Chapter 7: Goal 5: Reduce Injuries and Illnesses by informing and educating employers and employees about occupational safety and health hazards and control systems

[*N.B.*: Since the "Outreach" goal of the AFF Program often begins with the outputs of other portions of the program, the conceptual line between activities and outputs is somewhat blurred in the narrative that follows.]

7.1 Challenge or Issue

Agriculture is consistently ranked among the most hazardous industries. However, workers and employers have lacked knowledge about how to prevent occupational injuries and diseases, as well as the requisite skills to implement protective measures. In addition, prevention methods that are known to improve safety and reduce hazardous exposures are often not implemented in farming operations because of social, economic, and personal barriers such as the perceived need to accept greater risks when farming or perceived limitations of time or money to make changes. The influence of such barriers is not adequately understood. Also, occupational safety and health information and education interventions have been conducted in many communities, but their effectiveness was not often evaluated. Participatory research was needed to identify hazards that could be reduced by interventions and to develop, implement, and evaluate such interventions within the existing agriculture support structure. This type of research is challenging because of the large amount of time and resources needed to establish coalitions, conduct interventions, and then evaluate them. Other challenges include the seasonal nature of agricultural tasks and frequent changes in ownership of agricultural businesses.

7.2 Activities

Since 1990, the AFF Program has initiated several projects in response to the N-CASH report and Congressional funding directives discussed earlier. These projects implemented three components of a prevention approach: surveillance, research, and intervention.

7.2a Agricultural Health and Agricultural Safety Promotion Systems

The intervention component of the overall AFF Program approach was implemented in part by the AHPS cooperative agreement project. It used the existing network between the land-grant university, CES, and agricultural workers and employers. AHPS was directed toward expanding CES occupational safety and health programs by providing information dissemination, education, and referral services. Eighteen (18) cooperative agreements were funded in States that had a cooperative extension service State safety program (Arizona, California, Colorado, Florida, Iowa, Kansas, Michigan, Missouri, North Carolina, New Jersey, Ohio, Oklahoma, Pennsylvania,

Tennessee, Virginia, Vermont, Washington, Wisconsin). The overall funding period was 1990 to 1993. The intention was to have an AHPS in each State by the end of three years. (Appendix 7-01)

Information dissemination was accomplished through pamphlets, brochures, cooperative extension fact sheets, radio and television programs, and print media (newspapers and magazines). Based on the viewing audience and circulation figures, it is estimated that 6,130,151 farmers/rural people were exposed to agricultural safety and health information through the AHPS programs. A total of 864 training programs and/or meetings were conducted with more than 48,000 people in attendance. In addition, 454 on-farm hazard assessments were completed, and 34 demonstration projects at the local level were funded by the various State AHPS programs. Thirty-one (31) agricultural safety videos were produced (10 bilingual), six agricultural computer safety programs (four targeted toward secondary students) were developed, and three States instituted or increased the level of effort for tractor and machinery safety training programs for youth. The AZ AHPS project proposed and developed "model safety programs" in agribusinesses and schools within; at the conclusion of the project, there were 37 such model programs in AZ. All 18 AHPS projects conducted or supported some form of rudimentary surveillance of agriculture deaths and injuries.

In addition to materials development and dissemination, Wisconsin's Agricultural Health Promotion Systems effort evaluated knowledge, attitudes and agricultural safety and health efforts by 58 of 69 county health departments (Chapman et al., 1996a), 88 of Wisconsin's 89 agriculture and agribusiness extension county faculty (Chapman et al., 1995a), 193 of the state's 284 school-based agricultural education instructors (Chapman et al., 1995b), and 268 dairy farmers (Chapman et al., 1996b). The results indicated that although a majority of all four groups reported making some efforts, permanent hazard correction usually received a lower priority than training to work more safely around hazards. Findings from all four groups were published in peer review journals.

In 1994, the AHPS evolved into the ASPS. The ASPS was a project designed to stimulate the development of new interventions and the implementation of both new and existing interventions to reduce traumatic injuries. Emphasis was placed on assessing intervention effectiveness. The project was intended to have intervention projects implemented quickly, and then to provide practitioners with information about their effectiveness. In ASPS, cooperative agreements were awarded to universities in six States (California, Missouri, North Carolina, New York, Ohio and Wisconsin). The cooperative agreements targeted 195,483 farmers, agricultural employees, and students in rural areas.

7.2b Occupational Health Nurses in Agricultural Communities

From 1990 through 1996, the AFF Program funded 31 public health nurses in rural communities in 10 States (California, Georgia, Iowa, Kentucky, Maine, Minnesota, New York, North Carolina, North Dakota and Ohio) to conduct case-based, and

sometimes rate-based, surveillance through OHNAC. In 1995, the AFF Program funded continued surveillance work under the banner *Community Partners for Healthy Farming Surveillance*. States that were funded under the OHNAC project and subsequently funded by Community Partners for Healthy Farming Surveillance usually retained OHNAC in the titles of their programs. These surveillance projects addressed multiple agricultural subsectors. For simplicity, both surveillance projects will usually be referred to hereinafter as OHNAC. (Appendix 3.1-03)

The nurses identified cases of illness, fatalities, and serious injuries from emergency-room logs, newspaper clippings, and other sources identified by State and local health departments. Agricultural workers trusted the OHNAC nurses; allowed them to visit their farms, sometimes accompanied by other AFF Program staff; and provided them with important data about causes of incidents. Nurses used case findings to raise awareness of hazards and to encourage or implement interventions among stakeholders. The nurses developed strong partnerships in their communities with the CES, schools, agricultural organizations, migrant health clinics, hospitals, youth organizations, and equipment dealers. They disseminated materials created from their findings as well as materials created by other groups (e.g., the ASPS).

An OHNAC nurse in Maine collaborated with the State CES to collect injury data related to the annual potato harvest and to use the findings to revise safety training materials targeting youth. With the nurse's help, Maine included safety and health information in a statewide school curriculum called *Agr (agriculture) in the Classroom* for grades K-12.

In Minnesota, AFF Program collaborative efforts with operators of grain elevators and milk processors resulted in increased use of appropriate respiratory PPE from 25% to 88% by grain elevator workers. Seventy-percent (70%) of these workers reported that they personally encouraged farmers to also use appropriate PPE. The project increased local farmers' access to appropriate PPE by means of PPE sales at grain elevators and distribution by milk testers during routine visits to 1,300 dairy farmers.

In 1991, the New York OHNAC nurse received a report about a woman who had been scalped by inadequately guarded farm equipment. Investigation by the nurse and an agricultural engineer identified three similar incidents with female victims. The women were working with drivelines shielded from above by three-sided guards on hay-balling equipment. All of the women received extensive reconstructive surgery, but were left with permanent, sometimes disfiguring injuries. The nurse put them in contact with each other for support. Although OSHA standards for agriculture prohibit these limited guards, the bale throwers in these incidences were manufactured before the OSHA standard took effect. In addition, since these workers were on family farms, they would not be classified as full-time employees, so the OSHA standard could not be enforced. AFF Program staff published an MMWR article, a NIOSH Alert, and a NIOSH Update related to this problem to raise

awareness and promote the use of retrofit guard equipment which is available from the manufacturer. (http://www.cdc.gov/mmwr/preview/mmwrhtml/00017187.htm).

7.2c Community Partners for Health Farming Intervention Research

The AFF Program created the Community Partners project in response to an external evaluation [Kennedy 1995]. The external review panel recommended that the AFF Program promote the development of community-based research and prevention projects that would link the traditionally supported research and surveillance projects directly to those engaged in prevention activities at the community level. Such partnerships between researchers and stakeholders produce sustainable community change, as well as products and models that can be used in other geographic locations, other agriculture subsectors, and other industrial sectors. (Appendix 3.1-04)

Teen trapped under rolled-over tractor but saved by ROPS on tractor from probable disabling injuries or death

The Community Partners project uses key elements of the USDA's Cooperative Extension Education Service model. The Cooperative Extension Service model involves local community based educators who are known and trusted in their communities as linkages between the community and subject matter specialists/researchers at land grant universities in every state. Key informants, end users of information, and other stakeholders are engaged in assessing needs, problems to be addressed and dissemination of new information. It also uses multiple surveillance data sources such as the FFHHS, OHNAC, workers' compensation data; health insurance claims data, and worksite injury records. AFF Program intra- and extramural investigators have collaborated to respond to emerging issues.

Between 1996 and 2003, AFF Program researchers at the University of Kentucky conducted projects to promote the use of ROPS on farm tractors and to discourage second riders on tractors. Focus groups and community-based advisory groups were used to learn how to raise awareness of the problem, identify barriers, and enable farmers to use ROPS. The AFF Program staff collected case reports of rollovers to use in developing realistic stories.

In collaboration with their partners, AFF staff produced and evaluated a ROPS Notebook for farmers. After piloting the notebook in two counties in Kentucky, the researchers partnered with other organizations to assess its effectiveness. They found that in two treatment counties, 81 ROPS retrofits were sold in 3.5 years, compared to four in the year before introduction of the notebook. Farmers who purchased ROPS said they did so to protect their families. Farmers in the intervention counties had significant increases in 1) positive attitudes about ROPS, 2) consideration of fitting

ROPS on tractors, and 3) efforts to do so [Cole 2002]. Partners worked with the Kentucky AFF Program staff to expand use of the materials and the intervention model. Simulation exercises and other materials are available in English and Spanish on the NIOSH Web site and as CD-ROMs.

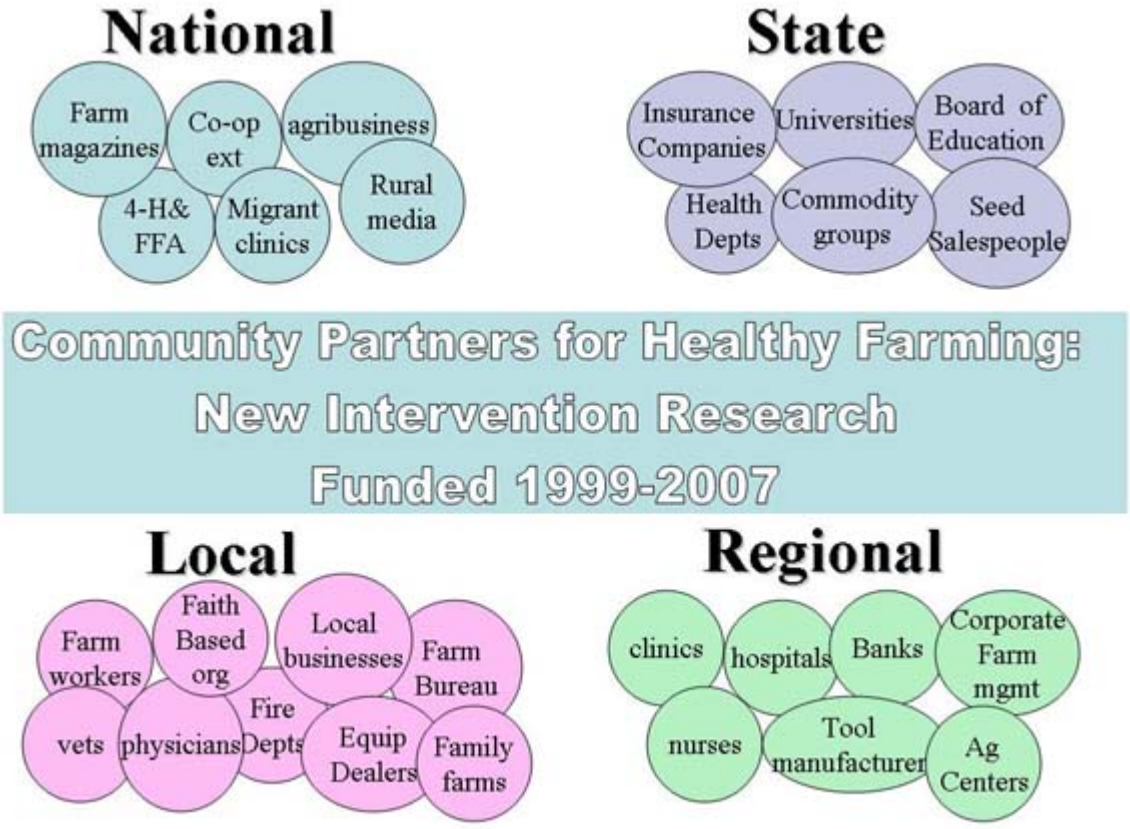


Figure 7-1. Examples of Partners in Project

Partners in this effort included Kentucky State University, South Carolina State University, Clemson University extension agents, Farm Bureau safety advocates in 23 States, and high school agriculture, social studies, and English teachers. More information is available at http://www.mc.uky.edu/scahip/rops.htm.

Green Tobacco Sickness (GTS) cases identified in Kentucky resulted in the development of training materials for health-care professionals and workers that were disseminated through the AFF Program. These materials included a self-administered educational module for physicians and a *foto-novela* for workers. Information about AFF Program work on GTS in Kentucky was also disseminated by national newspapers, the Agricultural Stabilization

Farmers said they purchased ROPS to protect their families

and Conservation Service, publications related to migrant workers, a 14-minute segment on *Day One* (a national prime-time television news magazine), and the reprinting of an MMWR article in JAMA.

Promotores de Salud teaches farm workers about importance of eye protection

Between 1999 and 2003, AFF Program researchers at the University of Illinois at Chicago developed and evaluated an intervention to reduce the number and severity of eye injuries in Latino farm workers through collaboration with peer health advisors (*Promotores de Salud*) in Illinois and Michigan. The *Promotores de Salud* were trained in eye injury and first aid by AFF Program staff. Contacts with workers focused on distributing protective eyewear and training in the importance of wearing appropriate eyewear. Data were collected on the effectiveness of this intervention. "Preliminary results indicate use of protective eyewear increased among observed farm workers from less than 1% to between 29% and 77% for most task-specific risks they encountered while working" [Migrant Health Promotion 2005].

The research group established an eye health/safety Web site in collaboration with the Rural Women's Health Project to disseminate information about eye injury prevention and the project nationally. They demonstrated that use of appropriate protective eyewear among Hispanic farm workers can be increased by the training of lay health advisors (*Promotores(as) de Salud)* to select and custom fit protective eyewear acceptable to workers and by providing protective eyewear for distribution by *Promotores*.

The extramural AFF Program researchers formed a partnership with growers, the Community Health Partnership of Illinois, Migrant Health Promotion-Michigan, and the University of Illinois Urbana-Champaign to accomplish this work.

7.2d Diffusion of Safety Innovations

Dairy farming work is extremely hazardous with injury rates that exceed the average for production agriculture. From 1997 to 2005, AFF Program researchers at the University of Wisconsin focused their efforts on developing safety-enhancing products for dairy farm workers, diffusing information about those products, and measuring the results of the diffusion efforts.

Long day barn lighting, bag silos for cattle feed storage, and a site for distributing calf feed are practices that can improve operation profits as well as reduce exposures to injury hazards on dairy farms (see tip sheets on the practices at http://www.bse.wisc.edu/hfhp). The Wisconsin researchers investigated whether a planned diffusion effort that improved the information quality and flow to all 20,000 (1998) Wisconsin dairy farm producers about these innovations could persuade the producers to adopt them (as well as others). The diffusion effort extended for several

years and included industry print media journalists, selected farmers as opinion leaders, public events, university extension, dealers, suppliers, and internet.
To test the effects of the diffusion effort, we measured the treatment group at baseline and annually with a mail questionnaire. After the second through seventh years of the project, we added an "exposed control" group of Maryland or New York dairy farmers who were likely to be exposed to the same industry print and internet media but not other intervention components.

In comparisons after the intervention, significantly more Wisconsin managers reported getting barn lights and bag silo information from print media and from public events than at baseline. Significantly fewer New York managers reported getting information about barn lights or bag silos from public events than did the Wisconsin managers, even though they were probably exposed to the same mass media (but not the other diffusion efforts). In addition, compared to the Wisconsin dairy farmers, the odds of the New York controls adopting barn lights and bag silos were significantly less. For barn lights, the odds of adopting increased by more than ten times.

Similar interventions were conducted among other agricultural workers. In 1998-99, we conducted a one year long intervention that promoted two safer, more profitable practices (mesh bags for washing greens, standard containers for harvest and post harvest crop handling) to 450 fresh market vegetable growers in Wisconsin (see tip sheets at http://www.bse.wisc.edu/hfhp). We used information sources the growers were already known to use to learn about new practices, including other growers, print trade publications, grower public events, and university extension.

In 1999-2003, we evaluated another diffusion intervention among 2,250 fresh market vegetable growers Wisconsin, Minnesota, Michigan, and Iowa. In 2000-2004, we conducted another intervention that promoted five safer more profitable practices to an estimated 1,250 berry growers in seven Midwest States. We are currently conducting another intervention that is promoting eight safer more profitable practices to an estimated 6,750 producers of field-grown nursery crops in seven states (see tip sheets at http://www.bse.wisc.edu/hfhp). In most cases, measured awareness of the innovations increases after our communication efforts, and in many cases, so does adoption by the farmers.

7.2e Certified Safe Farm

From 1998 to the present, AFF Program researchers at the University of Iowa have conducted an investigation of the concept of the Certified Safe Farm (CSF). Willing farmers work with a nurse trained in farm safety and health. They receive occupational health screenings, health and wellness education, on-farm safety reviews, and incentives for adopting safer farming processes. Self-reported occupational injury and illness costs to the farmer and to their insurer were collected.

Peer farmer audits safety issues in Certified Safe Farm project.

Farmers reportedly liked the CSF project and were able to (a) reduce hazards on their farms, (b) report lower health care costs than controls, and (c) experience safety levels that correlated with these lower health care costs. In the pilot project (1998 to 2002), farmers made 1,292 safety improvements at an annual per farm value of $130; respiratory and noise exposure were reduced because of PPE usage [Hodne et al. 1999; Jaspersen et al. 1999; Rautiainen et al. 2004; Schneiders et al. 2001; Thu et al. 1999; von Essen et al. 1997]. Participation in the multifaceted program was shown to be cost-effective. Iowa farms receiving the intervention had lower costs for occupational injuries and illnesses than control farms [Donham et al. in press]. Annual occupational injury and illness costs were 27% lower for intervention farms than for control farms. For intervention farms, these annual occupational injury and illness costs were positively associated with level of safety in the on-farm safety reviews. The cost savings would more than cover the cost of providing CSF services. With strong encouragement from Iowa Farm Bureau, Wellmark (provider of Iowa Farm Bureau health insurance) allowed use of their health insurance data to evaluate the CSF project.

The CSF nurses participate in a 40-hour training program on agricultural occupational safety and health conducted by a sister project. The sister project received a $10,000 Rural Health grant for scholarships to nurses from other States to disseminate this expertise.

The AFF Program is pursuing expansion of the CSF system into other States and into larger operations with more employees. These larger operations are subject to more involvement with OSHA standards, e.g., required safety training, engineering controls, and hearing conservation programs. Larger operations also have more experience with workers' compensation insurance. The Iowa Farm Bureau has become a strong supporter of the Certified Safe Farm program. With the its support of, the bureau, the Certified Safe Farm program will have access to pre- and post-intervention medical claims data to use in evaluating the project. This is unique not only in agriculture, but has been in all of occupational safety and health. Data from the second round of funding indicated that medical insurance paid for a significant amount of farm-related injuries in Iowa.

Partners in the CSF project are the AgriSafe Network; the Farm Bureau of Iowa; Pioneer, a Dupont Company; Wellmark: BlueCross/Blue Shield; the Iowa Pork Producers Association; and the National Pork Producers Council. More information is available at http://www.certifiedsafefarm.com.

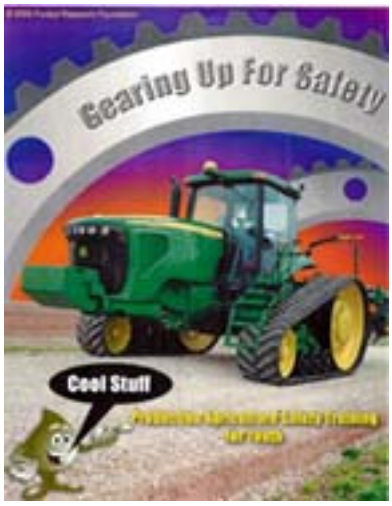
7.2f Safe Communities

From 1998–2000, AFF Program researchers at the National Farm Medicine Center in Wisconsin conducted an evaluation of a health and safety education initiative, Safe Communities, for rural high school students in 4,000 National FFA chapters across the United States. Data were collected from students and their FFA advisors. Community nurses provided injury data on participants following the intervention.

Evaluation of the Safe Communities model found minimal impact. Although students gained knowledge and leadership skills, the program did not demonstrate a strong likelihood of increasing sustainable community programs, as initially expected. On the basis of the evaluation, FFA phased out the newly-implemented project and redirected human resources and approximately $1,000,000 of private and public monies.

7.2g Other Outreach Efforts

Extramural AFF Program researchers at Purdue University worked on tractor and machinery safety training materials for youth during 2000-2003. An advisory panel guided the identification of 149 critical tasks. The Purdue evaluation of these materials included their impact on knowledge, attitude, and behavior 12 months post-intervention. The advisory panel included representatives from the NSC, equipment manufacturers, USDA, State extension safety specialists, and Hobart, a major publisher of agricultural training materials. Local school districts and their high school agricultural teachers were involved in testing the materials. Students who used the materials demonstrated improved safety attitudes and behaviors [Ortega et al. 2003].



Tractor and Machinery Safety training CD-ROM targets youth. It is being marketed by distributed by Hobart Publishing

Hispanic workers with limited education .use cTRAIN, an interactive, computer-based instruction format.

Extramural AFF Program researchers at the Oregon Health and Sciences University are studying the effectiveness of computer-based training for workers that is reinforced by supervisors. They worked with ¡Salud! of Tuality Healthcare Foundation, a community organization of vineyard employers, and workers, to identify training topics. Topics selected were hazard communication, heat exposure protection, personal protective gear for specific tasks, winter and wet weather slips and falls, post-pounding, tractor and forklift safety, confined spaces, pesticide safety, applicator training, and supervisor training. They used cTRAIN, an interactive,

computer-based instruction format that was used in a prior project among Hispanic nursery workers with limited education. The format uses a nine-button input device in place of a computer keyboard. The partners decided to integrate the safety training with job skills training to develop a top-to-bottom training program for the vineyards. Data collection instruments were field-tested for work practices and supervisor-employee interactions. Safety culture measures were used for different levels of the organization (employee, supervisor, manager, and owner). This intervention is expected to allow small companies to also provide training without the added expense of stopping production for classes or hiring trainers. We expect the training to be marketable.

In California, the AFF Program's Social Marketing Farm Safety Diffusion Tool project conducted a TV, radio, and newspaper media campaign to deliver safety information to farm workers and employers. As another part of the campaign, 300 copies of a multi-media tractor safety and field sanitation training package, *Loteria del Manejo Seguro,* have been sold in California. These training materials have been recognized in California and Arizona as effective training tools for non-English-speaking agriculture workers.

Extramural AFF Program staff worked with the Colorado Corn Growers Association to make a safety training video that featured an enactment of an operator entrapment in a corn harvester. The video also recognized the costs associated with such incidents.

7.3 Selected Outputs

Peer-reviewed Publications

In 1993, an issue of the *Journal of the Occupational Health Nurses Association* focused on agricultural health and safety. Intra- and extramural AFF Program staff wrote all of the articles and editorials for the issue. The journal issued 2,800 copies of the program staff-authored articles for distribution by OHNAC nurses.

AFF Program researchers in the Community Partners program have published 31 papers in 9 different peer-reviewed journals. Every project has disseminated its work at international, national, and regional conferences. Staff members have also disseminated their educational materials to farmers, farm managers, and farm families. They have also disseminated materials to rural media, USDA CES personnel, Farm Bureau personnel, rural youth organizations, agribusinesses, and advocates for Hispanic farm workers. Most have made such information available through their own Web sites and the NASD.

The GTS work in Kentucky resulted in an MMWR article in 1992 (reprinted in JAMA) [CDC 1993]. It was also published in the Archives of Environmental Health [Ballard et al. 1995] and as a NIOSH [1993] Update. There have been at least 23

citations of the journal and MMWR articles in peer-reviewed journals within two years, and reprints of one publication were requested from at least 5 countries.

The most important peer-reviewed publications from the AFF Program outreach activities include the following:

Cole et al.'s 1997 article, *Difficult decisions: A simulation that illustrates cost effectiveness of farm safety behaviors*, which appeared in Agricultural Health and Safety: Recent Advances. This tool addresses one of the root causes of farm injuries: having too much time-sensitive work at specific times due to the seasonal nature of agriculture.

Forst et al.'s 2004 article, *Effectiveness of community health workers for promoting use of safety eyewear by Latino farm workers*, which appeared in the American Journal of Industrial Medicine. Forst and colleagues published a second article on the eyewear project in 2006, *Barriers and benefits of protective eyewear use by Latino farm workers*, which appeared in the Journal of Agromedicine. These two publications relate to a Web site and curriculum listed below.

Kidd and colleagues at the University of Kentucky published *An economic motivator for safe farming: changing perceptions through learning* in the Journal of Agricultural Safety and Health in 1998. The study reported in the article provided valuable information for guiding the ROPS Notebook project.

Morgan and Cole published *Stories or statistics? Farmers' attitudes toward messages in an agricultural safety campaign,* in 2002 in the Journal of Agricultural Safety and Health. This article was based on data from the ROPS Notebook project and is useful for guiding tractor safety and other intervention programs.

Rautiainen and colleagues published *Injuries in the Iowa certified safe farm study*, in the Journal of Agricultural Safety and Health in 2004. The report is useful to guide interventions in agriculture.

Training Curricula

Farm tractors, safety, and economics, an interactive multimedia CD-ROM, was produced by AFF Program researchers at the University of Kentucky in 2004. The curriculum includes the electronic version of The Kayles' Difficult Decisions, a farm safety and economics simulation exercise (http://www.mc.uky.edu/scahip/rops.htm).

The University of Illinois and farm worker advocacy organizations are disseminating their eye protection training materials nationally among the *Promotores de Salud* (Camp Health Aides) programs and have modified those materials to address skin cancer as well. Training materials developed for preventing eye injuries among Hispanic farm workers have become a chapter in the *Camp Health Aid Manual*, used across the Nation in training *Promotores de Salud's*, peer lay health advisors. The eye safety and health Web site (http://www.FENet.org), established in collaboration with

Rural Women's Health Project, continues to develop. Gempler's Newsletter, a trade publication, solicited multiple articles from project staff.

Training materials developed by the project team at Purdue University are being marketed by Hobart Publishing, a recognized publisher of agricultural educational materials.

Booklets, Factsheets, and Web Sites

The Florida AHPS project was key to developing the NASD (Appendix 4.2-02). It started out as a project to garner all of the new agricultural safety and health information products produced by the AFF Program (fact sheets, videos, etc.). It was originally produced on a CD-ROM. At the end of the Florida AHPS project, the database was updated, became the NASD, and has a peer-review board. It is currently available on the NIOSH Web site: www.cdc.gov/niosh/nasd.html.

The AFF Program disseminated OHNAC findings and recommended interventions through 34 fact sheets that were developed by the OHNAC project in California. Known as *NURSE Reports*, they are available on the NASD Web site. In addition, the overall OHNAC project developed at least 38 peer-reviewed journal articles; 10 MMWR articles; 9 NIOSH Updates (targeted to media, agricultural organizations, equipment manufacturers, and health departments); 1 multi-agency Alert; and 4 other NIOSH publications.

The Kentucky researchers who were part of the Community Partners project prepared The Kentucky community partners for health farming ROPS project: A program of materials and activities to preserve farmers' health, way of life, and money in 2002. It is available in both English and Spanish at: www.cdc.gov/nasd/docs/d00901-d001000/d000997/10.html.

The Wisconsin dairy farm researchers issued a number of tip sheets and other media for farmers, dealers, suppliers, and others that can be accessed at http://www.bse.wisc.edu/hfhp/index.htm.

The CSF Project researchers developed a Web site about the project: http://www.public-health.uiowa.edu/icash/csf/.

Sponsored Conferences and Workshops

The AFF Program researchers in Iowa presented *The AgriSafe Network and the Certified Safe Farm: Sustainable Interventions for Agriculture* in 2006 at the International Association of Agricultural Medicine and Rural Health in Lodi, Italy.

Presentations and papers on the AHPS/ASPS projects were delivered at the Third National Injury Control Conference (1991), Third International Symposium: Issues in Health, Safety and Agriculture (1992), NIOSH Symposium on Agricultural Safety and Health: Detection, Prevention and Intervention (1994), the NIFS Conference

(1990, 1991, 1992, 1993, 1999), the Fifth U.S.–Finnish Joint Symposium on Occupational Safety and Health (1992), the NIOSH Agricultural Health and Safety Conference (1997), 7th Joint Science Symposium on Occupational Safety and Health (1998), the National Safety Council-Agriculture Division (1994), and the ASAE Conference (1996).

A complete list of outputs can be found in section 7.7 at the end of this chapter.

7.4 Intermediate Outcomes

7.4a National Agricultural Safety Database (NASD)

The AFF program's National Agricultural Safety Database (NASD) is the only extensive, publicly accessible database of agricultural safety and health information available. The AFF program created the NASD at the request of the NIOSH agricultural cooperative agreement participants to provide a national information resource for the purposes of dissemination, leveraging resources, and avoiding duplication of efforts. It is widely recognized and heavily used by the diverse community involved in agriculture, e.g. farmers, large agribusinesses, universities and government agencies. It contains over 3000 publications, has linkages from other organizations, e.g. The National Institute for Farm Safety, and utilizes an Editorial Review Board and continuous user input to improve quality. The website has typically received over 500,000 hits per month representing more than 75,000 unique users.

7.4b Agricultural Health Promotion System

AFF Program funding for the AHPS projects was instrumental in securing State funding for a State level agricultural safety center and a director to run it ($200,000/year) starting in 1995. The AHPS projects provided important requested information that was used during debate in the State legislature on Wisconsin Act 455 (1996). That act, now law, prohibits children under age 16 from driving farm tractors on public roads until they complete a tractor and machinery certification course.

Since the beginning of AHPS activity in Pennsylvania, the Pennsylvania State legislature allocated State funds for agricultural safety. The Pennsylvania State farm safety program has received about $50,000 annually through the Pennsylvania Department of Agriculture since 1996.

7.4c Agricultural Safety Promotion System

The AFF Program project in Missouri, *Missouri Training of Agricultural Safety to Kids*, became the basis for a national program later adopted by the National FFA for their Partners for Safer Communities. It was a million-dollar program, funded by private agribusiness, and was implemented across the United States by National FFA chapters.

The Cornell University project, *New York Agricultural Hazard Assessment Tool*, demonstrated that farmers will voluntarily correct workplace hazards if it reduces workers' compensation costs. This program is still running in New York and has been adopted by the State workers' compensation board.

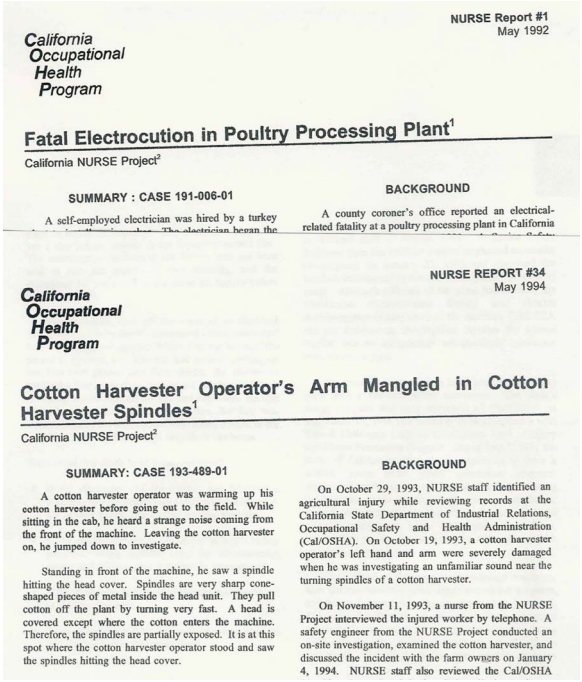
The AFF Program safety training project at the Ohio State University still exists as educational training for farmers and workers. It is used for reducing workers' compensation costs in the State.

7.4d Occupational Health Nurses in Agricultural Communities

The use of AFF Program reports by others to disseminate information about hazards and known interventions is an intermediate outcome. Below are examples from the OHNAC project.

For more than 12 years, insurance companies' risk managers have used the *NURSE Reports* developed by the California project to train farm workers, crew leaders, and managers in Department of Labor-mandated training. These reports are also used by university professors of agricultural education in their classrooms.

In response to the Kentucky GTS findings, researchers in North Carolina conducted further surveillance, developed additional educational materials targeting paid farm workers and health care providers, conducted outreach activities, published their findings, and subsequently were awarded a 2006 NORA award for their work. Mary Fleming, OHNAC nurse and Ohio dairy farmer, continues to have an impact on farm safety and health 7 years after AFF Program funding for OHNAC finished.



NURSE Report #1
May 1992

California Occupational Health Program

Fatal Electrocution in Poultry Processing Plant[1]

California NURSE Project[2]

SUMMARY : CASE 191-006-01

A self-employed electrician was hired by a turkey

BACKGROUND

A county coroner's office reported an electrical-related fatality at a poultry processing plant in California

NURSE REPORT #34
May 1994

California Occupational Health Program

Cotton Harvester Operator's Arm Mangled in Cotton Harvester Spindles[1]

California NURSE Project[2]

SUMMARY: CASE 193-489-01

A cotton harvester operator was warming up his cotton harvester before going out to the field. While sitting in the cab, he heard a strange noise coming from the front of the machine. Leaving the cotton harvester on, he jumped down to investigate.

Standing in front of the machine, he saw a spindle hitting the head cover. Spindles are very sharp cone-shaped pieces of metal inside the head unit. They pull cotton off the plant by turning very fast. A head is covered except where the cotton enters the machine. Therefore, the spindles are partially exposed. It is at this spot where the cotton harvester operator stood and saw the spindles hitting the head cover.

BACKGROUND

On October 29, 1993, NURSE staff identified an agricultural injury while reviewing records at the California State Department of Industrial Relations, Occupational Safety and Health Administration (Cal/OSHA). On October 19, 1993, a cotton harvester operator's left hand and arm were severely damaged when he was investigating an unfamiliar sound near the turning spindles of a cotton harvester.

On November 11, 1993, a nurse from the NURSE Project interviewed the injured worker by telephone. A safety engineer from the NURSE Project conducted an on-site investigation, examined the cotton harvester, and discussed the incident with the farm owners on January 4, 1994. NURSE staff also reviewed the Cal/OSHA

NURSE Reports in English and Spanish are case investigations with recommendations for prevention.

She received a 1-year award (2001) of $100,000 from the Robert Wood Johnson Foundation. In addition, Grady Memorial Hospital and the community she served continued to employ her after OHNAC. She continues to conduct agriculture injury surveillance using emergency room reports, hospital discharge data, news media, etc. She investigates cases, maintains a database, and then uses findings to enhance community awareness about injury prevention. Examples of her continued work include the following:

- In cooperation with Ohio Farm Bureau, she has chaired the Agricultural Producers and Industries Committee for the All Ohio Safety Congress of the Ohio Bureau of Worker's Compensation in 1995, 2003, and 2006 and presents annually at the Congress. She trains EMS workers in farm injury prevention and rescue methods.
- She spearheaded a coalition of EMS providers, community agency representatives, and individual farmers who conduct safety day camps that reach 800 Delaware, Ohio 5th graders annually. Evaluations of such day camp programs have found them to be effective in raising safety awareness and behavior change in children, and in disseminating hazard awareness information to parents by the participating children.
- Partly because of her efforts, inexpensive first aid kits are now available to farmers in more than 44 Ohio counties and surrounding States.
- She has helped develop committees of stakeholders to deliver agricultural safety and health programs to 29 counties in central Ohio.

7.4e Community Partners for Healthy Farming Intervention Research

Researchers and farmers collaborated in the developing tools to promote ROPS and seatbelts use.

- Tractor safety campaigns by Kentucky State University, South Carolina State University, Clemson University extension agents, and Farm Bureau safety leaders in 23 States
- In South Carolina, the installation of SMV emblems on tractors used in school agricultural programs and on 8-10 farms, a 4-H Camp upgrading to a tractor with an ROPS, and repair of broken lighting on at least one tractor.
- Fulfilling new requirements relating to the use of electronic media in the classroom in rural Kentucky high schools.
- In six rural Kentucky high schools, interactive narratives in social studies and English classes in conjunction with social issues such as the plight of farmers, social, technology, and economic changes.
- Simulation exercise in rural high schools. The materials were well accepted, more relevant, and of interest to rural youth than traditional textbooks. In

addition, according to telephone interviews conducted by the Kentucky Agricultural Statistics Service, after using the ROPS Notebook materials, high school students increased farmers' awareness of the cost effectiveness of farm planning and safety practices [Cole et al. 2004a].

- University of Kentucky agricultural economics courses demonstrating the importance of investing in safety as a method of loss control for profitable farming
- Collaboration with the Virginia Farm Bureau and the University of Kentucky to evaluate the Virginia Farm Bureau's safety program. The Virginia Farm Bureau's safety program has the potential for adoption by Farm Bureaus and farm insurance businesses in other States as a means to reduce injuries and to lower costs for insurance companies, farmers, and farm communities. Additional information about this collaboration can be found at: http://www.mc.uky.edu/scahip/vafb.htm. A link to the Virginia Farm Bureau's safety activities can be found at http://www.vafb.com.
- Inclusion in two texts as an exemplary, community-based intervention program [Cole 1997; Cole et al. 2004b]. Researchers and educators in Kentucky and elsewhere are adapting the ROPS Notebook model for use in other sectors, for example, for training health care workers about compliance with bloodborne pathogen precautions and to prevent adolescent pregnancy.

The following trade publications and media are examples of electronic links to the Kentucky ROPS promotional materials:

- Kentucky Living (January 2002): http://www.kentuckyliving.com/article.asp?articleid=520&issueid=93\
- Kentucky EMS Connection (September 2000) http://www.hultgren.org/news/00-3/n0-0242.html
- Successful Farmer (February 2002) http://www.findarticles.com/cf_dls/m1204/2_100/82743155/p3/article.jhtml?term
- Wallingford News link to dealers carrying ROPS for tractors http://www.citylinkz.com/Kentucky/Wallingford.html

Collaborations with the Rural Women's Health project, farm owners, migrant clinics, and advocacy groups are likely to sustain the activities of Eye Safety among Hispanic Farm Workers project beyond the end of AFF Program funding.

The CDC-funded Prevention Research Center at the University of South Florida collaborated with Florida A&M University, the Farm worker Association, and the largest citrus grower in Florida, the United States Sugar Corporation, to replicate the eye injury prevention program developed and piloted at the University of Illinois. Without AFF Program funding, the coalition's efforts reduced eye injuries 75% among 500 workers, between 2003 and the present. They found that the acceptance rate of using safety glasses increased to between 65% and 75% post-intervention, compared with 5% pre-intervention [NIOSH Agricultural Health and Safety Centers

2004; Lopez 2004; Lay Health Promoters 2004; Monaghan et al. (in review)]. The project intends to develop best practices for reducing eye injuries in citrus groves, to disseminate to other workers and employers. The CDC-funded Prevention Center (not NIOSH) received $20,000 in Healthy Vision grants, for Camp Health Aide stipends, to expand this program to reach 300 farm workers in 2006.

One objective of the Florida effort was for developing public health capacity in a traditionally black college for occupational safety and health, agriculture, and migrant farm worker issues. Florida A&M University had started a new Institute of Public Health with a small faculty in environmental and occupational health sciences. Although it was already conducting community-based participatory research, the college was not working in the area of agricultural health and safety before starting this project. It now has networks and trusted partnerships with both growers and worker organizations to facilitate further work in that area.

7.5 External Factors

We are unable to causally link the intermediate outcomes described above with occupational injury, illness, fatality, or hazard exposure data. However, the dairy farm intervention executed by the Wisconsin AFF Program researchers (see section 7.2d) did achieve measured hazard reductions among the population of Wisconsin dairy farmers (~ 50,000). This group represents around 15-18% of the U.S. dairy farm workforce.

7.6 Future Directions

Social and economic conditions and the regulatory environment affected these studies. External factors included the following:

The seasonal nature of agricultural tasks often provides only short windows of time for data collection. Therefore, multiple years are needed for studies. Crop production variations, due to weather and other conditions, can also affect studies.

Partners were helpful to the research. For example, the Iowa Farm Bureau and an insurance provider were instrumental to the success of the CSF project by assuring the availability of medical claim information.

Farmers' attitudes toward workplace safety and health issues affected our ability to do research. Among some, the perceived need to accept greater risks when farming was a deterrent to participation. In other cases, lack of awareness of the preventability of injuries, illnesses, and fatalities may also have been a deterrent.

Communities, volunteer organizations, and workers often have strong desires to implement interventions to prevent injuries and illnesses. These groups have access to target populations for assessing needs, innovations, and dissemination. However, they lack many of the resources of academic organizations, especially the ability to

evaluate programs to guide the best use of limited resources. The participatory research methods used by some AFF Program staff facilitate meeting the needs of both researchers and nonresearchers. Those methods also build trust between groups who do not commonly work together, sometimes facilitating other projects.

7.6 List of NIOSH projects included in this chapter

- DSHEFS-9278501-Community Partners for Healthy Farming (Appendix 3.1-04)
- EID-9278040-National Agriculture Safety Database (Appendix 4.2-02)
- DSR-VLE883-Agricultural Safety Promotion System (Appendix 7-01)

7.7 Outputs

7.7a Agricultural Health and Agricultural Safety Promotion Systems

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Web sites

Healthy Farmers/Healthy Profits Healthy Farmers-Healthy Profits: Tip sheets related to specific tools and work practices that reduce risks for musculoskeletal injury and are cost effective. Sources of tools provided. http://bse.wisc.edu/hfhp

Farm Worker Eye Network. Established by the Eye injury program led by the University of Illinois in collaboration with the Women's Health Network. http://www.fenet.org
Certified Safe Farm http://www.public-health.uiowa.edu/icash/csf/. Part of the Iowa's Center for Agricultural Safety and Health. http://www.public-health.uiowa.edu/icash/

Community Partners for Healthy Farming.
http://www.cdc.gov/niosh/pgms/commpart/default.html
Linked from NIOSH's Agricultural home page. Contains description of extramural projects funded 2000-2004 and links to extramural projects.

KY ROPS Notebook project. http://www.mc.uky.edu/scahip/rops.htm
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