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[I-CASH Home](#) > [Programs](#) > [Midwest Rural Agricultural Safety and Health Conference](#) > [2017 MRASH](#) > [Poster Abstracts](#)

Poster Abstracts

2017 MRASH Poster Abstracts

I-CASH Youth Grant Recipients 1998-2017.

Ralph Altmaier, MS, University of Iowa.

I-CASH designates funds for community grants targeted at the prevention of farm-related injury and illness in young people and their families. About \$5000 is awarded each year to projects that involve youth in the planning and delivery of agricultural safety and wellness messages. In the past 19 years, 145 grants have been awarded to 87 Iowa youth organizations totaling over \$135,000.

Personal Attenuation Ratings of Farmers: How Well Do Earplugs Really Fit?

Christie DeVito, MS; Jenna L Gibbs, MPH PhD; T. Renee Anthony PhD, University of Iowa College of Public Health, Occupational and Environmental Health

Farmers are exposed to multiple noise sources, yet little is known about whether farmers are adequately inserting hearing protection devices for noise protection. This study used the 3M EARfit Dual Validation System to test 60 farmer participants (77% males, 33% females) on four types of ear plugs. There was no

significant difference between gender. Younger farmers (age 16 – 23) had better attenuation ratings than older farmers for formable ear plugs. Farmers achieved better hearing protection with non-formable plugs (push-in and triflange types). Less than 6% of the farmers actually achieved levels anticipated from the manufacturer's Noise Reduction Rating (NRR). As a result of this project, GPCAH has started targeted promotion of different types of ear plugs to farmers of different age groups and for special work tasks.

Examination of Factors Impairing Operator Visibility for Machinery With Known Blind Spots

Shawn Ehlers, PhD, Purdue University

The evaluation of key factors impairing rearward visibility for operators of self-propelled agricultural machinery encompasses multiple facets including design characteristics of the machinery and operator physical limitations. It was intended that the data collected would identify not only common factors limiting rearward visibility, but also any changes that technological advancements in monitoring have on the operator's ability to observe objects and hazards. Through the design and utilization of a grid method for testing and evaluating rearward visibility, the authors have identified multiple makes and models of agricultural machinery demonstrating impairments for direct view of the area to the rear. This study looked at the risks associated with 4-wheel drive, track type, and wheeled row-crop tractors (with and without an implement in tow), along with self-propelled combines, large capacity self-propelled sprayers, skid-steer loaders, and UTVs. Results of this study evaluate the effectiveness of factory installed mirrors and the addition of rear-view cameras in providing the operator with a more complete rearward view. Analysis for changes in level of visibility in these high-risk areas are discussed.

Distributing Best Practices for Lighting & Marking: Translating Research Regarding Farm Equipment Signage into Practice.

Kayla Faust, University of Iowa, Great Plains Center for Agricultural Health; Jenna Gibbs, MPH, University of Iowa College of Public Health, Department of Occupational and Environmental Health; Marsha Cheyney, MPH, University of Iowa College of Public Health, Department of Occupational and Environmental Health; Marizen Ramirez, MPH, PHD, University of Minnesota, Division of Environmental Health Sciences, University of Iowa College of Public Health, Department of Occupational and Environmental Health

A recent study found that farm equipment crashes in the Midwest would decrease by more than 50% if state policies required more lighting and reflective marking on those vehicles. This project demonstrates implementation of these research findings into practice, by providing interviewed farmers with a SMV kit (including an SMV emblem and reflective strips). We created an educational display depicting ASABE standards and recommendations for lighting and marking of farm equipment and promoted it at farm shows across the Midwest. A total of 313 farmers were provided a SMV kit and were then asked to complete a brief survey, which included questions on demographics, farm vehicle characteristics, adherence to ASABE standards, and any personal accounts of near misses that occurred while operating farm equipment on roadways. Overall, 45% of farmers reported they were missing or did not have current SMV materials. Sprayers, trailers, and especially tractors were less likely to have SMV materials compared to other equipment ($p = 0.02$). Additionally, 26% of surveyed farmers reported crashes or near misses that occurred

while operating farm equipment on roadways. In agreement with previous findings, commonly reported crash configurations included rear-ending, improper passing, and reversing/backing.

Development of an ATV Safety Training Curriculum for Young Agricultural Workers – Using the Protection Motivation Model

Alexandra Farfalla, MPH, MA University of Nebraska Medical Center, College of Public Health; Ellen Duysen, MPH, University of Nebraska Medical Center, College of Public Health; Aaron Yoder, PhD, University of Nebraska Medical Center, College of Public Health

There were approximately 1,580,000 ATVs in use on farms and ranches throughout the United States in 2011 and this figure continues to grow. While both utilitarian and recreational, an unfortunate consequence of ATVs rising popularity has been the co-occurrence of ATV-related injuries and fatalities – especially among youth. Data from National Children’s Center for Rural and Agricultural Health and Safety indicated that of the leading sources of fatalities among youth, 17% involved motor vehicles such as ATVs. Using concepts from the Protection Motivation Theory, an ATV safety training was developed, specifically designed for young agricultural workers. The protection motivation theory proposes that people protect themselves based on four factors: the perceived severity of a threatening event, the perceived probability of the occurrence, or vulnerability, the efficacy of the recommended preventive behavior, and the perceived self efficacy. The curriculum and corresponding demonstration was tested with 75 youth enrolled in the 2017 Nebraska Tractor Safety Training Course. Measures included demographics, ATV knowledge, ATV riding practices, and protection motivation constructs. Results indicate the ATV-educational module increased youth’s ATV knowledge but did not appear to affect or be related to youth’s perception.

Farmers’ Preferences for Hearing Protection Devices: Do Educational Interventions Work?

Jenna Gibbs, MPH, PhD, Coordinator, Great Plains Center for Agricultural Health, University of Iowa; Marsha Cheyney, Outreach Coordinator, Great Plains Center for Agricultural Health, University of Iowa

In 2016 our outreach team surveyed 174 individuals (37 non-farmers, 137 farmers, MO & IA) on personal selection of six different types of hearing protection devices (HPDs). After the survey, the GPCAH outreach team performed an educational ‘step’, by discussing key information with a 3-panel display and allowing some farmers to take an EAR-fit™ personal attenuation test. After the education ‘step’, the participant was given the opportunity to change their initial selection.

Farmers selected HPDs based on ‘best fit/most protection’ (30%), ‘comfort’ (19%), and ‘easy/quick to use’ (19%). Non-farmers selected HPDs based on ‘best fit/most protection’ (30%), ‘comfort’ (35%), and ‘entertainment’ (16%). Farmers ≥ 40 years old were more likely than younger farmers to select HPD based on ‘best fit/most protection’ ($p = 0.01$) and ‘familiarity’ ($p = 0.02$). Initially, 38% of farmers selected roll in type ear plugs (3M Ear Soft™ and Classic™); 29% selected push-in type ear plugs (triflange and push-in); 28% selected ear muffs, and 5% selected ‘none’. There was no difference in selection and gender.

After participating in the educational display, 38% of non-farmers and only 14% of farmers decided to change their initial choice. However, when farmers participated in both the educational display and additionally had

an EAR-fit™ test, 33% decided to change their initial HPD choice. This increase of 138% was strong evidence for hands-on hearing conservation training with farmers.

Advancing the Health of Agricultural Producers through the Clinical Application of a Health Risk Assessment Tool

Sarah Hunt, BAN, MSN, FNP-BC, Regis University; Cris Finn, PhD, RN, FNP, FACFEI, FNE, CFC, Regis University; Carolyn Sheridan, BSN, AgriSafe Network Clinical Director

Primary care providers have the ability to prevent respiratory disease in agricultural producers as well as assess their current respiratory status to treat and prevent the progression of disease. The research question is: “Will applying the respiratory specific AgriSafe health assessment tool to a clinical setting, help nurse practitioners at a rural Clinic in IA improve their confidence in identification of agricultural producer’s pulmonary needs as compared to previously not using a health assessment tool?” This project plans address the gap between the knowledge of agricultural associated hazards (best practices) and give providers the confidence to apply this knowledge to practice. Initially information will be gathered via phone interviews from previous attendees of the AgroMedicine Course. Following the phone interviews a small rural clinic with four primary care providers will undergo a pre-implementation survey, a presentation discussing health history and applying the assessment tool, implementation of the assessment tool into an electronic record, followed by a three-month and six-month post implementation survey. A potential implication of this study is that it could help improve provider’s confidence in caring for agricultural producer’s respiratory needs as well as improve respiratory outcomes in agricultural producers in the community.

Air Quality in Livestock Production Buildings: Developing a Sampling Strategy for Measuring Concentrations of CO₂ and Dust in a Commercial Swine Farrowing Building.

Kelci Knight, BS, University of Iowa; TR Anthony, PhD, CIH, CSP, University of Iowa; TM Peters, PhD, CIH, University of Iowa; R Altmaier, MS, University of Iowa; JL Gibbs, MPH, PhD, University of Iowa; A Ramirez, DVM, MPH, PhD, Diplomate ACVPM, Iowa State University; MW Nonnenmann, MS, PhD, CIH, University of Iowa

Inhalation exposures with high concentrations of dust (e.g. inhalable and respirable) and CO₂ have been found to cause adverse respiratory health effects for workers. We developed a sampling strategy to measure the spatial distribution of contaminant concentrations with a mobile cart and fixed area basket. Our study’s preliminary results show concentrations measured using both a fixed area basket and a mobile sampling cart. Future analyses will lead to an understanding of the spatial distribution of contaminant concentrations in swine farrowing rooms. This approach will also inform the design and installation of a filtration system to be used as an engineering control to reduce worker exposure.

Determining Rural Health Clinic Data Gaps in Iowa

Lauren LaDuca, University of Iowa, Megan Hartwig, Iowa Department of Public Health, Brandi Janssen, University of Iowa

Rural health clinics are important vehicles for the State Office of Rural Health (SORH) to understand health issues facing rural Iowans. Recently, the SORH became aware of rural health clinic data gaps, therefore this project was conducted. There were 25 rural health clinics involved, who were contacted via phone from 25 different counties, representing 15% of rural health clinics in the state of Iowa. The interview was conducted to assess educational needs, preferred method of contact, disparities, strengths, common medical issues, if they treat agriculture populations, and if they are an accountable care organization. Many of the clinics, 72% belong to an accountable care organization and/or noticed major educational and financial differences between patients. Every clinic had agricultural works as patients in the past; three clinics, 12% decided agricultural safety information would be useful for their practice. The most common medical issues noticed by the clinics varied, although there was a theme of chronic disease, 24% and cold/flu, 20%. The strengths of each clinic also varied quite a bit, however, there were several that decided personalized care, 24% was one of their strengths. The SORH can use the results from this survey to better serve rural health clinics with information related to topics that they have identified.

Determinants of Fatalities in Production Agriculture

Moses New-Aaron, BMLS, AMLSCN, CSCASH, University of Nebraska Medical Center; Murray D. Madsen, CSCAH UNMC; Jessica Semin BSN, RN, UNMC; Risto H. Rautiainen, PhD, CSCASH UNMC; Ellen Duysen, MPH, CSCASH, UNMC

Background: Studying the work environment and demographics of agricultural workers involved in fatal incidents can provide valuable information on the cause of fatalities and lead to better prevention measures. **Objectives:** To determine populations at risk of fatalities and the determinants of fatalities in production agriculture. **Method:** Agricultural injury and fatality data were obtained from Press clippings and Google alerts covering seven Midwest States (SD, ND, MN, IA, NE, KS and MO). Google Alerts were collected based on key words including: “farm accident”, “farm incident”, “farm death”, “ranch accident”, “ranch incident”, “ranch death”, “ATV farm death”, “ATV ranch death”, “livestock death”, as well as other descriptors. Articles from Google Alerts were screened. Relevant articles were analyzed, and data were then extracted and added to the database. Differences in demographic and characteristics between fatal and non-fatal injuries were compared within the CS-CASH media monitoring database using the chi-square and logistic regression model. **Results:** A total of 1048 agricultural-related injuries including 586(56%) non-fatal cases and 462 (54.16%) fatalities were collected between 2011 to 2017 across the seven Midwest states by CSCASH monitoring database. We found that fatality was significantly associated with; age group ($p < 0.0001$), type of injury event ($p < 0.0001$), source of injury ($p = 0.01$), time of injury ($p = 0.0018$), activities during injury ($p = 0.0002$), place of injury ($p < 0.0001$) and gender ($p = 0.0004$) in a univariate analysis. It was further discovered in a multiple logistic regression that age groups, time and the place of injury were good predictors of fatalities. **Conclusion:** This study suggests that place of injury, time of injury and age of the victims were possible determinants of fatalities and males, elderly and the infants had more fatalities in agricultural production industry.

A Collaboration of the University of Minnesota School of Public Health; College of Veterinary Medicine; National Farm Medicine Center at Marshfield , WI; Migrant Clinicians Network;

Minnesota Department of Health.

Carol Peterson, MEd, University of Minnesota; Upper Midwest Agricultural Safety & Health Center (UMASH); A collaboration of the University of Minnesota School of Public Health; College of Veterinary Medicine; National Farm Medicine Center at Marshfield, WI; Migrant Clinicians Network; Minnesota Department of Health

The dairy workforce includes many workers with no experience with farm animals and no proper training. Immigrant workers make up nearly half of the dairy labor force and dairies employing immigrants produce 79% of the US milk supply. Producers and workers struggle with language and cultural barriers and limited safety resources. UMASH looked at three areas of concern for the dairy industry and provided educational solutions for the safety and health of managers and workers. These solutions focused on Positive Animal Handling, Needlestick Prevention and an OSHA approved training curriculum using a train the trainer model.

Social and Organizational Factors Influencing Indian Tea Workers' Health.

Maya Ramaswamy, MEng, University of Iowa

The US National Institute for Occupational Safety and Health describes vulnerable populations in the US agricultural industry as workers who may experience disproportionate rates of injuries and illnesses due to low literacy, socioeconomic status, migration, and culture. Agricultural workers on tea estates in India face these same vulnerabilities and, in addition, are subject to occupation-specific tasks that have been associated with adverse health outcomes in the US and elsewhere. Efforts to improve tea worker health will need to take a systems-level approach that recognizes the broad social and organizational factors that influence the tea harvesting process. Building upon a previous pilot project estimating occupational exposures and health outcomes in Indian tea workers, a qualitative approach including focus groups and interviews among Indian tea harvesting workers, management, and influential local community members was used to determine important social and organizational factors within tea production and to identify and prioritize occupational hazards within the tea harvesting process. Results from this study will be used to inform the development of an intervention among Indian tea harvesting workers. This research poster will focus on methods and preliminary results from this qualitative study.

A Total Worker Health® Intervention for Vineyard Workers and Supervisors

Diane S. Rohlman, PhD, University of Iowa; Katie Vaughn, BA, Oregon Health & Science University; Megan RW TePoel, MS University of Iowa; W. Kent Anger, PhD, Oregon Health & Science University

Many factors affect the health of agricultural workers, including job demands, workplace hazards, limited resources, and limited access to medical care. Although recent reports indicate that farm-related injuries and fatalities are declining, there has been an increase in stress-related behavioral health problems including suicide, depression, and substance abuse. There is a need to develop workplace interventions to improve the health, safety, and well-being of Hispanic farmworkers. Based on community and industry input, a Total

Worker Health® (TWH) intervention was developed for agricultural workers. The intervention includes two components. The first addresses supervisor interaction with employees, delivered through an online training program and the use of a behavioral tracking tool. The second is a team-based education program for supervisors and workers that addresses occupational and lifestyle topics (*e.g.*, farm safety, relaxation techniques, time management, sleep). Pilot testing indicated increases in knowledge, positive changes in measures of occupational stress, safety, and well-being, improved health, and an increase in interactions of supervisors with employees. This pilot study demonstrates the potential utility of workplace interventions for supervisors and employees in the agricultural industry to promote health, safety, and well-being.

Total Worker Health in Agriculture

Diane S. Rohlman, PhD, University of Iowa

Agriculture is one of the most hazardous industries. Physically demanding work, large equipment, long work hours, weather, and chemical exposures are common hazards faced by workers and impact health behaviors and outcomes. Additionally, the workforce ranges from youth to older adults, who each bring their own risk factors. Total Worker Health® is defined as policies, programs, and practices that integrate protection from work-related safety and health hazards with promotion of injury and illness prevention efforts to advance worker well-being. Researchers in the Healthier Workforce Center partner with other National Institute for Occupational Safety and Health (NIOSH) Centers to improve the health, safety, and well-being of agricultural workers and their families. A partnership with the National Children's Center for Rural and Agricultural Health and Safety is developing a Total Worker Health intervention for supervisors of young farmworkers. An intervention addressing supervisor and employee interactions and education on safety, health and lifestyle topics was developed for Hispanic vineyard workers in partnership with the Pacific Northwest Agricultural Safety and Health Center and the Oregon Healthy Workforce Center. A pilot project in the Healthier Workforce Center is examining the interaction between tractor operating behaviors and medication use among senior farmers.

Barriers to the Adoption of Safe Beef Handling Practices, Equipment, and Facilities in Iowa

DeAnn Scott-Harp, University of Iowa, Brandi Janssen, PhD, University of Iowa, Diane Rohlman, PhD, University of Iowa, Corinne Peek-Asa, PhD, University of Iowa

Agriculture is one of the most hazardous industries in the United States, with a fatality rate that consistently surpasses other industries. Livestock handling activities are often found to be the second or third leading cause of on-farm injuries, with machinery and falls being cited as other leading causes. Cattle are responsible for the most injuries and fatalities on farms of any animal, and cattle-related nonfatal injuries have been shown to be some of the most costly and result in more time off work than other injuries. Despite the fact that research has improved understanding of cattle behavior and sensory functions, developed low-stress handling practices, and determined how facilities can be safer for workers and livestock, injury rates remain high. This project identified typical equipment and facility designs in use on Iowa beef farms. The study also identified barriers to implementing safer equipment or facility designs. These data will contribute to

interventions that will reduce or eliminate barriers to safer facilities, with a long-term goal of ultimately reducing the number of injuries sustained while handling cattle.

Perceptions of Rural Residents Off-Road Vehicle Insurance Coverage

Karen Thornton, Charles Jennissen, Gerene Denning University of Iowa Hospitals and Clinics

Background. Side-by-sides (SxS), specifically utility-task vehicles (UTVs) have become increasingly popular for performing agricultural related tasks. There have been no studies that have examined safety issues and experiences of rural teens while using SxSs occupationally. The study objective was to better understand the epidemiology, safety behaviors and crash experiences of teen occupational SxS users. Methods. Attendees of the 2015 and 2016 Iowa FFA Leadership Conference were surveyed on their SxS use at the Iowa ATV Safety Task Force booth. Demographic information was collected and SxS exposure determined. For those who had ridden SxSs, data related to their specific occupational use, the safety behaviors they practiced and their crash and injury rate as it applies to their occupational use only were collected. Two thousand fifty-eight surveys were completed. Of the 2058 completed surveys 1400 or 68% indicated they used SxSs occupationally. The work tasks for which respondents utilized SxSs for agricultural purposes were also determined. Descriptive and multivariable analyses will be performed. Results: Analysis of the data will be completed prior to the conference and results of the the study will be presented. Conclusion. Preliminary analysis indicates that Iowa FFA SxS occupational users are not using safe behaviors when operating the vehicle or when they are a passenger in a SxS.

Iowa's Center for Agricultural
Safety and Health
UI Research Park, 124 IREH
The University of Iowa
Iowa City, IA 52242

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