

Coalitions: Partnerships to Promote Agricultural Health and Safety

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Abstract

Throughout the 1990s, a variety of partnerships and community-based organizations have been formed with the primary mission to promote agricultural safety and health. These groups are altruistic, creative, energetic, and provide critical perspectives for improving the safety and health of the agricultural workforce at the local, regional, and national levels. These coalitions have been created as a result of philanthropic support, public funding, grassroots interest, and personal experiences with agricultural injuries and fatalities. They are playing important roles in collaborating with researchers and in reaching the individual agricultural communities. They have been instrumental in conducting needs assessments and are critical to the development and implementation of successful surveillance programs and interventions. Outreach and dissemination of research findings and other safety and health information to target audiences are strengths of these diverse coalitions. This article will focus on primarily community-based coalitions, providing an overview of the development, foci, membership activities, and contributions or impact of these groups during the 1990s and the challenges in maintaining and sustaining the coalitions. This information should be useful to those seeking to understand the activities of existing coalitions and identify potential partnerships for future activities.

Keywords. *Agriculture, Coalitions, Partnerships, Community-based.*

One of the more significant challenges in promoting agricultural safety and health is recognizing the diverse problems, resources, priorities, and values of the unique workforce involved in farming, forestry, and commercial fishing. Understanding this challenge is critical for not only implementing successful prevention but for conducting successful research programs that identify the most feasible interventions and programs. Coalitions, including partnerships between researchers and other stakeholders, are one method used to address this challenge. The goal of this article is to focus on primarily community-based coalitions, providing an overview of the types, foci, activities, and results or impact of these groups during the 1990s and the challenges involved in maintaining and sustaining coalitions. Some national and regional coalitions will be described because of their relationship to community-based coalitions.

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Historical Guidance

The potential role of coalitions in reducing agricultural-related diseases and injuries has been identified in key forums. The 1988 report “Agriculture at Risk: A Report to the Nation” was a result of the work of coalitions and grassroots input (Donham, 1989). “Agriculture at Risk” concluded that expanding communication among all parties involved in agricultural and rural health would be necessary for the successful implementation of its recommendations; that communication between public and private sectors, and among the various groups within each sector, must be increased; and that coalitions must include professionals in the diverse fields related to agricultural and rural health (Merchant et al., 1989).

The theme of the 1991 Surgeon General’s Conference on Agricultural Safety and Health was “a national coalition for local action” (Myers et al., 1992). In addressing one purpose of the conference, building coalitions, Dr. Thomas Dean, former president of the National Rural Health Association, suggested two important directions for the development of coalitions. First, build coalitions within the professional community that include expertise in safety, public health, and healthcare. Second, build bridges between the professional community and the people on the farms. Those involved need to know that there is concern about health and safety risks, that help is available, and that their contributions are important to prevention efforts (Dean, 1992).

The 1995 External Reviewers’ Report to NIOSH on the National Occupational Safety and Health Program in Agriculture recommended that linkages be created between researchers and outreach programs to translate research results into useful community programs. The reviewers also suggested that safety and health promotion, education, and intervention projects must involve the affected communities in all phases of project development, implementation, and evaluation (Kennedy, 1995).

From 1989 until the present, a variety of partnerships and coalitions have been formed that reflect the guidance provided by the conferences and reports mentioned above. Several have had a national focus. **The National Coalition on Agricultural Safety and Health (N-Cash)** played an important role by publishing “Agriculture at Risk” and promoting implementation of report recommendations (Donham, 1989).

Methodology

For purposes of this article, coalitions will be defined as both temporary and longer-term alliances of factions for the specific purpose of enhancing health and safety of agricultural workers and their families. Furthermore, these coalitions, consistent with the description of coalitions put forth by Butterfloss et al. (1993), are issue-orientated, formally organized structures uniting individuals and groups with a common purpose; focused to act on specific goals external to the coalition; and “committed to recruit members and organizations with diverse talents and resources to achieve these goals” (Butterfloss et al., 1993).

This article will present a broad but not inclusive representation of existing coalitions that impact on agricultural health and safety. Information regarding specific coalitions was gathered by literature review and solicitation of information through agriculture-related internet e-mail list services. Although we recognize that many of these coalitions evolved out of multiple stimulating forces, we have divided them into three categories based on one of their original, primary stimulating forces: death or injury related to a child or children, stakeholder interest, and desire to stimulate surveillance, research, or interventions. The coalitions discussed in this

article demonstrate how coalitions provide feasible access to three essential components of health education described by McLeroy et al. (1993): “a clear understanding of the social factors, ...knowledge of interventions, ...and understanding of the communities, organizations, neighborhoods, networks, and individuals that are the target and context of health education programs.”

Selected Coalitions: Injury and Death of Children

Several coalitions have evolved with a focus on children, some of these as part of the healing process after a tragic loss of a child. Marilyn Adams began **Farm Safety 4 Just Kids** in 1987, after her son Keith suffocated in a gravity-flow wagon. The grassroots volunteers with the support of the national organization provided over 350 awareness and educational activities with nearly 300,000 participants in 1999 (FS4JK, 1999). In 2000, the organization had over 125 chapters in 33 states and 4 Canadian provinces (S. Burgus, personal communication, December 6, 2000). Jeris Peterson inspired the formation of **Sharing Help Awareness United Network (SHAUN)** after her son Shaun was fatally injured by a grain auger. SHAUN provides mental health services and peer support to farm families who experience a death, disabling physical injury, or serious psychological impairment of a family member while engaged in agriculture (Roseman, 1999).

Concern for children and the number of fatal and nonfatal unintentional injuries involving children associated with production agriculture provided the stimulation for the creation of the 42-member **National Committee for Childhood Agricultural Injury Prevention**. The goal was to develop specific recommendations to reduce unintentional agricultural injuries to youth under age 18. The committee worked for over 16 months to develop a national action plan included in the report “Children and Agriculture: Opportunities for Safety and Health” (NCCAIP, 1996). The committee had diverse representation of health and safety professionals from both the public and private sectors. The committee’s draft report was reviewed by nearly 100 other individuals and agency representatives. The report served to secure congressional funding for the current initiative for childhood agricultural safety and health and continues to direct those efforts.

A multi-disciplinary group of 12 individuals received funding from the Midwest Center for Agricultural Disease and Injury Research, Education, and Prevention to use a consensus-development process to create guidelines for 62 agricultural tasks for children. Approximately 60 secondary reviewers, including agricultural safety experts from across the U.S., provided comments on the draft guidelines. A 25-member **National Adolescent Farmwork Occupations Health and Safety Committee** using the same model is currently generating recommendations for migrant youth working in agriculture; 35 additional experts will review the recommendations. The significance of this coalition is that diverse groups, some with historical opposition, participated in consensus-development discussions (B. Lee, personal communication, November 29, 2000). This work is part of the childhood agricultural safety and health initiative.

There are grassroots, community-based groups and activities that are also supported at the national and state level. The **Progressive Farmer Farm Safety Day Camps** are supported on the national, state, and local levels by numerous groups and individuals. At the local level, individuals or groups in the area with a stake in agriculture are recruited to support and help conduct the instructional, fun, and safe Farm Safety Day Camp. The program had 11 camps in 1995, 250 planned for 2001

and over 100 communities on the waiting list. Major funding is received at the national level from agribusinesses. Local organizations, local donors, and over 30 volunteers from various backgrounds plan and conduct each camp (S. Reynolds, personal communication, January 9, 2001).

Help Me Grow – Safe Kids is a statewide Wyoming coalition concerned with health and safety issues for all children, including those in agriculture. This coalition has been organized for about six years and helps form local chapters in interested counties, of which there are about nine currently. The partners are involved in the statewide steering committee and with specific educational and interventional efforts as needed on a local basis. One of their most visible programs is the annual statewide Safe Kids Day, held in early May. It is a fair-like event of educational and service booths with excellent media coverage and high attendance by Wyoming families. Other efforts have included the passage of a children's health insurance initiative through the Wyoming legislature, car seat safety checks and education, and other efforts by individual action teams (D. Woiltaszewski, personal communication, November 29, 2000).

Selected Coalitions: Stakeholder Interest

Several coalitions have been developed by individuals or groups in recognition that diverse expertise and resources are needed to increase the effectiveness of efforts to reduce the hazards to those working in agriculture. These coalitions exist at the state, regional, and local level. They are composed of groups and individuals with different cultures, funding sources, and loyalties, but with the common goal of saving lives and preventing injuries to agricultural workers and their families.

In July 1990, the Iowa Legislature created the **Iowa Center for Agricultural Safety and Health (I-CASH)**. I-CASH's impressive list of accomplishments includes supporting and promoting research, conducting national conferences, initiating training and educational programs, and facilitating community-based activities. I-CASH has also fostered the development of other coalitions, including the AgriSafe Network, Farm Safety 4 Just Kids, and Sharing Help Awareness United Network (SHAUN).

The **AgriSafe Network**, a group of 24 hospitals, health clinics, and county health departments, provides community-based preventive occupational health services for the farm community (Donham, 2000a). The healthcare staff has received additional training in agricultural safety and health and has been certified by examination.

In September 1997, the Iowa Center and Agricultural Health and Safety (I-CASH) along with the Great Plains Center for Agricultural Health and the Iowa Injury Prevention Center convened "Tractor Risk Abatement and Control: The Policy Conference" to gain a consensus from 40 diverse stakeholders on specific actions to reduce death and injury caused by tractors. Within a year, they reached consensus on a national strategic plan with 25 actions to save 2000 lives by the year 2015 (Donham et al., 1997). Current efforts are focused on implementation.

Several coalitions are active in California. **AgSafe** is a non-profit coalition dedicated to reducing injuries, illnesses, and fatalities among those involved in California and western agriculture. AgSafe facilitates collaboration among groups and companies with interest in health and safety in California agriculture by providing expertise, information, funding, and other support (J. Myers, personal communication, November 30, 2000). The **Farm Safety Initiative** is a coalition of regulatory, environmental, farmworker, and agricultural organizations. The coalition

is currently developing a scientifically valid tool to determine problems as they relate to the federal and state worker protection standard for pesticides among agricultural workers in San Luis Obispo County, California. The roles of partners and the direction of resources will be based on the data analysis (R. Das and R. Greek, personal communication, November 28, 2000, and February 9, 2000).

The **Inland Northwest Farm Safety Network** consists of organizations and individuals who are involved in farm health and safety issues in central and eastern Washington and Idaho. Members come from a variety of fields: agricultural associations, business, cooperative extension, government agencies, health and safety education, healthcare, legal services, and labor. The network was formed to share information, knowledge, and resources. The network maintains an on-line directory, publishes a newsletter, and sponsors an annual conference. Partners share responsibilities on a rotating basis each year (K. Pitts, personal communication, November 29, 2000).

Three countywide coalitions to promote farm safety and health and one regional coalition to provide resource support have been developed in south central Pennsylvania. Membership consists of farmers and farm family members, agriculture-related businesses, extension services, ag teachers, and emergency service personnel. All have been active in developing and supporting farm safety day camps for youth, having a farm safety presence at their respective county fairs, and participated in a powered take-off (PTO) guard subsidy program sponsored by a PTO manufacturer. Additionally, these counties are working on a preplan tool for farm emergencies and on sponsoring first-on-the-scene programs for farm families.

An example of an effective temporary coalition is the **farm-church partnership** formed in Mercer County, Kentucky, to hold an injury prevention health fair. Local agricultural agencies contributed free educators and materials; the church provided an activity place, registered participants, and assembled educational packets; and farm families prepared exhibit space and loaned machinery for the sessions (Reed, 1994).

Selected Coalitions: Stimulation for Surveillance, Research, and Intervention

Several coalitions have been developed out of the need to reach the diverse populations in agriculture and to conduct accurate surveillance, meaningful research, and effective interventions. During the 1990s, federal and philanthropic funding for agricultural health and safety provided a stimulus for these efforts. In 1991, the W. K. Kellogg Foundation funded an initiative to promote and support collaborative and partnership efforts between institutions and communities at local, regional, and state levels. These funded projects became the **Agricultural Safety and Health Cluster** (Schuman, 1998) (table 1). Although the Kellogg Foundation no longer funds the Cluster projects, the group has evolved into the **Agricultural Safety and Health Network (ASH-NET)** to disseminate the lessons learned (table 2). ASH-NET's mission is "to catalyze the development, implementation, and evaluation of grassroots community programs for agricultural health and safety" (ASH-NET, 2001).

Occupational Health Nurses in Agricultural Communities (OHNAC) is an example of state and local efforts initiated, funded, and coordinated at the national level. As one component of NIOSH's Agricultural Initiative, from 1990-1996, OHNAC funded 31 public health nurses in ten states (California, Georgia, Iowa,

Kentucky, Maine, Minnesota, New York, North Carolina, North Dakota, and Ohio). Through active case-based surveillance, OHNAC identified new or under-recognized conditions and hazards and reported their findings through professional, NIOSH, and trade publications (Connon et al., 1993). The nurses had high credibility because most of them currently or formerly farmed, and as nurses, they were trusted professionals (Gallup, 2001). These nurses formed coalitions (often multiple) to enhance data collection and their effectiveness as community change agents. For example, one Ohio nurse initiated one coalition and then four more as outgrowths of the original coalition to serve other regions. Examples and outcomes of the varied activities conducted by the nurses and the coalitions include: increased tetanus inoculations among adults, first-aid kits sold to those who had never had them on the farm, farm safety day camps for over 2000 children, CPR classes, a barn tour for 600 youth focusing on animal safety, back safety training, and a farm safety school curriculum for all fifth graders in one county (M. Fleming, personal communication

Table 1. Kellogg-funded projects (Schuman, 1998).

Project and Agency	Summary of Project
Farm Worker Health and Safety Institute, The Farmworker Association of Florida.	Developed and implemented train-the-trainer program including leadership modules for migrant, seasonal workers; created links between communities and local healthcare providers.
Farm Partners Project, New York Center for Agricultural Medicine and Health.	Recruited and trained routine farm visitors to identify stress-induced problems among farmers and link them to appropriate agencies.
Rollins School of Public Health, Emory University.	Partnered with various organizations to conduct agromedicine training for family-practice residents and build networking throughout the state.
United Health Centers of the San Joaquin Valley, Inc.	Formed coalitions to implement California agricultural safety and health education/training, creating accessible culturally appropriate training programs.
University of Illinois Cooperative Extension Service.	Established leadership groups in communities to address local agricultural safety and health issues; local groups linked to coalition of state groups.
Kentucky Partnership for Farm Family Health and Safety.	Used the strong social network of women to empower them to reduce risks to their families on their own farms and in their communities.
Nebraska Rural Health and Safety Coalitions.	Developed education programs for farm youth, older farmers, health science students, rural practitioners, and emergency-response personnel.
South Carolina Farm Leaders for Agricultural Safety and Health Education (FLASH), Clemson University.	Initiated the FLASH program to provide safety and health information, leadership, and community development training to create local change.
University of North Carolina School of Public Health.	Developed a consortium of health professionals, farmworkers, environmental educators, researchers, and advocates to develop educational strategies.
Agricultural Hazards Reduction Through Stress Management Project, Eastern Washington University.	Implemented stress assessment and management education for farmers and their families, trained community members, fostered networking and coalition development to reduce stress among farmers.
Partners for a Safer Community, local chapters of National FFA Foundation.	Developed program to increase knowledge, promote changes in attitude and beliefs, and facilitate leadership development opportunities in communities.

November 29, 2000). OHNAC data are still used to target interventions, and coalitions are still active in many of the communities.

In 1996, in response to an external evaluation of the NIOSH agricultural activities, NIOSH began funding **Community Partners for Healthy Farming** for surveillance and intervention research (Kennedy, 1995). The surveillance component funded projects in nine states (California, Kentucky, Maine, Minnesota, New York, North Dakota, Ohio, Oregon, and Wisconsin) through the year 2000. Illnesses, injuries, and hazards to agricultural workers and their families were identified through review of hospital emergency logs, migrant clinics records, Department of Transportation records, existing registries, and data from volunteer agricultural organizations. As in OHNAC, nurses and others conducted follow-up investigations on selected cases and participated in coalitions. From 1996 through 2000, Community Partners funded intervention research projects in six states (California, Kentucky, Iowa, North

Table 2. Generalized lessons learned and barriers to success from external evaluation of Kellogg projects (Schuman, 1998). These lessons could be applicable for many coalitions.

Lessons Learned	Barriers to Success
Shared vision, power, responsibility, and accountability are necessary.	Inadequate funds to provide basic services.
Funding alone is insufficient to build and sustain coalitions; locally identified need is essential.	Ability to expand and respond to new opportunities limited by funds.
Maximum participation and a voice in decisions by all members, making them part of the solution, are important.	Fragmented efforts.
Time required to build effective coalitions is underestimated.	Training needs of staff and volunteers.
Innovation is in the eye of the implementer.	Keeping beneficiaries engaged in project.
Effective learning is occurring in unanticipated roles of teacher and learner.	Self-evaluation issues (appropriate data collection, determining priorities, time and funds).
Women had major roles in shaping and improving farm safety and health.	Suspicion of motives.
Programs need to be tailored to audience.	Lack of time to participate by target audience.
Long-term community commitment requires target audience partnership in the design of processes and programs.	Leadership styles can inhibit activities, trust, and collaboration among partners.
African-American, limited resource, and younger farmers under represented.	
Minorities need to be represented at all levels in minority-focused coalitions.	
Exclusionary practices lead to distrust and affect successes and sustainability.	
Return on investment on some projects exceeded expectations.	
Key project leaders could benefit from leadership and management training.	
Needs of projects vary over time.	
Projects need to be realistic as to expectations and effort required.	

Dakota, Washington, and Wisconsin) (Ehlers and Palermo, 1999). Active coalitions use the special resources of experienced researchers and local stakeholders to assess needs, plan, implement, disseminate, and evaluate the interventions. Community Partners produced useful engineering control, educational, and motivational tools and helped build the infrastructure for promoting agricultural health as essential to the sustainability of agriculture. Four of these projects were awarded competitive funding for second-generation projects (1999–2002) to expand their efforts (table 3).

The **North American Agromedicine Consortium (NAAC)** was founded in 1988, and in 2001 there were eleven states with programs (S. Ford, personal communication January 16, 2001). NAAC is an affiliation of faculty representing schools of agriculture, life sciences, family and consumer sciences, medicine, nursing, allied health, public health, pharmacy, and veterinary medicine, and representatives of government, agribusiness, and voluntary agencies. These faculty members and other interested parties have organized to share, through a multi-disciplinary approach, their expertise and resources in public service, education, and research to promote health and prevent disease and injury for rural residents involved in agriculture, forestry, or fishing industries and for consumers of the products of these industries.

The NIOSH-funded Centers for Agricultural Disease and Injury Research, Education, and Prevention have created advisory boards that often serve as coalitions for the regions served by the Center. Membership includes the broad expertise of multi-disciplinary researchers, community representatives, and other stakeholders. Center leadership depends on these advisory boards to provide information on regional priorities, perspectives, and concerns. The board members play multiple important roles: sharing expertise; participating in strategic and shorter term planning; increasing access to the region; dissemination of center information to their constituencies; and fostering participation in center activities (Mulloy et al., 1997). Examples of coalitions at the Centers include the following:

The Northeast Center is networked with ten federally funded migrant health programs in the Northeast to establish a primary care and emergency room surveillance system throughout seven states in their region. The data derived from these surveillance activities will increase the understanding of farmworker occupational injury and illness in the Northeast and will serve as a model to improve our ability to collect migrant and seasonal farmworker injury and illness data throughout the country (G. Earle-Richardson, personal communication November 22, 2000).

The Southeast Center initiated the development of the **Migrant Network Coalition** in 1994. This coalition is a not-for-profit entity composed of individuals from central Kentucky, representing over 45 public and private agencies. The group meets monthly, sponsors an annual migrant health fair and a statewide conference on migrant issues, and maintains and distributes a bilingual resource directory of services available to migrant farmworkers (Luchok and Rosenberg, 1997).

The Southwest Center, working with the cooperative extension agent for the Navajo Nation, community leaders, representatives from the Navajo grazing committees, and local experts, collaborated in designing and implementing an intervention for the Navajo farmers, perceived as needed, inclusive of all community members, enforced by recognized leaders, and feasible.

Table 3. Community Partners for Healthy Farming Intervention Research Projects (1996–2003). In all projects, researchers, workers, management, and others collaborated to select and implement interventions.

Project and Lead Agency	Accomplishments
Ergonomic interventions in wine grape production, University of California, Davis. ^[a]	Reduced size of picking containers (filled weight reduced from 57 to 46 lbs.), significantly reduced musculoskeletal symptoms among workers without significantly changing productivity (Miles et al., 2000).
Promotion of roll-over protective structures (ROPS), Southeast Center for Agricultural Health and Injury Prevention. ^[a]	In the two treatment counties, 71 ROPS retrofits were sold for tractors (as compared to 4 in the year prior to the intervention); ROPS project materials and activities are being revised to be disseminated in paper and electronic form; those who purchased did so to protect their families (Cole, 2000).
Ergonomic interventions for small-scale growers, University of Wisconsin Biological Systems Engineering Department. ^[a]	Identified simple, cost-effective interventions for growers of labor-intensive specialty crops. Developed tip sheets available via internet. Significant increases in self-reported adoption (Chapman et al., 2000).
Certified Safe Farms, University of Iowa. ^[a]	Enrolled 300 farmers; secured additional funding from non-federal sources to expand original project; increased use of respiratory protection and decreased respiratory symptoms among intervention group (Donham, 2000b).
Model health and safety information clearinghouse, University of Iowa. ^[b]	Produced and distributed catalog of agriculture-related materials with procurement information (Rautiainen et al., 2000).
Engineering control for dust in swine housing, University of Iowa. ^[b]	The oil mist system reduced total dust concentration up to 54% in treatment rooms, compared to control rooms (Nannenmann et al., 2000).
Evaluation of two established educational programs for children and youth, North Dakota State Department of Health and Consolidated Laboratories. ^[b]	Revised and evaluated “Always Be Careful,” a school-based safety program developed for fifth and sixth grade children by Farm Bureau, and tractor safety certification courses targeting youth ages 14 to 15 (Gilmore, 1999).
Ergonomics intervention in bareroot tree nurseries, Washington State Department of Labor and Industries. ^[b]	Established a labor/management ergonomics team; based on data collected, four economical and feasible ergonomic interventions were implemented at the experimental nursery (Howard and Spielholz, 2000).
Community-based agricultural safety and health intervention for adolescents, National Farm Medicine Center, Marshfield, Wisconsin. ^[b]	Evaluated activities conducted by local chapters of the national FFA organization utilizing the Safe Communities model; minimal differences in knowledge, attitude, and practices between the pre- and post-intervention phase were noted (Lee et al., 2000).
Effectiveness of electronic-based educational strategies for teaching community-based agricultural safety programs to youth, Purdue University. ^[c]	Conducting an evaluation of the effectiveness of curricula teaching (CD-ROM, multimedia, text) strategies in improving youth attitudes, behaviors, and knowledge related to tractor and machinery operation.
Reducing eye injuries and illnesses in Latino farmworkers, University of Illinois at Chicago. ^[c]	Conducting study to develop and assess the effectiveness of intervention strategies designed to reduce the incidence and severity of work-related eye injuries and illnesses in Latino farmworkers in Illinois and Michigan.

^[a] Agency was re-awarded funding for 1999–2003 to expand model geographically, to other sectors, or otherwise.

^[b] Funded 1996–1999.

^[c] Funded 1999–2003.

Discussion

According to Rowley (1990), “Individuals change behaviors in response to some event or reinforced message that has particular meaning to them” (p. 446). Peer and family pressure can create personal messages, and awareness and involvement of the community can provide the motivation to change health and safety behaviors as well as provide reinforcement (Rowley, 1990). Coalitions have successfully used this principle to move individuals, communities, and organizations to action to reduce or prevent agriculture-related disease and injury. Tables 1, 3, and 4 give examples. During the past 10 years, agriculture-related coalitions have been developed in all regions of the country, have involved stakeholders, and have been a significant force in disseminating agricultural safety and health messages to a diverse and unique population (table 4). Coalitions have increased the “buy in,” legitimacy, and acceptability of messages, increased community ownership of the problem, and empowered both communities and individuals to solve their own problems and change long held beliefs and norms (Lexau et al., 1993).

This outcome is most evident in the area of childhood agricultural safety and health. Coalition members (table 4), who represent diverse perspectives and disciplines, are energetic, creative, and enthusiastic about addressing difficult issues, developing consensus recommendations, and developing interventions (e.g., media messages and educational materials). By involving stakeholders in the planning, implementation, and evaluation, researchers have increased their credibility among target groups, developed a better understanding of the issues, explored new and

Table 4. Partners in coalitions for agricultural safety and health members contribute a variety of resources, including expertise, access to the population, dissemination, funding, and in-kind services. Some could be listed in several cells, but for simplicity they are only listed once.

Scale	Private Sector	Not-for-Profit Sector	Public Sector
Local	Family farm operators, farm-workers, and their families	Agricultural organizations (Farm Bureau, 4-H, FFA)	Cooperative extension service
	Corporate farm management	Hospitals and clinics	Schools/teachers
	Agribusinesses (e.g., implement dealers and suppliers)	Labor unions	Migrant clinics
	Media (television, radio, print)	Legal advocacy groups	Fire departments
	Health professionals (veterinarians, nurses, physicians)	Mental health agencies	Area Health Education Centers (AHEC).
	Non-agricultural employers, banks, and credit unions	Faith-based groups.	
	Other local businesses (e.g., restaurants, groceries)		
	Farm producer groups and organizations.		
State, regional, and national	Insurance companies	Rural electric coops	State boards of education
	Trade publications	Commodity organizations.	Departments of agriculture, health, and transportation
	Tool manufacturers		Colleges of nursing, medicine, public and environmental health, agriculture, engineering, education, communication
	Equipment manufacturers		NIOSH Agricultural Centers.
	Seed salespeople		
	Farming magazines and newsletters.		

innovative approaches, and gained access to study populations. This has been particularly valuable in assessing the unique needs of migrant and minority populations.

Research capacity has been increased among institutions that have not traditionally conducted research. The model of the **Kentucky Partnership for Farm Family Health and Safety, Inc.**, originally funded with W. K. Kellogg funds, is currently being replicated in three states (Texas, Louisiana, and Florida) involving such institutions as historically black colleges and universities. The original project leaders and three NIOSH Agricultural Centers are mentoring and providing funding to these new researchers. These projects conduct needs assessments and create non-profit, self-sustaining groups that address local issues.

Individual members of coalitions derive benefit from their participation by developing leadership, conflict resolution, and team building skills. Local community members have reported an increase in personal knowledge, an increase in self-esteem, and personal satisfaction from having a positive effect on the safety and health of their families and their communities (Kentucky Partnership, 1999). Most are involved because of their love for the agricultural lifestyle and their concerns about the future of agriculture and rural communities, as well as future generations of agricultural workers (Cole, 2000).

These coalitions are filling a critical need to educate rural healthcare providers on the various hazards and exposures that affect the health of their rural clients. This is becoming increasingly important as many healthcare providers no longer have the experience of growing up on farms and are not familiar with agriculture production. Most curricula for educating health professionals do not include an agricultural perspective.

Recommendations and Challenges

One of the major challenges facing coalitions is conducting a more rigorous evaluation of their programs and activities (Francisco et al., 1993). Although some have undergone a formal evaluation process (see tables 1 and 4 for examples), many are currently conducting little or no evaluation of their efforts (DeRoo and Rautiainen, 2000). A number of coalitions are gathering process and short-term impact information. Coalitions that receive funds to include evaluations use more rigorous models for evaluating their effectiveness (Ehlers and Palermo, 1999).

Coalition members need to recognize evaluation as a positive and necessary component to the success of their programs (Kentucky Partnership, 1999). They need to recognize that programs whose value has been demonstrated by evaluation are generally easier to maintain or expand. Evaluation makes it easier to revise and/or terminate projects at an earlier phase, before communities and individuals have a strong vested interest in continuing an activity. Money and energy spent on evaluating a project that is not achieving its goals is money well spent; it encourages redirection of resources to potentially more useful projects. Evaluation should be built in at the earliest stages of planning. A multi-disciplinary approach is essential to address the complex issues in agriculture.

Researchers should seek partnership with existing coalitions. These partnerships could allow researchers to use the strengths of the coalitions in university research, encourage existing coalitions to conduct impact and outcome evaluations of their activities, and contribute to the sustainability of the coalitions. The resources needed for evaluation need to be stratified apart from an activity's actual cost in order to

assess the cost of replicating the activity or its cost-effectiveness. Data are needed to determine the extent to which coalitions are effective in addressing agricultural safety and health issues, a question common to the use of coalitions in other areas of health promotion (McLeroy et al., 1994).

In addition to the need for rigorous evaluation, the second major challenge facing coalitions is sustaining their intervention over time, and transferring and maintaining interventions within the community after the formal research phase has ended. Plans for sustaining interventions should be an integral part of all phases of a research project and one of the criteria for funding. Support and active participation of all the stakeholders is essential for the success and sustainability of any coalition (Altman, 1995; Scharf et al., 1998). A clearly articulated mission, effective leadership, and adequate resources are important components of sustainability.

The third challenge is to increase the number of community-based coalitions in minority and migrant communities (Schuman, 1998). In recent years, advances have been made in gathering surveillance data, enhancing the recognition of cultural issues, and developing culturally appropriate materials related to these populations. Development of ways to include them as active participants in leadership roles, and in intervention implementation and evaluation, is needed. Literacy issues and ways to measure intervention effectiveness within these groups will require special attention.

Summary

Coalitions have been successful in reaching large numbers of agricultural workers and those who interact with agricultural workers and their families. Coalitions have played a significant role in policy development and legislative arenas. Open and honest dialogue has promoted increased understanding of the critical issues and the differences in priorities between stakeholders. These interactions have increased the credibility of research in the non-research community, increased the development of innovative approaches, increased the effectiveness of surveillance systems, and increased the number of effective and acceptable interventions. Many programs have been replicated with modifications to reflect the uniqueness of agriculture in different regions. Coalitions should continue to play an important role in promoting agricultural safety and health well into the 21st century.

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References

- ASH-NET. 2001. Available at: <http://www.age.uiuc.edu/ash-net/index.htm>. Accessed 11 January 2001.
- Altman, D. 1995. Sustaining interventions in community systems: On the relationship between researchers and communities. *Health Psychology* 14(6): 526-536.
- Butterfoss, F., R. Goodman, and A. Wandersman. 1993. Community coalitions for prevention and health promotion. *Health Education Research* 8(3): 315-330.

- Chapman, L., K. G. Josefsson, R. Myer, A. Newenhouse, and M. Miquelon. 2000. Intervention research to reduce injuries on dairy, berry, and fresh market vegetable farms. Paper presented at the *Agricultural Safety and Health in a New Century* conference. April. Cooperstown, N.Y.
- Cole, H. 2000. Promoting ROPS and seat belts on family farm tractors. Unpublished data. Lexington, Ky.: University of Kentucky.
- Connon, C., E. Freund, and J. Ehlers, J. 1993. Occupational health nurses in agricultural communities. *J. American Assoc. Occupational Health Nurses* 41(9): 422–433.
- Dean, T. 1992. Building coalitions for preventing injury and disease in agriculture. In *Papers and Proc. Surgeon General's Conference on Agricultural Safety and Health*, 19–21. DHHS (NIOSH) Publication No. 92–105.
- DeRoo, L., and R. Rautiainen. 2000. A systematic review of farm safety interventions. *American J. Preventive Medicine* 18(4s): 51–62.
- Donham, K. 1989. Agricultural, occupational, and environmental health: Policy strategies for the future. *Applied Industrial Hygiene* 4(10): F–12–F–22.
- _____. 2000a. A history of Iowa's Center for Agricultural Safety and Health: The first decade. *I-CASH Newsletter* 7(fall): 1.
- _____. 2000b. Certified safe farms. Presented at the 10th anniversary I-CASH fall meeting. November. Iowa City, Iowa.
- Donham, K., D. Osterberg, M. Myers, and C. Lehtola. 1997. Tractor risk abatement and control: The policy conference final report. Iowa City, Iowa: University of Iowa.
- Ehlers, J., and T. Palermo. 1999. Community partners for healthy farming: Involving communities in intervention planning, implementation, and evaluation. *American J. Industrial Medicine* (Suppl. 1): 107–109.
- Francisco, V., A. Paine, and S. Fawcett. 1993. A methodology for monitoring and evaluating community health coalitions. *Health Education Research* 8(3): 403–416.
- FS4JK. 1999. Children and the Future of Farming. In *Farm Safety 4 Just Kids 1999 Annual Report*, 5. Earlham, Iowa: Farm Safety 4 Just Kids.
- Gallup. 2001. Available at: http://www.gallup.com/poll/indicators/indhnsty_etcs.asp. Accessed on 25 October 2001.
- Gilmore, R. 1999. Evaluation of school-based farm safety program in North Dakota. Unpublished data.
- Howard, N., and P. Spielholz. 2000. Ergonomic interventions in a Washington State bareroot tree nursery. Paper presented at the *Agricultural Safety and Health in a New Century* conference. April. Cooperstown, N.Y.
- Kentucky Partnership. 1999. Evaluating the program of a community grassroots organization. Kentucky Partnership for Farm Family Health and Safety, Inc. Lexington, Ky.: University of Kentucky Publishing Services.
- Kennedy, S. 1995. National Occupational Safety and Health Program in Agriculture: Report to the National Institute of Occupational Safety and Health of an external committee to review the extramural cooperative agreement programs. Internal report.
- Lee, B., J. Westaby, and R. Berg. 2000. Evaluation of a national FFA educational initiative: Partners for a safer community. Paper presented at the *Agricultural Safety and Health in a New Century* conference. April. Cooperstown, N.Y.
- Lexau, C., L. Kingsbury, B. Lenz, C. Nelson, and S. Voehl. 1993. Building coalitions: Community-wide approach for promoting farming health and safety. *J. American Assoc. Occupational Health Nursing* 41(9): 440–449.
- Luchok, K., and G. Rosenberg. 1997. Steps in meeting the needs of Kentucky's migrant farmworkers. Simultaneously published in *J. Agromedicine* 4: 381–386 and in *Agricultural Health and Safety: Recent Advances*, 381–386. K. J. Donham, R. Rautiainen, S. H. Schuman, and J. A. Lay, eds. Binghamton, N.Y.: Haworth Press.
- McLeroy, K., A. Steckler, B. Simons-Morton, and R. Goodman. 1993. Social science theory in health education: Time for a new model? Editorial. *Health Education Research* 8(3): 305–312.
- McLeroy, K., A. Steckler, R. Goodman, and J. Burdine. 1994. Community coalitions for health promotion: Summary and further reflections. *Health Education Research* 9(1): 1–11.

- Merchant, J., B. Kross, K. Donham, and D. Pratt, eds. 1989. National Coalition for Agricultural Safety and Health. Iowa City, Iowa: University of Iowa.
- Miles, J., J. Meyers, J. Faucett, and I. Janowitz. 2000. Ergonomic interventions in agricultural operations. Paper presented at the *Agricultural Safety and Health in a New Century* conference. April. Cooperstown, N.Y.
- Mulloy, K., M. McDonald, and K. Gilmore. 1997. Cultivating an effective agricultural center advisory board. *J. Agric. Safety and Health* special issue(1): 121–127.
- Myers, M., R. Herrick, S. Olenchock, J. Myers, J. Parker, D. Hard, and K. Wilson, eds. 1992. In *Papers and Proc. Surgeon General's Conference on Agricultural Safety and Health*, 1. DHHS (NIOSH) Publication No. 92–105.
- Nannenmann, M., K. Donham, R. Rautiainen, P. O'Shaugnessy, S. Reynolds, and L. Burmeister. 2000. Evaluation of an automated low–pressure vegetable oil sprinkling system to control aerosolized dust in swine confinement buildings. Paper presented at the *Agricultural Safety and Health in a New Century* conference. April. Cooperstown, N.Y.
- NCCAIP. 1996. Children and agriculture: Opportunities for safety and health. A national action plan. Marshfield, Wisc.: Marshfield Clinic, National Committee for Childhood Agricultural Injury Prevention.
- Rautiainen, R., J. Tisch, and K. Donham. 2000. Quantitative evaluation of educational resources in agricultural health and safety. Paper presented at the *Agricultural Safety and Health in a New Century* conference. April. Cooperstown, N.Y.
- Reed, D. B. 1994. Notes from the field: Agricultural injury prevention: A farm–church partnership. *Applied Occupational Environmental Hygiene* 9(2): 93–7.
- Roseman, M. 1999. Sharing Help Awareness United Network. *Rural Mental Health* 25(3): 32–35.
- Rowley, B. 1990. A case for social marketing and education for acceptance and implementation of preventive health and occupational safety measures for rural communities. *American J. Industrial Medicine* 18(3): 443–447.
- Scharf, T., P. Kidd, H. Cole, T. Bean, L. Chapman, K. Donham, and D. Baker. 1998. Intervention tools for farmers: Safe and productive work practices in a safer work environment. *J. Agric. Safety and Health* special issue(1): 193–203.
- Schuman, S., ed. 1998. The W. K. Kellogg Foundation community–based agricultural safety and health projects. *J. Agromedicine* 5(2).