

The Pilot and Feasibility Program has been an essential component of the Central States Center for Agricultural Safety and Health (CS-CASH) since the Center was established in 2011. The projects selected for support by this program must address a critical issue in agricultural safety and health. This program awards projects up to \$20,000 over 18 months. In addition to NIOSH AFF (Agriculture, Forestry and Fishing) funding (\$795,000), generous funding from the University of Nebraska Medical Center's Vice Chancellor for Research (\$580,000), the University of Nebraska Lincoln (UNL) College of Agricultural Engineering (\$20,000), and the UNL Institute of Agriculture and Natural Resources (\$40,000) has allowed **CS-CASH to fund 77 pilot projects over 13 years**. Additional funding received by Pilot Program investigators due to data generated through their pilot research amounts to \$22,193,827.

Grant Year	# of Pilot Projects	Peer Reviewed Articles	Presentations Oral/ Poster	Initial Funding	*Additional Funding
¥1	5	0	20	\$95,000	\$1,319,581
¥2	7	1	25	\$100,000	\$1,275,712
¥3	5	1	3	\$60,780	\$15,000
¥4	4	9	25	\$100,000	\$3,135,208
Y5	5	4	5	\$100,000	\$1,270,000
Y6	7	6	12	\$140,000	\$1,853,484
¥7	7	5	4	\$140,000	\$120,000
Y8	5	7	13	\$100,000	0
¥9	7	6	8	\$138,742	\$3,149,499
¥10	8	6	9	\$140,000	\$9,518,731
¥11	5	8	10	\$100,000	\$125,612
¥12	6	5	9	\$120,000	\$411,000
¥13	6	NA	NA	\$100,000	NA
TOTAL	77	58	143	\$1,434,522	\$22,193,827

CS-CASH Pilot and Feasibility Project Report Years 1-13

*Additional Funding includes all grant years including indirect costs.

Return on Investment

A return on investment of 1,550% is calculated from subsequent agricultural safety and health funding received by Pilot/Feasibility Program recipients.

Evaluation of Pilot and Feasibility Projects

In addition to evaluation plans built into individual project proposals, the CS-CASH evaluation team also assesses each project's progress, outcomes, and outputs. Evaluations are shared with the grantees and Dr. Eleanor Rogan, Pilot Program principal investigator.

Resource Sharing

CS-CASH provides a range of no-cost resources to investigators from the inception of their project to completion. Resources include expert analytical assistance from Dr. Cheryl Beseler and the UNMC (University of Nebraska Medical Center) Center for Collaboration on Research Design and Analysis (CCORDA) and content expertise provided by CS-CASH researchers and administration. Grant recipients are invited to attend and present at the monthly CS-CASH member meetings and are forwarded all information about grant opportunities, webinars, conferences, and other information that could assist the investigators with their research.

Funded Regions

Since 2011 CS-CASH has funded 77 Pilot Projects in all 7 of the States served by the Center and several national projects. Recipients include community organizations, public health departments, post-doctoral students, scientific researchers, and ag safety and health organizations.

Pre-Submission Assistance

- Evaluation plan
- Data analysis plan
- Design of survey instruments
- Project review by content experts

Project Period Assistance

- 7-States farmer and rancher database available to project team
- Networking during monthly CS-CASH Member Meeting
- Referrals to stakeholders
- Notifications regarding additional funding opportunities

Post-project Assistance

- Manuscript assistance
 Technical and financial
 - Data analysis
 - Evaluation
- Notifications regarding additional funding and collaborative opportunities

Impact

Pilot Project data have been used to generate more significant awards totaling \$22,193,827, have resulted in 58 peer-reviewed manuscripts and many other valuable outputs.

Notable funding awards received as a result of pilot funding (Sep 2023-Aug 2024)

Principal Investigator: Ruth Woiwode, PhD

Pilot Grant Title: Factors Associated with Severe Livestock Work-related Injuries. Based on the preliminary pilot grant data, Dr. Woiwode was awarded a USDA-NIFA Foundational and Award: Applied Science New Investigator Seed grant for \$300,000 to continue Dr. Woiwode's work for a two-year period.

Principal Investigator: Aaron Schwab, MD/PhD Student

Pilot Grant Title: Targeting immunometabolic pathways of lung myeloid cells to reduce agricultural exposure-induced lung disease.

Award: Mr. Schwab received a National Institutes of Environmental Health Sciences Fellowship for \$111,000 to continue the work that was initiated in the pilot grant.

2023-2024 Funded Pilot Projects

Adverse Health Outcomes From Pesticide Exposure in the Female Agricultural Workforce

Muhammad Zahid, PhD (University of Nebraska Medical Center)

An Assessment of Formal and Non-Formal Safety Education in Secondary and Post-Secondary Agricultural Education

Jonathan Ulmer, PhD (Kansas State University)

Occupational Health Hazards Posed by Airborne Neonicotinoid Dust from Seed Treatments

Darrin Thompson, PhD (University of Iowa)

Cardiovascular Disease Risk of Latino Migrant Farmworkers: A Descriptive Study Maria Jose Sanchez Roman, MD, MPH (University of Nebraska Medical Center)

Surveillance of Ticks and Their Pathogens in Bison Worker Populations

Shaun Cross, PhD (University of Nebraska Medical Center)

PROJECT SYNOPSIS FROM THE CURRENT FUNDING CYCLE (2022-PRESENT)

Identification of Strengths and Limitations of Current Risk Assessment and Hazard Analysis Methods when Used to Improve the Safety of Automated Agricultural Machineries Roger Aby

This project seeks to find reasons why industry professionals no longer feel confident using current risk analysis methods, reveal weaknesses and strengths of these methods, and help engineers modify and/ or design well-suited and efficient risk assessment analysis tools for ag automated machinery, with the goal of decreasing safety concerns and barriers to adopting advances in automated technology.

Surveillance of Needs, Wants, and Perception of Agriculture Health and Safety Programs in Kansas Edwin Brokesh, PhD, & Tawnie Larson

This project aims to gather information of the needs, wants, and perception of agriculture safety and health programming in the state of Kansas, and determine next steps in developing an agriculture safety and health program throughout the state.

Investigating New Technologies for Heat Stress Mitigation in Agriculture Ryan Cannady, MS, MBA, CIH, CSP, STS-C

This project seeks to investigate the effectiveness of wearable technologies used to mitigate heat-related illness within the poultry industry, use cost-benefit analysis methods to investigate the financial benefits of new heat stress technologies, and investigate the workers' perceptions on the heat stress technologies.

Surveillance of Ticks and Their Pathogens in Bison Worker Populations Shaun Cross, PhD

This project intends to identify known pathogens in ticks that are collected from bison herds, and disseminate educational material for the prevention of tick borne disease.

The Classroom Component: A Hands-On Experience of Agricultural Safety and Health Education Aimed at Children Attending Rural Elementary Schools Jana Davidson

This project aims to make the adoption of a Progressive Agriculture Safety Day[®] program more accessible and appealing to elementary schools.

Focus Group Study of Iowa Farming Parents on their Attitudes Regarding Firearm Storage in Homes and Firearm Injury Prevention Efforts Marc Doobay, MPAS PA-C

This project aims to identify current practices, attitudes, and perceptions of firearm ammunition storage in the home of adolescents in rural farming/ranching families; determine how parents of adolescents in rural farming/ranching families feel about current programs and proposed legislation to improve firearm storage; and ascertain what parents of adolescents in rural farming/ranching families believe would be the most effective programming and messaging to improve safe storage practices of firearms and ammunition.

The Ability of Adult Female Operators to Reach Agricultural All-Terrain Vehicle Controls Farzaneh Khorsandi, PhD, & Fadi Fathallah, PhD

The results of this preliminary study suggest that females' anthropometry poses severe limitations to their safe and comfortable operation of utility ATVs.

Evidence-Based Training for Employees Exposed to Hazards Associated with the Storage, Handling, Transport, and Processing of Agricultural Wastes Mahmoud Nour, PhD

A panel of experts in the field of agricultural confined spaces was used to prioritize causative factors and identify primary learning and training outcomes for an evidence-based educational curriculum.

Exposure to Zoonotic Diseases in Agricultural Workers of the Great Plains: An Evaluation of Real and Perceived Risk and Mitigation Behaviors in Rural Agricultural Workers of the Great Plains Mystera Samuelson, PhD

This project seeks to determine which vertebrate vector species are of highest concern to agricultural workers in the Central States and describe the behavioral, biological, and ecological indicators used by workers to determine risk, assess and describe the risk mitigation strategies employed by agricultural workers, and identify the potential safety risks associated with such interventions.

Creating a generation of agriculture safety and health influencers: Youth peer-to-peer engagement strategies to foster positive change.

Jana Davidson, Laura Rice, PhD

The goal of this projects is to gain a better understanding of what influences youth involved in ag to make safer and healthier decisions, develop new resources to assist teens in teaching their peers and younger children about ag safety and health, and identify ways to recognize the success of these resources.

Cardiovascular Disease Risk of Latino Migrant Farmworkers: A Descriptive Study Maria Jose Sanchez Roman, MD, MPH

This project seeks to estimate cardiovascular disease (CVD) risk of Latino migrant farmworkers by measuring various risk factors for CVD at health fairs near farmworkers' housing sites, evaluate the relationship between CVD risk and key individual characteristics, and evaluate the feasibility and acceptability of health fairs tailored for Latino migrant farmworkers in Spanish and at housing sites.

Targeting Immunometabolic Pathways of Lung Myeloid Cells to Reduce Agricultural Exposure-Induced Lung Disease

Aaron Schwab

This project aims to delineate the role of the ACOD1 pathway in mediating the lung inflammatory response and resolution processes following inhalant agriculture-derives exposures, and determine whether lung-delivered itaconate serves as a novel therapeutic approach in promoting resolution of acute and repeated inhalant agriculture-derived exposures.

Occupational Health Hazards Posed by Airborne Neonicotinoid Dust from Seed Treatments Darrin Thompson, PhD

This project seeks to demonstrate that neonicotinoid-containing dust is a major source of occupational exposure during planting and harvest seasons.

An Assessment of Formal and Non-Formal Safety Education in Secondary and Post-Secondary Agricultural Education

Jonathan Ulmer, PhD

This project aims to build an understanding of school-based agriculture teachers' knowledge and teaching of agriculture safety, and identify safety-related courses at Kansas State University that can be used in an agricultural safety program.

Development of CRC Screening Education Material for Agricultural Workers Shinobu Watanabe-Galloway, PhD

This project obtained input about the content and delivery mode of colorectal cancer (CRC) screening educational materials from ag operators, and developed educational materials aimed to increase CRC screening among ag workers based off the findings.

Factors Associated with Severe Livestock Work-Related Injuries Ruth Woiwode, PhD, & Elliot Dennis, PhD

This project seeks to identify and quantify the primary drivers of animal work-related injuries in the US and examine how these drivers vary by the severity of the injury, across time, location, type of livestock operation, and other relevant covariates.

Adverse health outcomes from pesticide exposure in the female agriculture workforce Muhammad Zahid, PhD

This project seeks to determine the effects of urinary pesticides on estrogen metabolism before and after the pesticide application season, and survey the effectiveness of training and awareness of ongoing safety programs for female pesticide applicators.

PROJECT SYNOPSIS FROM THE LAST FUNDING CYCLE (2015-2021)

Human lung 3D organoids as model of damage and repair of lungs in agricultural airborne biohazards

Rohit Gaurav, MSc, PhD, FAAAAI

This project used 3D organoid culture from primary human lung cells to investigate the phenotypic and functional changes in structural cells when exposed to Toll Like Receptor agonists from agricultural dust. These data have been used for a successful NIH (National Institutes of Health) grant application.

Redesigning National Agricultural Safety Database Serap Gorucu, PhD

This project engaged an expert panel in redesigning a long-term plan for the National Agricultural Safety Database. The panel assisted in creating a nationwide survey that has led to achievable site improvements, a long-term plan for addressing site content recommendations from the site evaluations, and the development of a plan for promoting NASD (National Ag Safety Database) and NIOSH safety and health efforts.

Ag-Operator Monitoring Systems (Ag-OMS) for Safety and Health Risk Detection and Assessment Santosh K. Pitla, PhD

This project developed camera systems and instrumentation and used existing tractor technologies to monitor the activities of operators, thereby identifying high-risk behaviors. Artificial Intelligence machine learning techniques were used to analyze tractor data, images, and video feeds to develop a library of behaviors associated with safety and risk while operating agricultural machinery.

Agricultural Safety and Health Curriculum: Preparing the next generation of rural nurses Sue Schuelke PhD, Michelle Ellermeier

This project demonstrated the impact on the practice, attitude, and behaviors of the nursing students following the inclusion of the agricultural health and safety curriculum into the University of Nebraska College of Nursing program.

Investigating Opioid and Alcohol Risk and Misuse Among Rural Agricultural Workers Christine Chasek, PhD

This project Investigated the feasibility of screening agricultural workers for substance use by administering SBIRT screenings in agricultural work environments and settings rather than a clinic-based setting and determined the risk level of opioid and alcohol misuse among agricultural workers.

Teledermatology and Increasing Access to Care in Agricultural Populations Dillon Clarey, MD and Jennifer Adams, MD

This project determined the need and acceptance of teledermatology services for agricultural workers in rural regions where dermatologic care is limited or absent. The project provided educational training at health care sites to recognize, diagnose, and treat common skin conditions in this population.

Modeling Improved Access to Health Screening of Agricultural Populations Through Deployment of a Mobile Clinic and Networking with a Rural Health Care Network Kelley Donham, DVM, PhD

In a collaboration between the non-profit Rural Health and Safety of Eastern Iowa (RHSEI) and a regional health care network, this project developed a model for improved access to primary health screening of rural and farm residents through the deployment of a fully equipped mobile health screening and educational facility. Health care provider staff were trained in agricultural medicine to serve rural and agricultural populations better.

Building A Youth Mental Health Toolkit: Developing crucial resources to support children living and working in agricultural communities

Jana Davidson

This project brought together a national panel of mental health experts to develop a model curriculum that laypeople will use to discuss mental health and stress with youth working in agriculture.

Parkinson's Care for Nebraskans in Agriculture Bethany Lowndes, PhD

This project evaluated Parkinson's disease signs and disease prevalence in the agricultural community; identified user requirements for rehabilitation engineering and adaptive technology to enable individuals with Parkinson's disease to complete agricultural tasks safely and explored the feasibility of novel modes of early Parkinson's disease deterioration monitoring in the agricultural community.

Improving Agricultural Worker Health and Safety Awareness through Multimodal, Case-Based Physician Assistant Education

Carey Wheelhouse

This project developed a curriculum and an educational model for increasing Physician Assistant (PA) student awareness and knowledge of agricultural health and safety issues; and enhancing communication skills regarding occupational risks and hazards with agricultural patients.

Summary of Seven Central-State Region Injuries and Fatalities Involving Livestock Manure Storage, Handling and Transport Operations: 1975-2019 Mahmoud Nour, PhD

This project classified, analyzed, and summarized all available injury and fatality cases involving livestock manure storage, handling, and transport facilities and equipment in the CS-CASH 7 states region from 19752019 and developed evidence-based prevention strategies to reduce the frequency and severity of these incidents.

Gathering Local Data and Building Ag Partnerships to Better Reach Ag Families Chris Blanke

This project developed and disseminated a model for use by rural public health departments to obtain data on the health and well-being of workers at agricultural businesses and a protocol for directly engaging agribusiness on the topics of stress, substance use, suicide prevention, care for employees after a suicide death, and creating a mental health-friendly workplace.

Agricultural and Occupational Exposures in U.S. Veterans with Rheumatoid Arthritis and Associations with Disease Severity Bryant England, MD

This project characterized the associations between agricultural exposures with rheumatoid arthritis autoantibody and inflammatory cytokine expression in RA (Rheumatoid Arthritis) patients, stratifying by genetic background. Data were used in the successful application for Veterans Administration research funding.

ATV Aware

Susan Harris Broomfield

This project gathered data from FFA participants regarding their behaviors while operating or riding ATVs. Preand post-surveys (immediate and 6-month) measured impact following an interactive session about proper behaviors and laws. Findings were used in the creation of a curriculum guide for FFA and ATV instructors.

Creating Enduring Resources for Farm Safety Education Jana Davidson

Safety and health professionals were recruited to create unique and effective props for farm safety and health education. Videos (n=25) demonstrate the assembly of the props from start to finish and with designs that meet the needs of individuals with all learning types, including visual, auditory, and kinesthetic. These videos are available on the Progressive Ag Foundation website and the USAg Center YouTube Channel.

Investigation into the respiratory properties of snow molds Missy Berry

This project tested the hypothesis that snow mold-associated species would incite pathogenic pulmonary responses in agricultural workers and those seasonal changes contribute to the immunogenic properties of the fungal species. A manuscript is in production.

Injury Prevention in Greenhouse and Nursery Workers through Engineering Design Innovation Katherine Schofield, PhD

This project ascertained injury rates in a nursery/greenhouse worker population using regional workers' compensation (WC) injury claims and payroll data (2000-2017); evaluated comparative risk factors for injury and severity based on worker, job, and injury event characteristics, including text narratives; determined areas of high injury prevention priority and engineering design feasibility; and innovated and tested the efficacy of an engineering intervention to prevent a high priority nursery industry injury.

Evaluation of Medication-Related Agricultural Injury among Missouri Farmers Kelly Cochran, PharmD

This project determined the extent to which farm-related injuries resulting from hospital admission or emergency department visits were associated with drug-related problems in the farmers' home medication regimen and characterized and measured the frequency of drug-related problems. This work has led to additional work by Dr. Cochran on the agricultural injuries related to worker medication.

Blue Ribbon Outreach

Julie Rother, PhD

This project developed a public health department model for using information technology methods to communicate health, safety, and disaster preparedness information to agricultural workers in rural regions. This model has been presented and adopted in by several rural health departments.

Identifying the sources of stress and prevalence of anxiety and depression symptoms among young farmers and ranchers in the upper and western Midwest Josie Rudolph, PhD

This project identified sources of stress among young farmers and ranchers in the upper and western Midwest; estimated the prevalence of symptoms of self-reported anxiety and depression among young farmers and ranchers in the upper and western Midwest and evaluated the association between work stress and anxiety and depression among young farmers and ranchers in the upper and western Midwest. These data were used to write a successfully funded USDA (United States Department of Agriculture) mental health grant and will be used as part of the CS-CASH 2022 Competitive Renewal grant process.

Development of ion channel blockers for influenza D virus Hideaki Moriyama, PhD

This project developed mathematical models for the influenza type D M2 protein behavior based on experimental results. Results demonstrated the initial process of virus uncoating to release the RNA genome into the cell, modeling the opening and closing of the ion channel using a biophysical model, the Boltzmann equation. This project was instrumental in creating background data for federal-level funding applications. Two peer-reviewed manuscripts have been published.

MAPPER Immersion: Developing an Augmented Reality prototype to Protect Lives and Increase Emergency Responder Effectiveness Bryan Weichelt, PhD

Farm Mapping to Assist Protect and Prepare Emergency Responders (Farm MAPPER) is an interactive, deviceagnostic, web-based prototype developed to provide emergency responders with up-to-date information about hazards, resources, and the physical environments of agricultural operations. This pilot project developed an augmented reality version of Farm MAPPER, available on iOS and Android platforms. The application is now part of a 5-year NIOSH-funded study through the UMASH NIOSH Ag Center.

Farmer Evaluation of Agricultural Fatality Messaging: Best Practices for Disseminating Prevention Messages Based on FACE Cases

Stephanie Leonard, MS CIH

Using farmer-led evaluations of existing FACE format fatality investigation reports, hazard alerts, and media articles, this project developed new ag safety and health messaging; and enhanced knowledge about developing and targeting injury prevention messages.

Development of a mobile application for agricultural safety, AgHealth Joseph Siu, PhD

This project developed and validated the "AgHealth" mobile application. The AgHealth app contains two critical components – balance assessment and education for farm safety. The AgHealth links to important agricultural safety messages from the National Institute for Occupational Safety and Health (NIOSH) and CS-CASH and provides essential information about maintaining a good balance and preventing falls while working in agriculture. The mobile app is currently being evaluated by farmers and their healthcare providers.

Modeling the role of weather patterns and grain quality in predicting on-farm engulfments and entrapments

Dr. Gretchen Mosher, PhD

This ongoing project is exploring a new direction for predicting on-farm grain engulfments and entrapments and developing the basis for an alternative approach to an existing intervention strategy.

Gasoline Safety on the Farm - Developing a strategy to reduce the frequency and severity of gasoline-related explosions, fires, and burns involving the agricultural community Jane Allsup

This project is developing an evidence-based strategic plan designed to reduce the frequency and severity of gasoline-related explosions, fires, and burns on farms, and to create educational materials around this topic.

Sleep in Ag: Investing in the feasibility of measuring sleep quantity and quality in agricultural workers

Susan Harris

This ongoing project is collecting data to determine the need, value, and efficacy of potential educational interventions to improve sleep quantity and quality in agricultural workers to reduce the risk of accident and injury. This unique project will fill a critical research gap in knowledge of sleep patterns in ag populations.

Investigation of contaminants in the drinking water of agricultural workers in rural Nebraska Balkissa Ouattara, MD, MPH

This ongoing project will fill spatial and temporal gaps in available ag worker drinking water quality data by monitoring surface and groundwater quality within rural areas with a high incidence of water contamination.

Healthy Hearing, Healthy Aging in Agriculture Jan Moore, PhD

This ongoing project is documenting patterns of cognitive status in aging agricultural workers to determine the relationship between cognitive status, hearing status (degree of hearing loss), and age in agricultural workers.



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