



AgConnections

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for Agricultural Safety and Health Research, Education, and Prevention

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Ideas that Work: Model Programs Lead to Practical Solutions, Measurable Impact

We all hope that our work has impact, that what we do truly makes a difference. Working directly with people in agriculture -- farm owners, operators, and employees -- the NIOSH Agricultural Centers have shown how timely, relevant research can help put good ideas into practice. In this issue, we celebrate the 20-year success of the Western Center for Agricultural Health and Safety (University of California-Davis), which continues to work closely with farm owners and labor representatives to achieve measurable improvements in pesticide safety, worker housing, ergonomics, and other critical areas. The Northeast Center for Agricultural and Occupational Health likewise enjoys a long and distinguished record of service to stakeholders, and in this issue Dr. Dennis Murphy of Pennsylvania State University describes an easy-to-use farm safety audit tool that is simplifying hazard evaluations for farmers while offering immediate feedback for hazard mitigation and elimination.

As reported on page 4 by the High Plains and Intermountain Center for Agricultural Health and Safety at Colorado State University (HICAHS), the way that farmers and employees work when meeting day-to-day challenges does not always reflect the genuine interest that farm operators and employees have in maintaining a safe and healthy work environment. Maintaining a consistent safety climate requires, in addition to other variables, clear and effective communication among workers, supervisors, and employers. Toward this end, and as a result of prior cooperation with the Colorado

Corn Growers Association, the Safety Management Applied Research Team at HICAHS has produced safety climate tools now being used by some 500 farm operators and their employees.

The minimum legal age for employment in agriculture is 16, except for minors employed on their family farm and youths ages 14 and 15 who have completed special training. As reported on page 5 of this issue, to date the Southwest Center (University of Texas Health Center-Tyler) has enabled more than 150 agricultural extension agents and ag science teachers in Texas, Louisiana, Oklahoma, and Arkansas to become certified to offer USDA-approved training in safe tractor and machinery operation. The National Children's Center is likewise benefitting farm youth through its Safe Play Areas project (page 6) and, as described on page 7, the Economics of Prevention project led by Dr. Joan Mazur at the University of Kentucky (Southeast Center for Agricultural Health and Injury Prevention) is effectively combining farm safety and economics within mandated core curricula for high school students. As these projects demonstrate, good ideas continue to grow. This issue of *AgConnections* presents only a few of the many projects that have led to greater health and safety awareness and improvements in this most important U.S. industry.



*Wayne Sanderson, PhD
Deputy Director,
Southeast Center
for Agricultural Health
and Injury Prevention*

WS



Western Center for Agricultural Health & Safety (University of California-Davis) Twenty Years of Research, Engagement and Impact

On June 8, 2010 the Western Center for Agricultural Health and Safety (WCAHS) celebrated its 20th Anniversary at the Robert Mondavi Institute for Wine and Food Science at the University of California-Davis. Words of appreciation and congratulations were delivered by UC-Davis Executive Vice Chancellor and Provost Enrique Lavernia; Associate Vice Chancellor Tom Nesbitt; Dr. Bennie Osburn, Dean of the School of Veterinary Medicine; Lovell "Tu" Jarvis, Professor of Agricultural & Resource Economics; and WCAHS External Advisory Board members Guadalupe Sandoval, Managing Director of the California Farm Labor Contractors Association, and William Krycia, CalOSHA Regional Manager, *et al.*

Dr. Marc Schenker, current and founding director of WCAHS, was presented with resolutions by the offices of United States Representative Mike Thompson, California State Senator Lois Wolk, and State Assembly member Mariko Yamada.

Reflecting on the Western Center's start two decades ago, Guadalupe Sandoval recalled working with Dr. Patrick Marer O'Conner on pesticide safety education programs: "These programs trained hundreds of trainers throughout the state," observed Sandoval. "It is difficult to tell how much impact those programs had, but statistics from the Department of Pesticide Regulation

indicate the number of reported pesticide illnesses have decreased more than 60 percent between 1992 and 2006." Such measurable contributions to the safety and health of regional farm workers were a recurring theme of the WCAHS 20th Anniversary celebration. Sandoval further lauded "a near total transition in our hand-harvested orchards -- from the old picking lugs that carried up to 75 pounds of grapes to the smaller lugs that hold up to 45 pounds of grapes." Many of these devices now include more comfortable handles made of PVC pipes -- improvements that can be attributed in large part to ergonomic field studies by WCAHS researchers James Meyers and John Miles.

Farm workers, reported Sandoval, "tell me of the huge decrease in the level of pain and strain they have, thanks to the smaller picking lugs and modified handles. Those harvest workers can go home in a less exhausted state and enjoy a restful evening with their families, rather than wonder if they can make it through another brutal day of picking grapes."

Looking to the future, keynote speaker Don Villarejo, founding director of the California Institute for Rural Studies, emphasized the importance of continued, mutually instructive collaboration among farmers, hired workers, and leaders in applied research.

Video at <http://agcenter.ucdavis.edu>



The offices of U.S. Representative Mike Thompson, State Senator Lois Wolk, and State Assembly member Mariko Yamada presented WCAHS with honorary resolutions.

Above: Former US Deputy Secretary of Agriculture Richard Rominger and his son Bruce poured their "Rominger West Winery" wines during the WCAHS 20th Anniversary celebration.

Opposite page: On behalf of the Northeast Center for Agricultural and Occupational Health, Dr. Dennis Murphy, Distinguished Professor of Agricultural and Biological Engineering at Penn State University, describes an effective and easy-to-use farm safety audit tool.

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Cover photo credits, counterclockwise from top right: No-till planting of corn into cover crop of barley, Jeff Vanuga, USDA; logging road, Robert McKnight, University of Kentucky; Applying weed control to soybeans, Keith Weller, USDA; South Carolina clam harvest, Robert Durborow, Kentucky State University; Tractor with 4-post ROPS, Peggy Greb, USDA; Inspecting cattle for ticks, Scott Bauer, USDA; Dairy research technician, Keith Weller, USDA; Sheep shearer, Teresa Donovan, University of Kentucky; Women processing lettuce, USAID (Mario Lemus AGEXPRONT); Grain harvest, Tim McCabe, USDA; Pennsylvania farm in autumn, Scott Bauer, USDA.

FARM-HAT . . . Not Your Ordinary Cap!

Allows users to select safety categories and topics at their convenience and to conduct hazard audits in a timely, organized manner in a non-threatening environment.

Guides users toward a reduction in number and degree of hazards and risks.

Facilitates an easy-to-use standardized auditing process that adds objectivity to hazard evaluations.

Serves as a training tool for educators working with youth and other groups.

Teaches how to conduct hazard audits.

Provides insurers an objective method for evaluating risks and hazards at diverse farming operations.

The web-based Farm/Agriculture/Rural Management – Hazard Analysis Tool (FARM-HAT) from Penn State is a simple method of providing, at a single glance, firsthand information about safety hazards, a process for evaluating equipment and work sites, and solutions for correcting hazards.

The FARM-HAT method can be used with farming, ranching, roadside farm markets, agritourism settings and similar operations. The evaluation tool provides users with critical safety and health information using minimal text. Farmers, insurers, educators, and others can select from more than 150 topics, including machinery and equipment, buildings, and livestock handling hazards.

Each hazard analysis tool is two pages long. The first page includes photographs and images that clearly depict the level of hazard in a *Most Protection* to *Least Protection* assessment, along with concise word descriptions that enable the user to

simplify the evaluation process. The *Most Protection* to *Least Protection* scale refers to most protection against a worksite hazard, condition, or risk to least protection against the same hazard. “Least Protection” usually means that *no* protection against a recognized hazard was found during the audit.

The evaluation uses a five-level rating scale because hazardous conditions are seldom if ever merely “present” or “not present.” Typically there is always some level of hazard or degree of risk. Using a rating scale also helps to provide objectivity for repeat assessments. “Reminder” boxes highlight important points and behaviors associated with the hazard and identify specific Personal Protective Equipment (PPE) to be worn when working around certain hazards.

The second page of each hazard analysis tool describes laws, regulations, and standards that may apply. Also included is a section that covers helpful hints or recommendations for correcting observed hazards.

www.agsafety.psu.edu/farmhat

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Roll-over Protective Structures (ROPS)

Most Protection

- 1 A manufacturer approved ROPS cab with all glass in place and a door that shuts properly
- 2 A manufacturer approved ROPS cab with missing or improperly shutting door or missing window glass; a 4-post ROPS
- 3 A manufacturer approved two-post ROPS
- 4 A modified or homemade ROPS
- 5 No ROPS installed on the tractor or a tractor with weather cab* only

Least Protection

* Weather cabs provide no protection from roll-overs and may compound rescue efforts after a roll-over. Weather cabs may also prevent the operator from escaping the tractor during a roll-over.



Reminders

- Effective roll-over protection consists of ROPS with seatbelt.
- Seatbelts are to be buckled and worn in ROPS-equipped tractors.
- Replace a ROPS if it becomes damaged.
- Manufacturer approved 2-post ROPS are designed to meet or exceed ASAE standards.
- Approved 2-post ROPS are available for many tractors from dealers for less than \$1000.

Personal Protective Equipment

SMART Strategy: Partnering with the Colorado Corn Growers Association

One year after establishing a partnership with the Colorado Corn Growers Association, members of the Safety Management Applied Research Team (SMART) at Colorado State University are disseminating what has been learned about safety climate in agriculture from a three-phase study. During the first two phases, the team conducted 47 in-person interviews with farm operators and analyzed archival work safety survey data from 211 farm operators to understand behaviors, per-

ceptions, and barriers related to safety in this unique and hazardous industry. Findings from the archival data and interviews suggested that farm operators did regard safety as important, but had difficulty managing and implementing safety in everyday practice due to an overall lack of established safety policies and procedures and minimal communication about safety with employees. Therefore, the third and final phase of the project involved the development, implementation, and evaluation of an educational safety training seminar focusing on the everyday application of safety climate on farms. While farm operators benefited from attending the safety training seminar, one of the top barriers identified was

a lack of practical resources to help farm operators communicate about safety with their employees and pass on their knowledge. To address this need, SMART members created packets containing several innovative safety tools. These included educational safety seminar videos, emergency information cards, and an interactive safety behavior checklist to encourage communication between farmers and employees. Also, to overcome another common safety barrier in agriculture -- the language gap -- all materials were developed in both Spanish and English.

The research team continues to collect evaluation data; however, preliminary findings suggest that the farm operators found the safety packets to be an innovative and useful resource to improve safety on

their farms.

With 500 farm operators utilizing these new safety climate tools, the researchers expect to see a decrease in the high rates of injuries and fatalities on Colorado farms.

This work was funded by HICAHS as part of the "Enhancing Translation and Dissemination Through Ag Partners" project, led by Dr. John Rosecrance and Dr. Peter Chen. For questions regarding this article, please contact Erica Ermann, Colorado State University, ericaermann@gmail.com



Pacific Northwest
Agricultural Safety and Health Center (PNASH)

IPM Programs Adopt High Impact Training Tool

First used in research to assess pesticide contamination routes and dermal exposures, the Fluorescent Tracer (FT) technique has been adapted and field-tested by the Pacific Northwest Center as an effective tool for hands-on pesticide safety training. The dramatic visualization of the FT shows workers where contamination occurs and helps them to evaluate their day-to-day practices and personal protective equipment.

The FT training has been employed in Integrated Pest Management programs in the United States (Washington State, Oregon, Montana, Pennsylvania) and in other countries (Cambodia, Vietnam, Ecuador). The FT technique also has been incorporated into the hands-on training curriculum of the Washington State Department of Agriculture, which

is used to train approximately 200 pesticide handlers each year.

The impact of the FT tool is immediate and striking. Observed one pesticide safety professional: "This is one of the most powerful training tools that I have encountered, because the message is clear and it is shocking."

PNASH's Fluorescent Tracer Tool Kit provides everything needed to conduct 200 group trainings. The FT manual is available in both English and Spanish. Farm safety educators may rent an FT Kit from PNASH before deciding on a permanent purchase.

Information about the FT Kit and training video/DVD can be found online: <http://depts.washington.edu/pnash/FT.php>

To order, call 1-800-330-0827



*Tracer on face.
Note respirator
line across the jaw.
©PNASH*

Tractor Safety Certification

According to the Fair Labor Standards Act and the Hazardous Occupations Order for Agriculture, the minimum age for employment in agriculture is 16 except for minors employed on their family farm and minors ages 14 and 15 who have received special training. The U.S. Department of Labor certificate for tractor and machinery operation can be issued either by certified agricultural science teachers or by agricultural extension agents.

The SW Ag Center adopted the National Safe Tractor and Machinery Operation Program (NSTMOP) developed by Penn State, Ohio State University and the National Safety Council as a targeted initiative and sought to expand its implementation in the Southwest. Two NSTMOP Master Trainers from the southwest region remain active in tractor safety: Bob Williams, Ph.D., from Texas A&M-Commerce, and Kevin Hackett, M.S., from Oklahoma Extension (recently retired). In 2006, the SW Ag Center partnered with Dr. Williams to conduct numerous Community Lead Instructor (CLI) trainings and one Master Trainer (MT) workshop. The table below provides an overview of the training types.

Below, Master Trainer candidate Mike Alton drives a tractor through the serpentine course.

*Tractor Workshop
Texas A & M
Commerce:
Master Trainer
candidates
perform a
pre-operation
check.*



To date 140 CLIs and 6 MTs have been certified in Texas. A CLI training is now offered as a pre-conference workshop at the annual conference for the Vocational Agriculture Teachers Association of Texas.

Mr. Hackett used the *Safe Operation of Agricultural Equipment* manual to certify 34 extension agents in Oklahoma as CLIs and has collaborated with the SW Ag Center since 2008 to extend training opportunities to teachers in Texas, Arkansas, and Louisiana. Recently 8 teachers from Arkansas and 3 teachers from Louisiana were certified as CLIs.

The SW Ag Center maintains a database of CLIs and MTs trained, as well as youth certified. Mr. Hackett is currently developing standard curricula for conducting CLI trainings and Master Trainer workshops.

The SW Ag Center will continue to pursue a sustainable infrastructure for tractor safety certification by incorporating training programs into existing events, such as annual teacher conferences and extension workshops.

For more information contact the SW Ag Center staff at agcenter@uthct.edu

Training Type	Training Requirement	Capabilities
Community Lead Instructor (CLI)	1 day	Allows ag teachers & extension agents to <ul style="list-style-type: none"> certify 14-15 year olds for employment in tractor and machinery operation certify anyone 16 or older in safe tractor and machinery operation
Master Trainer (MT)	2 days	Allows ag teachers & extension agents to <ul style="list-style-type: none"> certify 14-15 year olds for employment in tractor and machinery operation certify anyone 16 or older in safe tractor and machinery operation train additional Community Lead Instructors (CLIs)



Creating Safe Play Areas on Farms: Good Ideas Continue to Grow

Scott Heiberger

Communications Specialist, National Farm Medicine Center

Most childhood injuries and deaths on farms and ranches occur when the child is with parents in a work area, either helping with chores or playing. Establishing a designated play area removes young children from hazardous work areas and provides safer environments that encourage developmentally appropriate play.



With the document *Creating Safe Play Areas on Farms* (2003), the National Children's Center for Rural and Agricultural

Health and Safety (NCCRAHS) provided the first comprehensive guide for designing and building an outdoor safe play area on a farm. Safe Play is a promising strategy to reduce injuries, especially when off-farm childcare is not available.

Safe Play has served as the catalyst for additional projects and studies. These include:

Safe Play Mini-Edition (Spanish)

Key elements were condensed and translated into Spanish for the eight-page *Creación de áreas de juego seguras en granjas* (Creating Safe Play Areas on Farms: 2009 Mini-Edition).

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

Led by Eileen Fisher, Ph.D., University of Iowa, this project is evaluating the effectiveness of two interventions: (1) information, (2) information-plus-\$500-incentive. The innovative element of this study involves a three-way partnership between the National Children's Center, University of Iowa and American Family Insurance. American Family is providing farm/

The National Children's Center offers fact sheets that describe key features of Safe Play Areas: play ideas, fencing and boundaries, and protective ground surfacing. Also available are Safe Play posters, rulers, notepads and bookmarks. For details see www.marshfieldclinic.org/safeplay or contact the National Children's Center, 1-800-662-6900, nccrahs@mcrf.mfldclin.edu.

ranch customers as the population base for the intervention. Should evidence emerge as to the effectiveness of the two interventions in promoting safe play areas on farms, these interventions would be suitable candidates for public and private support in the future.

Grant programs

Two Canadian organizations have implemented programs using monetary incentives to promote the adoption of safe play areas on Canadian farms. The [Canadian Agricultural Safety Association \(CASA\)](#) developed its program in 2006 in Manitoba. A similar program in Ontario launched in 2007. Each program has distributed multiple awards of \$500 each.

Digital Dissemination

The goal of this project is to add a Web-based functionality for farm parents to easily access the resources needed to create a Safe Play Area on their farm. The project features an interactive Safe Play Area map and a "virtual" Safe Play Area. The map provides information about 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 virtual Safe Play Area can be explored at <http://www.marshfieldclinic.org/safeplay/keystocreate>.

Interactive Demonstrations of Safe Play Areas at Rural and Agricultural Events

This 18-page how-to manual is a guide to coordinating a Safe Play Area Demonstration in your community. It includes planning checklists and illustrated instructions for constructing Safe Play equipment and other demonstration components such as ground surfacing, fencing, and gates and latches.

Reference

Esser N, Heiberger S, Lee B. (Eds.) *Creating Safe Play Areas on Farms*. Marshfield, WI: Marshfield Clinic; 2003.



Southeast Center (University of Kentucky)

The Economics of Prevention: Targeting At-Risk Teens and Adult Farmers

Research shows that safety intervention programs for at-risk teens and adult farmers are most effective when they are incorporated into the daily activities where these individuals meet and work on a regular basis (Green & Kreuter 2005). Field-tested through a 4-year study involving university instructors and students in Kentucky, Florida, and Mississippi, the Economics of Prevention (EOP) program helps participants to comprehend the individual and social costs of injury (Myers, Cole, Mazur & Isaacs, 2008) and reaches at-risk teens where they are accessible: in their high school classrooms.

TRAINING THE TRAINERS

By training pre-career teachers and Extension agents to recognize and understand occupational risks, hazards, injury prevention strategies, and the social costs of injuries, the EOP program equips these individuals with knowledge and skills they need to promote farm safety practices in the communities where they live and work. EOP combines farm safety and economics within mandated core content of high school curricula using innovative technologies -- digital documentaries, Web quests, podcasts -- to deliver the materials nationally. Program materials include Web-accessible narrative simulation exercises and cost tools, as well as several data collection instruments, available at <http://EOPonline.org>.

AGRICULTURAL INJURIES COST US ALL !

EOP targets four classes of injuries:

- Crush injuries/farm tractor overturns,
- Closed head injuries/ATVs, horse riding
- Hearing loss
- Motor vehicle/farm equipment collisions

Participants examine four essential questions:

- Who is at risk for agricultural injury?
- Who bears the cost of these injuries?
- How can these injuries be prevented?
- Why is it cost effective to do so?

As anticipated, the EOP program has shown to be effective in promoting farm safety awareness among teachers-in-training and other pre-career professionals. Follow-up interviews with program participants indicate that they are using the simulations and cost tools after graduation in their own classroom and Extension settings.

RESEARCH INNOVATION

The EOP project sought to implement an online system of data collection that would address NORA cross-sector charges for increasing the potential for data sharing. In order to be a viable distributed research tool, the online system needed to ensure

- Human subjects compliance by using a secure system that tags data with anonymous IDs and does not report data for analysis if participant consent is not documented;
- Accurate aggregation of data that was also accessible online for immediate evaluation and feedback so that classroom instructors could use the pre-test data for teaching purposes. For example, it is very important to know if you have students who have been exposed to fatalities or have themselves experienced injuries or loss prior to using the safety interventions.
- Capacity to output data that is portable to SPSS-SAS. The EOP system collects and aggregates data almost instantaneously and supports mobile/hand-held data collection.

Available at <http://EOPonline.org>

EOP materials combine farm safety and economics within mandated core curricula for high school students using the latest instructional technologies: e.g., Web quests, digital documentaries, podcasts, and computerized Cost Tools.

“ I wanted to tell you that I started working on a horse farm out Old Richmond Road the other week, and the first thing I looked for was for all the tractors to have ROPS, and they pass. This was your course in action. ”

*1st year high school teacher,
social studies, Kentucky*

INJURY AND EXPOSURE SURVEILLANCE

EOP data provide insight on farm hazard exposure and injuries:

For example, preliminary data from a sample of 302 participants (215 treatment, 87 control) indicate that 48% of subjects have lived on a farm, and 70% have worked on farms. Among other findings, nearly 32% reported a tractor overturn involving self, family member, or friend; 62% reported temporary hearing loss to self, family member, or friend from exposure to loud noise.



The Centers

for Agricultural Disease and Injury Research, Education, and Prevention represent a concerted effort of CDC/NIOSH to protect the health and safety of farm operators, hired farm workers, and their families. The Centers act by cooperative agreement to address urgent, persistent, and/or emerging problems related to occupational safety and health in agriculture, forestry, and fishing. The Centers are located in geographically diverse regions and respond to the unique needs of their stakeholder populations.

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