farmer Assessment of the Iowa Certified Safe Farm Program. J Agromedicine 12(3): 33-43.