Final Closeout Report

COOPERATIVE AGREEMENT

U54 OH009568

9/30-2008 – 1/29/2015

National Children's Center for Rural and Agricultural Health and Safety

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LIST OF TERMS AND ABBREVIATIONS IN THIS REPORT

ASHCA	Agricultural Safety and Health Council of America
CASN	Childhood Agricultural Safety Network
FFA	Future Farmers of America
ISASH	International Society for Agricultural Safety and Health
JAM	Journal of Agromedicine
JASH	Journal of Agricultural Safety and Health
NAGCAT	North American Guidelines for Children's Agricultural Tasks
NCAE	National Council of Agricultural Employers
NCCRAHS	National Children's Center for Rural and Agricultural Health and Safety
NFMC	National Farm Medicine Center
NIOSH	National Institute for Occupational Safety and Health
SaGHAF	Safety Guidelines for Hired Adolescent Farmworkers
STESAF	Safety Training for Employers and Supervisors of Adolescent Farmworkers
USDA	United States Department of Agriculture
WGL	Washington Growers League

Note: The National Children's Center has an extensive dictionary of terms to ensure staff uses consistent language across all projects. For a copy of this dictionary, contact us at 1.800.662.6900 or email nccrahs@mcrf.mfldclin.edu .

National Children's Center for Rural and Agricultural Health and Safety

Closeout Report of 2008 – 2014 Award
CDC-NIOSH U54 OH009568

Abstract

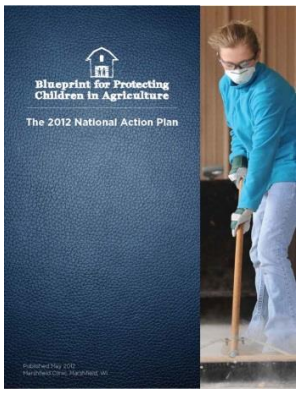
The National Children's Center for Rural and Agricultural Health and Safety (NCCRAHS) serves as the only NIOSH funded agricultural center designated to focus on children (0 to 18 years). Formally established in 1997, the theme for this cycle was "moving childhood agricultural safety knowledge into practice through sustained partnerships." From 2008 to 2014 NCCRAHS staff members planned, implemented and evaluated nearly all project activities as proposed in the Center application submitted April 2008. The Administrative Core provided a framework to support, guide and monitor the progress of the overall center and the specific components of each core. Scientific advisors provided periodic input and review of activities. The mini-grant program funded up to $80,000 annually with the majority of funded projects addressing vulnerable populations. The Childhood Agricultural Safety Network (CASN) grew in membership and an external evaluation revealed that participants are committed to further disseminating public awareness campaigns addressing tractors and parental accountability. The Blueprint for Knowledge Translation successfully developed and disseminated an updated national action plan. The Stakeholder Communications team published quarterly *Nurture* newsletters, launched social media sites, and provided frequent, high quality technical assistance to professional and lay audiences. The randomized controlled trial that tested methods to motivate farm parents to create safe play areas yielded important findings; while the study of economics of youth farm labor and injuries provided clear and compelling data on costs of childhood agricultural injuries and deaths. The project to test and disseminate work safety guidelines for hired youth was redirected when the federal government stopped the process of updating child labor in agriculture regulations. In its place, a model voluntary policy for hiring young workers was developed with support from the National Council of Agricultural Employers, a new website (www.cultivatesafety.org) was created as a reference point for parents and front-line supervisors. Additional funding was secured to conduct work beyond the Center's core budget from NIOSH, including a contract to operationalize the 2012 Blueprint for Protecting Children in Agriculture via a national Summit organized with the Agricultural Safety and Health Council of America.

Highlights of Overall Center

Significant Findings, Outcomes and Impacts

The National Children's Center for Rural and Agricultural Safety and Health (NCCRAHS) has been involved in the NIOSH-led National Initiative to Prevent Childhood Agricultural Injuries since its 1996 inception. Significant progress has been achieved. NIOSH released its sixth round of injury data (1998 – 2012) revealing the rate of childhood agricultural injuries per 1,000 farms (all youth) declined by 61% while the rate for youth living on farms declined by 57%. Although NCCRAHS cannot take direct credit for this progress, over the years we have become a national point of contact on this topic. NCCRAHS issued a press release with the new data and the media responded with many stories, highlighting successes to date and areas of concern, e.g., children younger than 10 years where rates increased. Our annually updated Child Ag Injury Fact Sheet is readily available online and frequently referenced (Appendix A).

During this period (2008 to 2014), NCCRAHS achieved the majority of objectives proposed in the 2008 application. Accomplishments are described in annual reports to NIOSH and visually depicted in the National Farm Medicine Center's Year in Review which is disseminated to the public. Some of our Center's most notable accomplishments were launched prior to this project period but continue to have impacts as detailed in 11 Impact Sheets (Appendices B 1 -11)



The "Blueprint for Knowledge Translation" project was a centerpiece because it updated the nation's action plan upon which NIOSH and others set their strategies. A six-member team assessed progress to date, reconfigured the approach for documenting goals and strategies, drafted a plan, solicited feedback via many mechanisms and continually refined the action plan, resulting in a 36 page fully illustrated and cited publication, *Blueprint for Protecting Children in Agriculture: The 2012 National Action Plan*. Timing for the release of the plan was compromised because of national attention directed at the withdrawal of proposed updates to the federal Child Labor in Agriculture rules; therefore, an alternate strategy was employed. Highlighted recommendations of the action plan were released at the 2013 North American Agricultural Safety Summit, hosted by an agribusiness-led entity, the Agricultural Safety and Health Council of America (ASHCA). Summit presentations, learning stations, genius bar sessions, posters and a plenary session all featured "research to practice" regarding children's work, play, and off-farm childcare, as recommended in the Blueprint action plan.

An in-depth analysis of the economics of childhood agricultural injuries was conducted, with three manuscripts published. We learned that youth agricultural injuries cost society an estimated $1 billion per year and deaths cost an estimated $420 million per year. The economic facts are referenced in Fact Sheets of NCCRAHS and ASHCA, and reported in the ag media.

An intervention evaluation project used a randomized controlled trial to test the efficacy of financial incentives and information for motivating farm parents to build safe play areas on farms. The study revealed barriers of farm parents to adopting recommended safety strategies. Results suggested ways in which organizations and businesses, e.g., insurers, bankers, might influence farm parents' safety practices via financial incentives.

The Childhood Agricultural Safety Network (CASN) continued to gain new participants and began more routinely sharing news clippings of childhood agricultural fatalities – keeping the importance of our collective attention alive. This loose-knit group worked together to develop and distribute calendars featuring safety messages that were subsequently reframed for

posters, newsletter items and resources to respective constituents. In the past six years nearly 50,000 calendars have been distributed. Evaluation feedback revealed that participating in the calendar production impacted personal and organizational knowledge and commitment. The CASN group also galvanized their commitment to “Keep Kids Away from Tractors” and re-launched a national campaign with “It is Easier to Bury a Tradition than a Child” message across the U.S.

Capitalizing on the ever growing electronic medium for public education, we contracted with an agricultural marketing firm to design a website geared specifically toward farm parents that features our resources (guidelines, model policies, safety campaign posters). The marketing firm created a “Parent First. Farmer Second.” message to motivate farm parents to visit the www.cultivatesafety.org site that was launched in spring of 2013. The marketing firm won several regional and national awards for the print ads, radio messages and website and website traffic continues to increase.

When our National Children’s Center first released Agritourism Health and Safety Guidelines for Children in 2007, we knew it was filling an important gap, however, little did we know that these guidelines would become highly referenced, requiring updates and augmentation with an interactive website. The Agritourism project engages staff in many national and regional events with hands-on training to owners as well as consultation with insurance companies. As an outcome, the insurance industry is becoming a disseminator of our farm safety resources.

The North American Guidelines for Children’s Agricultural Tasks (NAGCAT) were released in 1999. Research revealed that the tractor-related guidelines were inconsistent with child development factors. A team involving NIOSH and original NAGCAT developers systematically updated the core content and visual posters for 22 tractor-related guidelines. They increased the youngest age group from its original 12-13 years to 14-15 years old and developed a companion video/print resource for parents outlining five child development domains and their relationship to safe tractor operations.

The Center’s mini-grants program has been a successful endeavor as confirmed by feedback from 13 mini-grant recipients this cycle. Most projects addressed vulnerable populations and several led to sustainable initiatives with new champions for childhood agricultural safety.

NCCRAHS continues to be a communication and referral hub via technical assistance, participation in professional organizations, e-communication strategies, social media, resources and publications. In addition to an array of peer-reviewed journal publications, our accomplishments included guest editing a dedicated issue of *Journal of Agromedicine: Practice, Policy & Research* in April- 2012, Vol 17 (2) with 17 manuscripts focused on the health and safety of children exposed to agricultural worksites. Another primary resource is a dedicated issue of *Current Problems in Pediatric and Adolescent Health Care. Childhood Agricultural Injuries: An Update for Clinicians* in 2013, Vol 43 (2).

Administration

Principal Investigator: Barbara C. Lee, PhD
Deputy Director: Barbara Marlenga, PhD
Center Coordinator: Marsha Salzwedel, MS

Background
The Administration and Planning Core of the National Children's Center for Rural and Agricultural Health and Safety (NCCRAHS) strived to set strategic directions and provide a framework to support, guide and monitor the progress of core program areas: Outreach, Education and Translation; Prevention, Intervention and Translation; and Research.

Specific Aims for the Administration and Planning Core were:

1. Foster growth and success of the Center through strong leadership, informed guidance, and sustained partnerships.
2. Oversee the infrastructure, communication systems, and budgets to meet the needs of project leaders.
3. Promote innovative interventions and new partnerships, with an emphasis on underserved populations, via the mini-grant program.
4. Continually improve the quality of all Center initiatives per feedback from internal reviews and external assessments.

The structure of the overall center and its six distinct projects is depicted in Figure 1.

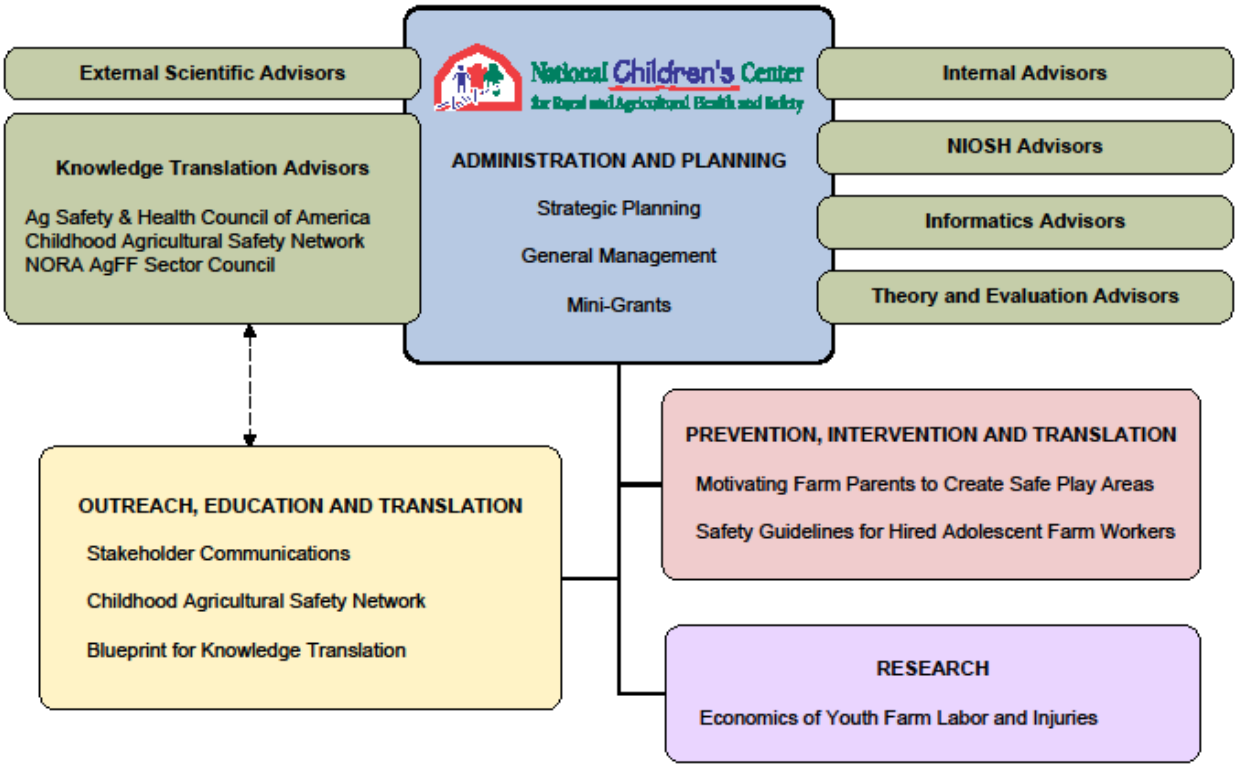


Figure 1. Organization of projects

Methods

In order for a National Center of Excellence to conduct meaningful research, education, and outreach activities, it required a team of committed and knowledgeable staff, informed guidance from external sources, and a network of colleagues and partners. We were fortunate to retain most of the staff involved in the Center throughout the cycle, and added several new scientists and project managers. By the end of the cycle, the following individuals held key roles contributing to the successful achievement of project-specific and center-wide objectives.

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Nine individuals served on our External Scientific Advisory Board, which met in-person and via electronic communications. These individuals included: Susan Gerberich, PhD, University of Minnesota and Director of the Midwest NIOSH-ERC; Paul Gunderson, PhD, of the Dakota Center for Precision Agriculture; John May, MD, Director of the Northeast NIOSH Agricultural Research Center (NYCAMH); Karen Mountain, MBA, Director of Migrant Clinicians Network; Dennis Murphy, PhD, of Penn State University; David Parker, MD, of Park-Nicollet Clinic in Minneapolis; Deborah Reed, PhD, Deputy Director of the Southeast NIOSH Agricultural Research Center; Lorann Stallones, PhD, Director of the CDC-Injury Center at Colorado State University; and William Pickett, PhD, of Queens University, Ontario. In addition to overall guidance, these scientists provided input into the Blueprint for Knowledge Translation project and participated in the review of mini-grant applications. External advisors received periodic progress reports in addition to newsletters and annual reports. Advisors also had an opportunity to comment on projects throughout the year.

To reach a broader audience, NCCRAHS staff maintained close ties with individuals whose respective organizations work directly at the grass-roots level. Organizations included: a) Agricultural Safety and Health Council of America; b) Childhood Agricultural Safety Network – included 18 organizations; and c) the NORA Agriculture, Forestry and Fishing Sector Council, comprised of 31 members charged with implementing a national plan, including outreach to communities. Members of these organizations comprised part of the review team for the Blueprint for Knowledge Translation project as well as for overall Center assessments.

Our Center developed seamless operational systems over the years with expert management of budget processes, personnel, and office organization. An important factor contributing to our success has been our infrastructure which is co-located with the National Farm Medicine Center. Nearly all staff members had the majority of their time dedicated solely to Center activities. We are located in adjacent private offices, with access to meeting space, conference facilities, a medical library, graphic arts department, website designers, office supplies, and clerical assistance. Staff members are assured of state-of-the-art telecommunication, Internet, and informatics systems. To augment in-person meetings, several projects involving external collaborators depended heavily on teleconferencing. Our administrative personnel had

extensive experience in scheduling, facilitating, and documenting teleconference meetings. Interactive and dynamic web sites and telecommunication capabilities were used to maintain off-site connections for many aspects of our work.

Our Center benefited from an efficient system for handling an average of 50 requests for technical assistance each month. As inquiries came in via phone, email, Internet or personal contact, details were written onto a standard form or entered directly into a database. Reports of technical assistance activities were generated every three months. Staff reviewed these reports, looking for new topics, unusual requests, trends by topic, location and overall level of activity.

During this cycle the Children's Center mini-grant program remained very active while continuing to refine the process for solicitation, review and monitoring of grants. Because project outcomes and impact often occur months, even years, after the final report is submitted, an effort was made to gather more information through a survey of mini-grant recipients from 2009 through 2013.

For purposes of evaluation, an external consultant was engaged. Sharon Dorfman, of Spectra, Inc., was helpful in trying to put a framework around our evaluation processes and reports. This was also a major topic during in-person meetings with Scientific Advisors. Part-way through this cycle a group of evaluators across all NIOSH Ag Centers began to meet on a regular basis to pursue mutually beneficial evaluation approaches. The "ECO" meetings included a representative from NCCRAHS. These processes were helpful, yet, no clear directions or guidance was set for an evaluation methodology from either the consultant or the ECO group. The request from NIOSH to generate stories and describe the impact or our work became the basis for the "Impact Sheets" on various projects.

An efficient process evaluation technique was the use of a Benchmark Metrics chart which was updated prior to each Center team meeting. For each project and each major component within a project line, the chart listed out the metric (e.g. number of website hits, number or resources requested, publications), the aspect being evaluated (e.g. new partnerships developed, timeliness of submitting report), and a comments section. Each project leader gave an update on their budget status and activities and solicited input on future directions. Monthly meetings also included an off-site advisor via teleconference who provided input on vulnerable populations and specific issues pertaining to migrant children.

As a reflection of the Center's visibility as a national leader in childhood agricultural injury prevention, Center personnel were asked to serve on numerous advisory panels. Among these were the National Tractor Safety Partnership initiative, the Safety for Agriculture Youth (SAY) project, the NORA Agriculture, Forestry and Fishing sector council, and the National Agritourism Advisory Board. Additionally, staff maintained involvement in professional organizations and played a major role, collaborating with the Agricultural Safety and Health Council of America to convene a national summit in 2013.

The Center's Logic Model (**Figure 2**) depicted the major inputs, outputs, activities, and desired outcomes forming the basis for impact measures.

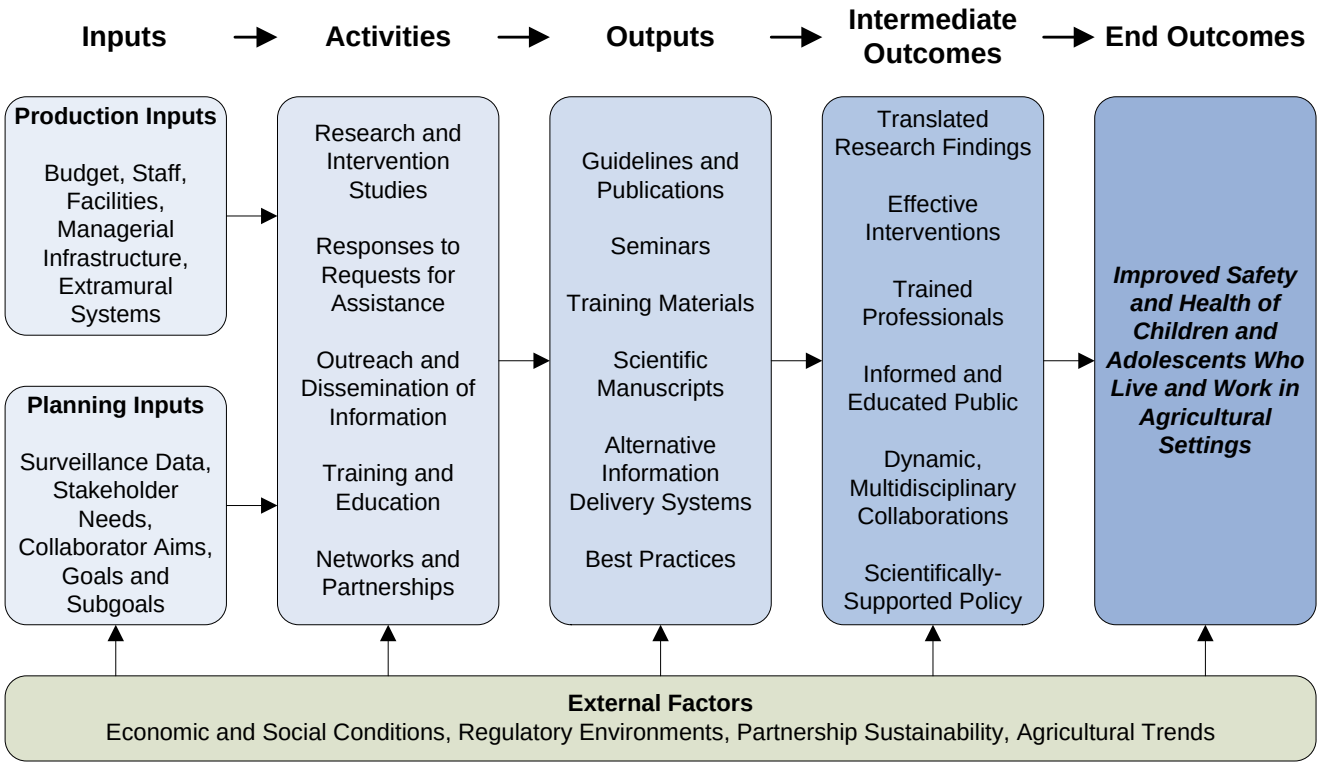


Figure 2: Logic Model of National Children's Center for Rural and Agricultural Health and Safety

Results

As a result of the administration oversight, the NCCRAHS was able to submit all required reports and secure annual budgets for subsequent years. A "with-cost" extension was granted for year six in order to complete important projects and to allow NIOSH greater time to update their plans for this initiative, including a new Program Announcement.

The results of the mini-grant program this cycle were gathered via survey and telephone follow-up, in addition to review of six-month and final reports. Nearly all mini-grants focused on vulnerable populations. Collectively, the 22 projects funded yielded: a) more than 140 professional presentations; b) seven peer-reviewed publications; c) 16 new resources that were distributed. Further, mini-grant project directors reported their funded projects increased the reach of their organization's activities; facilitated new partnership; increased their focus on youth; and increased their personal expertise. Many of the mini-grants became sustained programs and a few led to subsequent, larger grant applications.

The NCCRAHS center-wide results were published in an annual "Year in Review" in conjunction with the National Farm Medicine Center. It is printed and distributed to key collaborators and partner organizations as well as posted online for free downloading. Three *Nurture* newsletters were disseminated each year providing information on Center activities as well as efforts of other safety organizations and relevant research. The newsletter is described more fully in the Stakeholder Communications section of this report. Evaluation results are best explained in a series of "Impact Sheets" included in the Appendix. Each double-sided sheet addressed a project/topic such as Work Guidelines for Youth. There is a brief description of the relevance of the project, followed by key details and significant outcomes. These sheets continue to be used to depict the overall impact of the National Children's Center.

Economics of Youth Farm Labor and Farm Injuries

Principal Investigator: Ted Miller, PhD
Co-Investigator: Ed Zaloshnja, PhD

Background

The National Committee for Childhood Agricultural Injury Prevention's 1996 action plan identified social and economic consequences of childhood agricultural injury and the broader issue of child labor's effect on the economy of the family farm as research priorities, but minimal work was done in the area. Consequently, the economic impact of childhood agricultural injuries was among the much narrower set of five recommended research priorities that emerged from the 2001 Summit meeting that updated the National Action Plan. This project was the first major research effort addressing that long-standing and reaffirmed priority.

Specific Aims

1. To estimate the number and cost of injuries and deaths of youth while working or living on a farm, with breakdowns by type of farm, by region, and by major source/event (e.g., tractor injury).

2. To estimate the permanent disability and quality of life losses resulting from youth injury on farms.

3. To estimate the impacts of youth injury on farm profitability.

4. To compare injury rates and severities for hired youth, family youth, and adults doing farm work and analyze the cost-effectiveness of not letting children work on the farm from the perspective of a farm family.

5. To examine the practice and advocacy implications of the research findings and translate them into a form suitable for dissemination to the farm safety and family farming communities.

Methods

We used 2001-2006 Childhood Agricultural Injury Survey data to estimate the incidence of non-fatal injury and 2001-2006 Multiple Cause of Death data to estimate the incidence of fatal injury. To estimate the costs for injuries suffered by youth working/living in agricultural settings, we multiplied the number of injuries times published unit costs, disability probabilities, and quality of life losses per child injured by body part, nature of injury, and age group.
Using USDA data on farm prototypes, we built profit models for two types of farms, dairy and soybean farms. Then, we estimated the cost impact of farm youth injuries of different levels of severity on a farm family with no health insurance.

Results

This study provided a comprehensive analysis of the annual incidence and cost of agricultural youth injuries in the United States. It analyzed them from different perspectives: fatal versus nonfatal, at work versus not-at-work, and requiring hospitalization versus not requiring hospitalization. An average of 26 655 agricultural injury incidents occurred annually to youth (ages 0–19) in the United States during the period 2001–2006 (95% confidence interval: 24 263–29 046).

Nonfatal youth farm injuries are comparable to other occupational injuries, which makes them much more serious than the average youth injury. Their medical care costs average $3,500 which is quite close to the $3,641 average for all days-away-from-work (DAFW) agricultural injuries and the $3,696 average for all DAFW occupational injuries. That average is higher than the $2,728 average for occupational injuries of teenagers and much higher than the $1,388 average for all medically-attended nonfatal unintentional childhood injuries. Only 1.4% of injured youth in the United States were hospitalized in 2000, but 14% of youth injured in agriculture were hospitalized in 2001–2006.

Youth agricultural injuries cost society an estimated $1.423 billion per year in 2005 dollars. Fatalities alone cost an estimated $420 million per year. Most agricultural youth injuries were not work-related. Work-related injuries annually cost $347 million or 24.4% of the total cost. Farms that raise animals are especially dangerous for children. Beef cattle farms (31% of all U.S. farms) accounted for 48% of all child agricultural injury costs including 62% of work-related costs and 42% of non-work costs. Hog farms, however, had the highest rate of youth injuries at work (14.3 per thousand farms) and sheep, goat, wool and mohair farms had the highest rate of not-at-work injuries (45.4 per thousand farms). Dairy and poultry/egg farms also have high injury rates. Data on child injury by farm type only are available for nonfatal injury.

Falls were the most common injury event and structures and surfaces by far the most common source of injury to farm youth in the age groups 0-4, 5-9, and 10-14 year old. For the 15-19 age group, persons, plants, animals, and minerals were the main source of injury and contacts with objects or equipment were by far the most common injury event; but assault/violent acts had the highest share of the total cost. At all ages, the three largest injury cost drivers were falls, violence (assault and self-harm), and transportation.

Serious injury to a youth on the farm can potentially have a serious financial impact on a farm family that lacks health insurance. A severe injury that requires 10 or more days of hospitalization of a farm child with no health insurance would virtually eliminate a year of operating profit for the average dairy farm. It would saddle a soybean farm with a $100,000 loss for the year. The situation can be much more dramatic for smaller farms.

Conclusions

Similar to adult agricultural injuries, youth agricultural injuries tend to be more severe and more costly than nonagricultural injuries. To address this serious problem, prevention should focus on better controlling both child access to agricultural recreational activities and child assignment to agricultural work tasks that exceed developmental norms. Prevention of child agricultural injuries is also good business, in that it would significantly improve the financial situation for farm families that lack health insurance.

Inclusion Enrollment Table

Not applicable.

Publications

Two publications reported on the work on Aims 1 and 2:

E Zaloshnja, T Miller, B Lawrence, Incidence and Cost of Injury among Youth in Agricultural Settings in the United States, 2001-2006, *Pediatrics*, PMID: 22412022 , 129:4, 728-734, 2012.

E Zaloshnja, T Miller, B Lee, Incidence and Cost of Non-Fatal Farm Youth Injury, United States, 2001-2006, *Journal of Agromedicine*, PMID: 21213160, 16:1, 6-8, 2011.

A third publication reported on the work on Aims 3 and 4:

E Zaloshnja, T Miller, Impact of Youth Injuries on the Uninsured Farm Family's Economic Viability, *International Journal of Injury Control and Safety Promotion*, PMID: 21819178, 19:2, 109-113, 2012.

Two fact sheets incorporated results from these published studies to address Aim 5: Agricultural Safety and Health Council of America. Be Safe. Be Profitable. Facts 2015.

National Children's Center for Rural and Agricultural Health and Safety. 2014 Fact Sheet: Childhood Agricultural Injuries in the U.S.

Material Available for Other Investigators

All data used in this project were obtained from other sources. Contact Ted Miller at the Pacific Institute for Research and Evaluation, Beltsville, Maryland: miller@PIRE.org for further information.

Motivating Farm Parents to Create Safe Play Areas on Farms:
A Randomized Controlled Trial

Principal Investigator Eileen Fisher, PhD
Co-Investigators Risto Rautianen, PhD & Marizen Ramirez, MPH, PhD

Background

Agriculture is among the most hazardous industries across the world. Among all age groups, children are particularly vulnerable to injuries on the farm, as the farm may serve as a residence, location of employment, and a place of recreation and leisure. Approximately two million children reside on, work on or visit farms each year in the United States and thus are exposed to the hazards of agriculture (American Academy of Pediatrics, 2001).

Children engage in healthy exploration of the physical environment which is critical for their physical and cognitive development, and the farm is considered an ideal place where exploration and development can occur. However, because of their limited physical and cognitive abilities, children are ill-equipped to manage the hazards often seen on farms. Approximately 100 children are killed each year in the United States (Rivara 1997). In 2012, 7780 youth were injured on the farm, and 80% of these injuries occurred while not working (Centers for Disease Control and Prevention, 2014). Recent data indicate that the highest rates of injury to children occur to the youngest children under ten years of age (National Children's Center for Rural and Agricultural Health and Safety, 2014) Most of these injuries are due to tractors, machinery and animals (Rivara, 1997; Hard, 2006).

Many childhood injuries and deaths on the farm occur when children are in the workplace, either as workers in an unsafe environment, or as bystanders when their parents have no alternatives for appropriate child care. The American Academy of Pediatrics' top recommended strategy to prevention of child agricultural injuries is to separate the child from hazards (like tractors, machinery and animals) on the farm by use of fenced in play areas (American Academy of Pediatrics, 2001). Fencing a play area is consistent with the engineering strategies to injury prevention that use environmental design to remove or reduce the likelihood of contact with a hazardous exposure. Because a majority of farms are family-owned, environmental changes are not easy to implement. First, parents must be educated about safety behaviors and then motivated to adapt a specific behaviors – in this case, the safety behavior is creating a fenced in play area.

The best strategies for motivating parents to make these environmental changes have not been adequately identified. Yet, the concept of safe play areas is not a new approach. Safety advocates and experts have long encouraged the use of safe play areas particularly when off-site child care is not an option (Lee et al., 2002; Esser and Lee, 2001; Lee and Marlenga, 2006; Lee et al., 2007). The interest and debate regarding play areas prompted the National Children's Center for Rural and Agricultural Health and Safety to bring together a team of 10 external experts to produce the guidance document "Creating Safe Play Areas on Farms" (NCCRAHS, 2003).

Anecdotal evidence suggests that the number one barrier to creating fenced-in play areas is lack of financial resources. To address this barrier, two Canadian organizations implemented a program that used monetary incentives to promote the adoption of safe play areas on Canadian farms. The Canadian Agriculture Safety Association (CASA) developed its program in 2006 in Manitoba with a similar program launched in Ontario in 2007. CASA leaders felt these types of

incentive programs have been successful after distributing about 85 awards from 2002 through 2006; however, they have not been rigorously evaluated. Currently, we do not know if monetary incentives indeed motivate the decisions of parents to improve the safety of their farm.

"Safe Play Areas on Farms" is an educational strategy that encourages parents to create a fenced-in safe play area on the farm and adopt strategies for supervision of young children. It is based on the work of National Children's Center for Rural and Agricultural Health and Safety (NCCRAHS) and informed by experts on playground safety from the National Program for Playground Safety and child agricultural safety from the National Farm Medicine Center. The intervention consisted of a six educational modules developed by NCCRAHS that provides education on: 1) building and creating safe play areas, 2) fencing, 3) ground cover, 4) anchoring of play equipment, 5) effective supervision, and 6) childhood growth and development.

The goal of this study is to contribute to the evidence base for safe play areas on farms.

Specific Aims

Aim 1: To assess parental **intentions, attitudes, and beliefs** related to the installation and use of safe play areas.

Aim 2: Through a process evaluation, assess the uptake of the intervention and early indicators of adoption and motivation among those in the education-only and education plus incentive groups.

Aim 3: Through an outcome evaluation, assess the change in the **quantity** of safe play areas: the number and proportion of farms that have an enclosed, fenced play area.

Aim 4: Through an outcome evaluation, assess the change in the **quality** of play areas: the number of safe play features built/installed by each farm family, using safe play feature scores as an outcome indicator.

Accomplishments Under Each Aim

Aim 1: To assess parental **intentions, attitudes, and beliefs** related to the installation and use of safe play areas.

Objective: This goal of this study is to examine parental attitudes, barriers, benefits, and tolerance to risk related to safe play areas.
Methods: A cross-sectional study was conducted of 446 farm families with a child between 0-6 years of age residing in six Midwest states (Iowa, Nebraska, North Dakota, South Dakota, Missouri or Wisconsin). Four predictor variables were constructed based on a modified version of Ajzen's theory of planned behavior (Ajzen, 2002a): respondents' attitudes and beliefs, perceived benefits, perceived barriers, and tolerance to risk.
Results: Seventy three percent of farms had a specific place set up as a play area for young children; however, only 11.4% were fenced. Multinomial logistic regression analyses revealed that the odds of having a fenced play area relative to "not" having a fenced play area were higher among participants with higher scores for belief and benefit constructs and lower scores for the barrier and tolerance to risk constructs. Each one-unit increase in the belief score increased the odds of having a fenced play area by 27% (95% CI 20% to 37%). Similarly, a one-unit increase in the benefit score increased the odds by 23% (95% CI 14% to 33%). In contrast, increases in barriers and tolerance to risk were associated with a 27% decreased odds in having a fenced play area (95% CI 34% to 19%) and 9% (95 CI 16% to 2%), respectively.

Conclusion: Developing educational programs to influence attitudes, increase knowledge about the benefits of creating safe play areas, and overcome barriers is a promising approach to motivating parents to create a safe play area on the farm.

Aim 2: Through a process evaluation, assess the uptake of the intervention and early indicators of adoption and motivation among those in the education-only and education plus incentive groups.

Objective: Our objective is to conduct a process evaluation of the early impacts of a study incentivizing parents to create a safe play area on the farm.
Methods: The Safe Play Area on Farm intervention teaches parents to create a safe play area on the farm that separates children from agricultural hazards. We randomized 446 families with young children ages 0-6 residing in either Iowa, Nebraska, North Dakota, South Dakota, Missouri or Wisconsin into a control wing and two intervention wings: 1) educational materials plus $500 cash incentive for families to create/improve a safe play area on the farm, and 2) educational materials alone. Materials were delivered to families in a series of six mailings. Data were collected on demographics and farm safety behaviors at baseline. Process indicators (motivation, frequency in which materials were referenced, understandability of materials, and perceived helpfulness of materials) as well as early reports of creating/maintaining a safe play area on the farm were collected by phone follow-up at three-months after receipt of the intervention materials.
Results: A total of 170 families were included in this study, with 97 from the education only group and 73 from the education plus incentive group. Incentives were associated with increased motivation to maintain/create a safe play area on the farm (mean 6.5 vs. 5.7) but no differences were found in comprehension, helpfulness or frequency of referral to intervention materials. Motivation was also significantly associated with reports of early action (i.e., creating a safe play area on the farm at three-months follow-up).
Conclusion: Offering incentives with a passive educational program is a promising approach for motivating parents to create or maintain a safe play area on the farm.

Aim 3: Through an outcome evaluation, assess the change in the **quantity** of safe play areas: the number and proportion of farms that have an enclosed, fenced play area.

Objective: Research was conducted to evaluate the effectiveness of a parent-based educational safety intervention to create children's safe play areas on farms.
Methods: A total of 443 farm/ranch families with 720 children less than six years old from six Midwest states were enrolled. Families were randomized to one of three groups; an education only group (n=147), an education + $500 cash incentive group (n=147), and a control group (n=149). Educational mailings contained information on creating safe play areas, childhood development, supervision, and injury prevention.
Results: Post-intervention surveys were returned by 77% of the families. Overall there was an 11% increase in enclosed safe play areas. Sixteen percent (n=15) of families in the education only group, 26% (n=21) of families in the education plus incentive group and only 7% (n=7) of control families created a specific play area after enrolling into the study (p=0.0014). And, 24% (n=22) of education only families and 23% (n=19) of education plus incentive families had completely fenced play areas, compared with 17% (n=18) of control families.
Conclusion: Provision of educational materials and incentives can motivate families to create new safe play areas when none previously existed, and also change risk perception. Incentives made some significant differences when it comes to making creating new play arears.

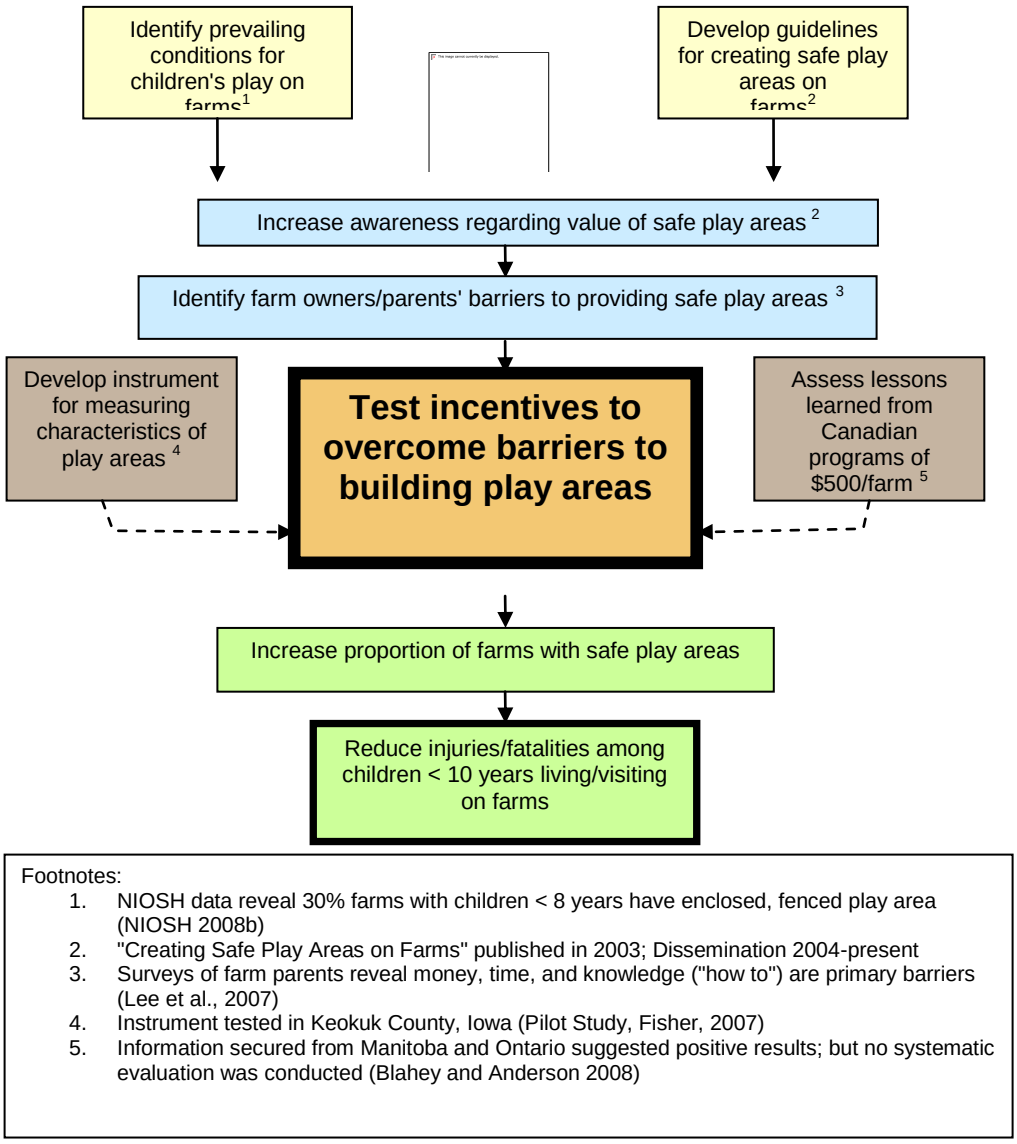
However, incentives did not seem to help improve safety features of existing play structures on a farm.

Aim 4: Through an outcome evaluation, assess the change in the **quality** of play areas: the number of safe play features built/installed by each farm family, using safe play feature scores as an outcome indicator.

Update on Aim 4: Analysis of aim 4 is still currently underway. As a first step, the team has examined the extent to which the intervention and intervention plus incentive has impacted reported improvement to existing play areas. The same methods used are the same as in analyzing Aim 3.
Objective: Evaluate the effectiveness of a parent-based educational safety intervention to improve the quality of children's safe play areas on farms.
Methods: A total of 443 farm/ranch families with 720 children less than six years old from six Midwest states were enrolled. Families were randomized to one of three groups; an education only group (n=147), an education + $500 cash incentive group (n=147), and a control group (n=149). Educational mailings contained information on creating safe play areas, childhood development, supervision, and injury prevention.
Results: Post-intervention surveys were returned by 77% of the families. Overall there was an 11% increase in safe play areas. A total of 24% (n=22) of education-only families and 27% (n=18) of education plus families reported making improvements to their play areas compared with 18% (n=18) of controls. These differences were not significantly different. We then examined if reading and receiving intervention materials made a difference. Among those who received/read materials, 29% (n=31) made improvements compared with 18% (n=27) of controls. This difference was statistically significant (p=0.0439).

Methodology

Theoretical Framework



Footnotes:

1. NIOSH data reveal 30% farms with children < 8 years have enclosed, fenced play area (NIOSH 2008b)
2. "Creating Safe Play Areas on Farms" published in 2003; Dissemination 2004-present
3. Surveys of farm parents reveal money, time, and knowledge ("how to") are primary barriers (Lee et al., 2007)
4. Instrument tested in Keokuk County, Iowa (Pilot Study, Fisher, 2007)
5. Information secured from Manitoba and Ontario suggested positive results; but no systematic evaluation was conducted (Blahey and Anderson 2008)

Figure 1: Shows how this project fits into the strategy to improve safe play on farms (the box in bold presents the positioning of this project in the overall program to reduce injuries among children less than 10 years of age living on and visiting farms). While significant efforts have been made in advancing the safe play area strategy, this study provides a critical evidence base for future efforts.

The Theory of Planned Behavior (TPB) is a model used by behavioral scientists to understand and predict a variety of health behaviors (Sheppard et al., 1988; Westaby et al., 2005). Individual intention to perform a behavior is a central tenet of this theory. Intentions indicate how hard people are willing to try or how much effort they are planning to exert to adopt a specific behavior (Ajzen, 1991). Intentions are predicted by attitudes, subjective norms and perceived behavioral control. Attitudes refer to the degree to which individuals are favorable or unfavorable towards a behavior. Subjective norms are the perceived social pressures to perform behavior, and perceived behavioral control is the perceived ease or difficulty in performing a behavior (Ajzen, 1991). Ideally, health interventions should lead to changes in intentions by changing attitudes, subjective norms and perceived behavioral control. Therefore it is critical that evaluation research measure not only behavioral actions but also intentions. A related concept is that of behavioral reason(s) concept, which supports researchers' examination of specific factors underlying behavior. This approach is particularly important in applied intervention research, in that it informs interventionists' strategies (Westaby and Braithwaite, 2003).

Also consistent with TPB, a key early indicator of a behavioral change is motivation (Ajzen, 1991). Personal motivation to adopt a safety behavior is often influenced by personal attitudes and peer and familial influences (i.e., subjective norms), as well as financial resources (e.g., incentives, knowledge) (Ajzen,1985). For a behavioral intervention to be successful then, it should first induce motivation to adopt a safety behavior which ultimately leads to adoption of the safety behavior. In this study, the safety behavior of interest is the adoption of a safe play area on the farm.

Study Population

The base population consists of farm families who have young children ages 0-6 residing in either Iowa, Nebraska, North Dakota, South Dakota, Missouri or Wisconsin. Two recruitment strategies were utilized. One involved collaboration with a large insurance carrier of farms in the Midwest. Fifty insurance agents interested in assisting in this study identified farm families with 0-6 year old children and provided lists of eligible families to the study team. The study team invited families to participate in the Safe Play on Farm study by mail and phone call follow-up. Only 30 families were recruited from 460 clientele. To increase the study sample, we purchased a mailing list of verified farm owners and operators maintained by Farm Market ID, a marketing technology company that retrieves records of government farm program participants from the USDA and Farm Services Agency. Their database captures approximately 98% of farmers in the six Midwest states. A random sample of 10,000 farm owners and/or operators with livestock or crops and a child 0-5 years of age were mailed a letter of invitation. Those interested in enrolling into the study were asked to return the enclosed baseline surveys and then would receive a $10 incentive. A total of 416 families were successfully recruited.

After recruitment, each family was randomized into one of three wings: the education-only intervention, the education plus monetary incentive group who were invited to apply for $500 to improve or build a safe play area, or the control group. For the process evaluation, those in the education-only and education plus monetary incentive group are included in this study. For the outcome evaluation, all three groups were compared: the education-only, the education plus monetary incentive and the control groups.

The Safe Play Intervention

Safe Play Areas is an educational program that teaches parents and guardians the "how to's" of creating safe play areas on farms. Safe Play Areas is based on the work of National Children's Center for Rural and Agricultural Health and Safety (NCCRAHS) and informed by experts on playground safety from the National Program for Playground Safety and child agricultural safety

from the National Farm Medicine Center. The intervention consisted of a six educational modules developed by NCCRAHS, which were mailed to intervention families over the course on 14 months (April 2011 – June 2012). The first was a 6-page "Creating Safe Play Areas on Farms" document focused on building and creating safe play areas. The next five modules provided information to support parents in the use of safe play areas and reinforce instruction provided in the 6-page document: 1) fencing, 2) ground cover, 3) anchoring of play equipment, 4) effective supervision, 5) childhood growth and development, maintenance, more play ideas, safety checklists, how to prevent injuries, an emergency first aid card, and a safe play interactive CD.

Incentives

Families in the education-plus group were offered the opportunity to apply for a $500 grant to help pay for the creation or improvement of a safe play area on their farm.

Data Collection

Baseline. At enrollment, a paper-pencil baseline survey was administered to all enrolled families to collect information on demographics, farm and household characteristics, farm hazards, presence/absence of a designated play area on the farm, presence/absence of a fence or natural barrier that encloses the play area, and practices in child supervision.

Three-month Process Evaluation. At three-months after all modules were mailed, telephone survey was conducted with families in the intervention arms (n=301) of the study to assess uptake of educational materials with a completion rate of 57% (n=171). We made ten attempts to survey families by phone, and nonresponders were mailed a questionnaire containing the same questions with two rounds of mailings.

At one year follow-up, participants were asked complete the same questions collected as baseline: farm hazards, presence/absence of a designated play area on the farm, presence/absence of a fence or natural barrier that encloses the play area, and practices in child supervision.

Variables and Measures

Demographics and Farm Variables

At baseline, the following demographic variables were collected: number of children in the household as well as their age and gender, and the age, education, and number of hours worked off the farm by the spouse and principal operator. The following farm variables were collected: the size of the farm in acres, row crops, non-row crops, and livestock. Row crops refer to corn, soybeans, sorghum, sunflowers, millet or cotton grown on the farm. Non-row crops refer to the presence of hay, forage, oats, wheat, or a conservation reserve program on the farm. Livestock refers to any livestock owned or raised on the farm or ranch.

Theory of Planned Behaviors Constructs

We developed four constructs based on the theory of planned behavior (Ajzen, 2002a): respondents' attitudes and beliefs (beliefs), perceived benefits (benefits), perceived barriers (barriers), and risky behaviors. Respondents were asked a series of questions pertaining to each of the four constructs. Responses to the questions were coded on either a four or five point Likert scale.

To measure the extent of beliefs relative to fenced-in play areas and the safety and desirability of having children spend time with parents or others while they do farm work, respondents were

asked to rate their agreement on a 5-point scale from strongly disagree to strongly agree to a series of 10 questions (Table 2).

Benefits and barriers of creating a fenced-in play area were accessed with 8 and 9 questions respectively (Table 3), on a 4-point scale (not a reason, slight reason, moderate reason, or strong reason). Benefit statements included beliefs about safe play areas reducing risk, improving supervision, and providing a fun place to play. Barriers addressed cost, time, difficulty, and knowledge. Open-ended questions were used to collect additional reasons for creating or not creating a fenced-in play area.

Risky Behaviors

To measure the extent that children in the family exhibited behaviors that would put them at risk for an injury, respondents were asked about the frequency with which their children were involved in certain farm activities (*risky behaviors*) such as riding on tractors, riding on other farm machinery, riding an ATV (adult or child sized), playing in/on grain, going inside fences with large animals (cattle, hogs, horses, etc.), playing near large unsecured tires, playing near unlocked chemical storage areas, crossing farmstead or public roads to retrieve balls or toys, or accompanying an adult or adolescent while he/she was doing farm or ranch work.

Process Evaluation measures

Referral to materials. To measure uptake of the intervention, we asked parents/guardians to report how frequently they referred to each Safe Play Areas material (total of ten) provided by the study team, using a scale from 0 to 2 where 0=never, 1= once, 2=frequently. For each respondent, we summed the total score across all materials and divided by the number of materials to obtain a composite referral score (possible range 0 to 10).

Comprehension of materials. To assess the quality of each educational component, parents were also asked to rank how much they understood each type of information provided to them, using a scale from 1-10 where 1=difficult to understand to 10=easy to understand. Similarly, we obtained a composite comprehension score by obtaining an average score across all materials.

Perceived helpfulness of material. To measure the quality of materials, parents were asked to rate how helpful was each type of educational piece, using a scale from 1 to 10 where 1=not at all helpful and 10=very helpful. A composite helpfulness score was obtained by calculating the average across all materials.

Outcome Measures

Motivation. To assess the extent to which the intervention influenced attitudes about safe play areas, parents were asked to report how much the intervention materials overall motivated them to create or improve a safe play area on the farm. A scale from 1 to 10 was used, where 1=not at all motivated and 10=very motivated.

Process Evaluation Safe Play Area Changes. Finally, to assess early measures of behavioral change, we asked parents an open-ended question to describe changes, if any, made to the farm based on safe play area recommendations provided in the intervention materials.

Primary Outcome Variable: Safe Play Area Features.

The dependent variable was the existence of a fenced-in play area. A fenced-in play area was defined as “an area enclosed by a fence with a gate or other physical barrier, such as shrubs,

that is designated for young children to play in. Respondents who said "Yes" to the following questions were considered to have a fenced-in safe play area (SPA): 1) "Is there a specific place set up on your farm or ranch as a play-area for young children?" 2) "If there is a specific play area, is it completely enclosed by a fence or other physical barrier such as shrubs?" The variable was dichotomized as fenced SPA versus no fenced SPA.

Post intervention site visits

On-site reviews. After the post-intervention survey data were collected, the field team visited a purposive sample of intervention education-only, education plus incentive, and control farms to validate the self-reported data, check installed play equipment for safety, photograph play areas and collect qualitative information. A safety features checklist was developed to assess adequate ground cushioning under equipment, secure anchoring, and entrapment and entanglement hazards. Team members took photographs of the play areas.

Interviews. Instead of focus groups, in-person interviews were conducted with farm families from the education-only, education plus incentive and control groups to obtain their opinion of the benefits of safe play areas, barriers to building safe play areas, ability to supervise their children and set rules, and their ideas on how to decrease injuries to children 0-6 years of age who live on farms. Intervention groups were asked their opinion of the effectiveness of the interventions in increasing the number of enclosed, fenced play areas.

Analysis

Aim 1: To assess parental **intentions, attitudes, and beliefs** related to the installation and use of safe play areas.

Basic descriptive statistics were used to describe the farms, parents, age and gender of eligible children. The acreage, crops, and livestock of 416 Farm Market id farms were compared to the non-responding 9,595 farms from Farm Market id using Chi-square test to detect differences.

Responses for each Likert scale were summed to obtain an aggregate score for each of the four behavior constructs. For some questions, the direction of the Likert scale was reversed so that a higher score would correspond to a higher level of exhibiting the behavior. The raw/standardized Cronbach's alpha scores for beliefs, barriers, benefits, and risky behaviors were: 0.77/0.78, 0.65/0.65, 0.86/0.86, and 0.68/0.68 respectively.

Univariate and multivariate logistic regression were used to identify factors associated with the presence of a fenced safe play area. Due to the high correlation between the behavior constructs, four multivariate models were created (i.e., one model for each construct). Three covariates were included in each model: number of children, education of principal operator, and education of spouse. Among the remaining covariates backward selection ($p<0.10$) was used to select variables for the final adjusted models. Results are presented as odds ratios and corresponding 95% confidence interval.

Aim 2: Through a process evaluation, assess the uptake of the intervention and early indicators of adoption and motivation among those in the education-only and education plus incentive groups.

The median values for the composite referral, comprehension, helpfulness and motivation scores were compared between the education only and education plus incentive group using the Wilcoxon ranksum test. This nonparametric test was applied because the distributions of the scores were nonnormal. Using an intent to treat analysis, we fit a linear regression model to evaluate if incentives improved motivation to adopt a safe play area. Linear regression models

were also used to determine if referral to materials, comprehension and helpfulness increased motivation. Finally, logistic regression was used to examine how uptake of materials (referral, comprehension, helpfulness) and motivation was associated with the early adoption safety behaviors (i.e., created a new safe play area or made improvements to an existing safe play area). To test mediation of uptake of materials on safety behaviors by motivation, we fit logistic regression models that included and excluded motivation. Estimates of association (beta parameters for linear regression models, and odds ratios for logistic regression models) were presented as well as 95% confidence intervals.

Aim 3: Through an outcome evaluation, assess the change in the **quantity** of safe play areas: the number and proportion of farms that have an enclosed, fenced play area.

We began our analysis by first conducting an Intent to Treat Analysis. We compared proportion of families who created new safe play areas after the start of the study by group assignment (education only, education plus incentive, and control), and compared these proportions using a chi-square test. Odds ratios for adopting a new safe play area and for also using a fence were estimated, along with their 95% confidence intervals, to comparing group assignment.

Aim 4: Through an outcome evaluation, assess the change in the **quality** of play areas: the number of safe play features built/installed by each farm family, using safe play feature scores as an outcome indicator.

Using the same approach described above, we compared proportions of families who reported making improvements to their safe play area using chi-square tests. We also estimated odds ratios to assess impact of the intervention (education only, education plus incentive and controls). We are still in the process of developing a safety feature score for this aim.

To furthermore examine if uptake of materials also made a difference in changing behaviors of parents in creating or improving safe play areas, we assessed if uptake of materials made a difference. We estimated odds ratios for adopting new safe play areas and improving existing safe play areas comparing those who read/received educational materials with those who did not read/review materials.

Results

Population

The 416 farms enrolled through Farm Market iD are representative of the farms/ranches in 6 Midwest states based on size (acres), crops, and livestock. Farm characteristics for farms included in the study and all farms in the six Midwest states are shown in Table 1. American Family Insurance participants are similar to the 416 Farm Market iD participants in farm characteristics. Fifty percent of the respondents were the principal operator, 46.4 percent were the spouse, and 3 percent were other (son, daughter, granddaughter, or missing). Gender of respondent was evenly divided between male and female. As would be expected of families with young children, 62% of the principal operators and 78% of the spouses were between the 20 – 39 years of age. The spouses were more educated with 54% having a 4-year college degree compared to 27% for the principal operators. Fifty nine percent of the principal operators were full-time farmers defined as working 40+ hours on the farm with 36% working 40+ hours at off farm jobs and only 36% working 0 hours at an off farm job. Only 11% of spouses worked 40+ hours on the farm, 39% worked full-time off the farm and 26% worked 0 hours off the farm.

TABLE 1. Characteristics of Participants (n=446 farms/ranches)

Characteristic	Principal Operator No. (%)	Spouse No. (%)
Age		
20-29	26 (5.8)	66 (14.8)
30-39	248 (55.6)	281 (6.30)
40-49	140 (31.4)	84 (18.8)
50-59	23 (5.2)	7 (1.6)
60+	8 (1.8)	5 (1.1)
Education		
High School or less	126 (28.2)	45 (10.1)
Post High School	200 (44.8)	147 (35.2)
College/post college	118 (26.5)	241 (54.0)
Hours worked on farm		
40 +	264(59%)	49(11%)
20-39	88(20%)	45(10%)
1-19	82(18%)	249(56%)
0	3(1%)	92(21%)
Hours worked off farm		
40 +	159 (35.7)	171 (38.6)
20-39	44 (9.9)	84 (18.8)
1-19	73 (16.4)	66 (14.8)
0	162 (36.3)	117 (26.2)
	Farm Market iD Responders	Farm Market iD Non-responders
Ave. acres planted	244 acres	256 acres
Percent who produce:	No. (%)	No. (%)
Corn	331 (80.9)	7410 (77.2)
Soybeans	298 (72.9)	6605 (68.9)
Hay/Forage	203 (49.6)	4534 (47.3)
Livestock (any)	180 (44.0)	4791 (49.9)
Dairy Cattle	163 (39.9)	4505 (47.0)
Beef Cattle	55 (13.4)	1188 (12.4)
Sheep	12 (2.9)	292 (3.0)

There were 1257 total children with 789 being age six or younger. Forty nine percent of the children age six or younger were males and 51% were female. The mean (SD) for children age six and younger was 4.3 (1.5).

Intentions, attitudes, and beliefs about safe play areas

Seventy three percent of participants responded “yes” to the questions, “Is there a specific place set up on your farm or ranch as a play area for young children?” However, only 11.4% of those play areas are completely enclosed by a fence or other physical barrier such as shrubs. Agreement with statements that reflect attitudes and social norms related to creating a safe play area for young children are represented in Table 2. Over sixty percent of participants agree or strongly agree with the statement “It better for children to spend time with us while we are doing farm work than being with a babysitter.” Forty percent disagree or strongly disagree that it is perfectly safe for children to be with them while they are doing farm work. On the positive side, 54% agree that creating a fenced-in play area would be beneficial to them.

TABLE 2. Percent agreement on 5-point Likert scale from “strongly disagree” to “strongly agree” for belief construct

	1	2	3	4	5
Beliefs					
It is difficult for us to create or maintain a fenced-in play area.*	8%	28%	22%	36%	6%
Our creating or maintaining a fenced-in play area would be beneficial to us.	4%	22%	21%	38%	16%
All of our children are given the freedom to walk around the farm wherever they like.*	23%	43%	7%	22%	6%
Most people important to us think we should create or maintain a fenced-in play area.	12%	38%	34%	11%	4%
It is better for children to spend time with us doing farm work than being with a babysitter.*	3%	13%	23%	39%	22%
It is perfectly safe for children to be with us while we are doing farm work.*	5%	35%	27%	28%	5%
The people who matter most to us think we should create or maintain a fenced-in play area.	11%	38%	36%	11%	5%
Our children would be safe near us while with us while we are doing our farm or ranch work outside.*	3%	26%	31%	35%	4%
It would be good for us to create or maintain a fenced-in play area.	4%	17%	27%	40%	11%
It would be easy for us to create or maintain a fenced-in play area.	7%	38%	23%	29%	4%

*Scores are reversed for negative statements to calculate belief score.
5-point Likert scale: 1=strongly disagree, 2=disagree, 3=neither, 4=agree, 5=strongly agree
Belief Score: Mean (SD)=29.5(6.0); Median=29; Range=9-48

The strongest reasons for benefits of creating a SPA are related to safety (Table 3). Over eighty percent responded “strong or moderate reason” to “It will keep our children safe” and “It reduces the risk of our children being injured.” Although money has been reported as a barrier to creating a SPA, only 15% said “It is too expensive” was a strong reason” and 42% said it was “Not a Reason”. Other barriers among the written comments included: 1) A fenced area is an eye sore; 2) We always supervise our children when they are outside; 3) A fence would not keep our children in; 4) There is no good place to build one.

TABLE 3. Percent agreement on 4-point Likert scale from "Not a reason" to "Strong Reason" with statements on the benefit and barrier constructs

	1	2	3	4
Benefits				
It will keep our children safe	4%	13%	25%	56%
It helps us supervise our children	7%	15%	32%	43%
It would be fun for our children	26%	29%	25%	17%
It reduces the risk of our children being injured	5%	11%	31%	51%
It gives us peace of mind	10%	16%	33%	41%
We know how to make one	28%	25%	29%	18%
We can afford it	35%	27%	24%	14%
To help us better monitor our children	10%	19%	36%	35%
Barriers				
It is too expensive	42%	25%	17%	15%
We do not have the time to make it, set it up or maintain it	37%	25%	27%	11%
Kids would not use it anyway	44%	26%	20%	11%
It would not decrease our childrens' risk of injury	60%	22%	12%	7%
Our current play areas and equipment are sufficient	22%	26%	31%	20%
We do not easily know how to construct a safe play area	69%	20%	10%	2%
Our kids like their freedom to play around the farm or ranch	32%	24%	29%	16%

4-point Likert scale: 1=Not a reason, 2=slight reason, 3=moderate reason, 4=strong reason
Benefit Score: Mean(SD)=22.5(5.8); Median=23; Range=8-32
Barrier Score: Mean(SD)=13.9(4.0); Median=14; Range=2-25

The highest percent of "often" responses for risky behavior statements were for riding an ATV (32%), accompanying someone doing farm work (30%), and riding on tractors (25%) (Table 4).

TABLE 4. Percent agreement on 4-point Likert scale from "Never" to "Often" for risky behavior construct

	1	2	3	4
How often in the past year did you children age 6 or younger:				
Ride on tractors	7%	23%	45%	25%
Ride on other farm machinery	26%	25%	35%	15%
Ride on an ATV (either adult or child size)	16%	16%	37%	32%
Play in or on grain	78%	16%	5%	1%
Go inside fences alone with large animals (cattle, hogs, horses, etc.)	68%	18%	11%	3%
Play near large dual tires that were NOT laying flat or secured from falling	85%	12%	3%	0%
Play near unlocked storage areas containing chemicals or other toxic substances	68%	25%	6%	1%
Cross farmstead traffic areas to retrieve balls or toys	48%	29%	19%	4%
Cross public roads to retrieve balls or toys	87%	10%	3%	0%
Accompany an adult or adolescent while he/she was doing farm or ranch work	8%	19%	43%	30%

*4-point Likert: 1=never, 2=seldom, 3=sometimes, 4=often
Risky behavior score: Mean(SD)=18.3(4.2); Median=18; Range=9-32;

The odds of having a fenced play area relative to "not" having a fenced play area were higher among participants with higher scores for belief and benefit constructs and lower scores for the barrier and risky behavior constructs (Table 5). This association was present regardless of the number of children, principal operator and spouse education or age, farm size or type (row crops, non-row crops, livestock). For each one-unit increase in the belief and benefit score there was a 27% and 17% increase in the odds of having a fenced play area, respectively. Whereas for each one-unit increase in the barrier and risky behavior score in the adjusted models, the odds of having a fenced play area decreased 21% and 9% respectively.

TABLE 5. Association between Fenced Play Area and Four Behavioral Constructs

Behavioral Construct	No Fence Mean (STD)	Fence Mean (STD)	Unadjusted OR (95% CI)	Adjusted[1] OR (95% CI)
Beliefs	28.8 (5.7)	38.8 (6.1)	1.21 (1.14, 1.29)	1.27 (1.198, 1.37)[2]
Benefits	22.0 (5.6)	26.6 (5.0)	1.20 (1.12, 1.29)	1.23 (1.14, 1.33)[3]
Barriers	14.3 (3.8)	10.6 (4.3)	0.76 (0.69, 0.84)	0.73 (0.66, 0.81)
Risky Behavior	18.3 (4.08)	17.1 (3.31)	0.93 (0.86, 1.00)	0.91 (0.84, 0.98)[4]

[1] All models adjusted for number of children, education of principal operator and education of spouse. Backward selection (p<.10) used for inclusion of additional covariates.
[2] Beliefs model also adjusted for age of spouse, principal operator hours worked off farm, number of acres and row crops
[3] Benefits model also adjusted for age of spouse and acres
[4] Risky Behavior model also adjusted for acres.

Process Evaluation of the Safe Play on Farms Study

A total of 170 families participated in this study, with 97 (57%) families randomized to the education only group (Table 6). Among those in the education only group, 40% of the respondents were male and 58% were female. Respondents were more often the spouses of the principal operator (57%) than the principal operator (44%). By age of principal operator, 5% were aged 20-29, 55% aged 30-39, 34% aged 40-49, and 5% aged 50-59. One-third of the principal operators had at most a high school education and 28% had at least a four year college degree. By age of the spouse of the principal operator, 19% were aged 20-29, 58% aged 30-39, 22% aged 40-49, and 1% aged50-59. One-third of the spouses had some post high school or college education and more than half (56%) had at least four years of college. The demographic distribution of families in the education plus incentive group was similar to families in the education only group.

Table 6. Demographics of Principal Operator and Spouse of Principal Operator by Randomized Group

	Total	Education only		Education plus	
	N	N	%	N	%
Total	170	97	100	73	100
Respondent Gender					
Male	66	39	40.21	27	36.99
Female	101	56	57.73	45	61.64
Did Not Answer	3	2	2.06	1	1.37
Respondent Role					
Principal Operator	70	43	44.33	27	36.99
Spouse of PO	99	53	54.64	46	63.01
Did Not Answer	1	1	1.03	0	0
Principal Operator Age					
20-29	10	5	5.15	5	6.85
30-39	101	53	54.64	48	65.75
40-49	48	33	34.02	15	20.55
50-59	9	5	5.15	4	5.48
60+	1	1	1.03	0	0
Missing	1	0	0	1	1.37
Principal Operator Education					
<=High School	52	32	32.99	20	27.4
Post High School	70	38	39.18	32	43.84
4 Years or More	48	27	27.83	21	28.77
Spouse Age					
20-29	28	18	18.56	10	13.7
30-39	106	56	57.73	50	68.49
40-49	33	21	21.65	12	16.44
50-59	2	1	1.03	1	1.37
60+	1	1	1.03	0	0
Spouse Education					
<=High School	14	11	11.34	3	4.11
Post High School	67	32	32.99	35	47.95
4 years or more	89	54	55.67	35	47.95

Process Evaluation: Effects of Incentivizing the Safe Play Area Intervention

The mean scores (standard deviation) for the comprehension, helpfulness, motivation, and referred sum scales were 6.3 (2.3), 4.9 (2.2), 6.0 (2.7), and 4.2 (3.3), respectively (Table 7). There were no significant differences between the education only and education plus incentive group by comprehension, helpfulness, and referred scales. Compared to the education only group, the education plus incentive group reported they were more motivated by the study materials (mean 6.5 vs. mean 5.7). The nonparametric test of this difference was found to be significant (p=0.04).

Table 7: Intervention Uptake and Motivation by Randomized Group

			Education Only		Education Plus		
Material	Total N	Mean (STD)	N	Mean (STD)	N	Mean (STD)	Wilcoxon P Value
Comprehension[1,2,5]	161	6.33 (2.27)	94	6.24 (2.14)	67	6.46 (2.44)	0.57
Helpfulness[2,3,5]	159	4.92 (2.24)	93	4.71 (2.06)	66	5.21 (2.46)	0.18
Motivation[4]	158	6.02 (2.74)	90	5.69 (2.63)	68	6.47 (2.84)	0.04
Referred	170	4.19 (3.27)	97	4.1 (3.15)	73	4.3 (3.43)	0.78

*Referred Sum Scale ranges from 0 to 10

1. How much did you understand what you read. Likert scale from 1: "difficult to understand" to 10: "easy to understand"
2. Among persons who said they read the respective material
3. How helpful was it. Likert scale from 1: "not at all helpful" to 10: "very helpful"
4. How much the materials motivated you to create or improve a safe play area. Likert scale from 1: "not at all motivated" to 10: "very motivated"
5. A 10 point referred scale was created by summing individual responses for each material. A reponses of 'Once' was given a .5 value and a response of 'Frequently' was given a 1 value.

Table 8 presents the coefficient estimates and 95% confidence limits from the linear regression models predicting the motivation score. Three models are presented for each of the material utility scales: comprehension, referred, and helpfulness. All three model estimates controlled for intervention group and one material utility scale. Motivation was significantly positively associated with the helpfulness scale (B= 0.66; 95% Adjusted Confidence Limit 0.50, 0.81; model 1), referred scale (B=0.26; 95% CL 0.13, 0.38; model 2), and comprehension scale (B=0.20; 95% CL 0.02, 0.39; model 3). Belonging to the education plus incentive group was also significantly positively associated with the motivation score in all three adjusted models.

Table 8: Linear Regression Model Predicting Motivation

Characteristic	Parameter Estimate (95% CI)	Model 1: Adjusted Parameter Estimate (95% CI)	Model 2: Adjusted Parameter Estimate (95% CI)	Model 3: Adjusted Parameter Estimate (95% CI)
Ed Plus vs Ed Only	0.89 (0.05, 1.74)	0.7 (0.0009, 1.39)	0.83 (0.02, 1.64)	0.95 (0.10, 1.79)
Helpfulness Scale	0.67 (0.52, 0.83)	0.66 (0.50, 0.81)		
Referred Scale	0.26 (0.14, 0.39)		0.26 (0.13, 0.38)	
Comprehension Scale	0.21 (0.03, 0.40)			0.20 (0.02, 0.39)

Predictors of Early Adoption of Safe Play Area Behaviors

A total of 82 (49%) of families reported taking some sort of safety action on their children's safe paly areas (e.g., building a fence, etc). Table 9 presents the Odds Ratios and 95% Confidence Intervals (CI) for creating a new safe play area or modifying an existing one. Three adjusted models are presented: model one controlled for referred and motivation scales, model two for comprehension and motivation scales, and model three for helpfulness and motivation scales. Motivation significantly increased the odds of action in all three adjusted models (model 1: 1.45; 95% CI 1.24, 1.59; model 2: 1.47, 95% CI 1.27, 1.72; model 3: 1.39, 95% CI 1.16, 1.65). Referring to materials also significantly increased the odds of action (1.14; 95% CI 1.01, 1.29). Comprehension and helpfulness of materials did not significantly increase the odds of action in the adjusted models.

Table 9: Mediation Models Predicting the Adoption of Safe Play Behaviors

Characteristic	N (%) Reported Action	Crude OR (95% CI)	Model 1 Adjusted OR (a95% CI)	Model 2 Adjusted OR (a95% CI)	Model 3 Adjusted OR (a95% CI)
Education Only	49 (59.04)	Ref			
Education Plus	33 (40.96)	1.09 (0.59, 2.01)			
Referred Scale		1.24 (1.11, 1.37)	1.14 (1.01, 1.29)		
Motivation Scale		1.50 (1.29, 1.75)	1.45 (1.24, 1.59)	1.47 (1.27, 1.72)	1.39 (1.16, 1.65)
Comprehension		1.15 (1.00, 1.33)		1.08 (0.91, 1.28)	
Helpfulness		1.40 (1.19, 1.65)			1.15 (0.94, 1.40)

Outcome Evaluation:

EFFECTS OF INTERVENTION ON CREATING SAFE PLAY AREAS

From the initial 446 participants enrolled at baseline, 77% (n=343) completed the study and were followed from baseline through 12 month follow-up. There were more female respondents in the control group (72%) compared with the education only (61%) and education plus (51%) groups. Other demographic and farm characteristics were not appreciably different across groups.

Table 10: Demographics of Outcome Evaluation (n=343)

		Control		Education Only		Education Plus	
Characteristics	N	N	%	N	%	N	%
Total	343	129	100	112	100	102	100
Respondent Gender							
Male	129	31	28.2	37	38.9	61	49.2
Female	200	79	71.8	58	61.1	63	50.8
Respondent Role							
Principal Operator	133	33	30.3	39	39	61	49.2
Spouse of PO	197	75	68.8	61	61	61	49.2
Other	3	1	0.9	0	0	2	1.6
Principal Operator Age							
20-29	22	5	4.5	7	6.9	10	7.8
30-39	197	59	52.7	65	64.4	73	56.6
40-49	106	43	38.4	25	24.8	38	29.5
50+	17	5	4.5	4	4	8	6.2
Principal Operator Education							
<=High School	89	36	32.1	22	21.8	31	24
Post High School	153	45	40.2	45	44.6	63	48.8
At least 4 Years of College	100	31	27.7	34	33.7	35	27.1
Spouse Age							
20-29	53	17	15.2	14	13.7	22	17.1
30-39	216	66	58.9	72	70.6	78	60.5
40-49	67	27	24.1	15	14.7	25	19.4
50+	5	2	1.8	1	1	2	1.6
No Spouse	2	0	0	0	0	2	1.6
Spouse Education							
<=High School	30	15	13.4	7	6.9	8	6.2
Post High School	118	33	29.5	41	40.2	44	34.1
At least 4 Years of College	193	64	57.1	54	52.9	75	58.1
No Spouse	2	0	0	0	0	2	1.6

We examined beliefs, perceived benefits and barriers of parents and reported risky behaviors of their children at 12 months follow-up, and calculated the mean differences between baseline and follow-up (Table 11). Families in the two intervention arms had a lower mean differences in reported risky behaviors (education only =17.45, education-plus =17.95) compared with controls (n=18.17) p=0.05.

Table 11: Beliefs, perceived benefits and barriers, and risky behaviors by group

		Overall	Control	Education Plus	Education Only	P value
	N	Mean (Std)	Mean (Std)	Mean (Std)	Mean (Std)	
Belief	340	29.94 (6.06)	29.61 (6.42)	30.72 (6.15)	29.59 (5.51)	0.37
Benefit	319	18.34 (4.89)	18.3 (4.77)	18.85 (4.68)	17.91 (5.22)	0.58
Barrier	320	13.84 (3.98)	13.93 (3.97)	13.63 (3.88)	13.92 (4.1)	0.4
Risky Behavior	340	17.87 (3.8)	18.17 (4.01)	17.95 (3.36)	17.45 (3.93)	0.05

P value listed is for the change in mean score from baseline to post using the Kruskal Wallis test
Belief scale ranges from 1-50, Benefit from 1-32, Barrier from 1-28, and Risky behaviors from 1-40

The education plus group, however, had almost five times the odds of creating a safe play area after enrolling into the study (OR=4.9, 95% CI = 1.97, 12.21). The education only group also had an increased odds of creating a safe play area (OR=2.62, 95% CI=1.02, 6.75) (Table 12).

Table 12: Odds Ratios for Creating Safe Play Areas Comparing Intervention and Control Groups

	Total	Safe Play Area Created After Enrollment			
		N	%	OR (95% CI)	P-value
Control	105	7	6.7	Ref	0.0014
Education Only	95	15	15.8	2.62 (1.02, 6.75)	
Education Plus	81	21	25.9	4.90 (1.97, 12.21)	
	281	43	15.3		

A similar proportion of education only (24%) and education plus (27%) groups made improvements to existing play areas. These proportions were higher than the control group (18%). These differences, however, were not statistically significant (Table 13).

Table 13: Odds Ratios for Making Improvements to Play Areas, Comparing Intervention and Control Groups

	Total	Make Improvements			
		N	%	OR (95% CI)	P-value
Control	99	18	18.2	Ref	0.3729
Education Only	90	22	24.4	1.46 (0.72, 2.94)	
Education Plus	67	18	26.9	1.66 (0.78, 3.48)	
	256	58	22.7		

Similarly, a greater but similar proportion of education only (24%) and education plus (23%) families fenced an existing play area compared with controls (17%). Again, these overall differences were not statistically different (Table 14).

Table 14: Odds Ratios for Making Improvements to Play Areas, Comparing Intervention and Control Groups

	Total	Fenced			
		N	%	OR (95% CI)	P-value
Control	105	18	17.1	Ref	0.4685
Education Only	93	22	23.7	1.50 (0.75, 3.01)	
Education Plus	83	19	22.9	1.44 (0.70, 2.95)	
	281	59	21.0		

Finally, to examine if reading and receiving educational materials had an impact on changing behaviors in creating and improving safe play areas, we used process evaluation results to account for the uptake of intervention materials (Table 15). Our sample size was reduced to n=281, representing those families who participated in all waves of data collection (baseline, 3-month process evaluation and 12 month follow-up). Those who did read/receive had 3.79 times the odds of creating a new safe play area compared with those who reported not receiving or reading materials (95% CL=1.88, 7.65). Similarly, the odds ratios for making improvements and fencing existing play areas were respectively 1.88 (95% CL = 1.04, 3.40) and 1.80 (95% CL = 1.01, 3.22).

Table 15: Odds ratios for creating or improving areas, comparing those who read educational materials.

	Total	Created New Safe Play Area			
		N	%	OR (95% CI)	P-value
None	161	13	8.1	Ref	<0.001
Any reading/receiving	120	30	25.0	3.79 (1.88, 7.65)	
	281	43	15.3		
	Total	Made Improvements			
		N	%	OR (95% CI)	P-value
None	150	27	18.0	Ref	0.0343
Any reading/receiving	106	31	29.2	1.88 (1.04, 3.40)	
	256	58	22.7		
	Total	Fenced			

		N	%	OR (95% CI)	P-value
None	161	27	16.8	Ref	0.0439
Any reading/receiving	120	32	26.7	1.80 (1.01, 3.22)	
	281	59	21.0		

Discussion

Improving attitudes and beliefs about safe play areas can change behaviors

This study was designed to investigate the role of four behavioral constructs in determining the likelihood of farm parents with young children having a fenced play area. It is the first study to evaluate parental beliefs and attitudes surrounding the concept of creating safe play areas on farms as a preventative measure. While over 70 percent of the farms had a specific place set up for young children to play, only 11.4% of those were completely fenced. Having a fenced play area is strongly associated with attitudes and beliefs. Positive responses related to attitudes and subjective norms (belief construct) had the strongest influence with each one-unit increase having a 27% increase in the odds of having a fenced play area.

The belief that it is better for children to spend time with a parent doing farm work than being with a babysitter is held by 61% of the participants. While a majority (54%) agreed that it would be beneficial for them to create a fenced play area, 39% think it is safe and 33% “perfectly” safe for their children age 6 or younger to be with them while they are doing farm work. The TPB indicates that human behavior is guided by beliefs about normative expectations of others, beliefs about likely outcomes of the behavior, and beliefs about the benefits and barriers of the behavior (Ajzen 2006). Only 15% of parents agree or strongly agree other people think they should create a fenced play area.

Media campaigns designed to change these norms in a favorable direction should increase the intention of parents to create fenced play areas. Media campaigns similar to those developed to change attitudes regarding allowing children to be extra riders on tractors such as *“It is better to bury a tradition, than bury a child”* (NCCRAHS 2010) could be used to change social norms related to allowing young children to accompany others doing farm work. Attitudes of family and friends can exert a powerful influence over many health behaviors including alcohol use, smoking, seatbelts and keeping firearms from children (Haines, Barker & Rice 2006; Perkins 2003; Johnson & Taliaferro 2012). Our research indicates if you can convince parents that fenced play areas will keep their children safe, they are more likely to create a fenced play area. Respected farm organizations and leaders should be used to promote fenced play areas and discourage allowing children to accompany someone doing farm work.

Previous work indicates lack of money, time, and knowledge are barriers to improving safe play areas on farms (Lee et al., 2007). Our study examined the effects of these barriers in conjunction with subjective norms and beliefs related to the perception of risk of having young children in the work area and the perception of the effectiveness of fenced play areas in reducing risk. We found that attitudes and beliefs related to having children in the work place have more of an effect on the likelihood of having a fenced play area than benefits or barriers. As would be expected, benefits have a positive influence (17% increase in odds ratio) and barriers a negative influence (11% decrease in odds ratio) on the likelihood of having a fenced play area.

The strongest reasons for creating a fenced play area were related to safety with over 50% believing strongly “It will keep our children safe” and “It reduces the risk of injury”. The fact that creating a play area might be fun for children was not a very strong benefit for most parents with over 50% saying this was not a reason or a slight reason.

The attitude that “Our current play areas are sufficient” and “Our children like the freedom to play around the farm or ranch” were moderate or strong barriers, 51% and 45% respectively. Money and time were moderate or strong barriers for 32% and 38% respectively. Lack of knowledge was a moderate or strong barrier for only 12%. However, providing information would remove a barrier for the 30% who indicate they do not easily know how to construct a safe play area.

Although creating an over-all culture of safety for young children on farms may be desirable, other risky behaviors had a modest effect in decreasing the odds of having a fenced play area. Seventy percent of the children age 6 or younger sometimes or often ride on tractors and 73% accompany an adult or adolescent while he/she does farm work and 69% ride on an ATV.

Providing incentives can motivate families to adopt safe play areas on the farm

Convincing farm families to create or fence a safe play area on the farm is not an easy task primarily because this safety behavior is complex and potentially resource-intensive. Using financial incentives coupled with an educational program is an intervention approach with some promise. In a recent review of 16 intervention programs, incentives worked to improve vaccination and screening behaviors (considered simple preventive behaviors) as well as physical activity and smoking cessation (complex behaviors) (Giles, 2014). In another review of 47 studies, financial incentives positively impacted behaviors 73% of the time, regardless of the complexity of the behavior (Kane, 2004).

For this current study, we evaluated the early impacts of an incentive-based intervention program, Safe Play Areas on Farms, to improve parent-based farm safety behaviors. At three months follow-up, parents who were offered financial incentives in addition to educational materials were slightly more motivated to adopt safe play area strategies than parents who were not offered an incentive.

Use of financial incentives to influence motivations to adopt behaviors has a theoretical underpinning informed by the Theory of Planned Behavior, which suggests that behaviors are determined by both motivations and ability. The ability to adopt certain behaviors requires opportunities as well as resources, such as time, money and skills (Ajzen et al., 1991; Ajzen et al., 1985). Our research supports a mediation mechanism in which financial incentives provides some resources to support the adoption of a safe play are on the farm by first influencing motivation which then positively influences safety behaviors. Accordingly, incentives that remove financial barriers and increase purchasing power (individual-level trait) can potentially lead to early changes in behavior by increasing motivation. Our process evaluation, conducted within three months receipt of an intervention, allowed us to examine how motivations may be impacted by an incentive program. We found that the “Safe Play Areas on Farms” program with incentives increased motivation by about 10% compared with a non-incentivized group, and motivated parents were 50% more likely to report early adoption of safety behaviors compared with less motivated parents.

Interestingly, very few families took advantage of the actual financial resources offered with only nine families who actually applied for and received a $500 grant. Hence, the effectiveness of incentives on motivation and the uptake of materials was likely minimal. Unfortunately, this small

sample of grantee families precludes our ability to analyze the *actual* receipt of incentives on motivation and adoption of a safety behavior. In our study, a grant application (targeted intermediate behavior) must have been completed prior to receiving the monetary incentive. This incentive delivery structure, as well as other logistical factors such as scheduling, immediacy and timing of the incentive relative to the behavior, can impact the effectiveness of financial incentive interventions (see review by Giles et al. 2014). Nonetheless, our findings underscore a key finding – that offering incentives alone (and not necessarily receiving the incentives) was still associated with a modest increase in motivation to adopt a safety behavior.

Notably, using incentives did not increase the frequency in which educational materials were referenced. Furthermore, materials were perceived neither to be more helpful nor more understandable by offering financial incentives. However, increased parental motivation was found to be the most important predictor of early adoption of a safety behavior - that is, creating a new safe play area or making a safety improvement to an existing one. Improved motivation was related to a 39-50% increased likelihood of adopting a safety behavior. These effects were more pronounced than the actual uptake and comprehension of educational materials, which were associated with an 8-15% increased likelihood of creating a safe play area.

Safe Play Area on Farms led to Improved Safety on the Farm

Through our outcome evaluation, we found after 12 months that incentives did matter. In fact, almost five times as many families who received educational materials and the offer of the incentive created new safe play areas on the farm after being in the study, compared with control families. Educational materials alone also improved behaviors, with about 2.5 times education only families creating new safe play areas compared with controls. Education only and educational plus incentive families with existing play areas still made improvements, but these differences were not statistically different. It may be that sample size was a limitation.

The greatest impact of this intervention was also found among families who chose to read the educational materials. The intervention delivery was quite passive through mailing – a strategy that sometimes must be adopted for hard-to-reach rural farm families. When we examined the effects of the intervention among families who reportedly read materials, we found greater impact. Those who reported reading materials were almost twice as likely to make improvements to their existing play area, compared with those who reported neither receiving or reading materials.

The implications of these finding suggest that the Safe Play Area of Farm Study might have the greatest impact on new families who have not yet created a safe play area, and to offer incentives to do so.

<u>Publications (in preparation)</u>

Ramirez M, Robertson M, Ellis T, Rautiainen R, Fisher E. Encouraging parents to create safe play areas on the farm: A process evaluation (in preparation). Target journal: American Journal of Preventive Medicine.

E Fisher, M Ramirez, R Rautiainen, M Robertson, T Ellis, M Smith, P Chang, B Lee. Parental attitudes associated with safe play areas on the farm (in preparation). Target journal: Journal of Rural Health.

M Robertson, M Ramirez, R Rautiainen, T Ellis, E Fisher. Effectiveness of the Safe Play Area of Farms Program (in preparation). Target journal: American Journal of Public Health.

Key Findings

BASELINE ASSESSMENTS OF FARM FAMILIES' ATTITUDES AND BELIEFS ABOUT SAFE PLAY AREAS. PERCEPTIONS NEED TO BE CHANGED TO IMPROVE PARENTAL BEHAVIORS.

- While 73% percent of farm families with young children reporting having a specific place set up on your farm or ranch as a play area for young children, only **11.4% of those play areas are completely enclosed by a fence or other physical barrier such as shrubs.**

- Over sixty percent of farm families with young children believe "it better for children to spend time with us while we are doing farm work than being with a babysitter." And, 33% believe it is perfectly safe for children to be with them during farm work.

- Only about 54% agree that creating a fenced in play area would be beneficial.

- Parents allowed their children under six to engage in risky behaviors. A total of 32% of parents reporting that their children frequently ride ATVs, and 25% report their children frequently ride on tractors. About 30% of parents indicate that their children accompany an adult or adolescent while doing farm work.

- Families who had positive safety attitudes were more likely to have a fenced play area. Those who had reported barriers to having a safe play area and also reported their children to be risky were less likely to have a fenced play area. Changing attitudes, reducing barriers and improving risky behaviors may be effective in encourage parents to create safe play areas on the farm.

PROCESS AND OUTCOME EVALUATION RESULTS: How Effective is the Safe Play Area on Farms intervention with and without incentives?

Process Evaluation Results at 3-months follow-up

- Offering incentives did not improve comprehension, perceived helpfulness or frequency of reading/referring to intervention materials
- Offering incentives did increase motivation of parents to create a safe play area on the farm (p=0.04).
- At 3 months follow-up, providing an incentive did not quite change parental behaviors (OR= 1.09, 95% CL =0.59, 2.01).
- But, evidence was supplied that improving motivation is an important target for early intervention.

I.

Outcome Evaluation Results

- The Safe Play on Farms Intervention was found to improve safety on the farm for young children. By itself, without any incentives and delivered passively through the mail, the program was associated with more than a two and half increased odds of creating a safe play area after enrolling in the study (OR=2.62, 95% CI=1.02, 6.75).
- Providing an incentive was even more effective. Families who received the Safe Play on Farms materials plus an offer of $500 had almost five times the odds of creating a safe play area after enrolling into the study (OR=4.9, 95% CI = 1.97, 12.21). Notably, only nine families actually applied for the grant money, so the offer in and of itself was an important vehicle for changing behaviors.
- Incentivizing families did not lead to significant improvements to the play areas on the farm. However, more families in the groups that received the educational materials with and without incentives made improvements or fenced their areas (22-27%) compared with 18% of the control families.
- A challenge with passive delivery of educational materials is that families may not read or refer to materials. Measuring uptake of materials is an important step in conducting evaluations of educational materials. Families who actually reviewed the intervention materials had almost double the odds of improving their safe play areas and even fencing these areas compared with those who did not review materials. Families who read the materials also had 3.7 times the odds of creating a new fenced-in play area compared to families who did not read the materials (OR=3.79, 95% CL=1.88, 7.65).

II.

Translation of Findings

The American Academy of Pediatrics' top recommended strategy to prevention of child agricultural injuries is to separate the child from hazards (like tractors, machinery and animals) on the farm by use of fenced in play areas (American Academy of Pediatrics, 2001). Motivating farm families to adopt this resource-intensive act of creating a safe play area is not easy task, however. Our research first provides some important baseline information about the current practices and attitudes of farm families about safe play areas on the farm. First, we found that while about ¾ of all families with young children on the farm have a designated play are for their children, only 11% are actually fenced. Our research also establishes a strong linkage between behaviors (adoption of a fenced-in play area) and attitudes. Creating a play area that is safe and fenced-in, therefore, requires changes in attitudes, beliefs, perceived barriers and control of children's risky behaviors. We also know from previous studies that money is a commonly perceived barrier.

Using a randomized controlled design, the most rigorous intervention design, we examined how the "Safe Play Areas on Farms" educational materials by itself and with an incentive changes attitudes, motivation and behaviors. First, these materials motivated families to make improvements to existing play areas on their farms so they are safer, either by creating a fence, improving the ground cover, enhancing supervision or even inspecting for sharp or entrapment hazards. For families who do not have designated play areas, the program motivated them to develop a new safe play are on the farm. Providing incentives is therefore a motivating force.

At 12 months follow-up, we also found that parental safety behaviors did change. The greatest impact was found among families who did not previously have a safe play area on the farm. When given the Safe Play Areas on Farms materials with an incentive, they were almost five times more likely to create a new safe play area on the farm. But, providing the materials alone

was also effective, leading to a 2.6 increased odds of creating a new safe play area. These findings have important implications for translation and dissemination. First, we know that incentives can be quite a powerful if available, especially for new farm parents of young children. We also found a powerful effect when the intervention materials were actually read.

The next steps for dissemination should therefore involve partnerships with entities that might have great influence on young farm families, including pre-schools, pediatricians, possibly faith-based organizations, and insurance agencies. Another program with great potential is the Young Farmer and Rancher programs that target young women and men between the ages of 18-35. These agencies certainly could deliver these materials passively or more actively with encouragement to review and read its content.

In another study conducted by our team to explore dissemination methods, we identified a number of avenues for disseminating the "Safe Play Areas on Farms" materials, including digital media, print media communications, and interpersonal communications methods. In developing the content for delivery, some elements of the current "Safe Play Areas on Farms" program may need to be streamlined for delivery say through email which then needs to be reduced to key messages.

A second question is the offering of incentives, which we have already found to be quite effective in motivating as well as inducing some changes in behavior. Identifying the funding to support incentives is not so easy. However, partnerships with industry especially insurance companies have some potential. Hence, in moving towards translation of the "Safe Play Areas on Farms" program into practice will involve strategic partnerships for both inexpensive delivery of written materials as well as some effort to identify sponsors for monetary incentives.

Outcomes and Impact

This is the first large-scale randomized trial of an incentivized and non-incentivized version of the "Safe Play Areas on Farms" educational program. We provided strong evidence of its effectiveness in changing safety behaviors in farm families of young children who have not considered creating fenced-in play areas on their farm or ranch. The program itself led to more than double the odds of creating a new safe play area for young children, and when incentivized the odds increased to more than four. Among families who already had play areas of their farm or ranch, the intervention even without incentive still led to improvements but these were not statistically significant. However, when we focused our analysis on families who in fact read the materials, there was a statistically significant improvement of their existing play areas. In sum, our study provides the first rigorous evidence-base for the Safe Play Areas on Farm program.

The next step of this research on educational materials is to find alternative modes of delivery that enhance reach and uptake of materials. It is clear that reading and referring to the written documents can lead to increased impact. Passive delivery through the mail is one means; however, other avenues for dissemination must be explored scientifically.

This project demonstrates the effectiveness of educational materials along with incentives. Interestingly, even the offer of an incentive alone was enough to motivate families and improve some of the behavioral outcomes of interest. And, in fact, only nine of the 150 offered the $500 incentive actually applied and received it. Incentive structures may also need to be explored further as a means for changing health and safety behaviors.

Finally, our research used process evaluation methods that tend to be neglected in intervention science studies. By conducting a process evaluation, we were able to evaluate some key immediate outputs of intervention studies, including process indicators of reach, uptake of materials (comprehension, perceived helpfulness, reading of materials) as well as motivation. These immediate outcomes should be thoroughly evaluated in intervention studies.

Our research also addressed other types of outcomes that impact the safety of young children on the farm, including attitudes, beliefs and barriers of parents. By collecting these indicators, we gained a better understand some of influencing factors for adopting safety behaviors on the farm.

Finally, this study has demonstrated potential in protecting against death and injury to young children on the farm. More than double to over quadruple the number of families created new fenced-in play areas after receiving "Safe Play Areas on Farm." This strategy of fencing in the play area is in fact a key primary prevention approach that ultimately keeps children free from hazards that could lead to death and injury on the farm.

References

Ajzen, I (1991). The Theory of Planned Behavior. Organizational Behavior and Human Decision Processes. Vol 50: 179-211.

Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. In J. Kuhl & J. Beckmann (Eds.), Action-control: From cognition to behavior (pp. 1 l-39). Heidelberg: Springer.

Ajzen, I. (2006). Constructing a theory of planned behavior questionnaire.

Blahey, G., Anderson D. (2008). Personal communication and email correspondence January.

Centers for Disease Control and Prevention. Child Agricultural Injury Prevention Initiative: Child agricultural injury survey results. http://www.cdc.gov/niosh/topics/childag/cais/default.html Accessed 7/25/14.

Committee on Injury and Poison Prevention and Committee on Community Health Services. (2001). Prevention of Agricultural Injuries among children and adolescents. Pediatrics. Vol 197: 1016-1019.

Esser, N., Lee, B. (2001). Both sides of the fence: Complex issues in agricultural health and safety. National Institute for Farm Safety Annual Conference Proceedings, Pittsburgh, PA.

Giles EL, Robalino S, McColl E, Sniehotta FF, Adams J. (2014). The effectiveness of financial incentives for health behavior change: systematic review and meta-analysis. PLOS one. Vol 9(3): e90347.

Hard DL, Myers JR (2006). Fatal work-related injuries in the agriculture production sector among youth in the United States, 1992-2002. J Agromedicine. Vol. 11:57-65.

Haines, M. P., Barker, G., & Rice, R. M. (2006). The personal protective behaviors of college student drinkers: Evidence of indigenous protective norms. *Journal of American College Health*, *55*(2), 69-76.

Johnson, K. E., & Taliaferro, L. A. (2012). Health behaviors and mental health of students attending alternative high schools: A review of the research literature. *Journal for specialists in pediatric nursing*, *17*(2), 79-97.

Kane RL, Johnson PE, Town RJ, Butler M. A structured review of the effect of economic incentives of consumers' preventive behavior. (2004). American Journal of Preventive Medicine. Vol 27(4):327-352.

Lee, B., Gallagher, S., Marlenga, B., Hard, D. (Eds.). (2002). Childhood agricultural injury prevention: Progress report and updated national action plan from the 2001 summit. Marshfield, WI: Marshfield Clinic.

Lee, B., Fisher, R., Westaby, J. (2007) Reasons influencing creation of safe play areas on farms. Published abstracts of National Institute for Farm Safety, Inc. Penticton, BC, June 25.

National Children's Center. 2014 Fact Sheet Childhood Agricultural Injuries in the U.S. http://www3.marshfieldclinic.org/proxy/MCRF-Centers-NFMC-NCCRAHS-2014_Child_Ag_Injury_FactSheet.1.pdf Accessed 7/25/14.

NCCRAHS. (2003). National Children's Center for Rural and Agricultural Health and Safety. Creating safe play areas on farms. Marshfield Clinic, Marshfield, WI.

NIOSH (2008b). Personal and email communication. John Meyers, March 12, 2008

Perkins, H. W. (2003). The emergence and evolution of the social norms approach to substance abuse prevention. *The social norms approach to preventing school and college age substance abuse*, 3-17.

Ramirez M, Yang J, Young T, Roth L, Garinger A, Snetselaar L, Peek-Asa C. Implementation evaluation of Steering Teens Safe: Engaging parents to deliver a new parent-based driving intervention to their teens. (2012). Health Education and Behavior. Vol 40(4):426-434.

Rivara, F.P. Fatal and non-fatal farm injuries to children and adolescents in the United States, 1990-3. Injury Prevention. Vol 3: 190-194.

Sleet, D.A., Hopkins, K.N., Olson, S.J. (2003). From discovery to delivery: injury prevention at the CDC. Health Promotion Practice. Vol 4: 98-102.

Westaby, J., Versenyi, A., Hausmann, R. (2005). Intentions to work during terminal illness: An exploratory study of antecedent conditions. Journal of Applied Psychology, 90, 1027-1035.

Westaby, J., Braithwaite, K. (2003). Specific factors underlying reemployment self-efficacy: Comparing control belief and motivational reason methods for the recently unemployed. Journal of Applied Behavioral Science, 39, 415 – 437.

Integrating Safety Guidelines for Adolescent Farm Workers into Field Supervisors' Practices

Principal Investigator: Barbara C. Lee, PhD

Background

Data collected by the National Agricultural Statistics Service and NIOSH from farm owners in 1998 indicated there were an estimated 666,500 youth who do not live on a farm but were hired to work on a farm. Of these, 387,500 were between the ages of 14 and 17 years; and 87% of these hired workers from 14 to 17 years of age were males. These data also indicated that about 254,000 youth, classified as migrant and seasonal laborers, were hired for the 1998 season (Myers and Hendricks, 2001).

According to a report based upon NAWS surveys, an estimated 126,000 teenagers (ages 14-17 years) performed agricultural fieldwork for wages each year from 1993 to 1998. Several key findings were noted about these adolescent farm workers: a) 76% are 16 or 17 years old and 84% are male; b) 52% are U.S. born and 48% are *de facto* emancipated minors; and c) a small portion of teen fieldworkers are local rural youths whose parents are not farm workers. This latter group comes from middle-class families to work in jobs such as detasseling corn on corporate farms; and d) the biggest demographic shift in teen farm workers is the growing number of emancipated minors, two-fifths of whom drop out of school, working more than 13 weeks per year. Extrapolating from NIOSH and NAWS data, there are more than 500,000 teens between 14 and 17 years hired as farm workers each year. Evidence suggested the population of hired adolescent farm workers will not be declining any time soon.

Over the past decades, federal and state-funded initiatives were undertaken to improve occupational health and safety training for young workers, but relatively little focus was given to adolescents hired to work in agriculture. The RFA (OH-08-006) for this application, Priority 1 called for "partnering with farmer-identified peer groups to …improve dissemination of farm safety resources and programs for …working youth." Priority 4 called for testing interventions to improve safe working conditions for young workers, including hired adolescent farm workers."

This project intended to use already developed resources and training venues to test a new method for conducting training and integrating resources into practices of field supervisors in labor-intensive agriculture. The project intended to involve representatives of labor intensive agriculture in all aspects of the project and its implementation and hoped to build trust and expand partnerships between researchers, safety advocates, and labor-intensive producers.

The long-term goal of this initiative is to improve agricultural supervisors' practices related to training and supervising adolescent farm workers. In 2007 a set of seven *Safety Guidelines for Hired Adolescent Farm Workers* (SaGHAF) were developed based on the successful model of the *North American Guidelines for Children's Agricultural Tasks*. Rather than simply distributing these safety training resources, the plan was to test two methods of integrating the SaGHAF into the performance expectations of agricultural work supervisors who are responsible for training adolescent (teen) workers.

Specific aims for meeting the goal of this translational project included:

Aim 1: Evaluate the impact of adding SaGHAF training workshops into two existing venues for supervisors of adolescent workers in agriculture.

Sub Aim 1.1: Measure areas of self-reported knowledge gain following participation in workshop training sessions.
Sub Aim 1.2: Assess behavioral intentions and underlying motives to use workshop materials.
Sub Aim 1.3: Assess self-reported behavioral practices pertaining to teen workers (including use of SaGHAF resources) eight months following the training.

Aim 2: Assess changes in agricultural owners/employers' performance expectations of their field supervisors pertaining to safety training and supervision of adolescent workers.

Sub Aim 2.1: Quantify the degree to which owners/employers added specific teen worker content into supervisors' safety manuals following participation in California or Washington workshops.
Sub Aim 2.2: Gather evidence from owners/employers regarding change in practices of supervisors pertaining to teen workers following workshop participation.

Aim 3: Identify gaps in resource content and prepare modifications based on end-user recommendations.

Sub Aim 3.1: Determine whether key content regarding jobs, regulations, characteristics of adolescents, training, and other relevant topics warrant addition to the resource posters or accompanying materials.
Sub Aim 3.2: Develop a plan to integrate recommended modifications to resources and performance improvement options, based on input and participation of employers/supervisors of adolescent farm workers and those organizations and consultants that provide safety training and materials to agricultural workers.

Aim 4: Propose long-term promotion and distribution of resources aimed toward integrating safety training and supervision of adolescent farm workers as a best management practice in labor-intensive agriculture.

Sub Aim 4.1: Identify major growers (and their respective associations) that routinely hire adolescent workers for labor-intensive, seasonal work in order to more effectively target promotion/distribution activities.
Sub Aim 4.2 Engage organizations, consultants and safety professionals in the process of integrating SaGHAF resources into ongoing programs and services.
Sub Aim 4.3: Facilitate ease of access to adolescent farm worker safety resources via multiple options, including websites of major agricultural organizations.

Methodology

A low-cost intervention, involving key stakeholders in the process, was proposed to identify optimal methods to integrate *Safety Guidelines for Hired Adolescent Farm Workers* (SaGHAF) into field supervisors' practices. This project used a combination of quantitative and qualitative approaches that engage the "community" in the process. Behavioral reasoning theory and organizational management principles would be used to gain insights into the reasons for and against successful adoption of the recommended supervisory practices. Project results were expected to guide future plans for broader promotion of SaGHAF via the risk control managers of major producers and their respective organizations (e.g., Washington Growers League, National Council of Agricultural Employers, Western Growers, etc.), as well as agricultural

safety professionals. California and Washington were chosen as test sites for this intervention because of the nature of their labor-intensive agriculture and their tendency to be early adopters of new agricultural technologies and production practices compared to other regions.

The project methodology applied a community-based participatory research approach, with the modification that the problem to be addressed has already been identified. Members of the project team at the outset were dedicated to the issue of adolescent farm workers and most had already met in person and/or by phone to consider the perspectives and desired outcomes of project participants and potential end-users. Those contributing to the plans included scientists, safety professionals, representatives of producers, and insurers.

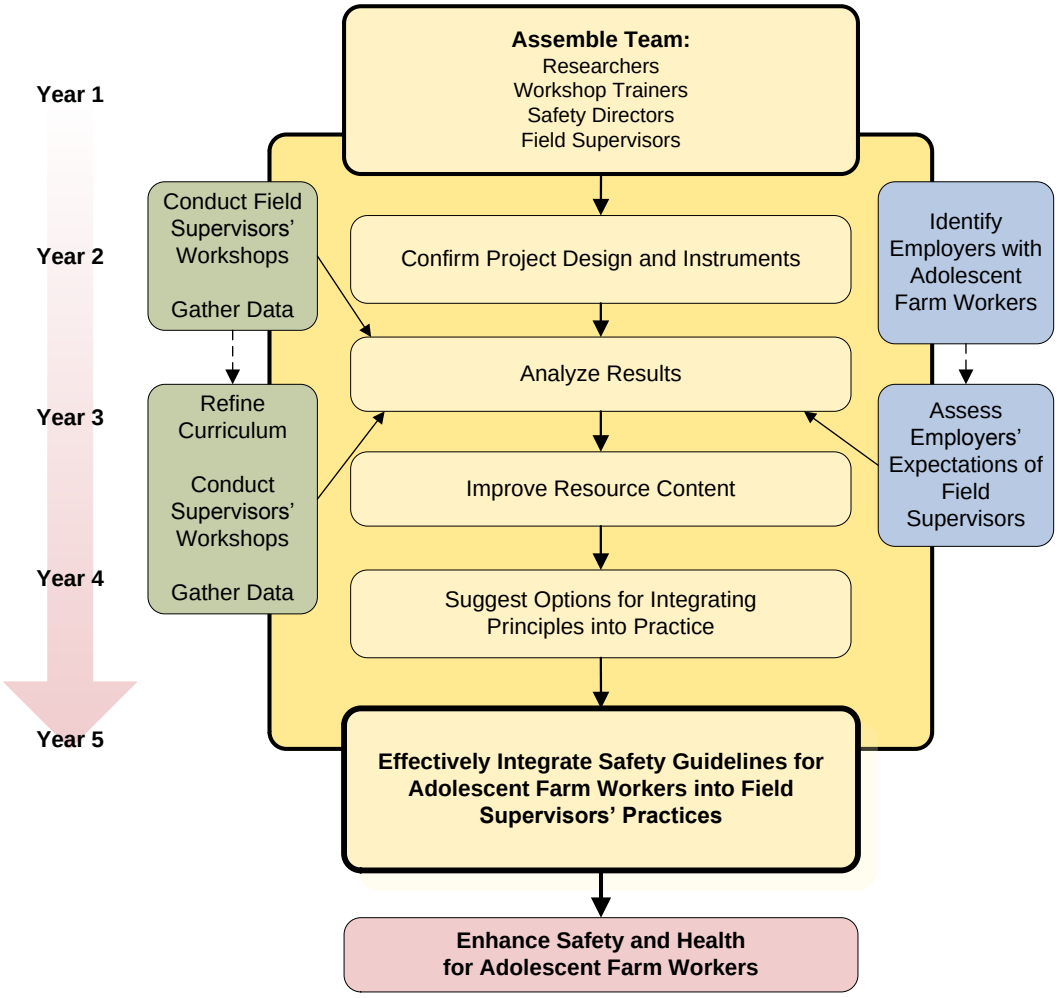


Figure 1: Project Design with Participation of Agricultural Community

Agricultural terms differ by region, commodity, and size of production firm. For purposes of describing this project, consistent terminology was employed with the following definitions:

Adolescent Farm Worker – a person from 12 through 17 years who is employed for work that is in compliance with state and federal regulations; within this proposal sometimes referred to as a teen worker.

Advisors – includes academic and corporate individuals whose current employment situation offers direct and easy access to several project activities, such as workshop trainings, interactions with labor contractors, or ergonomic recommendations for teen workers. Advisors participate in project planning meetings.

Community – the people whose lives and work are most closely affected by conditions associated with labor-intensive agriculture. Community members include owners of corporate and large family farms, their workers and family members, and the people who provide services to them, such as property insurers, workers compensation providers, suppliers, and equipment manufacturers.

Field Supervisor – refers to the individual with day-to-day contact with workers in the field. Many supervisors are year-round employees with responsibilities for knowing how to operate and maintain all equipment and to provide orientation to all new workers. In California most field supervisors are bilingual. Other terms for them may be crew leaders, general supervisors, or foremen.

Labor-Intensive Agriculture – refers to large-scale production of fruit, vegetables and specialty horticulture crops that require a significant amount of hand planting, hand harvesting or other manual labor. California has the largest and most complex agriculture labor market in the U.S. with more than 8.8 million acres of land producing 77 million tons in crops such as berries, melons and nuts (California Agriculture, 2004).

Owner/Employer – refers to the individual who bears accountability for the safety of the workforce on a farm, ranch, or orchard. In some cases the owner defers this to a Safety Director. Other terms might be Loss Control Manager, Human Resource Director (role sometimes includes safety responsibility), or Risk Manager. This individual is knowledgeable of OSHA requirements and state-specific regulations for worker safety. While some large scale operations contract with an independent Safety Services provider, the responsibility for worker safety ultimately rests with the owner/employer.

Researchers – those individuals who are not directly involved in the agricultural work, its management or worker training.

By the end of the second project year, the overall direction required a major adjustment. The project coordinator had resigned and it took nearly 12 months to fill the position and train new staff. About the same time, the project liaisons in both California and Washington indicated they had severe time constraints due to other job responsibilities and, thus, would need to reduce their commitment to intervention testing in their region. For about 10 months this project was put on hold. To capture the essence of the project with a change in the core team composition, new aims were proposed.

Two new project aims were developed for Phase II and submitted to NIOSH for approval.

Phase II Aim 1: Improve public access to the NAGCAT and SaGHAF work guidelines via a new website and a public awareness campaign driving farm parents to that website.

Phase II Aim 2: Develop a voluntary model policy for employing young workers in agriculture.

Methods for achieving the new Aim 1 involved developing a marketing proposal to work with an agricultural marketing firm and embarking on a 12-month project that involved the creative team of Broadhead, Inc. in collaboration with our NCCRAHS team members involved in the Stakeholders Communications project. Major steps included developing a marketing campaign message with print and audio outlets then creating a new website where farm parents could easily understand the why and how to protect children on farms.

For Aim 2, the methods involved working in collaboration with the National Council of Agricultural Employers (NCAE) to draft a voluntary model policy for employers who hire teenagers, primarily for seasonal work. Over the course of one year, there were eight teleconference calls where multiple drafts of the policy were reviewed.

Results

Tasks to address the original Aim 1 occurred during the first 2.5 project years. The first site where workshops were scheduled in 2009 and 2010 was the annual California AgSafe conference which includes credited courses for a safety certificate for front line supervisors (primarily hand harvested berries and vegetables). Over the 3-day conference, we had an exhibit space and convened two 2-hour workshops. Unfortunately, only three individuals participated in the workshops despite efforts to recruit additional attendees.

To assess participants' underlying behaviors and intentions, behavioral reasoning theory was used as the basis for a survey instrument that had been pilot tested in advance of the workshop. Variables included a) basic demographic profiles including type of agriculture; b) knowledge regarding work hazards and teen characteristics (i.e. information embedded with resource posters); c) reasons for and reasons against using workshop materials; d) suggestions for improving future trainings; and e) gaps in safety resources (content and medium) deemed useful by field supervisors. The survey instrument was used with the three participants and is now available for reference or adoption upon request.

A training resource was developed through a subcontract with Dr. Kent Anger of OHSU, based upon his successful development of C-Train curriculum and 9-button keyboard. Project staff assisted Dr. Anger in converting the SaGHAF resources into the C-Train format.

The results for Phase II Aim 1 – improving public access to work guidelines - provided several deliverables. Working with Broadhead, Inc, an agricultural marketing firm, the first result was a visually appealing and compelling message - "Parent First. Farmer Second" – which was as created for a public awareness campaign. Three styles of print ads were run in agricultural/trade magazines, newspapers, and websites. Radio messages were broadcasted. Metrics of website analytics, appearances of the ads in trade magazines, and radio messages were gathered and reported in the Stakeholder Communications report. The "Parent First. Farmer Second" print advertisement and radio messages won regional and national awards from the National Agricultural Marketing Association (NAMA) and the National Association of Farm Broadcasters (NAFB). Print and radio resources were distributed via jump drives at the National Association of Farm Broadcasters and preliminary follow up indicates that many of the recipients have aired the radio messages across the U.S.

The second result was a new website, www.cultivatesafety.org, developed to encourage parents to understand child development issues (via video) with respect to agricultural hazards. Additional information includes age-relevant work and risks, news clippings of recent childhood agricultural injuries/deaths, previously developed work guidelines and the updated youth tractor guidelines. This website has now become the primary outlet for all childhood agricultural safety information generated by NCCRAHS for public use.

Phase II, Aim 2 results yielded a new Model

Policy for Youth Employment in Agriculture. The "*Model Policy: Youth Employment in Agriculture*" was developed in collaboration with NCAE to promote best practices regarding youth employment, the work environment, voluntary guidelines for youth, and resources specifically for youth aged 14-17 years. The policy can be used "as is" or modified for agricultural company purposes. Initially, NCAE had intended to formally announce this Model Policy as endorsed by their organization. Unfortunately, when this option came before their Board of Directors, there was a dissenting opinion – not because of the policy contents but because of the organization's "policy on policies." In lieu of this being an NCAE policy, the decision was made to post and promote it as a NCCRAHS best practice.

Once finalized, the Model Policy was posted on the NCCRAHS website as well as Cultivate Safety public website. A press release regarding the model policy was issued and picked up by several agricultural trade journals. The Canadian Agricultural Safety Association adapted the Model Policy and distributed it (English and French versions). A presentation was given at the American Public Health Association meeting as well as the International Society for Agricultural Safety and Health. At the 2013 North American Agricultural Safety Summit, Frank Gasperini, NCAE Executive VP, gave a special presentation touting the importance of the model policy and continues to be a strong advocate for young workers within agribusiness employers. From his involvement with this project, Mr. Gasperini has now been invited to serve as a liaison with other youth agricultural safety endeavors.

Publications

Miller ME and Lee BC (2014). Developing a model policy on youth employment in agriculture. Journal of Agromedicine. 19:3, 249-257.

Model Policy: Miller ME, Salzwedel MA and Lee BC (2014). Model Policy: Youth Employment in Agriculture. National Children's Center for Rural and Agricultural Safety and Health. Marshfield, WI., accessible from http://www3.marshfieldclinic.org/nccrahs/?page=nccrahs_projects-products-model-policy

Materials available for other investigators

The survey instrument developed for the original Aim 1 is available for others to use as is or modify for their own purposes. The C-Train computer based curriculum has not been subjected to formal testing but is available as a reference for others to use. The Model Policy is also available upon request, along with the key references used for its development.

Stakeholder Communications

Principal Investigator: Barbara Lee, PhD
Project Manager: Scott Heiberger, MS
Project Participants: Barbara Marlenga, PhD, Matthew Keifer, MD, Marsha Salzwedel, MS, Tammy Ellis, BS, Bryan Weichelt, MBA

Background

The 2001 Summit on Childhood Agricultural Injury Prevention called for communications to be a central part of childhood agricultural injury prevention with its recommendation that, "Information regarding all aspects of this national childhood agricultural injury prevention initiative should be widely communicated". The RFA OH-08-006 required that a National Children's Center "identify, disseminate, and facilitate the use of state-of-the-art information and programs to prevent childhood agricultural injuries," and "partner with farmer-identified peer groups to raise awareness and improve dissemination of existing childhood farm safety resources." The Stakeholder Communications project was congruent with both of these guidance documents.

The Stakeholder Communications project was closely linked with all other components of the National Children's Center for Rural and Agricultural Health and Safety (NCCRAHS). Taken broadly, Stakeholder Communications has been the underpinning for all past and current NCCRAHS projects and materials, since the information archive for all these projects is accessed and maintained by Children's Center staff for individual resource assistance responses. Nearly every aspect of the Stakeholder Communications project built on some mode and level of communication that was refined over previous years. Individual resource assistance and requests for presentations and educational seminars refer to years of projects promulgated by the Children's Center and collaborators. The *Nurture* newsletter's wide distribution contributed to other electronic media, although printed copies remain important for distribution for certain populations and purposes. The Children's Center's website was expanded via collaborations and usability testing with Marshfield Clinic Research Foundation's Biomedical Informatics Research Center and their new facilities.

Specific aims

The specific aims for Stakeholder Communications are:

Aim 1: Provide relevant, timely, high quality individual resource assistance responses at an average of 30 per month.
Aim 2: Provide a minimum of six professional seminars and/or presentations annually.
Aim 3: Prepare and disseminate three newsletters annually and one annual report.
Aim 4: Create five patient education fact sheets for distribution by clinicians annually.
Aim 5: Maintain and update accessible websites, as documented by annual 10% increases in general and targeted web traffic (site hits).
Aim 6: Create one new web-based functionality annually for current and proposed Children's Center projects in partnership with the Biomedical Informatics Research Center (BIRC) through the Digital Dissemination program team.
Aim 7: Maintain and disseminate outputs from current and prior Children's Center projects, as documented by numbers of resource assistance requests and page-specific website traffic.

Methodology

Underlying all communications strategies used by Children's Center staff are the channels used to gain information about the concerns of farmers, farmworkers, agricultural employers, safety organizations and researchers. Some of these communications occur as a result of Children's Center staff involvement in external organization advisory boards, conferences, and various project meetings. Increasingly the Internet is being utilized as a primary communication tool for many of our stakeholders. Children's Center staff also maintain general awareness of issues and concerns within the agricultural community through regular review of farm newspapers, Internet sites, trade journals, participation in professional organizations, and media contributions. Whenever possible, staff actively participate in regional and national conferences by staffing exhibits, making presentations, and submitting scientific abstracts. Our Rural Health Communications Specialist, Scott Heiberger, conducts a daily scan of current news for staff reference and receives news "alerts" via the web. For example, he has monitored the Childhood Agricultural Safety Network's national public awareness campaign to "Keep Kids Away From Tractors" as it has continued to ripple through rural America. To assist the center with monitoring digital media, staff used a combination of tools including Meltwater Buzz, Google Alerts, and submissions from friends of NCCRAHS. Meltwater is a subscription-based, digital media searching platform used for historic searches and daily reports of child agricultural injury and death events reported by media. We set algorithmic search criteria to crawl the web for specific keyword combinations and phrases. Google Alerts offers similar, but more limited functionality through a free service.

A popular discussion thread emerged on www.TractorByNet.com on January 15, 2008 under the heading, "It's Easier to Bury a Tradition than a Child," one of the campaign's slogans. Through March 9, 2008, nearly 100 postings had been made and nearly 3,900 views registered. TractorByNet.com is an informational resource for compact tractor buyers and owners, and claims to reach more than 80 percent of the under-50 horsepower tractor market in the United States. We also subscribe to 10 farm journals; three farm newspapers; and receive more than 60 newsletters, trade journals, and commodity reports.

Results of Multiple Communication Projects

Our Center serves as a communication hub with strong links to agricultural print, radio and television reporters. Press releases inform the public of updated statistics on child ag injuries as well as new resources for injury prevention. Individuals and organizations across all 50 states interact with NCCRAHS staff, seeking consultation for educational resources, programs and referrals. Newsletters and social media posts provide frequent points of contact with public and professional audiences. During this grant period, topics of keen interest included: safety for agritourism operations, safe play areas on farms, work guidelines for family farm youth and guidance of employers of hired teen workers.

Methods of communication have expanded tremendously over the years. While many farmers still like print versions of resources and newsletters, others prefer to access information via the internet through websites and social media. This has necessitated the development of materials in a variety of different formats, allowing us to communicate with our stakeholders in a variety of ways. Digital development and dissemination of resources now accompany print versions of many of our resources. Following is a description of specific projects conducted this cycle.

North American Guidelines for Children's Agricultural Tasks (NAGCAT)

The North American Guidelines for Children's Agricultural Tasks (NAGCAT) were developed to assist parents in assigning farm jobs to their children 7-16 years of age living or working on farms. Guidelines were available for 62 different tasks. While lists of the guideline posters were

available online to professionals and groups who interact with farm parents, finding a guideline for a specific task was not always easy, given the number of guidelines. A searchable framework (http://www.nagcat.org/nagcat/?page=guideline_search) was developed that allows website users to search for guidelines by entering key words about farm tasks for children, the first of the digital dissemination projects. The search returns the guidelines which most closely match the tasks selected.

In addition to creating a searchable website for NAGCAT, twenty-two of the tractor related NAGCAT guidelines were updated, based on review of the scientific literature and recommendations of a core group of scientists, co-led by Barbara Marlenga, PhD of our Center and David Hard, PhD of NIOSH. Among the changes made was to eliminate the youngest age group (12-13 years) and updating the adult responsibilities, recommended supervision and personal protective equipment. Five new child developmental guidelines were also added, which outline developmental domains and their relationship to tractor operations.

Promotion and dissemination of these updates followed both upgrades. Dissemination efforts included press releases, media interviews, social media posts and knowledge dissemination through the Childhood Agricultural Safety Network and other similar groups. These guidelines have served as the primary reference for matching hazards and safety recommendations of agricultural jobs with the developmental level of the child since 1999. They have been and are still used by Farm Safety 4 Just Kids, SafeKids, Progressive Agriculture Foundation and others. These guidelines have been disseminated, adopted and further modified internationally (Canada, Sweden, Croatia, etc.). NCCRAHS also worked with NIOSH in 2011 to develop "A Story of Impact" that described NAGCAT and suggested the guidelines may have contributed to the decline in work-related childhood agricultural injuries. Numerous other related outcomes have occurred including

- Tractor manufacturers have endorsed distribution of work guidelines to retail customers.
- A Model Policy on Youth Employment in Agriculture was developed, then endorsed by a national agricultural employer organization. (Miller, ME, Lee, BC, 2014)
- A Position Statement for Youth Working with Grain was developed and released by the Grain Handling Coalition (Grain Handling Safety Coalition, 2014)
- Agriculture-related injuries to youth living, working, and visiting on farms declined by 61% from 1998 to 2012 (National Children's Center for Rural Agricultural and Safety, 2014).

Work Guidelines Resources Targeted for Key Groups

Another strategy for communicating with key stakeholders is the development of materials with selected resources targeted to their needs. After facilitating a presentation with the Association of Equipment Manufacturers (AEM), feedback indicated the need for resources focusing on farm equipment for this industry. A "Safety Guidelines for Youth Operating Farm Equipment" booklet was developed, which included selected guidelines from both NAGCAT and Safety Guidelines for Hired Adolescent Farm Workers (SaGHAF). SaGHAF guidelines include federal labor regulations and are designed specifically for supervisors and employers of hired youth. The "Safety Guidelines for Youth Operating Farm Equipment" booklet was introduced in a presentation at the 2014 John Deere Product Safety & Compliance Conference. Feedback from the conference indicated the booklet was well liked and would be utilized. The booklet is available in print and digital formats (https://www3.marshfieldclinic.org/proxy/MCRF-Centers-NFMC-SafetyGuidelines_for_YouthOperatingFarmEquipment.1.pdf). Since the introduction of the booklet, we have received requests from AGCO, John Deere and New Holland for booklets

and other safety information, including assistance with the development of a child agricultural safety webpage.

The value of a resource developed specifically to address the growing involvement of youth in community gardens was first addressed at a meeting convened by AGree (May, 2014 in Washington, D.C.) that was addressing options to increase youth interest in agricultural careers. It was again highlighted at a meeting of the National Women in Agriculture Association (NWIAA) Symposium in Georgia in 2014. While interacting with the Executive Director of NWIAA and others attending the symposium, it became evident that there was a gap in the information they were providing to their community garden organizers, specifically in safety. Further research identified community based agriculture (community gardens, urban gardens, etc.) as a growing trend in agriculture, but all programs identified exhibited the same gap in safety knowledge and dissemination. This identified need resulted in the development of the booklet "Community-Based Agriculture: Safety Guidelines for Youth Working in Gardens".

The "Gardens" booklet contains selected NAGCAT and SaGHAF guidelines, as well as some background information and other information which needs to be considered. The booklet is now available in both print and digital formats (https://www3.marshfieldclinic.org/proxy/MCRF-Centers-NFMC-NCCRAHS_Community_Garden_Booklet.1.pdf). The booklet was recently finalized and printed, and early indications are that it will be in high demand. More than 300 Garden Safety booklets have been distributed upon request to over 20 organizations. Divisions of the USDA and CDC have promoted the booklet through their listservs, and the national Farm-to-School program has featured it in their online resource database. More information is available in the "Guidelines for Children's Work in Agriculture" information sheet (Appenidix B).

Safe Play Areas on Farms

A "Safe Play Interactive Map" was the second digital dissemination project undertaken by NCCRAHS. The goal of this project was to add a new web-based functionality, enabling the user to easily access the resources needed to create a children's safe play area on their farm. The map features an interactive Safe Play Area guide in a 3D modeled. The guide highlights key elements such as fencing, ground cover, play activities, supervision, proper distancing between play structures and injury prevention.

In 2010, NCCRAHS built a web-based interactive map for farm parents to easily access the resources needed to create a children's safe play area on their farm. NCCRAHS worked with the Biomedical Informatics Research Center (BIRC) web development team to visually display the key elements needed to create or improve a play area including: fencing, ground cover, play activities, proper distancing between play structures and how to prevent injuries. The map can be found at: www.marshfieldclinic.org/keystocreate.

In 2010, to address the needs of farm parents, the Center published an English and Spanish mini-edition of the "Creating Safe Play Areas on Farms" booklet specific for this audience along with fact sheets on low cost play ideas. In 2012, the Safe Play resources were reviewed and updated with information from the Consumer Product Safety Commission Public Playground Safety Handbook.

Promotion and dissemination of safe play resources, including the interactive map, has been widespread. Media releases are done each spring and throughout the year, as well as posting to social media sites. Demonstration play areas have been set up at Wisconsin Farm Technology Days, and safe play is included in an average of 20 educational outreach events each year. Numerous hard copies of the Safe Play resources have been distributed, as well as

promotional items such as bookmarks, notepads and rulers. The website has had thousands of hits and resource downloads. More information is available in the "Safe Play Areas for Children on Farms" information sheet (see Appendix B).

Agritourism Health and Safety Guidelines

The Agritourism Health and Safety Guidelines for Youth, which are designed to help farmers implement safety strategies for children who visit their farms, were introduced in 2007. Due to numerous requests by farmers, the "checklist" items in the resources were used to create two supplemental stand-alone checklists, a "Policies and Procedures Guide" and a "Worksite Guide". These resources were then used by the North Carolina Agromedicine Institute and a farm in North Carolina, Lazy O' Farms, to acquire a mini-grant through NCCRAHS, to implement safety strategies outlined in these guidelines. The farm owners worked with their insurance company, as well, and in addition to increasing safety on the farm, they also received a significant reduction in their insurance premium (Tutor-Marcom, et-al, 2013).

The Agritourism Health and Safety Guidelines for Youth booklet was then updated in late 2010 and early 2011, ensuring all materials would be up to date prior to developing digital resources. Providing digital access to agritourism resources was the basis for the third digital dissemination project, which was undertaken in late 2011 (delayed due to lack of staff). This project culminated in the interactive website, "Integrating Safety into Agritourism" (www.safeagritourism.com). Prior discussions with agritourism operators at conferences and on farms had resulted in requests for NCCRAHS staff to "walk through" their operations and identify safety issues. This concept was used in this project to help develop "interactive walkthroughs" that farmers can use to help them learn how to identify health and safety issues on their own operations. The walkthroughs, which include the health and safety guidelines, are accompanied by a downloadable checklist which can be printed, and the farmer can use it to "walk through" his own operation and identify safety issues. Once the safety issues are identified, the viewer can download free resources from the website to address them. The digital dissemination project for agritourism was guided by an advisory team whose members included agritourism owner/operators, agritourism association representatives, safety professionals and computer/information systems staff. A "Contact Us" page (originally a "Feedback" page), allows farmers to contact NCCRAHS staff with questions, suggestions or to share resources.

As more farmers continued to add agritourism activities to their farms to help diversify revenues, the types of activities offered also continued to grow. A survey conducted by NCCRAHS in the spring of 2014 helped identify gaps in the Agritourism Health and Safety Guidelines resources, indicating the need to update the materials. As the survey also indicated that the majority of the farmers accessed information via the internet, it was determined that updates to the website "Integrating Safety into Agritourism" would be the main priority. Updates to the website included re-designing the homepage, expanding animal safety information by splitting the material into two walkthroughs (Petting Zoos and Large Animal Safety), adding extensive materials for Play Areas, updating the Emergency Prep and Planning materials and adding information and resources for "Inflatable Rides".

Promotion and dissemination of these updates followed both upgrades. Dissemination efforts included press releases, media interviews, social media posts and knowledge/resource dissemination through the Childhood Agricultural Safety Network, the North American Farm Direct Marketing Association (NAFDMA) and other similar groups. The website and updated resources were well received, resulting in numerous requests for materials, presentations and thousands of website hits. In addition, NAFDMA endorsed these guidelines as "best practices" and Charlie Touchette, the Executive Director of NAFDMA said: "*The work you are doing is*

hugely important to the operators and the public that drives the growth of the industry we are ALL part of..." (Personal communication, 3/27/2012). More information on activities and outcomes is available in the "Integrating Safety into Agritourism Operations" information sheet (Appendix B)

Cultivate Safety Website

In 2012, feedback from various users of the NCCRAHS website (www.marshfieldclinic.org/nccrahs) indicated that farm families had found navigating the website and finding information to be challenging. A project that would minimize injuries and fatalities to children by providing easy access to safety strategies for the parents to use was launched. As part of this project, the Cultivate Safety website (www.cultivatesafety.org) was developed in an effort to make safety materials more accessible to farm parents. The Cultivate Safety website provides one-stop shopping for parents seeking tips on how to keep children safe while they work and play on farms. The website includes easy-to-use information about child development (including videos featuring David Schwebel, PhD), best-practice work guidelines and safe play areas. An interactive feature allows users to upload stories, videos and photos about child injuries, so farm families can learn from one another. Prevention briefs, included on the website, also help parents understand how to prevent injuries.

NCCRAHS partnered with Broadhead Inc. to develop the media campaign "Parent First, Farmer Second" which promoted parent accountability and was designed to motivate farm parents by acknowledging the many important roles that farmers have, while reminding them that the most important responsibility is keeping their children safe. The media campaign then directs farm parents to the Cultivate Safety website. The website was released in early 2013 in Wisconsin. Three print ads, two radio ads and internet ads help direct traffic to the website.

Promotion and dissemination efforts resulted in thousands of visitors to the website. The campaign won the 2013 Plambeck Award, Best Series, for "You're a Parent First, Farmer Second" campaign. The campaign won a first-place award for "radio ad series" from the National Agri-Marketing Association (NAMA). The radio series also won first place in the NAMA Regional contest, as did the Cultivate Safety print ad series. More information on activities and outcomes is available in the "Parent First. Farmer Second, Cultivate Safety Campaign" information sheet (Appendix B)

News Clippings Assessment

To better understand the value of information in news reports of agriculture-related childhood injuries and deaths, a pilot study was conducted in late 2014. The basis for this study was the experience of getting reporters to include details such as presence/absence of seat belt use when reporting motor vehicle crashes. The practice of including such detail ultimately influenced social norms and state policies. Staff realized that if reporters of childhood agricultural injuries/deaths included details about unsafe practices (e.g. child riding on fender; youth operating tractor that did not have ROPS), might eventually influence social norms and policy.

About 100 news clipping reports from the previous five years were double-checked for presence or absence of certain variables. An assessment of findings and future implications is now underway.

News Clippings Database

NCCRAHS has been collecting news clippings on child agricultural injuries and fatalities for years. Initially collecting print copies of news articles, NCCRAHS has since added digital media to the collection. These "news clips" were collected through the print subscriptions that

NCCRAHS receives, as well as through digital monitoring (e.g. Google Alerts, Meltwater Buzz) and are sometimes submitted to NCCRAHS staff by others. These news clips are shared via email with the Childhood Agricultural Safety Network (CASN). NCCRAHS also receives requests from media for news clips information to use as background, from other safety professionals to use in presentations and publications and numerous others. With no official data set on childhood agricultural injuries and fatalities, news clippings can be helpful in understanding the scope of the problem. The request received by NCCRAHS, as well as the use of news clips by NCCRAHS staff in their research, presentations and publications, spurred the development of the News Clippings database.

This database, the final digital dissemination project developed by NCCRAHs in this period, is a web-based database that can store, search and report news clippings. The database allows for searching of the news clips, based on a variety of parameters, including injury agent, year, state, age of victim, etc. Searches can also be done using keywords. To date, more than 500 clippings have been loaded into the system, with more being added every day. The site will soon be available for public use at www.AgInjuryNews.org. Once the site is publicly available, promotion and knowledge dissemination, similar to that done for other projects, will ensue.

Media Relations

The National Children's Center works closely with its media partners to disseminate safety and health information, and to educate them regarding the predictability and preventability of childhood agricultural injuries. The Center does this with: 1) a dedicated Communications Specialist; 2) an annual Journalists Workshop; 3) Media Contact Database; 4) Press Releases; and 5) Social Media.

The Communications Specialist helps ensure that the Center provides a quick response to media inquiries and a timely, proactive flow of safety and health information. The specialist is charged with facilitating interviews and providing reliable information to meet media deadlines.

A Journalists Workshop was conducted from 2004 through 2008, co-hosted with a different NIOSH ag center each year. A how-to booklet, "Agricultural Safety and Health Workshops for Journalists: Strategies that Work," (http://www3.marshfieldclinic.org/proxy/MCRF-Centers-NFMC-NCCRAHS-JWStrategiesthatwork.1.pdf), served as an impetus for the workshop, "A New Approach to Farm Safety Communications," sponsored by the Canadian Agricultural Safety Association, 2013; and "Injuries and Agriculture: Telling the Story," scheduled for July 30-31, 2015, hosted by the Iowa Center for Agricultural Safety and Health. The Children's Center Journalists' Workshop series also sparked development of a one-page fact sheet, "Media Guidelines for Agricultural Safety," produced by the Childhood Agricultural Safety Network based on feedback from workshop attendees. The Media Guidelines help journalists to safely depict farming practices in words and pictures. "I headed to your media tips page before writing my article on the 13-year-old boy who died on the skid steer," said a reporter for The Country Today newspaper, Eau Claire, WI, December 2013. "I do try to adhere to those tips and stay away from using 'accident' or 'freak accident' in my coverage."

A Media Contact Database containing more than 300 names allows the Children's Center to target press releases to state, regional and national media. The database includes not only agricultural and mainstream journalists, but agricultural communicators who work for advertising agencies, commodity groups, producer groups and agribusiness.

Approximately 30 press releases were disseminated annually via targeted email and social media, announcing new products, new data or new initiatives. The releases usually are written

as standalone pieces, adhering to journalistic standards of balance and brevity to increase odds of being used whole. A particularly effective release, re-launching the CASN "Keep Kids Away from Tractors" campaign in April 2014, used a tough love approach, acknowledging that the campaign message of keeping kids younger than 12 away from tractors is seen as "controversial and blunt" by many. Within three weeks the release provided the basis for articles featured by four news organizations with national reach: Farm Progress Publications; Milwaukee Journal Sentinel; Gannett Wisconsin; and the Associated Press.

The Web and Social Media provide an ever-growing pathway of dissemination. The Children's Center is active on Facebook, Twitter, YouTube and Pinterest. Posts refer readers to Children's Center releases and resources, as well as highlight upcoming outreach events, visitors to the Center and other items of general safety and health interest found on the Web. The Center regularly convenes meetings of its Web Committee and Social Media Committee to plan upcoming posts and keep content fresh.

Website Updates

All NCCRAHS websites are reviewed on a monthly basis by a Website Committee. Content is discussed, as well as other websites features such as appearance and functionality. Content is updated as needed, often on a weekly basis, whenever relevant information or content is identified. Many of the website pages that address specific projects and/or resources have shortened URLs, to make sharing links and accessing the materials easier.

All feedback from users is acknowledge and reviewed when received, and action is taken if appropriate. There was an average 15% increase in general and targeted web traffic each year of this cycle. From Oct 1, 2008-Jan 30, 2015 we had 35,323 website visits to the Children's Center website, or an average of 470/month. Visitors from month to month fluctuate with the campaigns and press releases that are published.

Technical Assistance

NCCRAHS receives and responds to numerous requests for technical assistance each month. Types of requests received include requests for materials and resources, professional consultations, presentation requests, exhibit and sponsorship requests and more. In 2013, NCCRAHS developed a new Technical Assistance database with improved functionality. The new database can easily track technical assistance requests, note which requests are complete, and generate reports.

The Children's Center continues to provide relevant, timely technical assistance responses. From October 2008-January 2015 NCCRAHS has handled 530 requests. Sixty four percent of the requests originated for resources, followed by 12% for consultations and 24% for other activities. This number is lower than our original aim since all of our resources are now online. Our overall website traffic has increased (90%) along with more page views (78%) and 20,070 downloads of resources. Further, NCCRAHS responded to 81 requests for professional seminars and/or general presentations, with an average of 14 presentations annually.

NCCRAHS Resources

In addition to the resources developed from projects and through the CASN group, NCCRAHS also maintains other resources. The NCCRAHS Center Fact Sheet is a resource sheet which describes our center, current projects and the websites that NCCRAHS maintains. The Childhood Agricultural Injury Fact Sheet is updated yearly by NCCRAHS and contains information on injury and fatality statistics, costs, trends and other information. While there is no central database on childhood agricultural injuries or fatalities, this fact sheet is drawn from the

best available data. Staff also developed a “NCCRAHS Resource Sheet” for inclusion in a publication of Current Problems in Pediatrics (Wright, Marlenga, Lee, 2013). Subsequently, the chart was enhanced and printed to provide information and web links to all current resources and materials, along with contact information.

In 2009, we worked with Marshfield Clinic Patient Education to format our resources for the internal clinic KRAMES system and KRAMES on demand (https://www.kramesondemand.com/Bookmarks.aspx) for clinicians. We have resources available for parents with young children (Children and Dairy Chemicals) and resources for working adolescents (Back Pain, Skin Cancer, Silo Gas, Dusts and Molds, Eye Protection, Manure Gas, Respirators and the Agricultural Health and Safety Checklist). In 2014, we added resources for identifying ticks that carry Lyme Disease and updated the content on all the 2009 Fact Sheets.

Child Labor Laws – Proposed Changes

The US Department of Labor’s proposed updates to the federal child agricultural labor laws touched off more than a year of intense media coverage and debate on social media, ending with the department’s withdrawal of those proposed changes in April 2013. The Children’s Center devoted extensive staff time to address misconceptions and offer perspectives. Proactive communication strategies occurred via press releases, social media outlets, letters to editors, and involvement of the Communication Specialist in professional news media groups. Mary Miller, our child labor consultant, worked with the US Department of Labor’s Art Kerschner to produce a four-page Children’s Center document that provided background on child ag labor in the United States and compared proposed changes with the current laws. This document was published September 2011 to provide a clear explanation of the changes before the comment period. The Communications Specialist authored and co-authored two Journal of Agromedicine editorials regarding the proposed changes, one of which focused on lessons learned from the media coverage. In addition, the Children’s Center posted a Position Statement online. Although the proposed changes were withdrawn, the debate raised the profile of child ag safety and yielded additional media contacts.

Nurture

Nurture provides a regular reminder of our services to safety professionals, media, public health officials, agricultural leaders and others who influence agricultural health and safety. It is published three times per year with an annual report serving as the “fourth” issue. Feedback from readers has provided suggestions for improving our newsletter, which has been published since 1998. *Nurture* made a successful transition to email delivery. Print copies continue to be made available for those who prefer hard copy and for outreach events. Its primary goal is to translate promising prevention or intervention findings into applied safety programs related to childhood agricultural injury prevention. It is truly a “national” newsletter in that story ideas and content are solicited before each issue. We work with our NIOSH Child Agricultural Safety liaisons, NIOSH-funded Agricultural Research Center Directors, and CDC-funded Injury Centers to ensure that the newsletter is a tool to disseminate new knowledge regarding national child agricultural health and safety issues. We repurpose content of *Nurture* so that it can be carried in other related publications of local, state, regional, and national organizations. The lead story in each *Nurture* is typically used as a press release as well. One such story/press release, describing the “Integrating Safety into Agritourism” interactive web guide, was picked up by the American Farm Bureau Federation “Rural Community Building” blog in September 2012.

Year in Review (Annual Report)

An annual recap of Center activities, this publication serves as the "fourth" issue of *Nurture*. Typically about 32 pages in length, the Year in Review is e-mailed to those on the regular *Nurture* list and an additional 200 or so hard copies are distributed throughout the year.
x The Annual Report includes project work from the NCCRAHS along with that of the National Farm Medicine Center and the NIOSH-funded Upper Midwest Agricultural Safety Health (UMASH) Center.

Journal of Agromedicine

The Journal of Agromedicine is a peer-reviewed quarterly that publishes original research, special features, brief reports and editorials dedicated to human health and safety in agriculture. The Journal is published by Taylor and Francis Group and first received an Impact Factor in 2012. Its managing editor is Scott Heiberger, Communications Specialist for the Children's Center. The Journal regularly publishes articles addressing childhood agricultural safety and health. The Journal dedicated Volume 17, Issue 2 (2012) to the Blueprint, with 15-full length manuscripts and accompanying editorials. In these papers, scholars in various disciplines generated recommendations for research, programs, policy, dissemination and other topics based upon their areas of expertise. Topics included: data collection, agricultural labor regulations worldwide, partnering strategies, role of social media, child care services and trends in protecting working children.

Child Death Review

During the final project year, the National Children's Center partnered with the National Center for the Review and Prevention of Child Deaths (NCRPCD) to refine the review and case reporting system for childhood agricultural injury deaths. The goal was to support and improve the childhood agricultural injury data collection process and data quality in order to better address causation, gaps in knowledge, and development of prevention strategies. Directed by Barbara Marlenga, PhD, a series of teleconference calls were convened. In addition, meetings with regional Child Death Review team members were convened to learn how best to achieve the desired outcomes.

Over a 12 month period, the project allowed NCCRAHS to forge a new partnership with NCRPCD, with whom we had not worked previously. Together, they developed a Guide to Effective Review of Farm-Related Deaths to be used by Child Death Review Teams across the U.S. In addition, they developed a chapter in the NCRPCD web-based curriculum on farm-related deaths to be used for training Child Death Review teams across the U.S.

Publications

Heiberger, S. Lessons Learned from the Child Agricultural Labor Law Debate" (J Agromedicine. 2012;17(4):351-353).

Tutor-Marcom R, Greer A, Clay M, Ellis T, Thompson T, Adam-Samura ES., (2013). Qualitative Assessment of Agritourism Safety Guidelines: a Demonstration Project. J Agromedicine, 2013;18(2):107-16.

Wright S, Marlenga B, Lee BC. Childhood Agricultural Injuries: An Update for Clinicians. *Current Problems in Pediatric and Adolescent Health Care. 2013;* 43(2): 19-46

Materials available for other investigators

All resources developed from the Center are posted on the website and available for free download. Print copies are available upon request. Additionally, there is a “Limited Use Agreement” that allows a requestor to co-brand any of the NCCRAHS resources.

Literature cited

Miller, ME, Lee, BC. Developing a model policy for youth employment in agriculture. *J Agromedicine* 2014; 19 (3): 249-257.

Grain Handling Safety Coalition (2014). Position statement for youth working with grain (retrieved from http://grainsafety.org/young-workers/) .

National Children’s Center for Rural and Agricultural Health and Safety. *2014 Fact Sheet: Childhood agricultural injuries in the U.S*. Marshfield Clinic.

Childhood Agricultural Safety Network

Principal Investigator: Barbara C. Lee, PhD
Project Coordinator: Marsha Salzwedel, MS

Background

Different organizations have developed programs to enhance child agricultural safety and health over the years. Unfortunately, these efforts sometimes resulted in duplication of effort, conflicting messages, and competition rather than cooperation, thus highlighting the need for a "united voice." This project was responsive to the RFA that calls for a National Center to "establish linkages and partnerships with the agricultural community to facilitate childhood agricultural injury prevention" (RFAOH-08-006). This initiative addressed two priorities set forth in the RFA by NIOSH: a) partnering with farmer-identified peer groups to raise awareness and improve dissemination of existing childhood farm safety resources and programs for non-working children and working youth, and 2) developing effective networks and organization partnerships to address prevention of childhood agricultural injuries and fatalities via national-level initiatives, including public awareness campaigns. The Childhood Agricultural Safety Network (CASN) was first established as a loose-knit coalition in 2001 and continues to this day. This reports describes major activities during the 6-year cycle of this award.

The value of coalitions or networks for promoting behavioral change is evidenced in the "spectrum of prevention" conceptual model (Cohen and Swift, 1999; Figure 1). First presented by Larry Cohen in the late 1980s, based on years of injury prevention education and outreach efforts, this model proposes six levels of injury prevention that address increasingly effective spheres of influence for changing behaviors. Each level in the spectrum is important, and effective injury prevention has elements of each level. At the first level, individual educational approaches are used to strengthen individual knowledge and skills. The second level involves community-based education approaches, followed by professional education and train-the-trainer approaches. The fourth level addresses fostering coalitions and networks to expand the influence of injury prevention efforts. The fifth level is that of changing organizational practices, while the sixth level is that of influencing policy and legislation. Thus, by attempting to prevent injuries through a network of organizations, our efforts reach all levels of the spectrum. CASN members engage in activities ranging from educational activities to influencing organizational and public policy.

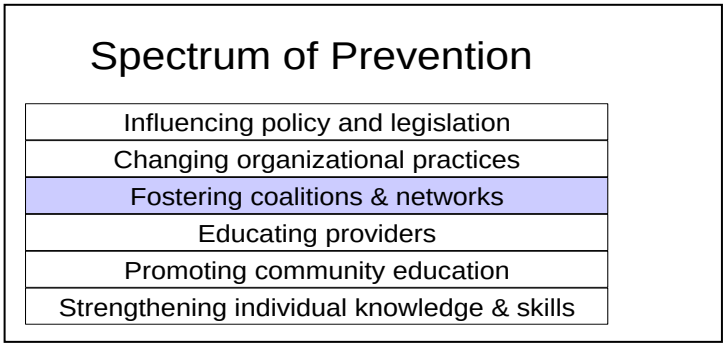


Figure 1: Spectrum of Prevention Model (Cohen and Swift, 1999)

The CASN member organizations have made great strides in building bridges and developing trusting relationships among agricultural safety groups and farm organizations through effective communication and joint efforts. This is evident through the various member organizations currently involved in CASN. The continuation of this trust, respect, and appreciation for all stakeholders is imperative for addressing long-term solutions, such as child labor regulations, and for developing and implementing strategies to protect children who are exposed to agricultural hazards.

This project reflected the "charge" of the National Occupational Research Agenda (NORA) Agricultural, Forestry, and Fishing (AgFF) Sector Council to "maximize impact through partnerships by promoting widespread adoption of improved workplace practices based on research results." A number of CASN members were also involved in the NORA AgFF Sector Council, including Marilyn Adams of Farm Safety 4 Just Kids, David Strauss of Association of Farmworker Opportunity Programs, Sharon Hughes of National Council of Agricultural Employers, Deliana Garcia of Migrant Clinicians Network, and Pedro Serano of Washington Dept. of Labor and Industries.

Prevention strategies related to children and agricultural injury can be quite complex, and recommendations may meet resistance by the very same people they are intended to help (e.g., farmers resisting rollover protective structures on tractors). Individually, organizations lack collective perspectives, and there is not any easy mechanism to interact and debate new or complex issues. Individuals and groups interested in this topic have been segmented, coming from a variety of disciplines, geographic regions, ethnic backgrounds, and agricultural experiences. Without the advantage of cross-fertilization of perspectives on problems and their solutions, we do not benefit from each other's experiences. The CASN has been a mechanism to develop a united voice for safety campaigns and for response to emerging issues.

For this grant period (2008-2014), the overall goal was to strengthen partnerships and collaborative initiatives among the CASN group, including minority-serving associations.

Specific aims

Aim 1: Enhance the individual knowledge and organizational capacity of CASN members to address childhood agricultural injury prevention.
Aim 1a: Facilitate knowledge sharing that helps shape organizational positions on complex or controversial issues.
Aim 1b: Increase organizational commitment to address childhood agricultural health and safety within their overall mission.

Aim 2: Strengthen partnerships by improving the quality of communications and collaborative efforts among CASN members.
Aim 2a: Facilitate information dissemination and sharing across CASN organizations.
Aim 2b: Facilitate active involvement of CASN members in specific intervention projects.
Aim 2c: Maintain and improve the CASN website as a vehicle for sharing pertinent information and as a public relations tool.

Aim 3: Expand the CASN composition and gradually transition CASN into the private sector, independent of NIOSH funding.
Aim 3a: Add new members representing key stakeholder groups that are positioned to influence agricultural health and safety practices.

Aim 3b: Utilize evaluation feedback to guide plans for transitioning the role of CASN coordination away from the Children's Center into a non-NIOSH-funded system or organization.
Aim 3c: Encourage other CASN member organization leaders to assume leadership roles within the CASN framework.

Aim 4: Expand upon the CASN Public Awareness Campaign framework to address emerging and priority issues in childhood agricultural safety.
Aim 4a: Develop and implement an action plan to identify and create resource materials for new campaigns in 2009 and 2011.
Aim 4b: Coordinate dissemination of campaign messages to key stakeholder groups.

Aim 5: Facilitate the translation of childhood agricultural injury prevention knowledge into practice through CASN members.
Aim 5a: Involve CASN members as key participants in the "Blueprint for Knowledge Translation" project (Outreach Project 3).
Aim 5b: Assist CASN members in updating their respective resources and safety messages to be aligned with current research and injury data evidence.

Aim 6: Document lessons learned from Internal Coalition Outcomes Hierarchy (changed from Network Goal Theory*) and CASN outcomes.
Aim 6a: Evaluate the current interactions and behaviors among CASN members based upon Internal Coalition Outcomes Hierarchy (changed from Network Goal Theory*).
Aim 6b: Prepare, publish and disseminate theory-driven results from assessment of CASN member behaviors and outcomes.

Methodology

Different methods were employed to achieve the various aims. As an Outreach endeavor of the Center, most activities relied on simple communication strategies, including teleconferences and listserve electronic messaging. A dedicated CASN website served as a communication hub. Once a year an in-person 4-5 hour dinner meeting was convened, co-located within the International Society for Agricultural Safety and Health (ISASH) conference. CASN members were encouraged to participate in the 2013 North American Agricultural Safety Summit and several gave formal presentations at that event.

Nearly all CASN activities were coordinated from the NCCRAHS offices. During the first two years of the project, Regina Fisher, MS was the CASN coordinator. For the subsequent years and continuing now, Marsha Salzwedel, MS was the CASN coordinator. To develop the annual CASN child agricultural safety calendar, we contracted for services of a graphic designer. Our original plan for James Westaby, PhD to conduct a comprehensive evaluation of the network was modified when he took a leave of absence from Columbia. In his place, we contracted for services of Mary Cramer, PhD of University of Nebraska, an evaluation expert familiar with NIOSH agricultural centers.

A formal evaluation of the network, using a mixed methods approach and the ICE© instrument (Cramer, et al., 2006) was undertaken in 2014, based on the conceptual model, Internal Coalition Outcomes Hierarchy (Cramer, et al., 2006). The objectives of the evaluation were to assess the organizational effectiveness of CASN, identify factors that contribute to the success of CASN and develop suggestions from CASN members on future sustainability.

This evaluation approach was undertaken, rather than utilizing the Network Goal Theory assessment as initially proposed, due to the appropriateness of the ICE© instrument for the evaluation of coalitions and the accessibility of the evaluation team, who are part of another NIOSH funded agricultural safety and health center.

Results

The Childhood Agricultural Safety Network (CASN) is a collaborative effort of national organizations, which has expanded from 17 participating organizations in 2008 to 47 organizations by the beginning of 2015. This network is composed of diverse organizations that work together to advocate farm safety for children.

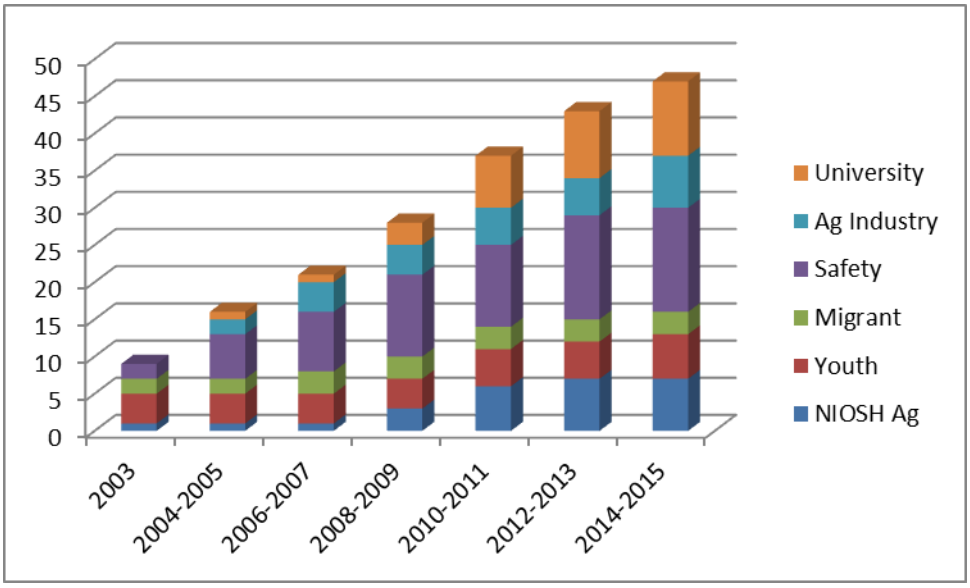


Figure 2: Composition of CASN Participating Organizations

Participating organizations in CASN communicated on a variety of childhood agricultural safety issues through several communication venues, including teleconferences and annual in-person meetings. Additional methods of communication include email, website, phone, think tank sessions and webinars. Results from the evaluation performed by the University of Nebraska team (see appendix for 2014 CASN External Evaluation Report) indicated that email is the preferred method of communication, although the majority of organizations also participate in teleconferences and in-person meetings.

Email is a primary communication tool of CASN, and all members received and sent information through this venue. Information on upcoming meetings, webinars, projects and campaigns is shared regularly through email. Knowledge and awareness of childhood agricultural injury was also enhanced through the sharing of news clippings about child agricultural injury incidents through email.

Teleconferences were held as needed to discuss ongoing projects and campaigns, as well as to enhance knowledge dissemination. The teleconferences were usually well attended, with meeting notices and agendas sent out via email and posted to the website in advance of the meetings. Annual in-person meetings were held annually in conjunction with the International Society of Agricultural Safety and Health Conference. These meetings were held on Monday evening of the conference and were well attended by up to 45 CASN participants, with meeting

notices and agendas also sent out via email and posted to the website in advance of the meeting. Teleconference and in-person agendas included discussion of past and current child agricultural safety efforts, current issues and future campaigns and topics, as well as providing participants the opportunity to provide feedback on the network. All participants were encouraged to participate, and discussions and presentations were led/facilitated by various participants who shared their expertise.

Several think-tank sessions and webinars were held to share information with CASN participants and, in some cases, to expand awareness of safety campaigns (Aims 1, 2, 4 and 5). Topics covered in these sessions included 1) Understanding Child Development Principles to Prevent Injury, 2) Supervision, 3) Understanding the Proposed Changes to the Agricultural Child Labor Regulations, 4) FReSH: The New Frontier for Ag Safety and Health Resources, 5) Keeping Kids Away from Tractors and 6) Child Development and Tractor Operation: How Children Change as They Grow Older.

The webinar on Proposed Changes to the Child Ag Labor Rules was especially valued by CASN members. During a 12 month period the U.S. DOL had proposed changes to the regulations and posted a Federal Register notice seeking public comment. There was unexpected outrage voiced from the farming community, which led to a series of media requests for comment from CASN members. The debacle became the point of numerous communications about the pros and cons of proposed legislation as well as most appropriate messages that child safety advocates could put forth. Although all CASN members were not “on the same page” in terms of how to handle the situation, they were informed of the various perspectives on the proposed changes to child labor rules. In the end, the decision came from the White House to discontinue all action on the proposed updates. Again, CASN members took opportunities to follow up with each other about the entire process, its current status, and ways to approach contentious issues in the future.

The CASN group was able to use the information/resource sharing and dissemination capabilities of the networks to develop and promote safety campaigns and information sharing. Major campaigns included the “I Didn’t Know” ATV safety campaign for rural youth, which was successfully released and promoted in 2010. Also released in 2010 was the Media Guidelines for depicting children in agriculture, which were widely distributed. In 2011 and 2012, the CASN group shared information through various communication channels, most notably the debate on changes in child labor regulations in agriculture. In late 2013, after a rash of child agricultural injury incidents involving tractors, a re-release of the “Keep Kids Away from Tractors” campaign was launched. This campaign was continued with press releases in spring of 2014 and a webinar co-hosted by CASN and AgriSafe in March, 2014. The campaign garnered a lot of media attention, featured by four news organizations with national reach; 1) Farm Progress publications, 2) Milwaukee Journal Sentinel, 3) Associated Press, and 4) Gannett Wisconsin, resulting in increased requests for campaign materials, safety resources and media interviews.

Another valuable communication tool for the CASN group is the Childhood Agricultural Safety Network website (www.childagsafety.org). The website provides access to information about the network and about upcoming events, provides a monthly safety message based on the CASN calendar, lists all the participants with contact information, provides access to all products and campaign materials developed and promoted by CASN (free download), and contains information about upcoming meetings and events, as well as access to archived webinars and meeting minutes from past events. The website was updated in 2014 to refresh the look, make it easier to navigate, and provide more information.

Child safety information and resources were also shared through the CASN calendar, which participants worked together to develop and disseminate. Each month of the CASN calendar highlights a separate child agricultural safety issue, with the content contributed and approved by the hosting organization for that month. Each year, thousands of the calendars were distributed by CASN. CASN participants also utilized the calendar messages for other purposes, such as displays at events, poster board messages, news releases and listserv messages. An evaluation of the CASN calendars indicated that the calendars were widely disseminated, high quality and contained usable information, adaptable for additional purposes. It further indicated that the calendars appear to have a positive impact with a modest cost. Refer to the Appendix to review the *2014 CASN Calendar Evaluation Executive Summary*.

CASN members were also involved as key participants in the Blueprint for Knowledge Translation project. The team that developed the Blueprint was composed primarily of CASN members. In addition, feedback and review of the Blueprint was solicited through email communication, teleconferences and in-person meetings. All feedback was reviews and incorporated when applicable.

At the in-person meeting in June, 2011, NIOSH funding and CASN sustainability was discussed. At that time, the consensus of the group was that NCCRAHS should continue its leadership of the CASN group. Thus, Aim 3 was never accomplished as originally proposed.

An external evaluation of CASN was executed by Mary Cramer, PhD., and Mary Wendl, MSA from the University of Nebraska in 2013. Evaluation results showed that both members and leaders agree that CASN is an effective network. Participants view their own contributions to CASN as equal to those of the leaders. Both participants and leaders identify positive relationships within the CASN network as strength, and they believe everyone works well together to advance the national agenda for childhood agricultural safety. Respondents identified several benefits of membership including improved knowledge, shared resources, and enhanced opportunities to network and disseminate resources. CASN has a solid and stable base of long-time participants who remain committed to the social vision of CASN. They also have a membership of newer organizations, indicating growth and vitality. There are frequent communications between CASN participants and leaders through a wide variety of modalities—all of which are used effectively to keep participants informed, to share resources, and to expand participant knowledge and practices.

There was strong agreement that CASN fulfills an essential and national leadership role in childhood agricultural safety. Participants believe the network should be sustained to continue its work that has already achieved important outcomes. Participants understand the need for funding to support the work of CASN, but they are undecided about other options for financial support such as dues or fees.

Results from the evaluation of CASN are available in the CASN External Evaluation Report (Appendix C). These results will also be published in an upcoming publication in the Journal of Agromedicine. Additional information on CASN activities, outputs, outcomes and impact is available in the information sheet “Networking Among Child Safety Advocates in the Appendix.

<u>Publications</u>

Cramer, M., Wendl, M. (2015). Measuring the effectiveness of the National Children’s Agricultural Safety and Health Network. J Agromedicine (in press).

Materials available for other investigators

Materials, resources and information is available for other investigators on the CASN website (www.childagsafety.org) or by contacting NCCRAHS at 800-662-6900 or nccrahs@mcrf.mfldclin.edu.

Literature cited:

Cohen, L, Swift, S. The spectrum of prevention: Developing a comprehensive approach to injury prevention. *Inj Prev*. 1999 Sep; 5(3): 203-207.

Cohen, L, Baer, N., Satterwhite, P. Developing Effective Coalitions: An Eight-Step Guide. In: *Wurzbach ME, ed. Community Health Education & Promotion: A Guide to Program Design and Evaluation*. 2nd ed. Gaithersburg, Md: Aspen Publishers Inc; 2002:161-178.

Cramer, M., Atwood, J., & Stoner, J. (2006). A conceptual model for understanding effective community coalitions. *Public Health Nursing,* 23(1), 67-73.

Cramer, M., Atwood, J., & Stoner, J. (2006). Measuring community coalition effectiveness using the ICE instrument. *Public Health Nursing*, 23(1), 74-87.

Lee, B, Gallagher, S, Marlenga, B, Hard, D. (Eds.) Childhood Agricultural Injury Prevention: Progress Report and Updated National Action Plan from the 2001 Summit. Marshfield, WI: 2002 Marshfield Clinic.

National Academies of Science Committee to Review the NIOSH Agriculture, Forestry, and Fishing Research Program. *Agriculture, Forestry, and Fishing Research at NIOSH*. Washington, DC: The National Academies Press; Dec 2007. National Academies of Science (advance copy).

Blueprint for Knowledge Translation: Updating the National Action Plan

Principal Investigator: Susan Gallagher, MPH
Co Investigator: Barbara Lee, PhD

Background

Since NIOSH formalized its Childhood Agricultural Injury Prevention Initiative in 1996 with funds appropriated by Congress, approximately $5 million annually has been dedicated to this topic. The resulting wide array of activities (Castillo *et al.*, 1998; Lee and Marlenga, 2006) were positively reviewed as reported by the National Academies of Science (NAS, 2007). A portion of those funds was targeted for injury surveillance efforts (Castillo *et al.,* 1998). The data demonstrated a steady downward trend of 16.7 injuries/1000 farms in 1998 to 6.4/1000 14 years later (NIOSH, 2013) (Table 1). While data suggest progress in injury reduction, there was minimal evidence to validate factors contributing to this decline.

Table 1: Childhood Agricultural Injury Data for U.S. 1998 - 2012 (NIOSH, 2013)

Childhood Agricultural Injury Estimates of Youth Farm Injuries					
Year	Farm Injuries Youth < 20	Injuries/1000 Farms	Farm Household Youth < 20	Farm Household Youth Injuries	Injuries/1000 Household Youth
1998	37,774	16.6	1,460,000	27,321	18.8
2001	29,277	14.0	1,350,000	22,144	16.4
2004	27,590	13.1	1,260,000	18,800	15.0
2006	23,074	10.5	1,120,000	11,773	10.5
2009	15,876	7.2	1,040,200	7,715	7.5
2012	13,996	6.4	955,400	7,783	8.1

A major difference exists between our national strategies for adults working in agriculture versus strategies for children who live and/or work on farms. That difference lies in the spectrum of knowledge and the number of individuals committed to the issue. The 1989 publication *Agriculture at Risk: A Report to the Nation* (Merchant, *et al.*, 1999) served as the basis for action plans in agricultural health and safety and was followed shortly thereafter by the landmark Surgeon General's Conference on Agricultural Safety in 1991 (DHHS, 1991). The plan addresses everything from machinery design to environmental policies, and has pockets of scientists, educator, engineers, sociologists, and others often working in isolation on diverse topics. Variations of the original plan have been developed by public and private-sector coalitions, but there is no "single" plan of action.

In contrast, a relatively small number of child safety researchers and advocates have been building a solid knowledge base upon which to launch interventions for children in agriculture (includes working and non-working issues). Many of these individuals network with each other on a regular basis. Over the past two decades they started to develop a common vision for the future. Past action plans, dedicated solely to children on farms, became building blocks to the "Blueprint" project (Figure 1).

The 1992 Symposium on Childhood Agricultural Injury Prevention was a formal, invitational gathering of researchers, educators, parents, pediatricians, sociologists and media representatives looking at the complex issues associated with childhood injuries (Lee and Gunderson, 1992). The documented proceedings served as the basis for a national plan. A national conference in 1995 encouraged participation of many colleagues across the U.S. to share information and begin networking. The most notable event was the consensus-developed 1996 national action plan, *Children in Agriculture: Opportunities for Safety and Health* (National

Committee, 1996). Eighty organizations, including the American Farm Bureau and the American Medical Association, signed on to this plan. The document was endorsed by Congress with funding appropriated to NIOSH for leading its implementation. The 1996 plan became the initial *Blueprint* or framework for what is now known as the national initiative for childhood agricultural injury prevention.

A gap in the 1996 action plan pertained to children and adolescents of migrant and seasonal farm workers. An advisory committee was convened to fill this gap, and after nearly one year issued its report, *Migrant and Seasonal Hired Adolescent Farmworkers: A Plan to Improve Working Conditions* (Vela Acosta and Lee, 1999). Later, funding was secured to conduct a comprehensive assessment of all progress to date. Printed and anecdotal findings were systematically gathered and reviewed by a five-member team. An invitational Summit was organized at which 100 attendees were pre-assigned to a specific group: 1) leadership, funding and partnerships; 2) interventions and evaluations; 3) policy; 4) professional training; 5) public education; 6) research; and 7) injury surveillance. Over two days, participants reviewed current knowledge and proposed priorities for the future. The resultant document was refined and further reviewed by all Summit participants. All individuals, including farm parents, were given opportunities to comment on the updated action plan. In April 2002, the *Childhood Agricultural Injury Prevention: Progress and Updated National Action Plan from the 2001 Summit* was released (Lee *et al.*, 2002). The Summit process formally integrated the migrant and seasonal adolescent farm workers issues into its updates. As of 2008, the 1996 plan and its 2001 update remained the designated plan for the U.S. as referenced in the RFA. Thus, it had been eight years since the last intense assessment was undertaken to realign priorities for the future.

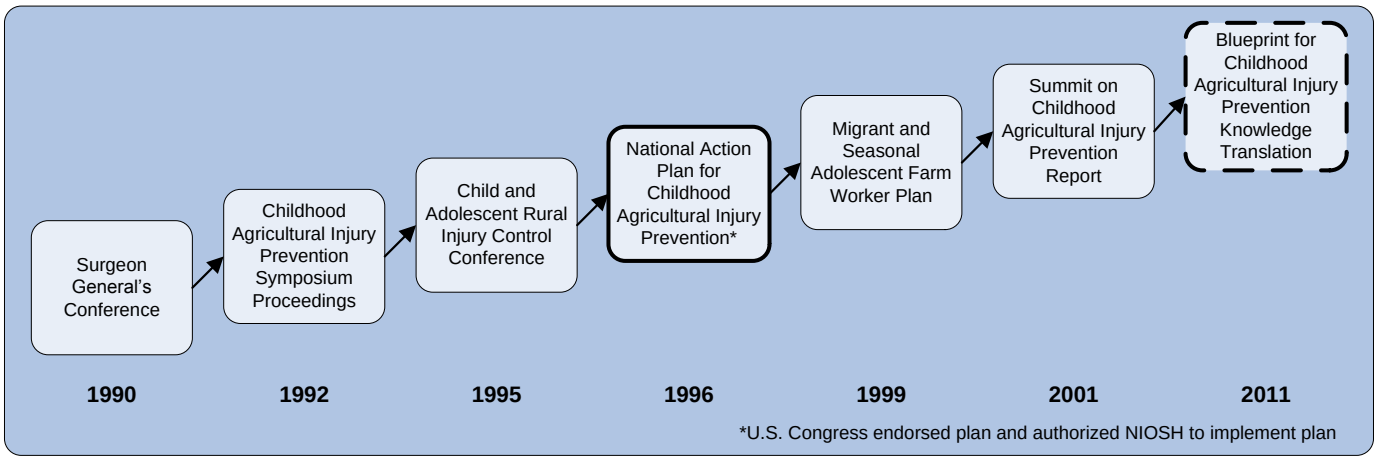


Figure 1: Major Events Shaping the National Initiative for Childhood Agricultural Injury Prevention

1) A National Children's Center should lead efforts to ensure that health and safety professionals can attain knowledge, skills and networking required to address childhood agricultural injury prevention. We viewed our obligation as that of helping professionals "translate research into practice" so they are in a position to influence knowledge and practices of farm owners, parents, agricultural organizations, youth-serving groups and policy makers. It is these stakeholders who can then implement changes to protect children from harm. This project coincided with the overall mission of "moving childhood agricultural injury prevention knowledge into practice through *sustained* partnerships."

Specific aims

The overall goal of this project was to translate state-of-the-art knowledge on childhood agricultural injury prevention into practice. First, the *Blueprint* would be generated. Second the *Blueprint* knowledge would be integrated into professional training outlets for application by end-users. Specific aims included:

Aim 1: Gather and synthesize findings from childhood agricultural injury research and interventions that have been conducted since the assessment for the 2001 Summit on Childhood Agricultural Injury Prevention.

Aim 2: Identify strengths and weaknesses of known interventions based on: a) injury data; b) different audiences; and c) different levels of the ecological model.

Aim 3: Engage researchers, practitioners, and other stakeholders in developing a *Blueprint for Childhood Agricultural Injury Prevention Knowledge Translation.*

Aim 4: Activate the *Blueprint* through intermediaries and innovative technological communication strategies.

Aim 5: Continually assess, modify, and expand translation opportunities based on participant feedback and updated knowledge regarding effective interventions and injury trends.

Methodology

The process for developing the 2012 action plan took advantage of lessons learned from previous efforts. The major phases included drafting of an updated action plan, solicitation of input and feedback to refine the draft, printing the plan, followed by its dissemination through partnerships with child safety advocates and others. In contrast to the detailed, expensive process required for the 2001 Summit event, this method was more cost-effective and involved very knowledgeable core team members for the initial phases. These individuals included: Susan Gallagher, MPH from Tufts University School of Medicine, Barbara Marlenga, PhD, of the Children's Center, Amy K. Liebman, MPA of Migrant Clinician's Network, Mary Miller, MPH of Washington Dept. of Labor and Industry, David Hard, PhD of NIOSH, and the P.I.

First, we gathered and synthesized information needed to assess strengths, weaknesses, and gaps in our nation's efforts to protect children from agricultural hazards. We determined what aspects of the previous action plans had been accomplished and identified certain successes to date. In order to secure the most current research on issues relevant to a future strategy, a dedicated issue of the *Journal of Agromedicine: Practice, Policy & Research* was planned. Topics were suggested and authors identified. The core team members shared responsibility to facilitate manuscript preparation, peer review and eventual publication. Contents of the dedicated issue are depicted in Table 2. The process of writing the manuscripts began in 2011. Papers were completed and peer reviewed while the action plan was being drafted.

TABLE 2. Journal of Agromedicine, Volume 17, Number 2 (2012) Contents

Author	Title	Page No.
Matthew C. Keifer	The Future Structure of Childhood Agricultural Injury Prevention: First the Blueprint	83
Marilyn Adams Barbara Lee Susan J. Reynolds	Commitment and Cooperation for a Common Cause	85
Barbara C. Lee Susan S. Gallagher Amy K. Liebman Mary E. Miller	Developing the 2012 National Action Plan for Protecting Children in Agriculture	88

The core team tested several different frameworks upon which to build recommendations at a global level as well as a more detailed level where possible. After considerable trial and error, major categories were chosen and each was given a goal statement and up to five strategies. Additional explanatory information was put into a text box. The seven categories/topics were: leadership, data, research, public policy, organizational policy, interventions, and knowledge mobilization/dissemination. From here, the team fine-tuned priorities for the future based on injury trends. In particular, it was noted that children six years and younger were at very high risk and most etiologic factors for their injuries had been identified. Thus, a priority became to focus on knowledge mobilization – informing parents and responsible adults of appropriate safety interventions. Per the five-level socio-ecologic model we looked at options to influence parents and farm owners more effectively, therefore, attention was given to public policy and organization policy as spheres of influence over responsible adults.

The Journal authors and other scholars in various disciplines provided feedback on initial drafts of the action plan. Presentations via webinars were given to interested colleagues and the topic was the keynote address for the 2011 conference of the International Society for Agricultural Safety and Health as well as several presentations given at the annual American Public Health Association. The Scientific Advisors to the Children's Center reviewed versions of the document. Meanwhile, the core team met in-person and via teleconference on a regular basis.

To garner as much input and feedback as possible from professional and lay groups, several strategies were employed. An in-person meeting of the Childhood Agricultural Safety Network (June, 2011, Boise, Idaho) offered a two-hour interactive discussion with 40 participants. Several important insights were gleaned that resulted in changed terminology and the addition of narrative text boxes. For six weeks during summer months in 2011, the document was posted on the web with numerous announcements to the general public, farming audiences, and professional groups to review the draft goals and recommendations and provide feedback. There were 56 substantive, detailed suggestions generated from this process.

The formative evaluation process evolved over time and, for the most part, was consistent with the phases originally proposed in Figure 2.

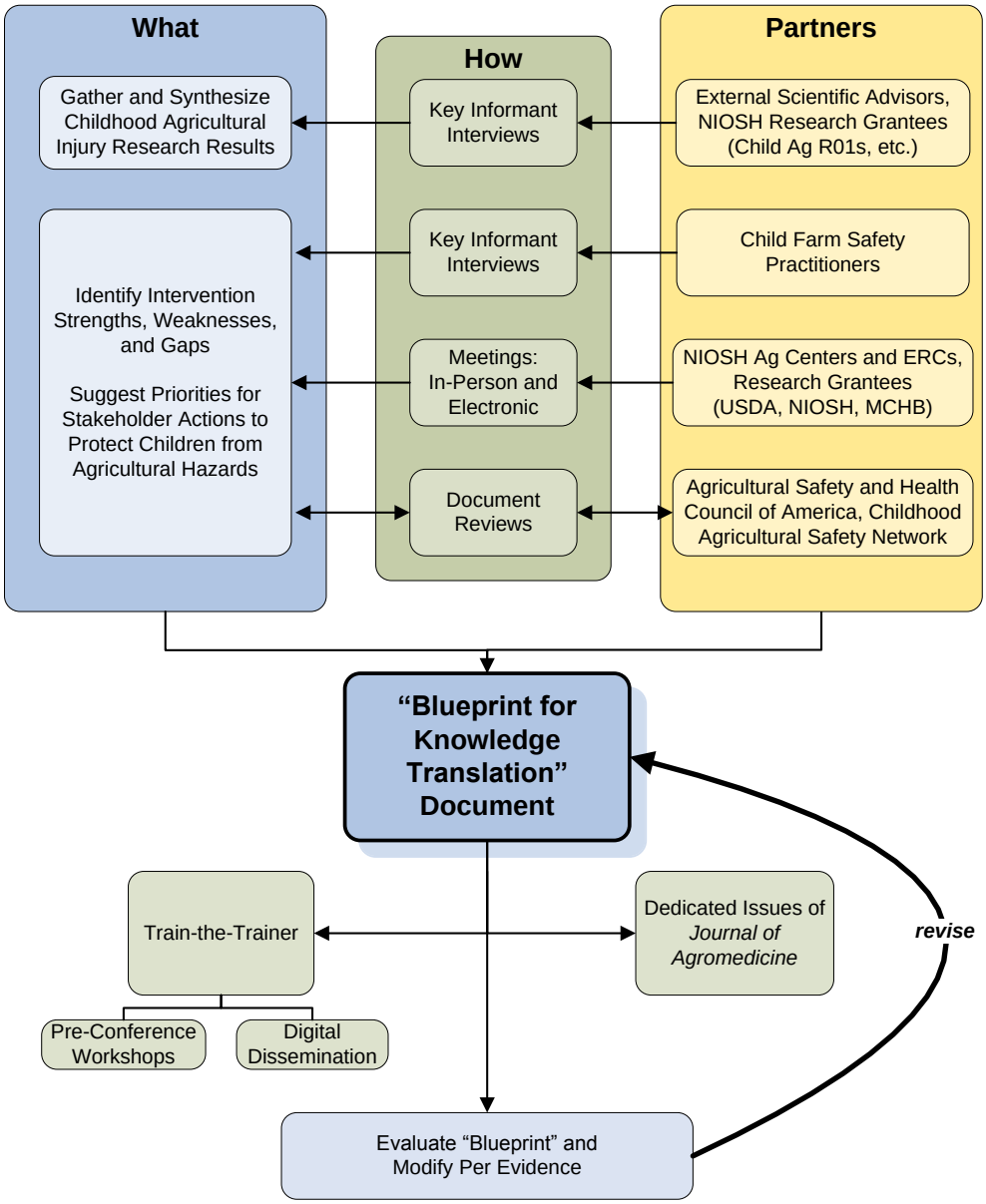
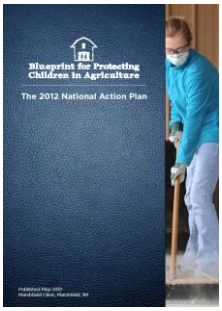


Figure 2: Initial Plan for Activities, Methods, and Partners

Results

In May 2012 the *Blueprint for Protecting Children in Agriculture: The 2012 National Action Plan* was printed. The 34 page, full color, fully illustrated document included a Foreword from then U.S. Secretary of Labor, Hilda L. Solis. The narrative included purpose, executive summary, background, key points, evidence of the problem, successes to date and then detailed The center-fold was a visual depiction of 60 actual news clippings of serious injuries and fatalities among children on farms. The core element of the plan was the descriptions of seven goals with their targeted strategies and narrative explanations. Additionally, the plan included footnotes, references and appendices. There were 2,000 hard print copies published in addition to having the pdf version of the document highlighted on several websites and available for free download.

During the 10 months leading up to the release of the 2012 Blueprint for Protecting Children in Agriculture another phenomenon was occurring that would seriously hamper attention given to the project results. The U.S. Department of Labor had published a notice in the Federal Register that described proposed updates in the Child Labor in Agriculture rules. The proposed changes were challenged by many farm organizations and youth-serving groups through a barrage of news stories, website blogs, and national broadcasts. Indeed, the farm organizations, with considerable coordination and lobbying efforts generated massive public attention regarding the roles of children in agriculture. For the most part, the public media was reminded of the value of a strong work ethic while the hazards and injuries associated with youth on farms were minimized. Efforts to counter these arguments were attempted, including a statement from U.S. Senator Tom Harkin in support of the updated regulations. Then, in spring 2012, the national news covered the story about "the White House" directed the DOL to withdraw all plans to update the Hazardous Orders for as long as President Obama is in office. The extensive public awareness of this debacle severely compromised attention that could have been given to a plan to protect children in agriculture. Nonetheless, the project team proceeded to issue a press release and share information about the updated plan wherever possible.



The release of the action plan was occurring about the same time that the Agricultural Safety and Health Council of America (ASHCA) was planning a national event that would bridge the gap between research and practice. Partners in the planning process included agricultural leaders, industry representatives, safety organizations, NIOSH leaders and NIOSH Agricultural Centers. The "2013 North American Agricultural Safety Summit" was deemed an opportunity to reach a broad audience to raise awareness of the recommended strategies within the updated action plan. NIOSH funds were secured through a contract to "operationalize" the relevant aspects of the plan. A result was the inclusion of a learning station, a genius bar, a breakout session on hired working youth and many poster presentations and published abstracts, all reflecting recommendations from the action plan. Details about the 2013 Summit, including peer-reviewed manuscripts and published abstracts are available in the *Journal of Agromedicine,* Volume 19, No. 2. Videotapes of presentations and best practices are posted on www.ashca.org including the featured story on family services to protect the children of migrant and seasonal farm workers.

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An area of concern is that the 2012 Blueprint made a strong case for continued and improved childhood agricultural injury surveillance. As of the writing of this report, NIOSH posted on notice in the Federal Register of the plan to discontinue periodic telephone-based surveillance through contracts with USDA-National Agricultural Statistics Service. While attempts will be pursued to find and analyze other data sources, the reality is we are losing a valuable tool that helped track progress in the national initiative from 1998 to 2012.

Long-term outcomes of this project will be adoption of interventions that directly impact behaviors associated with protection of children from agricultural hazards. Confirmation of such an outcome would require many years and would likely require that the childhood agricultural injury surveillance system be maintained and enhanced via federal funding to NIOSH and the National Agricultural Statistics Service. Unfortunately, as of March 2015, NIOSH has indicated that, due to budget issues, the Child Ag Injury Surveillance system will be discontinued after the current cycle.

Publications

Hard copies of the 2012 Blueprint for Protecting Children in Agriculture are available upon request and the full document is posted online for free reading and/or downloading. Publications generated from this project are listed in Table 2.

Materials available for other investigators

No specific new data were collected for this project. However, all references and resources used for the project, including photos and figures in the published action plan are available at no charge upon request.

References

Castillo D, Hard D, Myers J, Pizatella T, Stout N. A national childhood agricultural injury prevention initiative. Special Issue. *J Agric Saf Health.* 1998 Special Issue; (1):183-191.

Hartling L, Brison RJ, Crumley ET, Klassen TP, Pickett W. A systematic review of interventions to prevent childhood farm injuries. *Pediatrics.* 2004. Oct. 114(4): 483-496.

Lee B, Gallagher S, Marlenga B, Hard D. (Eds.). Childhood Agricultural Injury Prevention: Progress and Updated National Action Plan from the 2001 Summit. Marshfield, WI: Marshfield Clinic; 2002.

Lee BC, Gunderson PD. (Eds.). Childhood Agricultural Injury Prevention: Issues and Interventions from Multiple Perspectives. Marshfield, WI: Marshfield Clinic; 1992.

Lee BC, Marlenga B. Childhood Agricultural Injuries. Chapter 8 In: Liller KD. (Ed.) *Injury Prevention for Children and Adolescents: Research, Practice, and Advocacy.* Washington DC: American Public Health Association; 2006.

Merchant JA, Kross BC, Donham KJ, Pratt DS. (Eds.). Agriculture *at Risk: A Report to the Nation.* Iowa City, IA: University of Iowa Press; 1989.

National Academies of Science (NAS) Committee to Review the NIOSH Agriculture, Forestry and Fishing Program . Preliminary Report on Agriculture, Forestry, and Fishing Research at NIOSH. Washington, DC: National Academies Press; 2007.

National Committee for Childhood Agricultural Injury Prevention (NCCAIP). Children and Agriculture: Opportunities for Safety and Health. Marshfield, WI: Marshfield Clinic; 1996.

NIOSH. Internal analysis of the Childhood Agriculture Injury Surveillance (CAIS) database. Mortantown, WV: National Institute for Occupational Safety and Health; 2013.

U.S. Department of Health and Human Services . Papers and Proceedings of the Surgeon General's Conference on Agricultural Safety and Health. Public Law 101-517. DHHS (NIOSH) Publication Number 92-105. Des Moines, IA: Proceedings April 30 – May 3 1991.

Vela Acosta MS, Lee BC. (Eds.). Migrant and Seasonal Hired Adolescent Farmworkers: A Plan to Improve Working Conditions. Marshfield, WI: Marshfield Clinic; 2001.

Appendices

National Children's Center
for Rural and Agricultural Health and Safety

2014 Fact Sheet

Childhood Agricultural Injuries in the U. S.

Population at Risk

Farms
- In 2012, there were approximately 2.2 million farms in the United States.[1]

Children
- More than 955,400 youth lived on farms in 2012 and almost half (49%) worked on their farm.[2]
- About 258,800 non-resident youth were hired in agriculture in 2012, up from 230,100 in 2009.[2]

Toll of Childhood Agricultural Injuries

Deaths
- About every three days, a child dies in an agriculture-related incident.[*]
- Of the leading sources of fatalities among all youth, 25% involved machinery, 17% involved motor vehicles (includes ATVs), and 16% were drownings.[3]
- Among working youth, vehicles and machinery accounted for 73% of deaths.[4]

Nonfatal Injuries
- Every day, about 38 children are injured in an agriculture-related incident.[**]
- In 2012, an estimated 7,780 household youth were injured on a farm and 80% of them were not working when the injury occurred.[5]
- Leading sources of nonfatal injuries are surfaces (falls), animals and vehicles.[2]

There is no central database on childhood agricultural injuries. This fact sheet draws from the best available data.

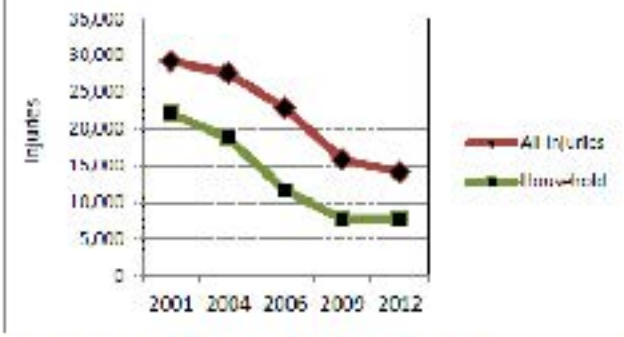
Injury Trends

Injury Trend
- From 1998 to 2012, the rate of childhood agricultural injuries per 1,000 farms (includes youth who live on, visit, and are hired to work on farms) declined by 61% and the rate of injuries per 1,000 household youth (those living on farms) declined by 57%.[2]
- While overall rates are declining, farm injuries among children under 10 years are increasing.[2]
- Among household youth, the gap between males having higher injury rates than females has decreased.[2]

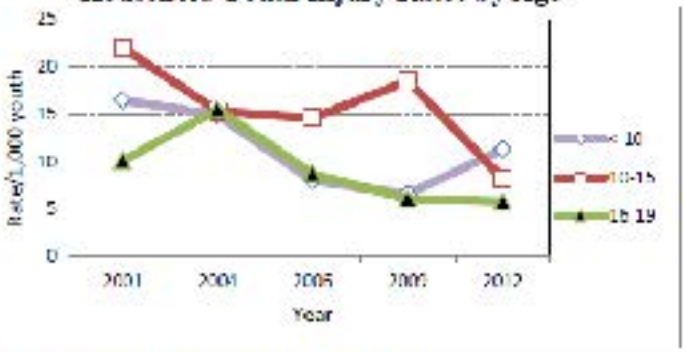
Childhood Agricultural Injury Estimates of Youth Farm Injuries

Year	Farm Injuries Youth < 20	Injuries/1000 Farms	Farm Household Youth < 20	Farm Household Youth Injuries	Injuries/1000 Household Youth
1998	37,774	16.6	1,460,000	27,321	18.8
2001	39,777	18.5	1,350,000	22,144	16.4
2004	27,591	13.1	1,257,000	18,801	15.0
2006	22,094	11.0	1,120,000	11,654	10.4
2009	15,876	7.2	1,040,200	7,715	7.5
2012	13,996	6.4	955,400	7703	8.1

Nonfatal Injuries All Youth

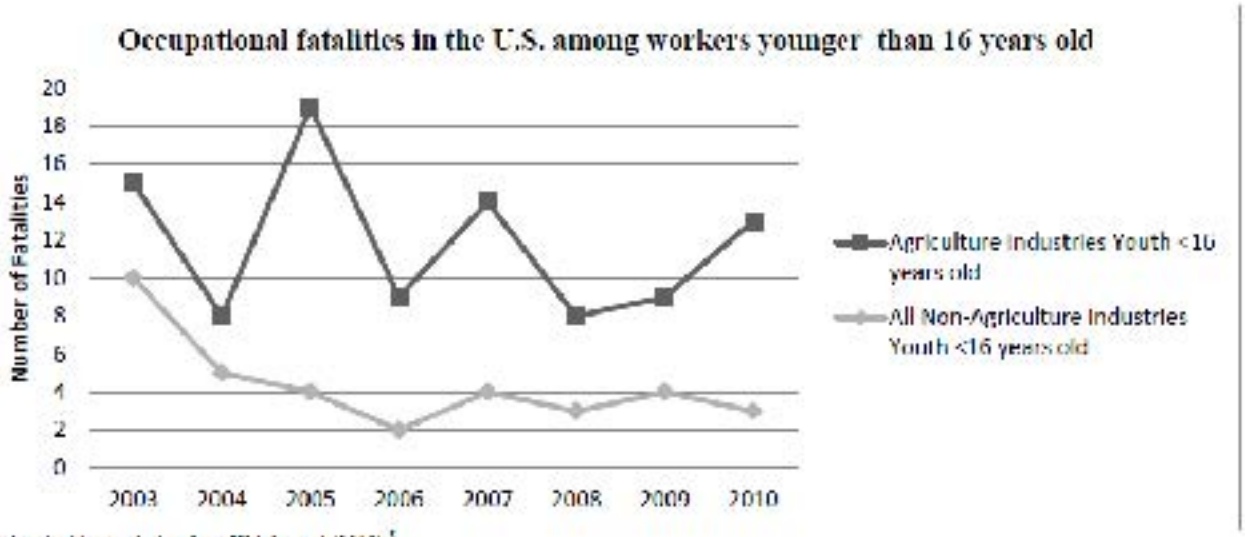


Household Youth Injury Rates by Age



Note. Data from the Childhood Agricultural Injury Survey (CAIS) does not include injuries to contract laborers.
For more detailed child agricultural injury data, go to http://www.cdc.gov/niosh/topics/childag/.

The National Children's Center for Rural and Agricultural Health and Safety (a program of the National Farm Medicine Center and Marshfield Clinic Research Foundation, Marshfield, Wisconsin) is funded by the National Institute for Occupational Safety and Health (NIOSH Award No. U54 OH009568-06)



Reprinted with permission from Wright et al (2013)[5]

Economic Data

Nonfatal Injuries	▪ Youth agricultural injuries cost society an estimated $1 billion per year (in 2005 dollars).[6]
Fatalities	▪ Youth agricultural deaths cost society an estimated $420 million per year (2005 dollars).[6]

Prevention Strategies and Resources


Tractor Safety

ATV Safety


Creating Safe Play Areas on Farms


Integrating Safety into Agritourism


North American Guidelines for Children's Agricultural Tasks


Safety Guidelines for Hired Adolescent Workers

*From reported 115 agriculture-related deaths annually from 1995 to 2000.[1]
**From estimated 13,906 injuries annually.[2]

References

1. USDA. NASS publications: Farms, Land in Farms, and Livestock Operations. 2012 Summary. February 2013. Available at: http://usda01.library.cornell.edu/usda/current/FarmLandIn/FarmLandIn-02-19-2013.pdf
2. NIOSH (2013). Analyses of the 2012 Childhood Agricultural Injury Survey (CAIS). Morgantown WV: U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health, Division of Safety Research. Unpublished.
3. Goldcamp M, Hendricks KJ, Meyers JR. (2004). Farm fatalities to youth 1995-2000. A comparison by age groups. *Journal of Safety Research*. Vol. 35(2): 151-157.
4. Hard DL, Myers JR (2006). Fatal work-related injuries in the agriculture production sector among youth in the United States, 1992-2002. *J Agromedicine*. Vol. 11:57-65.
5. Wright S, Mardenga B, Lee BC (2013). Childhood agricultural injuries. An update for clinicians. *Curr Probl Pediatr Adolesc Health Care*. Vol. 43(2): 20-44.
6. Zaloshnja E, Miller TR, Lawrence B (2012). Incidence and Cost of Injury Among Youths in Agricultural Settings, United States, 2001-2006. *Pediatrics*. Vol. 129(4). 728-734.

For more information contact:
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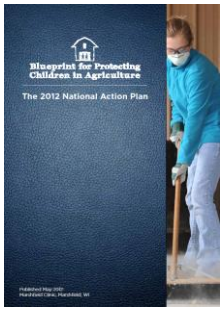
Updated December 2013

Operationalizing the National Action Plan for Childhood Agricultural Injury Prevention

Program Description:

NCCRAHS led development of the *"Blueprint for Protecting Children in Agriculture: The 2012 National Action Plan"*, taking advantage of lessons learned from previous efforts and relying heavily on a core group of 6 individuals. Published research, data, and changing patterns of agricultural production and worker demographics were reviewed. Scholars in various disciplines authored papers and generated recommendations. The draft plan was posted on the Internet for public feedback, with advisors guiding the process and reviewing preliminary drafts. Journal articles and the core document were finalized in early 2012, and the 2012 National Action Plan was released in April of 2012.



At that time, there was a national conversation underway regarding the proposed updates, then subsequent withdrawal of federal Child Labor in Agriculture Regulations. The public confusion and animosity over the child labor regulations issue generated relative lack of interest in a federally-funded action for safeguarding children on farms. Thus, the strategies for promoting the updated "Blueprint" were postponed and integrated with the 2013 North American Agricultural Safety Summit (NAASS), held in September, 2013. The Summit was hosted by the Agricultural Safety and Health Council of America (ASHCA) with support from NIOSH through our Center, which was charged with ensuring child-related issues would be addressed at this national venue.

2013 NORTH AMERICAN AGRICULTURAL SAFETY SUMMIT

Outputs:

- A dedicated issue of *Journal of Agromedicine: Practice, Policy & Research* Vol. 17(2) was released in April 2012 with 15 peer-reviewed manuscripts on topics related to children, agriculture, safety, policy and interventions.
- A 36-page, fully illustrated 2012 National Action Plan was published in May 2012.
- Dissemination strategies included the distribution of 651 hard copies of the National Action Plan and 200 copies of the Journal of Agromedicine, vol. 17(2).
- Action Plans and Reports web page visited 1,279 times with 1,126 downloads of Blueprint.
- The NAASS had 250 attendees and 33 partner organizations. One of the plenary sessions addressed safeguarding children of migrant and seasonal farm workers, 13 poster/abstracts were presented, and three new topics were presented on child issues, including voluntary certification systems, a model policy for training and supervising youth and model child care services for migrant and seasonal workers.
- A dedicated issue of the *Journal of Agromedicine* will be published in May 2014 with 13 child-related abstracts and three full-length manuscripts.

Intermediate Outcomes:

- The 1996 action plan generated funding to NIOSH to launch the National Childhood Agricultural Injury Prevention Initiative, which continues to this day.
- Since 1996, action plans have served as the basis for public and private sector funding of surveillance, research, and interventions and the plans have guided public policy.
- The NCCRAHS has maintained visibility as a national leader in setting and updating a plan for action that is associated with a measurable decline in nonfatal childhood agricultural injuries.
- Numerous presentations to a variety of audiences have been given by the NCCRAHS staff regarding the overall U.S. Strategy for prevention childhood agricultural injuries.
- These national action plans have served as a model for other agencies and organizations to generate and operationalize a consensus – driven strategic plan.

National Academies of Science Recommendations:
This series of national leadership activities has been responsive to several of the NAS 2007 AgFF Recommendations. The 1996 and 2001 National Action Plans have facilitated a cohesive program and approach for NIOSH funding (Recommendation 2). Having a lead center (NCCRAHS) and a national plan has facilitated stakeholder engagement and partnerships, especially noted through the Childhood Agricultural Safety Network which brings together individuals representing many national organizations to collaborate on projects and avoid duplication of efforts (Recommendation 6.d and 7.b). This national plan of action supports the NAS recommendation to be aware of national policy and guide efforts that can impact workers and risk factors (Recommendation 8). Also of note is that the decline in childhood agricultural injuries was touted among the ten great public health achievements of the U.S. from 2001-2010 (Centers for Disease Control and Prevention, 2011).

References:

Centers for Disease Control and Prevention (CDC) (2011). Morbidity and Mortality Weekly Report (MMWR). Ten great public health achievements – United States, 2001 – 2010. Weekly May 20, 2011, 60(19); 619-623.

Kilanowski JF. Latino Migrant Farmworker Student Development of Safety Instructional Videos for Peer Education. J Agromedicine. 2014;19; 150-161.

Liebman AK, Mainster B, Lee BC. Family Services for Migrant and Seasonal Farm Workers: The RCMA Model. J Agromedicine. 2014;19; 123-129.

Miller ME, Lee BC. (2014). Developing a Model Policy on Youth Employment in Agriculture. J Agromedicine. 2014;19; 249-257.

Lee BC, Gallagher SS, Hard DL, Liebman AK, Miller ME and Marlenga B (Eds.) (2012). Blueprint for Protecting Children in Agriculture: The 2012 National Action Plan. Marshfield, WI: Marshfield Clinic.

Lee BC, Gallagher SS, Liebman AK, Miller ME and Marlenga B. Developing the 2012 National Action Plan for Protecting Children in Agriculture. J Agromedicine. 2012;17(2)88-93.

Lee BC. Editorial. NIOSH fills void with surveillance of injuries to youth living on U.S. Farms. J Agromedicine. 2006;10(4)3-4.

Lee B, Gallagher S, Marlenga B, Hard D (Eds.). Childhood agricultural injury prevention: progress report and updated national action plan from the 2001 summit. Marshfield, WI: Marshfield Clinic. 2002.

Vela Acosta MS, Lee B (Eds.). Migrant and seasonal hired adolescent farmworkers: A plan to improve working conditions. Marshfield, WI: Marshfield Clinic. 2001.

Lee B. Editorial. Are we making progress in childhood agricultural injury prevention? J Agric Saf Health 1999;5(1):7-9.

Lee BC. The National Committee for Childhood Agricultural Injury Prevention: A plan for the United States of America. Proceedings of the U.S. Nordic Conference on Rural Childhood Injury Prevention, the Royal Swedish Academy of Agriculture and Forestry. 1997; 136(7):15-21.

National Committee for Childhood Agricultural Injury Prevention. Children and agriculture: opportunities for safety and health. Marshfield, WI: Marshfield Clinic. 1996.

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Updated April 21, 2015

National Children's Center for Rural and Agricultural Health and Safety

Guidelines for Children's Work in Agriculture

Problem:
Children on farms are often assigned work typically performed by adults and much of this work is beyond the child's physical and cognitive capabilities. Many agriculture work-related injuries and deaths are associated with children conducting work that does not match their developmental level.

Project Description:
The North American Guidelines for Children's Agricultural Tasks (NAGCAT) is a collection of guidelines designed to assist parents in assigning age-appropriate tasks for children ages 7–16, who live or work on farms and ranches across North America. The guidelines are based on childhood growth and development, agricultural practices, principles of injury prevention, and agricultural safety. Voluntary use of the guidelines helps parents and others make informed decisions about appropriate tasks for youth. NAGCAT were released in 1999 and have become a key resource for safety professionals working with farm parents.

Based upon requests from agricultural employers, NAGCAT resources were adapted in 2009 to include child labor in agriculture federal regulations. Seven guidelines were developed in English and Spanish. Each colorful, illustrated poster addresses supervisor responsibilities for ensuring work conditions are appropriate and for assessing their teen workers. Training and supervision tips specific to teens and to each job are provided. Each poster also includes pertinent federal regulations and referrals to obtain state-specific child labor regulations.

We acknowledged that many farm parents and agricultural employers are unaware of the existence of NAGCAT and SaGHAF. To address this gap in 2013, an agricultural marketing firm was engaged to market and disseminate the guidelines to target audiences via the internet (Cultivate Safety website). In 2014, two work guidelines booklets were developed to address specific topics for working youth. The "Safety Guidelines for Youth Operating Farm Equipment" booklet was developed. After identifying a gap in Community Based Agriculture (CBA), the Safety Guidelines for Youth Working in Gardens booklet was developed.

Outputs

- NAGCAT Posters: 62 posters available in English, 6 posters available in Spanish
- NAGCAT Professional Resource Manual and training module
- SaGHAF Posters: 7 guidelines available in English or Spanish
- All NAGCAT and SaGHAF resouces are available in print and can be viewed and downloaded from the internet
- Cultivate Safety Website was developed using NAGCAT and SaGHAF, with child development as the core framework (http://cultivatesafety.org)
- Safety Guidelines for Youth Operating Farm Equipment booklet
- Community Based Agriculture: Safety Guidelines for Youth Working in Gardens booklet

Intermediate Outcomes:

- From 1999 to present, NAGCAT has served as the primary reference for matching the hazards and safety recommendations for 62 different agricultural jobs with the developmental level of a child. These guidelines have been used by Farm Safety 4 Just Kids, SafeKids, Progressive Ag Foundation, and others to reach target audiences.

- NIOSH has funded several important research projects examining the content, application, and injury reduction potential of NAGCAT, resulting in numerous publications as well as evidence-based updates to the original content.
- The original NAGCAT have been disseminated, adopted, and further modified in the U.S. and internationally:
    - The Ohio and Wisconsin Farm Bureau developed and distributed NAGCAT calendars. The University of Minnesota developed an online NAGCAT course for nurses. Hmong safety stories were developed based on NAGCAT.
    - Sweden used the NAGCAT concept to develop Swedish Guidelines, Canadian Labour groups translated NAGCAT into French and distributed them, and the Philippines developed sugarcane work guidelines. The latest request was a request from Croatia to translate the guidelines into their language.
- Book chapter written upon request, adapting NAGCAT for international application.[1]
- NIOSH developed and disseminated "A Story of Impact" in 2011 that described NAGCAT and suggested the guidelines may have contributed to the decline in work-related childhood agricultural injuries.
- At an invited presentation at the 2014 John Deere Product Safety & Compliance Conference, 100 Farm Equipment booklets were distributed upon request.
- More than 300 Garden Safety booklets have been distributed upon request to over 20 organizations. Divisions of the USDA and CDC have promoted the booklet through their listservs and the national Farm-to-School program has featured it in their online resource database.

End Outcomes:

- Research confirmed that when NAGCAT are used by farm parents, childhood work-related injuries (ages seven to 19 years) were reduced by 50%.[2]
- Research demonstrated that active dissemination of NAGCAT resulted in more safety-related changes on the farm.[2]
- NAGCAT tractor guidelines were updated based on the latest scientific evidence by dropping the youngest age group (12-13 years) from the NAGCAT tractor matrix, thus making 14-15 years the recommended age to begin tractor operations. The adult responsibilities, recommended supervision, and age recommendations for 22 NAGCAT guidelines that involve tractor operations were also updated. A companion piece for parents outlining 5 child development domains and their relationship to safe tractor operations (video and print) was developed.[3]
- Tractor manufacturers have endorsed distribution of work guidelines to retail customers.
- A Model Policy on Youth Employment in Agriculture was developed, then endorsed by a national agricultural employer organization.[4]
- A Position Statement for Youth Working with Grain was developed and released by the Grain Handling Coalition.[5]
- Agriculture-related injuries to youth living, working, and visiting on farms declined by 61% from 1998 to 2012.[6]

References:

[1]Lee, BC. 2010. Applying agricultural work guidelines from one country in another. In: Fassa, AG, Parker, DL and Scanlon, TJ (eds) Oxford University Press. *Child Labour: a public health perspective*.

[2]Gadomski A, Ackerman S, Burdick P, Jenkins P. Efficacy of the North American guidelines for children's agricultural tasks in reducing childhood agricultural injuries. *Am J Public health*. 2006;96:722-727.

[3]Hard D, Schwebel DC, Ellis T, Marlenga B. (September 2013). Updating the NAGCAT tractor guidelines to reflect the latest scientific evidence. Poster presented at the *2013 North American Agricultural Safety Summit*, Minneapolis, MN.

[4]Miller, ME, Lee, BC. Developing a model policy for youth employment in agriculture. *J Agromedicine* 2014; 19 (3): 249-257.

[5]Grain Handling Safety Coalition (2014). Position statement for youth working with grain (retrieved from http://grainsafety.org/young-workers/) .
[6]National Children's Center for Rural and Agricultural Health and Safety. *2014 Fact Sheet: Childhood agricultural injuries in the U.S*. Marshfield Clinic.

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National Children's Center
for Rural and Agricultural Health and Safety

Youth and Tractors: Guiding Public Policy

Problem:
Farm tractors are the leading source of fatal injury for youth working in agriculture and also a major source of disabling non-fatal trauma.

Program Description:
The National Children's Center has been involved in research and scholarly activities aimed at reducing tractor injuries and fatalities for more 10 years. Beginning with the development of the North American Guidelines for Children's Agricultural Tasks (NAGCAT), the Center has focused on matching children's developmental characteristics with the requirements of the agricultural job to assist parents in making appropriate decisions about tractor work assignments for youth 7-16 years old.

Early research focused on parental assignment of tractor work to children and the operational characteristics of tractors driven by children. Knowledge of child development and perceptions of risks to children on farms were later explored as possible factors that might influence parental use of NAGCAT. It became clear that voluntary guidelines alone may not be sufficient to protect children from tractor injuries and fatalities, so we turned our attention to research and scholarly activities that could inform organizational policy, as well as state and federal policies and regulations.

Outputs	Intermediate Outcomes
Summary of state laws regulating youth operating tractors on highways: • 2006 *Journal of Agricultural Safety and Health*, 12 (1): 51-58. • Internet searchable map on the National Children's Center website.	• Used by USDA as part of its critical review of the National Tractor Certification Program. • Used by the Department of Labor (DOL) during its deliberations and proposed rulemaking to update the child labor laws in agriculture (NPRM: RIN 1235-AA06 released September 2, 2011).
Evaluation of a state policy to reduce tractor crashes on public roads: • 2006 *Injury Prevention*, 12 (1), 46-51. • 2006 Guest editorial, *Journal of Agricultural Safety and Health*, 12(1), 3-4.	• Used by USDA as part of its critical review of the National Tractor Certification Program. • Used by the DOL during its deliberations and proposed rulemaking to update the child labor laws in agriculture (NPRM: RIN 1235-AA06 released September 2, 2011).
Changing the child labor laws for agriculture impact on injury: (removing the family farm exemption and raising the minimum age for hazardous work from 16 to 18 years) • 2007 *American Journal of Public Health*, 97 (2), 276-282.	• DOL served as an invited consultant on the project to assure accuracy in the interpretation of the child labor laws. • Used by the DOL during its deliberations and proposed rulemaking to update the child labor laws in agriculture (NPRM: RIN 1235-AA06 released September 2, 2011).

Outputs	Intermediate Outcomes
Physical mismatches between anthropometric characteristics of children and the physical requirements of tractor operations: • 2008 *Ergonomics*, 51 (7), 1096-1108. ♦ Forces required to operate farm tractor controls. • 2009 *Ergonomics*, 52 (6), 685-694. ♦ Ability of youth to reach farm tractor controls. • 2010 *Ergonomics*, 53 (6), 758-766. ♦ Limitations in fields of vision for simulated young farm tractor operators.	• Used by the DOL during its deliberations and proposed rulemaking to update the child labor laws in agriculture (NPRM: RIN 1235-AA06 released September 2, 2011). • Used by an internal NIOSH grantee to update the NAGCAT tractor guidelines. • (2013) Completed update of the NAGCAT tractor guidelines by dropping the youngest age group (12-13 years), thus making 14-15 years the recommended age to begin tractor operations. • (2013) Updated the adult responsibilities, recommended supervision, and age recommendations for 22 NAGCAT guidelines that involve tractor operations. • (2013) With the assistance of David Schwebel, PhD, developed a companion piece for parents outlining 5 child development domains and their relationship to safe tractor operations (video and print).
Proposed revisions to the Agricultural Child Labor Hazardous Occupations Orders (NPRM: RIN 1235-AA06) released September 2, 2011: • September 2011 Fact Sheet: Comparison of present rules with 2011 proposed revisions developed in partnership with Washington State Department of Labor & Industries. • October 2011 Webinar: Understanding the proposed changes to the child labor regulations sponsored by the National Children's Center, AgriSafe & ASHCA. • November 2011 National Children's Center submitted public comments on NPRM: RIN 1235-AA06. • Secured *Foreword* from Labor Secretary Hilda Solis for the 2012 *Journal of Agromedicine*: 17 (2) issue focused on children and agriculture, where she justifies the proposed changes.	• 754 downloaded child labor fact sheet from the National Children's Center and Childhood Agricultural Safety Network website • Webinar: ♦ Attendees: 91 people from 24 states, DC, & Argentina ♦ Archived webinar accessed: 395 ♦ PowerPoint downloads: 115 • Interviewed by CBS News' 60 Minutes, the Wall Street Journal and USA Today, as well as major metropolitan dailies (Minneapolis Star Tribune, Milwaukee Journal Sentinel) and top agricultural media outlets (Successful Farming, Progressive Farmer, Brownfield Ag News radio with 350-plus stations).

National Academies of Science Recommendations:
These research and scholarly activities are responsive to the Academies recommendation to *Enhance Awareness of National Policy* (Recommendation 8) "because they can have a substantial impact on AFF worker populations and risk factors." The role of policy has been an integral part of the National Children's Center, as we recognized early on that education alone will not be effective in reducing traumatic tractor injuries to youth in agricultural worksites.

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Evaluation of a Hearing Conservation Program for Farm Youth: A 16-Year Follow-up

Problem:
Agriculture is one of the industries identified as having the highest exposure to dangerous levels of noise. However, many agricultural worksites are exempt from OSHA hearing conservation regulations, so alternative strategies to promote hearing conservation among youth working in agriculture must be identified and evaluated.

Project Description:
We had the rare opportunity to evaluate the long-term effectiveness of a well-designed hearing conservation intervention for high school youth working in agriculture. This study assessed whether the randomized controlled trial intervention conducted from 1992-1996 resulted in (1) reduced prevalence of noise-induced hearing loss and/or (2) sustained use of hearing protection devices.

From 1992-1996, 34 rural Wisconsin schools were recruited and 17 were randomly assigned to receive a comprehensive 3-year hearing conservation intervention. During 2009-2010, extensive efforts were made to find and contact all students who completed the original trial. Participants in the 16-year follow-up completed an exposure history questionnaire and a clinical audiometric examination. Rates of noise-induced hearing loss and use of hearing protection were compared.

Outputs	Key Findings
• Berg RL, Pickett W,Fitz-Randolph M, Broste SK, Knobloch MJ, Wood DJ, Kirkhorn SR, Linneman JG, Marlenga B. (2009). Hearing conservation program for agricultural students: Short-term outcomes from a cluster randomized trial with planned long-term follow-up. ***Preventive Medicine***, 49(6): 546-552. 	• Presents a major re-analysis of the original randomized controlled trial using modern standards (CONSORT) that were not available at the time the original study was completed. These analyses established a procedure for assessment of objective hearing loss metrics that were used in the follow-up study.

Outputs	Key Findings
• Marlenga B, Linneman JG, Pickett W, Wood, DJ, Kirkhorn SR, Knobloch MJ, Broste SK, Berg RL. (2011). Randomized trial of a hearing conservation intervention for rural students: Long-term outcomes. ***Pediatrics***, 128 (5): e1139-e1146. 	• The hearing conservation intervention did not make a huge difference. ♦ The intervention appeared to increase the use of hearing protection devices, but the usage was still quite low. ♦ There was no difference between groups with respect to objective measures of hearing loss. • Future interventions to prevent noise-induced hearing loss should focus on environmental modification and regulations to control noise emissions, as a comprehensive educational intervention by itself showed limited effectiveness.
• Marlenga B, Berg RL, Linneman JG, Wood DJ, Kirkhorn SR, Pickett W. (2012). Determinants of early stage hearing loss among a cohort of young workers with 16-year follow-up. ***Occupational and Environmental Medicine***, 69 (7): 479-484. 	• Risks for hearing loss increased in association with higher levels of almost all common recreational and occupational sources of noise, as well as chemicals with ototoxic potential. • Non-occupational noise exposures were found to be related to hearing loss, even more so than occupational noise exposures. • Priority exposures that should be considered for hearing conservation programs include: gunshots, chainsaws, power tools, smoking, and some chemical exposures.
• Berg RL, Pickett W, Linneman JG, Wood DJ, Marlenga B. Asymmetry in noise-induced hearing loss: Evaluation of two competing theories. ***Noise and Health*** (in press). Noise & Health A Bimonthly Inter-disciplinary International Journal	• While "head shadowing" is accepted as the primary explanation for asymmetric hearing loss, our findings were more consistent with physiological differences as the primary cause of asymmetric hearing loss, with greater susceptibility to noise-induced hearing loss in the left ear of men.

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National Children's Center
for Rural and Agricultural Health and Safety

Safe Play Areas for Children on Farms

Problem:
More than half the children injured or killed on farms are not working at the time of the incident. Our Center generated guidelines for *Creating Safe Play Areas on Farms* in 2003. Barriers and motivators to adopt these guidelines are not well-known.

Program Description:
Since 2007, the Center's approach to promoting the principles of safe play areas on farms has been multi-faceted with development of new resources for stakeholders (agricultural business, farm organizations, health care facilities, youth serving groups, media, farm families, Spanish-speaking parents and others), resource updates, research on barriers and motivators to building a fenced play area, safe play demonstrations, and social media efforts to encourage agricultural producers to adopt the Safe Play Areas concept on their farms. From 2008-2013, the Center funded the University of Iowa to conduct a randomized controlled trial with 446 families with young children ages 0-6 from 6 states in the Midwest to evaluate the effectiveness of specific interventions to motivate parents to build safe play areas.

Safe Play

Outputs:

- *Public access to content* - The *Creating Safe Play Areas on Farms, Interactive Demonstrations of Safe Play Areas* and all of our fact sheet publications are freely available to the public on our designated website: http://www.marshfieldclinic.org/safeplay/ or by emailing or calling our Center.
- *Training opportunities* - Professionals and the public have access to training or promotional materials including our publications, table top and bulletin displays and power point presentations. Recommendations on how key groups can use safe play resources are posted on the safe play website.
- *Promotion and adoption* - Our Center promotes creating safe play areas with media releases in the spring and throughout the year and continues to participate in demonstrating interactive safe play areas at Wisconsin Farm Technology Days.
- *Timely Resources* - In 2010, to address the needs of farm parents, the Center published an English and Spanish mini-edition of the *Creating Safe Play Areas* on Farms booklet specific for this audience along with fact sheets on low cost play ideas. Also developed was a user friendly interactive safe play map for parents to address the need for the basic elements (location, protective barriers, play equipment, and ground surfacing) required to create a safe play area: http://marshfieldclinic.org/safeplay/keystocreate The site offers guidelines on how to choose the site, how to plan and design and how to prevent injuries in the play area.

- *Technical Assistance* - Our Center has National Program for Playground Safety certified staff who respond to requests for resources, professional consultations, referrals, activity participation, media interviews and presentations about new resources and research findings.

Intermediate Outcomes:

- *Education/Outreach* - The Center participates in an average of 20 safe play educational outreach events each year and in 2011, the Center set up an Interactive Safe Play Area Demonstration at Wisconsin Farm Technology Days, July 12-14, 2011.
- *Technical Assistance and Resources* – An average of 40 safe play requests are handled every year; 5139 copies of *Creating Safe Play Areas on Farms* have been disseminated upon request since 2007, 865 Safe Play mini-editions-English, 209 Safe Play Mini-editions-Spanish and 1674 other promotional safe play area resources (i.e. bookmarks, rulers, magnetic notepads) have been disseminated upon request.
- *Website* - Safe Play Home has 2680 page views and the safe play map has 5773 page views and 3021 resource downloads.
- *Research* – 73% of the farms in the randomized control trial had a specific place for kids to play. Only 11% were fenced. The offer of incentives was associated with increased motivation to maintain/create a safe play area on the farm.

National Academy Recommendations:

The Center has used a variety of tools to reach farmers directly including in-person presence at farm shows, dairy breakfasts, Farm Technology Days and agribusiness meetings, proactive contact with leading farm journals, newspapers and farm magazines, and radio networks to run ads reminding parents about our resources and interviews to discuss the importance of keeping children out of the dangerous worksite. We also use social media tools  (Recommendation 5.b). NCCRAHS was involving stakeholders throughout the research process with the "Motivating Farm Parents to Create a Safe Play Areas on Farms Randomized Control Trial" research project. Four hundred and forty six families were recruited with help from a public-private partnership that was developed with a major insurance company to solicit their policy holders to test the translational research intervention. The project assessed the change in quantity and quality of safe play areas (Recommendation 6 and 6.d). Researchers visited a selected number of farm sites for the "Motivating Farm Parents to Create a Safe Play Areas on Farms" research project and conducting interviews with parents to determine the motivators and barriers to creating a fenced play area (Recommendation 7.a). This research project used an interdisciplinary researcher trained to predict a variety of health behaviors and intentions. The intentions, attitudes and beliefs related to creating a safe play area will be evaluated from the data (Recommendation 7b).

References:

National Children's Center for Rural and Agricultural Health. "Safe Play Home." *Marshfield Clinic Research Foundation*. Marshfield Clinic, 2012. Web. 28 March 2012 http://www.marshfieldclinic.org/safeplay

Esser, N., Heiberger, S., Ellis, T., Salzwedel, M., and Lee, B. (2012). Creating Safe Play Areas on Farms, Fourth Edition. Marshfield, WI: Marshfield Clinic.

Ellis, T., Heiberger, S., Fisher, R., Pilz, M., Gungor, V., Lee, B. Safe Play Interactive Map. CD-ROM. Vers. 1.0. Media Services, Marshfield, WI: Marshfield Clinic. 2010

Esser, N., Heiberger, S., Ellis, T., and Lee, B. (2010). Creating Safe Play Areas on Farms, 2010 Mini-Edition. Marshfield, WI: Marshfield Clinic.

Esser, N., Heiberger, S., Ellis, T., Lee, B. (2010). Creación de áreas de juego seguras en granjas, Miniedición 2010. Marshfield, WI: Marshfield Clinic.

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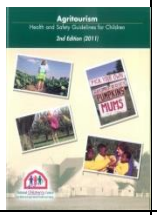
Integrating Safety into Agritourism Operations

Problem:
An estimated 29.3 million children visit farms each year (NIOSH, 2006), many of whom are unfamiliar with the farm environment and its hazards. Communicating health and safety guidelines to agritourism operators is fundamental to ensuring the safety of visiting children.

Program Description:
Agritourism Health and Safety Guidelines for Children were developed by the National Children's Center for Rural and Agricultural Health and Safety (NCCRAHS) to give farm owners the information necessary to reduce the risk of illness and injuries to children visiting farms. The resource contains information on a variety of different topics as well as sections pertinent to all operations. A *Policies and Procedures Guide* and a *Worksite Guide* accompany the guidelines. Both guides contain checklists that help farmers prepare, plan and evaluate their operation's preparedness for child guests.

The "*Integrating Safety into Agritourism*" website (www.safeagritourism.com) was developed and released in August 2012. This website features interactive walkthrough scenarios and checklists that owners can use to identify health and safety issues on their own operations. The website also contains resources that can be used by the owners to address any issues identified on their farms. To ensure that the website is usable and relevant, an advisory team was used that included agritourism operators, agritourism association representatives, an agritourism marketing expert, and technical advisors. A survey of agritourism operators and association representatives was performed in March 2014 to identify gaps in the resources, and the information was used to update the resources and the website, utilizing a similar advisory team.

Outputs	Intermediate Outcomes
Agritourism Health and Safety Guidelines ♦ Two editions (most recent 2011) 	◆ 6495 booklets distributed upon request ◆ 1161 downloaded from website ◆ Examples of usage: Agritourism Assn., County Fairs, Hospitals, Agritourism operations (farms and ranches), Universities & University Extensions, Trade Journals, State Depts. of Agriculture, Farm Bureau, Farm Cooperatives
 Policies and Procedures Guide: Supplement A Worksite Guide: Supplement B	Policies and Procedures Guide: ◆ 2426 guides distributed upon request ◆ 1084 downloaded from website Worksite Guide: ◆ 2426 guides distributed upon request ◆ 929 downloaded from website
Agritourism website (www.marshfieldclinic.org/agritourism)	◆ 4855 visits since launch in January 2007
Integrating Safety into Agritourism website (http://www.safeagritourism.com) ◆ Press releases resulted in articles in a wide variety of newspapers, newsletters (including NAFDMA) and on websites	◆ 6549 visits since launch in June 2012 ◆ 89,879 page views ◆ 7 minute 51 second view duration ◆ Top page visits: resources, walkthroughs & play areas.
Mini-Grant to North Carolina Agromedicine Institute and Lazy O Farm	◆ Reduced injury risk: decreased non-compliant checklist items by 85.7% (checklist A) & 88.1% (checklist B) ◆ Open house training Aug, 2010: 89% of farmers attending indicated intent to use Agritourism Guidelines &/or Certified Safe Farm Checklist ◆ Publication: Tutor-Marcom R, Greer A, Clay M, Ellis T, Thompson T, Adam-Samura ES., (2013). Qualitative Assessment of Agritourism Safety Guidelines: a Demonstration Project. J Agromedicine. 2013;18(2):107-16.

Networking Association for Farm Direct Marketing and Agritourism (NAFDMA) ◆ 2008 – Presentation & Disseminated 750 Guideline booklets ◆ 2012 – Networking ◆ 2013 – Presentation ◆ 2014 – 2 Presentations & 6 farm safety assessments ◆ 2015 – 3 Presentations	◆ 2012 - Disseminated > 80 sets of resources upon request & provided safety consult to > 20 operators ◆ 2013 - Disseminated 250 sets of resources upon request & provided safety consult to > 30 operators ◆ 2014 – 3rd interactive session: participants used checklist to evaluate their farm safety & problem solve ◆ 2015 – Received Outstanding Leader of the Year Award
2013 Agritourism Safety and Emergency Management Workshops, Tennessee	◆ Participants discussed safety issues on their farms, used checklists to evaluate farm safety & problem solve ◆ 6 month follow up with the participants indicated: ◆ 65% had used checklists on their own farms ◆ 50% used safety signs from website ◆ 25% used safety/emergency plans from website ◆ Agree/strongly agree: they had evaluated their farm safety, established new safety procedures and their customers/employees are safer.
Wisconsin Agricultural Tourism Association ◆ 2014 – 4 Education Days, presented at each one ◆ 2015 LUV-R-AG Summit - Presentation	◆ 2015 Partner of the Year Award
Additional Presentations/Workshops ◆ 2012 Nordic Meeting, Ystad Sweden ◆ 2012 Midwest Regional Ag Safety & Health Conference, Cedar Rapids, IA ◆ 2012 Mississippi Agritourism Assn. Conference, Jackson MS (videoconf.) ◆ 2013 Indiana Horticultural Conference, Indianapolis, IN ◆ 2013 ISASH Conference, Sandusky, OH ◆ 2013 North American Ag Safety Summit (Poster Presentation), Minneapolis, MN ◆ 2014 WI Fresh Fruit & Vegetable Growers Conference, Wisconsin Dells ◆ 2014 ISASH Conference ◆ 2014 NAMIC Ag Inspection School ◆ 2014 Midwest Injury Prevention Alliance Summit ◆ 2015 Iowa Fruit & Vegetable Growers Conference ◆ 2015 Nebraska Agri-Eco Tourism Conf. ◆ 2015 Corn Party (Maize Company) ◆ 2015 Florida Agritourism Workshop	

End Outcomes:

- Lazy O Farms (NC Mini-grant recipient) achieved a $300 reduction in its liability insurance premium from its insurance carrier for utilizing these guidelines and checklists.
- An insurance agency agreed to work with the North Carolina Agromedicine Institute on developing a new insurance product for agritourism farms incorporating concepts from the Policies and Procedures and Worksite guides.
- Quote from Charlie Touchette, Executive Director of NAFDMA: "*The work you are doing is hugely important to the operators and the public that drives the growth of the industry we are ALL part of...*" (Personal communication, 3/27/2012).
- North American Direct Farm Marketing Assn. (NAFDMA) endorsed NCCRAHS Agritourism Resources (Touchette, 2013)
- Agritourism guidelines and checklists were entered into evidence in the Wisconsin State Assembly hearings as evidence for the passage of the agritourism liability law to address the safety concerns of Assembly committee members. The Wisconsin Agricultural Tourism Assn, sponsors of the bill, indicated that the materials would be used to educate farmers on agritourism safety. Reassured, the Assembly committee passed the bill the next day (bill subsequently passed both houses, signed into law 4/16/14).

National Academies of Science Recommendations:
The activities associated with this project have been responsive to several of the NAS 2007 AgFF Recommendations. This project has addressed the issue of "knowledge diffusion" and exploring communication tools capable of reaching the AgFF workforce through the use of digital dissemination of information, availability of resources by download, and tracking of usage rates (Recommendation 5). This project also addresses Recommendation 6 through the use of an advisory team made up of public/private stakeholders and Recommendation 7, which entails visiting worksites to acquire understanding of the worksite environment to develop and integrate culturally appropriate and sensitive approaches.

References:
Injuries to Youth on Farms and Safety Recommendations, U.S. National Institute for Occupational Safety and Health, 2009. Retrieved from http://www.cdc.gov/niosh/docs/2009-117/pdfs/2009-117.pdf

Touchette, C.(2013, Winter). Providing a warm, safe, welcome to our winter visitors. *Farmers Inspired*, Vol.1(1), 27.

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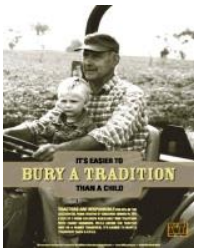
Networking Among Child Safety Advocates

Problem:
Different organizations have developed programs to enhance child agricultural safety and health over the years. Unfortunately, these efforts have sometimes resulted in duplication of effort, conflicting messages, and competition rather than cooperation, thus highlighting the need for a “united voice.”

Program Description:
Since 2000, the Childhood Agricultural Safety Network (CASN) has worked to speak with one voice, advocating farm safety for children. CASN was formed to strengthen partnerships and collaborations among national and regional organizations dedicated to keeping children safe on the farm. These organizations represent the agricultural community, child injury prevention, and minority-serving associations. The mission of CASN is to "set a vision and provide leadership and coordination of childhood agricultural injury prevention efforts in a manner that is both geographically and ethnically diverse."

CASN members participate in quarterly teleconferences and an annual in-person meeting. Other forms of communication for the network include email, a listerv, and webinars. The network works together to develop safety messages and campaigns on childhood agricultural disease and injury prevention.

Outputs	Intermediate Outcomes
Website	• 6411 visitors since 11/26/10 • 16447 page views

Tractor Safety Campaign (2006)
• TV/radio commercial featuring Michael Peterson
• 3 different poster messages in English
• Posters available in Spanish and French
• Campaign released via website and through over 100 press releases
• Campaign re-launched in 2014
 
	• 1324 Posters distributed upon request
	• 1943 Posters downloaded
	• 78 Spanish posters downloaded
	• 41 French posters downloaded
	• 47 Radio commercials downloaded
	• 163 TV commercials downloaded
	• Campaign won the National AgriMarketing Association (NAMA) Region IV “Best of Show in Public Relations” Award in 2008.
	• TV Commercial took second place for best television commercial at same event.
	• 2014 – Farm Bureau used concept for Ag Safety Awareness Campaign
	• 2014 Campaign
	  ♦ 115 press release downloads
	  ♦ Articles in newspapers, websites and newsletters, presentation for AEM group, numerous organizations co-branded and distributed posters.
	• Examples of usage: Physicians’ offices, Farm Cooperatives, County Fairs, Ag Shows, AgrAbility Newsletter, Newspapers, Progressive Ag Foundation, FFA Convention

ATV Safety Campaign – Posters and rack cards (2010)	• 746 Rack Cards distributed upon request • 311 Rack cards downloaded • 184 Posters distributed upon request • 510 Posters downloaded • Examples of usage: Progressive Ag Foundation, Farm Safety 4 Just Kids, Community Outreach Programs, Hospitals, County Fairs, Farm Bureau

Outputs	Intermediate Outcomes
Listserv/Email – for posting & discussion	• Avenue to seek assistance/help • Increase awareness of resources and activities of members • Sharing of news clips on child ag injury incidents
Partnerships	• Joint Projects - CASN has facilitated the development of formal partnerships between migrant advocates and traditional farm safety groups ♦ Migrant Clinicians Network (MCN) prepared *Aunque Cerca Sano* (pesticide comic book). Farm Safety 4 Just Kids printed and disseminated. ♦ Progressive Agricultural Foundation Safety Day Camp materials were modified by MCN for Spanish speaking migrant children. • Increased partnerships ♦ Shared convention exhibit space. ♦ Co-authorship of educational resources.
Evaluation	2014 external evaluator conducted evaluation survey and confidential interviews with CASN members and reported: ♦ CASN leadership is effective ♦ CASN has facilitated new partnerships ♦ Members believe the Network has had a significant effect on child ag safety in the U.S. ♦ CASN members have improved capacity based on their participation in CASN.
Media Guidelines – English (2010) & French (2011) versions • 96 Guidelines distributed	• 249 Guidelines downloaded • French version created in 2011 upon request of Iowa State University, in partnership with Canadian Agricultural Safety Association.
Webinars • Proposed Changes to the Ag Child Labor Regulations – M. Miller • Keep Kids Away from Tractors – B. Lee and M. Salzwedel	• Child Labor Laws Webinar: ♦ 91 Attended live ♦ 395 Viewed archived webinar ♦ 115 Downloaded Power Point Slides • Keep Kids Away from Tractors Webinar (3/12/14): ♦ 69 Attended live ♦ 20 Viewed archived webinar ♦ 30 Downloaded Power Point Slides
• Calendars – Different CASN participants provided an illustrated safety message for each month.	• Over 50,000 calendars distributed since 2007 • 2014 evaluation demonstrated the calendars are ♦ Widely disseminated ♦ High quality ♦ Filled with usable information 

National Academies of Science Recommendations:

CASN provides the leadership and opportunity for a cohesive and coordinated approach to research and transfer activities (Recommendation 2). CASN reaches underserved populations more effectively via networking with fellow advocates for child safety (Recommendation 4). CASN uses a variety of "tools" for knowledge diffusion, such as websites, exhibits, safety events, and support of fellow CASN members (Recommendation 5). Finally, CASN addresses Recommendation 6, with membership from both the public and private sectors working together.

National Children's Center
for Rural and Agricultural Health and Safety

Minimizing Migrant Children's Exposure to Pesticides

Problem:
Health and safety resources for Hispanic farmworker parents, especially pertaining to para-occupational or "take home" exposures, were not available. This problem was addressed by developing, evaluating and widely disseminating a needed educational resource and training system.

Program Description:
With a pilot grant from the National Children's Center (NCCRAHS), Migrant Clinicians Network (MCN) and Farm Safety 4 Just Kids (FS4JK) partnered to design a culturally and linguistically appropriate educational comic book, *Aunque Cerca…Sano,* aimed at minimizing pesticide exposure to migrant children. This 16-page educational comic book in Spanish targets migrant and seasonal farmworker families and helps educate parents about pesticide safety and ways to minimize risks to their children.

Using the comic book to strengthen farmworker educational efforts, MCN also developed and piloted a comprehensive farmworker training program on pesticide safety for the whole family that utilized *promotoras de salud* (community health workers) and incorporated the comic book to reinforce safety messages. MCN was able to show that a positive impact could be achieved in behaviors by utilizing popular education techniques.

Outputs	Intermediate Outcomes
• Migrant Clinicians Network and Farm Safety 4 Just Kids. (2003). *Aunque Cerca…Sano: Una guía para prevenir los riesgos de los pesticidas*. Austin, TX: Migrant Clinicians Network and Farm Safety 4 Just Kids. In 2007 an English version was published.	• 178,362 copies printed and distributed upon request since 2011. (English version if specified). • 8617 downloads of the Spanish "Aunque Cerca…Sano" • 3391 downloads of the English "Pesticides Nearby..But Staying Healthy" • Leveraged funding to create an effective educational intervention employing Community Health Workers (*promtores de salud*) who used the comic book to reinforce pesticide safety messages.
• Liebman A, Juárez P and Sáenz S. (2004). *Aunque Cerca…Sano* Training Manual. Migrant Clinicians Network and the Paso del Norte Health Foundation.	• ≥ 150 outreach workers and *promotores* were trained ♦ ≥ 3,000 workers trained by *promotores*
• Liebman A, Juárez P, Leyva C and Corona A. (2007). A pilot program using *promotoras de salud* to educate farmworker families about the risks from pesticide exposure. *J Agromedicine*; 12(2): 33-43	• US Environmental Protection Agency (EPA) awarded MCN a 2008 Children's Environmental Health Champion Award for outstanding commitment in protecting children from environmental health risks.

End Outcome:
Because of numerous requests for resources and training regarding pesticide safety, MCN leveraged an additional $250,000 from both private and public funding sources (no additional funds from NIOSH) to directly print and distribute the comic books and to develop educational interventions to support the messages in the comic book. MCN designed and implemented several successful interventions in which the comic book was distributed to farmworker families through *promotores de salud*. MCN documented important changes in behavior and knowledge aimed at reducing pesticide exposure. A 2011 study examined the change in knowledge of farmworker parents when the resource was used with and without an accompanying educational session and found changes in knowledge in both circumstances. The comic book is widely distributed upon request to organizations that use the comic book to educate the farmworker families they serve. When available in print, organizations place orders with MCN. It is also available to download from the MCN and National Children's Center websites. MCN continues to conduct ongoing assessments the impact of these comic books. In 2013 MCN conducted an anonymous online evaluation to gather feedback from constituents who received comic books and distributed them to farmworker families. The evaluation had a response rate of 65 percent and produced overwhelmingly positive responses from 97 agencies and organizations who participated in the evaluation: 97% of respondents 1) agreed the comics were a useful tool to education farmworkers and their families about pesticide exposure, risk and prevention; and 2) said they were relevant and easy to understand for farmworkers and their families.

National Academies of Science Recommendations:
These scholarly activities are responsive to Recommendation 5b addressing communication tools capable of reaching the AFF workforce and Recommendation 7a regarding the integration of culturally appropriate approaches to workplace safety.

Reference
Liebman A, Juárez P, Leyva C, Corona A. A Pilot Program Using *Promotoras de Salud* to Educate Farmworker Families About the Risks from Pesticide Exposure. *Journal of Agromedicine*. 2007; 12(2):33-43.

Juárez-Carrillo, PM. Comparison of Two Environmental Health Education Methods to Reduce Exposure to Residential Pesticides in Hispanic Households in the U.S.-México Borderland. Doctoral Dissertation 2011. University of Texas at El Paso, El Paso, TX.

Contact: Amy K. Liebman, MPA, MA aliebman@migrantclinician.org

Reviewed/Updated April 23, 2015

Building Media Relationships for Childhood Agricultural Safety

Problem:
Minimal attention is generally afforded to childhood agricultural safety in the media and if an issue does not receive media attention and coverage, then it is not viewed as an important issues by decision makers or the general public.

Program Description:
The goal of this initiative is to build a cadre of journalists who understand the broad scope – and preventability – of childhood agricultural injuries. The National Children's Center proactively engages and educates media professionals (digital, print, radio, television) on Center activities with the goal of shaping public policy discussion and reducing the burden of injury and illness in agricultural populations.

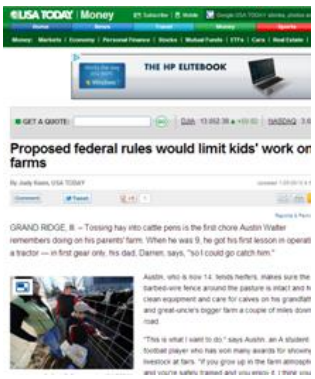
The Center's media relations strategy is built around a full-time communications specialist who represents the Center as a member of the National Association of Farm Broadcasting and the American Agricultural Editors Association, and participates in the annual meetings of those respective organizations.

Outputs:

- Media releases are sent out via updated distribution lists that include agribusiness and commodity group communicators as well as traditional media professionals.
- Facebook, Twitter, YouTube and Pinterest updates supplement releases.
- Media inquiries are triaged and the appropriate scientist/staff member is made available for interviews.
- An annual Journalists' Workshop (2004-2008) explored roles for journalists in childhood agricultural injury prevention efforts. The concept lives on. The Center is consulting on: "Injuries and Agriculture: Telling the Story," scheduled for July 30-31, 2015, and hosted by the Iowa Center for Agricultural Safety and Health.

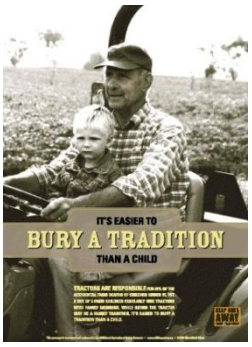
Intermediate Outcomes:

- Already the established resource on matters of childhood agricultural safety and health for the agricultural media, the Children's Center increasingly fields calls from mainstream media such as the Wall Street Journal, Minneapolis Star Tribune, Associated Press and USA Today (Link to USA Today article: http://www.usatoday.com/money/economy/story/2012-01-24/regulations-kids-farm-work/52778304/1



- Fifty journalists “graduated” from the series of five annual workshops (2004-2008), and many continue to use the Children’s Center as a resource. Each workshop was conducted in collaboration with a different NIOSH-funded Ag center and included other organizations to varying degrees. The 2007 workshop, for example, was hosted by the Southeast Center for Agricultural Health and Injury Prevention in partnership with the University of Kentucky’s Institute for Rural Journalism and Community Issues (IRJCI). Each Ag center reported immediate and long-term workshop outcomes that improved communications reach to its regional agricultural community. Interaction among faculty and media at the workshops led directly to numerous positive impacts, including:
    1) A rollover protective structure (ROPS) rebate program in New Hampshire
    2) An all-terrain vehicle (ATV) youth safety intervention in Texas
    3) A research study on using geographic information system technology to map ATV injuries in Texas, results published: Journal of Agromedicine, Volume 17(1)
    4) A monthly occupational health column written for a Pacific Northwest farm magazine (Western Farmer-Stockman)

- The “Keep Kids Away from Tractors” campaign relied on media to spread the message that children under 12 should not be allowed on or near tractors. The campaign was judged “Best of Show in Public Relations” in the 2007 National Agri-Marketing Association (NAMA) Region IV competition. The campaign was re-launched in 2014 due to a rash of tractor incidents involving children. Within three weeks, the April 1 release provided the basis for articles featured by four news organizations with national reach: Farm Progress Publications; Milwaukee Journal Sentinel; Gannett Wisconsin; and the Associated Press.



- Heiberger accepted an invitation from the International Federation of Agricultural Journalists (members in 31 countries) to write an article for its website on *Media Guidelines for Agriculture,* a project of the Center-led Childhood Agricultural Safety Network (CASN) that addresses safe depictions of agriculture.

National Academies of Science Recommendations
This initiative is responsive to Recommendation 5 regarding knowledge diffusion with the ultimate goal of increasing awareness and shaping public policy discussions (Recommendation 8).

References:
Heiberger SW, Hanna CL, Lee BC. Agricultural Safety and Health Workshops for Journalists: Strategies that Work. Marshfield, WI: Marshfield Clinic; 2008

Contact: Scott Heiberger, Communications Specialist – heiberger.scott@mcrf.mfldclin.edu

Updated April 23, 2015

Journal of Agromedicine Practice, Policy & Research

Problem:
Agricultural safety and health needs a venue to reach broader audiences with research findings, practice recommendations, and policy relevant issues. Disseminating research results via peer-reviewed manuscripts is critical to building a body of knowledge in agricultural safety and health.

Program Description:
The National Farm Medicine Center/National Children's Center has been the editorial home of the *Journal of Agromedicine Practice, Policy and Research* since 2004. All NIOSH-funded agricultural centers are represented on the Editorial Board; approximately one-third of all manuscript submissions originate with authors whose work is funded by NIOSH. The Journal's primary purpose is to address the health and safety workers in agriculture, as well as those who are impacted by production practices. Dedicated issues have gone into depth on the topics of pesticides, aquaculture/commercial fishing, children in agriculture, aging farmers, dairy workers, and conferences of special importance such as the Sixth International Symposium: Public Health and the Agricultural-Rural Ecosystem, and the 2013 North American Agricultural Safety Summit. To handle the influx of papers, publisher Taylor and Francis built a ScholarOne manuscript management system for the *Journal* in 2012.

Outputs:

- An issue dedicated to "*"Blueprint for Protecting Children in Agriculture: The 2012 National Action Plan,"* (Volume 17, Issue 2), was published in April 2012 with 16 peer-reviewed manuscripts on topics related to children, agriculture, safety, policy and interventions.
- Three manuscripts and 13 abstracts related to childhood agricultural safety and health were included in the issue dedicated to the 2013 North American Agricultural Safety Summit, scheduled for publication May 2014. Abstracts - http://www.tandfonline.com/toc/wagr20/current.
- State-of-the-art research and evidence-based safety strategies presented at the Agricultural Safety and Health Council of America (ASHCA)-NIOSH conference (Vol. 15, Issue 3). Abstracts - http://www.tandfonline.com/toc/wagr20/15/3.

Intermediate Outcomes:

- In 2012 the *Journal* was accepted by ISI/Thomson Reuters for coverage in Science Citation Index Expanded and Journal Citation Reports. Its 2014 Impact Factor was 0.924, ranking it 126/160 in the category of Public, Environmental & Occupational Health.

National Academies of Science Recommendations:
The Journal addresses Recommendation 6 by "disseminating what is learned to all entities that have a stake in improving the health and safety of workers and producers in these industries." Further, this activity supports awareness of and input for public policy consistent with Recommendation 8.

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Updated April 23, 2015

National Children's Center
for Rural and Agricultural Health and Safety

PARENT First. FARMER Second
Cultivate Safety Campaign

Problem:
Farm children continue to experience high rates of premature mortality, morbidity, and disability due to injury in the agricultural environment. Many recommendations for injury prevention have been developed, yet adoption of these best practice strategies has not been widespread. With this campaign and deliverables, we bridge research findings on the efficacy of childhood farm injury practice guidelines with practical strategies to get easy-to-use information into the hands of farmers.

Program Description:
The media campaign, "Parent First, Farmer Second," promoted parent accountability and was designed to motivate farm parents by acknowledging the many important roles that farmers have while reminding them that the most important responsibility is keeping their children safe.

The campaign used multiple communication tools to direct farm parents to a parent-friendly website (www.cultivatesafety.org) with childhood farm injury resources and best practice guidelines with demonstrated efficacy for injury prevention in a number of different formats.

The site was launched in Wisconsin in March 2013 with radio, print and Internet ads, directing traffic to the website.

Outputs:

- 3 campaign ads (I AM RAISING, I AM PARENT, WE ARE RESPONSIBLE)
- Parent-friendly website (www.cultivatesafety.org)
- Website Google analytics
- 10 videos
    - Can My Child Do the Job Safely?
    - Child Development is More than Physical Size and Strength
    - Child Development Can't Be Rushed
    - Tired Children Make Mistakes
    - Brain vs. Brawn
    - Child Development 101
    - Training with a Positive Attitude
    - Supervision Can Prevent Injury
    - Follow the Leader

- 8 prevention briefs
    - Playing It Safe
    - Skid Steer Safety
    - Big, Strong, Unpredictable
    - A Child's Perception May Not Be Reality
    - Make It A Habit – Grab It
    - Keep Kids Away From Tractors
    - Don't Mix Worksite and Childcare
    - Can My Child Do this Job Safely?
- 85 child agricultural injury newspaper clippings
- 1 child agricultural injury testimonial video
- 2 radio public service announcements
- Facebook page
- Twitter account
- 3 Internet banner ads
- 2 conference posters
- 2 published abstracts

CULTIVATE SAFETY

PLAYING IT SAFE

Web tool helps busy farm parents design Safe Play Areas

Most childhood injuries and deaths on farms occur when children are with parents in a work area, either helping with chores or playing. Keeping children out of the agricultural worksite, and away from machinery, motor vehicles and other hazards, can save young lives.

If off-farm childcare is not available, there is an interactive Web tool to help parents design and build a designated outdoor Safe Play Area. Based on the document Creating Safe Play Areas on Farms, the Web tool, (http://www.marshfieldclinic.org/safeplay/keystocreate), features an interactive guide in a 3D modeled, Flash-based "virtual" Safe Play Area. The guide highlights key elements such as fencing, ground cover, play activities, supervision, proper distancing between play structures and injury prevention.

What is a Safe Play Area?

A Safe Play Area is a carefully planned location, within sight and sound of a responsible adult, away from hazards, designated by a physical barrier such as a fence, and supplied with protective ground cover. Creating Safe Play Areas on Farms is the first resource of its kind to merge playground safety, farm safety, environmental health and adult supervision.

Safe Play resources include:

- Fencing guidelines and recommendations
- Ground cover comparisons and recommendations
- Low cost play ideas with "nature made" options
- Child development chart showing safety issues and appropriate play activities by age, 2 through 10
- Types of supervision needed for different age groups

Vulnerable ages

Research indicates that non-working children ages 6 and younger are the most vulnerable to farm injury. On average, a child dies every 3.5 days on a U.S. farm or ranch due to an unintentional injury, or "accident." Creating Safe Play Areas on Farms and the Web tool focuses on children ages 2-10 who live on or visit farms and other agricultural settings.

Farm parents have indicated that they want to protect their children, but they felt they had neither time nor resources to build a Safe Play Area.

"We wanted to provide busy farm parents with the knowledge they need to create a safer environment that encourages developmentally appropriate play," said Tammy Ellis, research program associate, who led the project for the National Children's Center for Rural and Agricultural Health and Safety. "We appreciated the feedback from farm parents who tested our site and reminded us to keep it simple. We hope that other farm parents will find the interactive map easy to use and take the key concepts to create their own play areas."

The project was supported by funds from the National Institute for Occupational Safety and Health. It was built through collaboration of the National Children's Center, Marshfield Clinic and Ministry St. Joseph's Hospital Trauma Services, Marshfield, WI.

cultivate SAFETY

For more information visit CultivateSafety.org

Intermediate Outcomes:

5) The Cultivate Safety website is a usable knowledge mobilization product that has been tested and evaluated by farm parents and modified to its current format. Since the launch in March 2013, the site has had over 2800 visitors with 10,700 page views with the top pages including "preventing injury" for children ages 0-6 years. Childhood agricultural injury intervention content from the North American Guidelines for Children's Agricultural Tasks (NAGCAT), Safety Guidelines for Hired Adolescent Workers (SaGHAF) and Safe Play Areas for Farms are on the site.

- The site also includes information from our "Keep Kids off Tractors" campaign promoting children under 12 should NOT be allowed on or near tractors.
- The campaign earned the 2013 Plambeck Award, Best Series, for "You're a Parent First, Farmer Second" campaign awarded in Nov. 2013 at the National Association of Farm Broadcasters' (NAFB) awards dinner.
- The campaign won a first-place award for "radio ad series" from the National Agri-Marketing Association (NAMA). The annual "Best of NAMA Awards" competition honors the best work in agricultural communications. The radio series also won first place in the NAMA Regional contest, as did the Cultivate Safety print ad series. The Cultivate Safety campaign was a joint effort of the National Children's Center and marketing agency Broadhead.

National Academies of Science Recommendations

This initiative is responsive to Recommendation 5 regarding knowledge diffusion with the ultimate goal of increasing awareness and shaping public policy discussions.

References:

Ellis, TM, Lee, BC, Schwebel, DC, Salzwedel, MA, Flyte, J, Heiberger, S, and Marlenga, B. Effectiveness of a Media Campaign to Motivate Farm Parents to Seek Child Farm Injury Prevention Information Online. *Journal of Agromedicine*. 2014;1059-924X

Contact: Tammy Ellis, Education Outreach Specialist – ellis.tammy@mcrf.mfldclin.edu

Updated April 23, 2015

CHILDHOOD AGRICULTURAL SAFETY NETWORK (CASN)

EXTERNAL EVALUATION REPORT

April 10, 2014

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EXECUTIVE SUMMARY

The purpose of external evaluation was to assess the organizational effectiveness of the Childhood Agricultural Safety Network (CASN) and identify factors that have contributed to its success. We used a conceptual model, *Internal Coalition Outcomes Hierarchy*[1], to guide the evaluation. Our evaluation design was a mixed methods approach to gather quantitative data using a Survey and the ICE©[2] instrument. We also conducted Interviews to gather rich data on examples. Response rates were 80% for the Survey and 53% for the Interviews.

Combined study findings showed that both members and leaders agree that CASN is an effective network in all construct areas that define successful coalitions. Members feel as invested in CASN success as do the leaders. Both members and leaders identify positive *Relations* within the CASN network as strength, and they believe everyone works well together to advance the national agenda for childhood agricultural safety. Members identified several benefits of membership including improved *Knowledge*, shared *Resources*, and enhanced opportunities to network and disseminate. CASN has a solid and stable base of long-time members who remain committed to the *Social Vision* of CASN. They also have a membership of newer organizations, indicating growth and vitality. There are frequent communications between CASN members and leaders through a wide variety of modalities—all of which are used effectively to keep members informed, to share *Resources*, and to expand member *Knowledge* and *Practices.*

There is strong agreement that CASN fulfills an essential and national leadership role in childhood agricultural safety. Members believe the network should be sustained to continue its work that has already achieved important outcomes. Members understand the need for funding to support the work of CASN, but they are undecided about other options for financial support such as dues or fees. A prominent theme for future focus is that CASN be more involved in research.

National Children's Center for Rural and Agricultural Health and Safety

Assessment of Mini-Grant Program (2009-2013)
Executive Summary

Background and Purpose

The National Children's Center for Rural and Agricultural Health and Safety's Mini-Grant program aims to support small-scale projects that address prevention of childhood agricultural disease and injury. Funds are allocated to test innovative strategies, strengthen partnerships, and translate research findings into practical applications. Project outcomes and impact often occur months and even years after the final report is completed. In an effort to gather more information on outcomes and impacts from past mini-grant projects, NCCRAHS developed a survey instrument to gather information and assess mini-grants from the 2009 through the 2013 grant periods. Objectives of this evaluation were to: a) identify outcomes of the mini-grants; b) assess the impact of the mini-grants on organizations receiving the grant; c) determine if participants in the mini-grants demonstrated knowledge gain; d) assess the impact of mini-grants on Principal Investigators and e) assess/acquire information on how results were used and about the sustainability of the projects.

Methods

An online survey instrument was developed in REDCap and pilot tested prior to dissemination. There were fifteen total grants from 2009-2013. Surveys were sent electronically via REDCap. Reminders were sent to non-responders at one week, two weeks, and the day before the survey deadline the third week. Responses were received for fourteen of the fifteen grants.

Results (n=14)

The survey instrument used a mixed methods approach. Quantitative data were collected through yes/no and numeric questions. Qualitative data were collected using open ended questions, with example responses included below (not inclusive of all responses).

1. Which of the following were tangible outcomes for your grant? *Check all that apply.*

Outcome type	Yes	Total	Range
Presentations	10	140+	1-100+
Publications	7	7*	1-2*
Products	8	16	1-6
Media	0	0	0
Other	2	4	1-3

*One response checked publications, left # blank, one publication indicates in progress

2. Which of the following describe impacts of your grant? *Check all that apply.*

Impact type	Yes
Increased "reach" of activities	6
New partnerships	7
Increased organization focus on youth	5
Participant knowledge gain	6
Project sustained beyond grant	3
Other	2

Please explain how the "reach" of activities was increased:

"Training for parents was delivered to other RCMA locations not included in the original grant and as a result, an awareness increase was observed at those locations."

Please explain new partnerships that were formed:

"Partnerships were made not only with the farm but also with emergency services personnel, state veterinarians and the NC Agritourism Network Association."

Please provide more information on your project's sustainability beyond the grant period:

"Our grant established a coalition of individuals vested in benefiting child safety on rural farms, as well as the development of a calendar of outreach events and plans for sustainability."

3. Which of the following did you personally experience in association with the mini-grant? *Check all that apply.*

Impact Type	Yes
Increase in knowledge/expertise	14
Change in behavior/attitude	2
Change &/or expansion in career focus	4
Other	1

4. What type(s) of additional funds were secured in conjunction with this mini-grant? *Check all that apply.*

Funding Source	Yes (n=14)
Matching funds	0
Supplemental funds	2
Another related grant	6
Other	2
None	5 (+1)**

**"Other" checked, explanation provided

Please describe other funding secured in conjunction with project:

"We were able to partner with others in agricultural youth safety and write a USDA - NIFA grant by networking through the presentations on this grant."

5. How have the results of this grant been used?
   - "Results have been accepted for publication in the Journal of Agricultural Safety and Health. Support has helped graduate student recruitment. Invited presentations have been made with partners."
   - "Continued work with the coalition to advance child safety on rural farms."
   - "Some results were used in an NIH-NCI R21 proposal and a USDA/NIFA proposal submitted last year."
   - "Through this grant, our staff gained expertise in working with state educational standards, and understanding the critical role they play in promoting the use of curriculum in any school-based programs"
   - "The booklets are still being given in schools --one per family. Booklets were given to New York Farmers, to other farmers in Pa and were shared with Ohio Health Department at Holmes County and others. Some of the booklets were shared with Canada with nurses working with Mennonites. One thing is sure, these books are read by the families. They do not trash things like this, children in schools can instantly tell me if they have a book at home. They know the stories."

6. What is the most unexpected or interesting thing that came out of this project?

   "The awareness that trained Redlands Christian Migrant Association parents brought to their communities, disseminating the knowledge obtained in the presentations."

Additional comments:

- "Felt welcomed into the agricultural community at the conference and by Marshfield Clinic researchers and staff. Thank you for your support and welcoming nature of the Institute. I hope for future collaborations."
- "A good tool has been developed as a result of this project. Taking it to the next level, piloting and evaluating are the next steps, and we continue to consider funding possibilities for this."

Conclusions

Survey findings reveal sustained outcomes that are rarely documented in peer-reviewed literature, yet suggest investments $\leq$ $20,000 in mini-grants yield important outcomes.

National Children's Center
for Rural and Agricultural Health and Safety

2014 CASN Calendar Evaluation
Executive Summary

Background and Purpose

For the past eight years, the Childhood Agricultural Safety Network (CASN) developed and distributed a wall calendar with child safety messages pertinent to farm parents and agricultural employers. Each calendar page is hosted by a CASN participant, who working with NCCRAHS staff, develop a safety message with resources and an appropriate photo. Recent editions of the calendars also include child development information, and all calendars contain logos of CASN participants on the back cover. Calendars are distributed by CASN participants and other organizations and companies.

This evaluation aimed to assess the costs and benefits of the production and distribution of the annual CASN calendar to guide decisions about continuation or modification. The objectives of the evaluation are to: a) summarize perspectives on the quality of calendars from 2010 – 2014, b) identify the reach (distribution) of the calendars, c) assess the impact and perceived value of calendars by distributors; and d) identify personnel, printing and distribution actual costs and in-kind contribution of those contributing to and distributing calendars.

Methods

An online survey instrument was developed in REDCap and pilot tested prior to dissemination. The surveys were sent electronically to 191 people who had requested CASN calendars from 2010-2014. Reminders were sent to non-responders at one week and at two weeks, which was the day before the survey deadline. Responses were received from 76 of the calendar recipients.

Results (n=75)

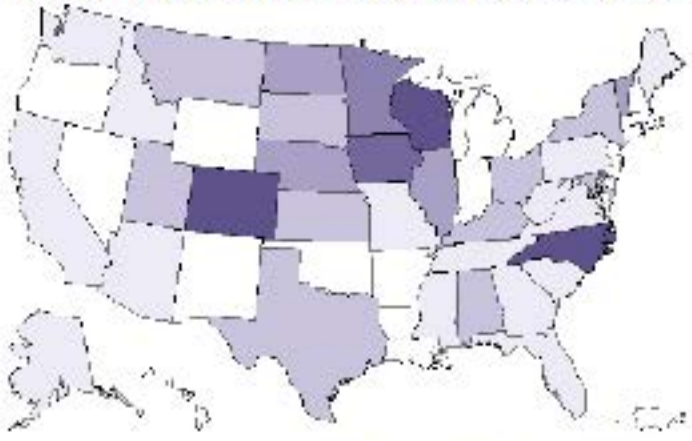
1. Which of the following best describes your organization?

Organization Type	No	Percent
Health care organization	12	16%
Safety and health organization	22	30%
Youth organization	13	18%
Government agency	15	20%
Other	12	16%
Missing = 1		

2. To whom did you distribute CASN calendars? *Check all that apply*

Population Type	No	Percent
Rural population	41	55%
Parents/Grandparents	40	53%
Safety Professionals	34	45%
Other	20	27%

3. In which states/provinces/territories did you distribute these calendars?



Responses also included:
- Multiple states
- 35-40 states
- National
- US Virgin Islands
- American Samoa
- 6-8 Provinces
- 10 responders indicated Canadian Provinces

Frequency Count: 1 2 3 6 9 13

4 a. The CASN calendars were attractive

Response	No.	Percent
Strongly Agree	39	53%
Agree	30	41%
Neutral	4	5%
Disagree	1	1%
Strongly Disagree	0	0%
Missing = 1		

b. CASN calendar messages were easy to understand:

Response	No.	Percent
Strongly Agree	44	59%
Agree	27	38%
Neutral	2	3%
Disagree	1	1%
Strongly Disagree	0	0%
Missing = 1		

c. The CASN calendar messages addressed important topics

Response	No	Percent
Strongly Agree	48	66%
Agree	20	27%
Neutral	5	7%
Disagree	0	0%
Strongly Disagree	0	0%
Missing = 2		

5 How much of the information from the CASN calendars were you able to use and/or apply?

Amount	No	Percent
All	9	12%
Most	22	30%
Some	29	40%
Very Little	3	4%
None	11	15%

6 Did you use the information/messages for purposes other than the calendars (e.g. to create posters)?

Yes	No
10	64

How else did you use the calendar information/messages?

- "I plan to use on display at the 2014 Farm Progress Show (August, Boone Iowa)"
- "I was able to post reminders for safety via social media outlets"
- "Poster board messages"
- "For news releases. I have used information for National Farm Safety and Health Week posters/flyers"
- "We have incorporated the information into brief safety messages sent to a listserv"

7. Did the CASN calendars help strengthen or create new partnerships?

Yes	No
23	51

Please explain how the calendars helped strengthen or create new partnerships

- "We have been able to open doors that may have been closed by using calendars as a free display item."
- "Including the logos of various organizations increased the visibility of organizations with the common mission to promote agricultural health and safety."

NCCRAHS Data

Costs incurred by NCCRAHS for calendar production included an estimated

- 45 hours staff time for Coordinator
- $2000 graphic arts/design expenses
- $3000 printing of 6000 calendars
- $600 postage/shipping calendars to CASN members and others for their subsequent distribution

Conclusion

Survey findings reveal positive outcomes for the calendars, indicating they are widely disseminated, high quality and contain usable information, which is adaptable for additional purposes. While limited information was collected on distribution costs in the survey, the calendars appear to have a positive impact with a modest cost.