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ANNUAL REPORT

of the

**Central States Center for
Agricultural Safety and Health**

University of Nebraska Medical Center

College of Public Health

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Produced by

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Center Summary

The Central States Center for Agricultural Safety and Health (CS-CASH) conducts high quality research and translates scientific discoveries into practical applications to reduce the burden of injury and illness among farmers, ranchers, their families, and workers. CS-CASH, with a strong network of collaborators, provides regional leadership in research and outreach. Research teams from several states and institutions bring multi-disciplinary expertise and access to special populations. With our advisors and partners, we can leverage the Center's resources to address local, regional and national issues. CS-CASH has built a cohesive approach that links planning, evaluation, research, and outreach to reduce agricultural occupational injury and illness. The Center's Planning and Evaluation Core provides strategic direction, administration, and evaluation, and it responds to emerging issues. The Research Core conducts basic, intervention, translation, and surveillance research. The Research Core also manages pilot/feasibility projects with substantial in-kind support from the University of Nebraska Medical Center. The Outreach Core has a special emphasis on vulnerable populations: women, veteran farmers, immigrant workers, and Indigenous peoples. Several Center projects address health and safety in feedyard and livestock production work, a major gap in previous efforts of the Ag Centers. CS-CASH has collaborative agreements with several other Centers to work on issues of mutual importance. CS-CASH is well established with a clear vision, mission, goals, organization, and service area.

Center Relevance

CS-CASH serves a highly productive agricultural region: North Dakota, South Dakota, Nebraska, Kansas, Minnesota, Iowa, and Missouri. CS-CASH partners with NIOSH, other Ag Centers, and agricultural stakeholders, and works towards fulfilling our common mission to improve health and safety, and reduce the burden of injury and illness in agriculture.



Key Personnel

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Kelsey Irvine, MPH, CPH	Communications Specialist	kepalm@unmc.edu
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External Advisory Board

The external advisory board for CS-CASH provides strategic planning, guidance, and advice. The advisors serve as force multipliers to enhance the Center’s effectiveness, expanding the Center’s reach, and increasing the sustainability of Center efforts.

Marilyn Adams	Founding President, Farm Safety 4 Just Kids	Earlham, IA
Denise Andress	Director, Western North Dakota AHEC	Hettinger, ND
Alfredo DiCostanzo	Beef Systems Extension Educator, University of Nebraska Lincoln Extension	Westpoint, NE
Brad Forristall	Farmer & Agribusiness Owner	Carson, IA
Karen Funkenbusch	Extension Director, University of Missouri	Columbia, MO
Dr. Roger Hoy	Professor of Biological Engineering, University of Nebraska at Lincoln	Lincoln, NE
Angela Johnson	Extension Coordinator Farm and Ranch Safety, North Dakota State University	Fargo, ND
Mike Keenan	Senior VP Loss Control Services, Gallagher Insurance	Omaha, NE

Continued on next page.

External Advisory Board, continued

Allison Keyser Metobo	Epidemiologist, Nebraska Department of Health and Human Services	Lincoln, NE
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Dr. Steven Kirkhorn	Director, Occupational and Environmental Medicine Academic Program, Midwest Center for Occupational Health and Safety	Minneapolis, MN
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Tawnie Larson	Project Coordinator, Kansas State University Department of Biological and Agricultural Engineering, AgrAbility	Manhattan, KS
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Bonita Lederer	Director of Producer Education, Nebraska Cattlemen	Lincoln, NE
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Brad Rein	USDA - retired	
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Brad Snyder	Director Brand Reputation, Nationwide Insurance	Des Moines, IA
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Derry Stover	Injury Epidemiologist, Nebraska Department of Health and Human Services	Lincoln, NE
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Cheryl Tevis	Journalist and Founding Member of Iowa Women in Agriculture	Pilot Mound, IA
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MULTI-YEAR PROJECTS

A NIOSH Agriculture, Forestry, and Fishing Program grant funds CS-CASH multi-year research projects. CS-CASH projects aim to determine the causes of and to design and engineer solutions for work-related injuries and illnesses among agricultural workers in the Center's seven-state region and beyond. Project investigators conduct research to understand and decrease exposure to hazards that cause disease and injury in agriculture industries; develop and evaluate control measures and technologies to protect workers; and produce educational, outreach, and prevention programs to guide workers and employers.

Improving Safety Climate and Safety Culture in the Cattle Feedyard Industry

Aaron Yoder, PhD

Project Aims

- 1. Identify the motivators and barriers to conducting safety trainings on cattle feedyards.**
 - **Conduct interviews of current and potential users of the Feedyard 15 commendation program about motivators and barriers to safety trainings on feedyards.**
 - **Expand and adjust the membership of the Feedyard Safety Advisory Board to gather additional input.**
- 2. Develop and implement a new safety climate and safety culture survey tool for cattle feedyards.**
 - **Obtain qualitative information about safety culture on feedyards using multi-sited ethnography.**
 - **Develop, implement, evaluate, and disseminate a new safety climate survey tool for feedyards, based on validated tools used in other industries.**
- 3. Develop, disseminate, and evaluate an open source Feedyard 15 online commendation program.**
 - **Expand and adapt the current bilingual feedyard worker safety and health training program and materials for online delivery to registered users based on surveillance data and their needs.**
 - **Promote and support the adoption of the training program at feedyards nationwide.**
 - **Evaluate the effectiveness of the online Feedyard 15 training and commendation program through qualitative user feedback and quantitative worker safety climate survey results.**

Significance

For more than a decade, agriculture has been the most hazardous industry in the US. In 2019, the occupational fatality rate was 109 fatalities per 100,000 workers in the beef cattle ranching and farming industries (including feedyards). This rate was five times higher than the rate in the agriculture, forestry, and fishing sector overall (23.1 per 100,000) and 33 times higher than the rate in all industries combined (3.5 per 100,000). The cattle feedyard subsector also has exceptionally high non-fatal injury and illness rates. In 2020, beef cattle ranching and farming (including feedyards) had a “days away from work, job restriction or transfer” rate of 29 per 1,000 full-time workers, while the overall agriculture, forestry, and fishing rate was 31, and the all-industries combined rate was 18. These high injury, illness, and fatality rates may be partly due to high turnover among feedyard employees. Many enter the industry with little experience and no safety training and arrive from other countries with limited English language skills.

The industry is competitive, requiring owner operators to improve their efficiency. Labor represents a major part of the production costs, and high Workers' Compensation premiums add to the costs. There is increasing recognition that reducing injuries and illnesses among workers is a critical part of retaining a skilled workforce, decreasing losses, and improving sustainability of the operation. This became even more apparent during the COVID-19 pandemic. The industry is skeptical about regulatory approaches to safety, but there is increasing demand and opportunities for safety and health training.

Feedyard safety is a major focus of the CS-CASH with the development of the Feedyard 15 commendation program. CS-CASH is ideally located to conduct such research, as half of the feedyards in the US are in the Center's region. In 2020, the Center's seven-state region (IA, KS, MN, MO, NE, ND, and SD) had 582 cattle feedyards and 7,252 feedyard employees. This represents 52.2% of all feedyards and 49.5% of feedyard workers in the US. CS-CASH has funded several projects addressing the safety and health of livestock workers, and the research team has experience in developing, implementing, and evaluating interventions in the feedyard industry, guided by the Feedyard Safety Advisory Board (FSAB) of major stakeholders. Their input emphasized the need for enhanced safety training and resources to manage safety. Based on the recommendations from the FSAB, the long-term goal of this project is to reduce the burden of injuries and illnesses among feedyard workers. The objective of this project is to improve safety climate and safety culture on cattle feedyards through the adoption of a comprehensive feedyard safety and health training and commendation program.

Accomplishments

In the second year of the project, Dr. Klataske has continued collecting safety culture information from feedyard managers and workers at both sites that use/don't use the Feedyard 15 materials through site visits known as multi-sited ethnography. He is currently in the process of submitting a manuscript for publication based on the findings of his work. The project team has continued work on developing a motivators and barriers survey as part of their new safety climate and culture toolkit. As part of exploring safety climate and culture on feedyards, we are evaluating the use of wearable technology adoption on feedyards. We have submitted a journal article with heat exposure data that has been collected on the feedyards. The project team has continued to review existing safety and health programs and materials that apply to feedyard workers. This has led to the continued creation of the Feedyard 15 training materials which targets the 15 top priority safety and health hazards on feedyards. Training materials are nearing the end of creation for in-person trainings in both English and Spanish for use by feedyards in the study. The materials are currently being converted to self-pace online training modules at the request of some stakeholders. The project team continues to implement a structure for a commendation program to recognize feedyards that conduct monthly safety trainings for twelve consecutive months. Feedyards continue to be recruited to participate in this commendation program.

Currently there are 32 Feedyards across 11 states signed up for the program. This covers 4,138 employees that have received a total of 3,227 hours of training. The Feedyard 15 training and commendation program, as well as other parts of the project, continue to be presented to the beef industry and safety and health professionals through trade- and peer-reviewed publications and professional conference presentations. This includes working with the US Roundtable for Sustainable Beef to add the Feedyard 15 to their training recommendations.



CHECK OUT THE FEEDYARD 15 WEBSITE

Visit go.unmc.edu/feedyard-15

Or use your smartphone to scan the QR code.



Presentations

Tucker S, Yoder A, Besler C. 2024. Wearable Technology for Feedyard Safety. International Society for Agricultural Safety and Health Conference. Portland OR. June 2024.

Besler C, Adhikari S, Ramos A, Yoder A. 2024. Growing the Feedyard-15 Program: Who is enrolling and what training modules are they using? International Society for Agricultural Safety and Health Conference. Portland OR. June 2024.

Publications

Cannady R, Warner C, Yoder A, Miller J, Crosby K, Elswick D, Kintziger KW. (2024). The implications of real-time and wearable technology use for occupational heat stress: A scoping review. *Safety Science*, 177, 106600.
<https://doi.org/https://doi.org/10.1016/j.ssci.2024.106600>



Multiple Methods Approach to Study the Impact of Stress among Latino Immigrant Cattle Feedyard Workers in the Central States Region

Athena Ramos, PhD, MBA, MS, CPM

Project Aims

1. Examine the interrelations among severe stress within domains (e.g., work, immigration, pandemic), perceived and physiological stress, occupational injuries, physical (e.g., biomarkers) and psychosocial (e.g., depression, anxiety, psychological well-being) health, and social well-being outcomes (e.g., job satisfaction, prosocial behaviors).
2. Investigate whether risk and protective factors mediate or moderate the links among severe stress, perceived and physiological stress, and occupational injuries, physical and psychosocial health, and social well-being outcomes.
3. Explore whether changes in severe, perceived and physiological stress across time are linked to changes in occupational injuries, physical and psychosocial health, and social well-being outcomes across time.
4. Develop, pilot, and disseminate evidence-based bilingual health and safety materials for cattle feedyard workers.

Significance

Cattle production is one of the most important industries in the United States, particularly in the Central States region of the country. Thousands of workers are employed on cattle feedyards, and many of these workers are at risk for chronic health conditions and work-related injuries. Understanding risk and protective factors may help in keeping workers healthy, safe, and productive over the long-term.



Accomplishments

This longitudinal study has three core components: health assessments, worker interviews, and in-depth conversations.

Health Assessments

The project team conducted onsite health fairs at participating feedyards, with the goal of conducting three health fairs at each partnering feedyard. To promote the health fairs, we developed a bilingual flyer and video about what to expect. This video is shared with participating feedyards and can be shared easily with workers. At the health fairs, we assess height, weight, body mass index, blood pressure, cortisol, lipids, lung function, and cardiorespiratory fitness. All workers who participate in the health fair receive their health results. Some results are available onsite while others must be processed in the lab. For those that are processed in the lab, results are mailed to workers along with a link to a bilingual video that describes more about the meaning of the test results. We also provide educational resources and connections to local healthcare providers for follow-up if necessary. Thus far, our team has conducted 13 feedyard health fairs (11 first time fairs and 2 second time fairs) providing health screenings for 330 feedyard workers.

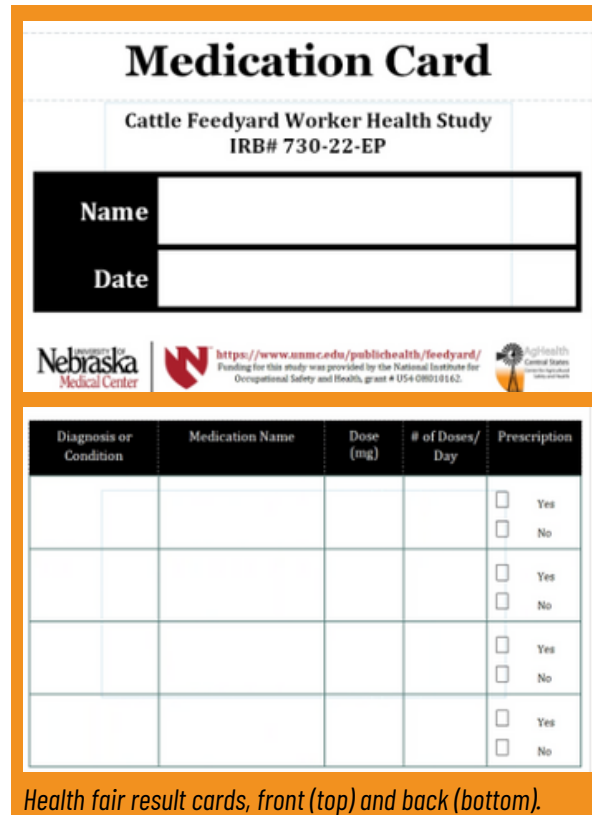
Worker Interviews

Some workers are invited for the second phase of this study, which includes a structured interview with a member of the research team. These interviews are conducted outside of the work environment and address physical, mental, and social well-being. Thus far, we have completed 130 structured interviews and have recruited approximately 60% of the cohort for the study.

Based on what our team has seen at the health fairs, we have developed various health education resources for feedyard workers focused on medication management, oral health, and stress.

We are also working to develop and grow relationships with beef industry partners across the region including the Beef Innovation Hub and the Nebraska Feedyard Labor Task Force. We have participated in the Cattlemen’s Ball and county cattle feeders’ association meetings. Team members have also completed Beef Quality Assurance certification, which is the training standard across the industry.

We look forward to the positive impact that this project can have on feedyard workers, management, and the beef industry.



Health fair result cards, front (top) and back (bottom).

Presentations

Ramos AK. Opportunities for public health and agriculture. Invited presentation for the UNMC Public Health Early Admission Student Track (PHEAST) annual visit, Omaha, NE, October 2, 2023.

Ramos AK. Opportunities for Latinos in the health sciences. Invited presentation for University of Nebraska at Omaha Latinos in STEM, Omaha, NE, October 9, 2023.

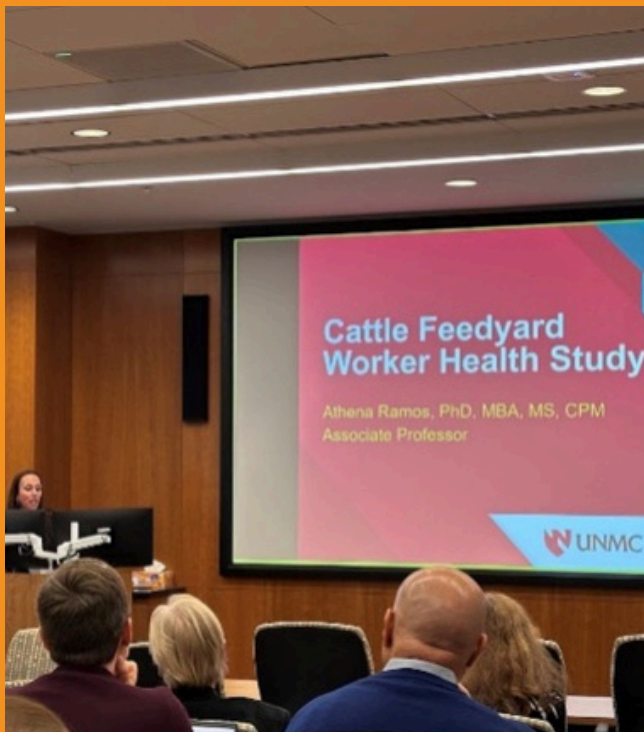
Ramos AK. Cattle feedyard worker health study. Midwest Public Health Innovation and Research Expo, Omaha, NE, November 3, 2023.

Ramos AK. Building research and community partnerships for farmworker health and well-being: A campfire discussion. Planting Seeds of Partnership Conference, Kearney, NE, May 1, 2024.

Carlo G, Maiya S, Rowland S, Ramos AK. Immigration-related stress and Latine youth prosocial behaviors: Mediation of parents' occupational stress and life satisfaction. Poster presentation at the 2024 Society for Research in Child Development Anti-Racist Developmental Science Summit, Panama City, Panama, May 15-17, 2024.

Sanchez Roman MJ, Rowland S, Ramos AK. Chronic diseases and access to healthcare among Latino cattle feedyard workers in the Midwest. Latino Farmworker Symposium, Greensboro, NC, August 5, 2024.

Ochoa R, Ramos AK. Obesity among cattle feedyard workers: A descriptive study. Poster presentation for the UNMC Summer Undergraduate Research Program, Omaha, NE, August 8, 2024.

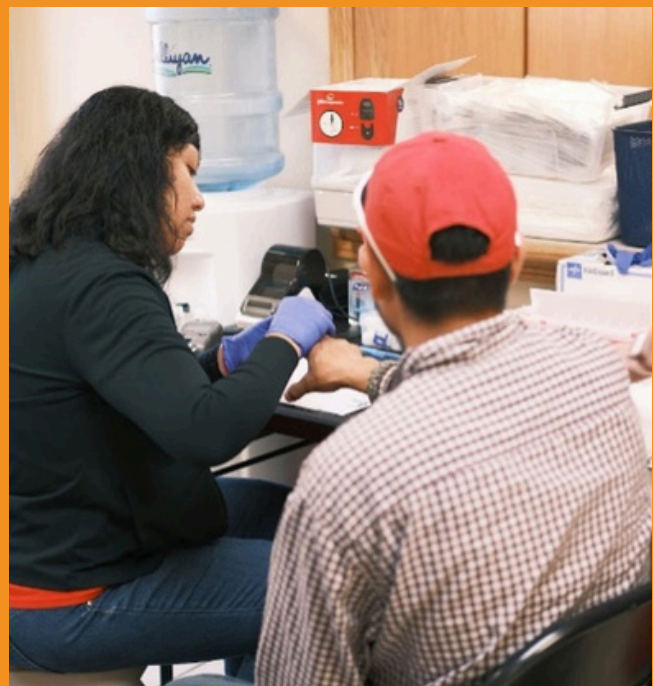


Publications

Ramos AK. (forthcoming). Hired hands, tired bodies: Health and well-being among Latino farmworkers. In Y.D. Macías Mejía (Ed.), Latino health. MSU Press.

Other Forms of Media

Ramos AK. Migrant and immigrant health disparities with cattle feedyard and meatpacking workers. American Association of Occupational Health Nurses, Nursing Pulse podcast, <https://sites.libsyn.com/400046/migrant-and-immigrant-health-disparities-with-cattlefeed-and-meatpacking-workers>



The Exposome and Organic Dust-Induced Lung Injury

Todd Wyatt, PhD

Project Aims

- 1. Determine the mechanism of swine barn dust on increased viral infectivity of SARS-CoV-2 using both human and mouse models of lung primary epithelial cells and organoids.**

We hypothesize that organic dust activates ADAM-17 and increases ACE2 expression and function leading to increased viral infectivity. We will then characterize changes in SARS-CoV-2 binding and infection under conditions of dust injury interventions targeting ADAM-17 with IL-10, an endogenous anti-inflammatory agent.

- 2. Determine the mechanism of enhanced dust-mediated lung infection injury with alcohol exposure.**

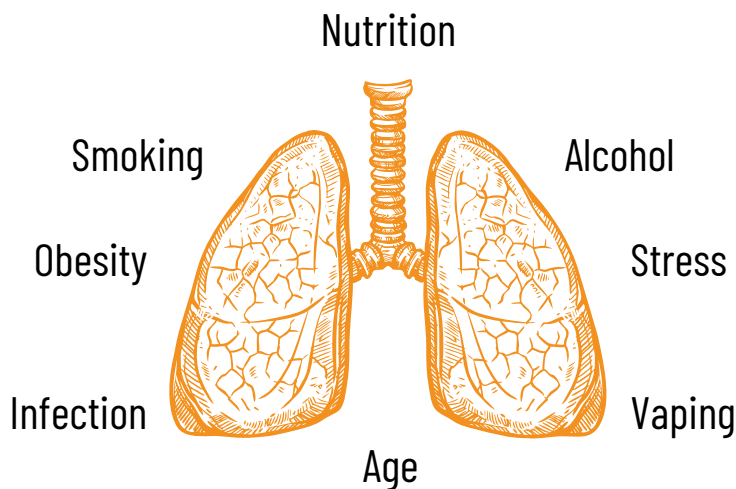
We hypothesize that reactive aldehydes derived from liver extracellular vesicles (EV) after alcohol exposure decrease the lung innate response to dust injury and promote pneumococcal pneumonia. Using liver EV to deliver alcohol-metabolizing enzymes to the lung, we will examine the mechanisms of increased *S. pneumoniae* infection and decreased innate defense in mice as well as human lung cells and organoids exposed to swine barn dust. We will use the aldehyde-trapping drug, ADX-102, to explore a therapeutic intervention to alcohol-enhanced dust injury.

- 3. Determine the role of gut-derived bacterial outer membrane vesicles (OMV) and the mechanism of zinc deficiency in dust-mediated lung injury in response to bacterial infection.**

We hypothesize that zinc supports gut-derived vesicles protective against dust-injured innate lung defense. We will use mouse models of zinc sufficient and deficient conditions and mechanisms of innate cellular defense defined.

The Agricultural Exposome:

How do environmental exposures impact innate lung defense?



Significance

Pneumonia causes a significant amount of global morbidity and mortality. For those who are 65 and older, pneumonia is the seventh leading cause of death. Worldwide, pneumonia causes more disability-adjusted life years lost than any other disease, including cancer and cardiovascular disease. In the United States alone, total medical expenditures and indirect costs attributed to pneumonia amounted to more than \$40 billion in 2005. Pneumonia accounts for 1.1 million hospitalizations per year. Almost half of patients admitted for pneumonia die within the next year, a significantly higher percentage than those admitted for other reasons. This underscores the need to find new targets for better prevention and treatment of pneumonia. The most common bacterial pathogen causing pneumonia is *S. pneumoniae*, and alcohol misuse is a known predisposing factor to pneumonia. The “alcoholic lung” is characterized by detrimental alterations to airway mucociliary clearance, alveolar barrier function, and inflammatory cytokine responses. Longstanding clinical observations established that pneumonia and acute respiratory distress syndrome (ARDS) occur more frequently and with greater severity in individuals who have alcohol use disorders (AUDs). Of more immediate importance is the COVID-19 pandemic and the increased risk of SARS-CoV-2 infections leading to ARDS. Essential workers important to our food supply have increased COVID-19 infection risk associated with their occupations. Little is known concerning how occupational dust inhalation impacts COVID-19. While environmental dust exposure is long associated with increased susceptibility to lung bacterial and viral infections, the complex role of alcohol and nutritional deficiencies in this exposome has not been investigated.

Accomplishments

Significant accomplishments have been achieved on Specific Aim 1. We have identified two distinct mechanisms for increased susceptibility to SARS-CoV-2 under conditions of organic dust inhalation. First, swine barn dust increases the expression of the specific receptor (ACE2) for this virus in the lung of mice. Secondly, dust-activated sheddase enzyme (ADAM-17) activity increases and this increase leads to increased viral uptake. We found that this enhanced inflammatory pathway is regulated by a key protein kinase, and that a result of this modulation is the potential dysregulation of important innate cytokine response to infection. This has implications for the duration and severity of COVID-19 in those who are exposed to organic dust environments. This work is now published (see publications list).

Next, we have made significant progress on Specific Aim 2. Because workers with an agricultural/rural background who have lung symptoms also show zinc deficiency, we explored whether the known effect of dust on cilia slowing is impacted by zinc therapy. Using a more effective cellular-uptake version of zinc (ZinPro), we found that cilia could be protected from dust-induced slowing. We identified the mechanism of this effect to be a direct inhibition of the enzyme that slows cilia, thus protecting the cilia flight response in maintaining mucociliary clearance. This work is now published (see references).

Lastly, work is in progress on Specific Aim 3. We are developing the alcohol, dust, and zinc deficient exposome model for both cells and mice. Current focus is on the generation and characterization of liver and gut derived extracellular vesicles for the delivery of alcohol metabolizing cargo that may impact lung injury in response to inhaled occupational dust in alcohol consuming individuals and in nutritionally zinc deficient workers.

Grants Awarded

Title: Clinical Resource for Lung Alcohol Investigators

Funding Agency: NIH-NIAAA (R24 AA019661)

Principal Investigator: Burnham, Ellen (T. A. Wyatt, Co-I)

Amount: \$1,960,960

Funding Period: 05/01/24-04/30/29

Status: Active

Title: Human biobank of Nebraska: Investigating the role of the microbiota in health and disease

Funding Agency: National Research Initiative (NRI)

Principal Investigator: Samuelson, D. R. (Knoell, D. L., Co-I)

Amount: \$100,000

Funding Period: 07/01/24 – 06/30/25

Status: Active

Title: Using targeted dietary fiber to alter the gut microbiome in people with cystic fibrosis

Funding Agency: National Research Initiative (NRI)

Principal Investigator: Deschamp, Ashley (Samuelson, D. R., Co-I)

Amount: \$100,000

Funding Period: 07/01/24 – 06/30/25

Status: Active

Title: The role of alcohol-associated microbiota membrane vesicles in mucosal immunity

Funding Agency: NIH-NIAAA (F32 AA031180-01)

Principal Investigator: Villageliu, Daniel (D. R. Samuelson, T. A. Wyatt, Co-Sponsors)

Amount: \$250,000

Funding Period: 07/01/2023-6/30/2026

Status: Active

Title: The role of specialized pro-resolving mediators of inflammation resolution in lung health: analyses of the Lung Health Cohort

Funding Agency: Great Plains IDEA-Clinical and Translational Research, Scientist Development award pilot program

Principal Investigator: Ponce, Jana (K. L. Bailey, Sponsor)

Amount: \$10,000

Funding Period: June 2024-2026

Status: Active

Grants Pending

Title: Zinc Homeostasis, the Gut Microbiome, and Preservation of the Gut-Lung Axis

Funding Agency: NIH

Principal Investigator: Knoell, Daren L, Samuelson, Derrick R (MPI)

Amount (Including indirect costs): \$7,924,401.00

Funding Period: 5 years, resubmitted

Status: Pending

Title: Nebraska Center for Cancer Prevention (NCCP)

Agency: NIH-NCI (P20 GM156562)

Principal Investigator: Bergan, Raymond (T. A. Wyatt, Co-I Project Mentor to Jieqiong Wang)

Date: 5 years, submitted

Amount: \$15,000,000

Status: Pending

Title: Gut-Lung Crosstalk Regulates Pulmonary Natural Killer Cell Recruitment and Function in Response to Alcohol- Associated Bacterial Pneumonia

Agency: NIH-NIAAA (R01 AA031263)

Principal Investigator: Samuelson, D. R.

Date: 5 years, resubmitted

Amount: \$1,875,000

Status: Pending

Title: Daniel Grant

Funding Agency: NIH-NIAAA (K99)

Principal Investigator: Villageliu, Daniel (D. R. Samuelson, T. A. Wyatt, Co-Sponsors)

Amount: \$131,333/year

Funding Period: 05/01/2025-04/30/2027

Status: Pending



Presentations

Bailey KL, Katafiasz D, Khalid N Wyatt TA, Stauch KL. Mitochondrial dysfunction associated with aging contributes to slowed cilia beat frequency. *American Journal of Respiratory and Critical Care Medicine*, 207:A6162, 2023.

Wyatt TA, Bailey KL, Samuelson DR, Knoell DL. Triple-hit model of alcohol, zinc deficiency, and cigarette smoke exposure impairs lung inflammatory and immune responses. *Alcohol, Clinical, and Experimental Research*, 47 (51):289, 2023.

Samuelson DR, Cunningham KC, Smith DR, Knoell DL, Mosley DD, Bauer CD, Wyatt TA. The exposome and lung bacterial infections: Role of liver and gut-derived extracellular vesicles. *Alcohol, Clinical, and Experimental Research*, 47 (51):105, 2023.

Wyatt TA, Knoell DL, Samuelson DR. The Alcohol Exposome: Impact on lung cilia function. *Alcohol*, 113:66, abstract 31, 2023.

Villageliù D, Cunningham K, Smith D, Knoell D, Wyatt TA, Ramer-Tait AE, Price JD, Samuelson DR. Bacterial membrane vesicles from an alcohol microbiota increase susceptibility to respiratory infection. *Alcohol*, 113:65, abstract 29, 2023.

Bailey KL, Katafiasz DA, Wyatt TA, Stauch KL. Protein Kinase C epsilon (PKC ϵ) mediates mitochondrial function in aging airway epithelial cells. *American Journal of Respiratory and Critical Care Medicine*, 209:A3101, 2024.

Bauer CD, Samuelson DR, Knoell DL, Wyatt TA. Zinc Protects Against Swine Barn Dust-induced Cilia Slowing. *American Journal of Respiratory and Critical Care Medicine*, 209:A3102, 2024.

Gul MH, Taylor K, Bailey KL, Adickes E. An Unexpected Cause of Acute Liver Failure. *American Journal of Respiratory and Critical Care Medicine*, 209:A1723, 2024.

Kukrety SP, Singh A, Brink H, Bailey KL. A Pilot Study to Determine Outcomes in Lung Transplant Recipients Using Sodium-Glucose Cotransporter-2 (SGLT2) Inhibitors. *American Journal of Respiratory and Critical Care Medicine*, 209:A3727, 2024.

Ponce J, Anzalone AJ, Sayles H, Bailey KL, Timmerman M, Jackson M. Associations Between Micronutrient Deficiency and Post-acute Sequelae of COVID-19 After Acute Infection: A Multi-site Retrospective Study. *American Thoracic Society*, A4389-A4389, 2024.

Peer AM, Villageliu DN, Cunningham KC, Smith DR, Knoell DL, Wyatt TA, Samuelson DR. Alcohol alters gut microbiota and decreases lung host defense against pneumonia. *Alcohol, Clinical, and Experimental Research*, 48(1): 467; W085, 2024.

Villageliu DN, Cunningham KC, Peer AM, Smith DR, Knoell DL, Wyatt TA, Samuelson DR. Alcohol-associated dysbiosis contributes to increased lung damage following bacterial pneumonia. *Alcohol, Clinical, and Experimental Research*, 48 (1): 65; 121, 2024.

Do E, Knoell D, Bauer C, Mosley D, Samuelson D, Wyatt TA. A zinc chelate of lysine/glutamic acid reduces alcohol-induced ciliary dysfunction. *Alcohol, Clinical, and Experimental Research*, 48 (1): 470; W092, 2024.

Wyatt TA, Osna N, Samuelson D, Knoell D. The Alcohol Exposome: Impact on lung cilia function. ISBRA 2024, Melbourne, AUS, Sept 22-26, 2024.

Villageliú D, Cunningham K, Smith D, Ellis C, Knoell D, Wyatt TA, Ramer-Tait AE, Price JD, Samuelson D. Humanized alcohol-microbiota mice have increased susceptibility to respiratory infection. Gordon Research Conference on Alcohol-Induced End Organ Diseases, Ventura, CA, March 26-31, 2023.

Wyatt TA, Samuelson DR, Knoell DL. Zinc Protects Against Swine Barn Dust-induced Cilia Slowing. ISASH 2023, Tampa FL, June 17-21, 2023.

Wyatt TA, Bailey KL, Samuelson DR, Knoell DL. Triple-hit model of alcohol, zinc deficiency, and cigarette smoke exposure impairs lung inflammatory and immune responses. VISN 23 Research Symposium FY2023, Minneapolis, MN, August 8-9, 2023.

Mosley DD, Xiong W, Bauer CD, Wyatt TA. Analysis of an Emphysema Mouse Model using MicroCT Scanning and 3D Slicer Software. Central States Regional Society on Toxicology Conference, Lincoln, NE October 19-20, 2023.

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Sabè N, Mosley DD, Bauer CD, Wyatt TA. The Alcohol Exposome: Impact on lung cilia function. Central States Regional Society on Toxicology Conference, Lincoln, NE October 19-20, 2023.

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Wyatt TA. The Alcohol Exposome. Invited Speaker. University of California at Davis, April 19, 2024.

Wyatt TA. The Alcohol Exposome. Invited Speaker. University of Nebraska-Lincoln, April 22, 2024.

Wyatt TA. The Alcohol Exposome. Invited Speaker. Des Moines University, Grand Rounds, Des Moines, IA, May 10, 2024.

Wyatt TA. Alcohol-Induced Ciliary Dysfunction- A protective role for zinc? Invited Speaker. ZinPro Corporation, Minneapolis, MN, May 31, 2024.

Wyatt TA. Alcohol Center of Research-Nebraska: the Alcohol Exposome. Invited Speaker. University of South Florida Taneja College Of Pharmacy Graduate Program Distinguished Speaker Series, Tampa FL, September 5, 2024.

Knoell DL. Zinc homeostasis, the gut microbiome, and maintenance of gut and lung defense. Invited Speaker. ZinPro Global Headquarters, Eden Prairie, MN, December 7th 2023.



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Establishing a Community-Based Training Network to Enhance the Safety of Bison Herd Workers on Tribal Lands

Mystera Samuelson, PhD

Project Aims

1. **Characterization of workplace injuries, working conditions, and safety hazards for workers handling bison under contemporary reservation field conditions.**
2. **Develop and distribute functional educational materials including established intervention strategies to mitigate worker safety risks.**
3. **Facilitate the development of an indigenous-led training and mentorship program focused on worker and herd health from the OneHealth perspective**

Significance

This is the first formal worker safety program focused on a holistic approach to worker safety in bison management on Tribal lands. Specifically, we are focused on supporting existing expertise within Indigenous communities and developing expertise in areas deemed significant by our Tribal members. We always put culture first, to ensure that our approach is adaptable, appropriate, and sustainable.

Our goal is to bolster the Tribes' mission in bringing bison home to Tribal lands, by supporting a culturally-appropriate way of making existing operations safer for both the daily herd workers – but also the community who do interact with the bison, as well as process and consume bison products.

Because of this common-sense approach and developed mutual trust, we have been able to expand our reach to include 76 of the 83 ITBC member Tribes, whose lands span across 22 states. Our impact has included participants as young as 6 and as old as 90, as our Tribal mentors and colleagues are able to expand the reach of this project into community events such as cultural harvests, which often involve all members of the community.

The **InterTribal Buffalo Council** (ITBC) is a collection of 83 tribes in 22 different states that facilitates the management of over 20,000 buffalo. Its members manage more than 32 million acres of Tribal lands, and have restored buffalo to nearly 1 million of those acres. From the large intact grasslands of Montana, to the small desert herds of New Mexico, ITBC is committed to reestablishing buffalo herds on Tribal lands in a manner that promotes cultural enhancement, spiritual revitalization, ecological restoration, and economic development.



Accomplishments

Specific Aim 1

Working with our members, we have identified a need for training on low stress handling, safe necropsy during and outside of cultural harvests, reducing the risk by monitoring and assessing parasite load and risk, as well as fire safety surrounding prescribed burns.

We have provided training on parasite assessments in the form of necropsy sampling, but also photographic identification, and fecal float tutorials at the annual Bison Worker Safety and Herd Health Roundtable as well as in additional field necropsy trainings. Further, we have invited The Nature Conservancy of Nebraska's tribal liaison, Brandon Cobb, to present on cultural and prescribed burns and their impact on human health, and the landscape. We have also increased our programming to include items focused on mental health in rural indigenous communities, as this has been something our member Tribes have discussed as being relevant to the return of the bison to Tribal lands.

Specific Aim 2

We have held our annual roundtable event and have completed our annual writeup which is distributed to attendees and ITBC member Tribes. Our writeup will be released Fall of 2024 and is currently undergoing review by ITBC member Tribal elders. Each year, we seek this approval before release to ensure that cultural information is represented appropriately. This year this is of an even higher level of importance, as we were allowed to participate and photograph a cultural harvest, which included many elements of ceremony led by Tribal elders. This year Dr. Samuelson was invited to demonstrate safe field necropsy sampling methods alongside Tribal elders as they processed the organs, cape, and meat. Dr. Samuelson was able to demonstrate the importance of certain types of sampling and photographs for later review by a veterinary pathologist and was given permission to send tissue samples to a veterinary diagnostic lab for testing. This is a significant breakthrough to the reach of our project, as we have learned that some organs, for example, are consumed raw or dried, and may be a source of community health risks. We firmly support the right of Indigenous peoples to practice these cultural food preparations and are honored to share simple sampling methods that can help to monitor disease exposure, for the safety of the herd workers and their communities at large. This significant display of trust across our investigators and our collaborating Tribal communities demonstrates the importance of our continued work with a shared mission: To ensure the safety of Indigenous bison herd workers and their communities.

Dr. Samuelson has been invited by ITBC to join in leading their Zoonotic Disease Initiative necropsy trainings in the upcoming year, and has helped to coordinate additional guest lectures and safety and health training sessions from specialists in the fields of wildlife veterinary science, wildlife pathology, parasitology, and veterinary technicians specializing in the logistics of tissue sample storage, subsampling, shipping, and the paperwork and documentation associated with submission of samples to a certified veterinary pathology laboratory.

In support of necropsy training and safety, we have worked with ITBC to order and distribute bison disease and bison necropsy field manuals. We have also prepared and distributed functional necropsy photo cards and checklists used to facilitate minimally invasive data collection in the field while respecting the integrity of anatomical structures of cultural significance.



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Specific Aim 3

This project continues to work on and refine previous efforts to impact bison herd worker health. In this funding year, we have worked closely with the ITBC to identify willing mentors and mentees within the community to hold and attend applied trainings.

Through feedback acquired at the Annual Roundtable Events and interactions with the communities this project aims to serve, we were made aware that there is a strong need to enhance the safety of necropsies through training on sample collection during cultural harvests, as well as training on how to safely conduct necropsy sampling and other data collection during necropsies on non-harvest buffalo and other animals on the landscape (e.g., whitetail deer, ground squirrels, etc.).

To facilitate this, we learned from our participants that Arlo Iron Cloud Sr. of the Ogalala Lakota and Diné Nations and Lisa Mni of the Ogalala Lakota Nation, are highly sought teachers of traditional harvest methods, which emphasize the safety and inclusion of both youth and elders from the community. We learned that many Tribes were holding off on their harvests until Lisa and Arlo could come teach these practices. Thus, we provided funding for Lisa and Arlo to travel to over 15 cultural harvests, reaching over 100 individuals from ITBC member Tribes ranging in age from 6 to over 80 years in age. In so doing, we have been able to expand our reach to include both the daily herd workers, but also the community members who participate in these events to receive safety messaging and training in the context of cultural harvests and food preparation.

Through our continued work with ITBC, as well as Arlo and Lisa, we have been able to greatly expand our reach to include safety messaging in these more private events, such as during ceremonial harvests.



Presentations

Samuelson MM, Reuther M. The Role of Animal Behavior and Cognition Research in Food Systems: Worker Safety and Culturally Appropriate Training Initiatives. Virtual Presentation. CDC Food Systems Interest Group Quarterly Meeting. April, 2024.

Samuelson MM, Reuther M. The Role of Animal Behavior in Worker Safety Initiatives, Tribal-Led Training and Programming in Buffalo Management. Remote Presentation. CDC-NIOSH Quarterly Meeting. December, 2023.

Publications

Samuelson MM, Iron Cloud A, Iron Cloud L, Elliot KC, Post J, Rautiainen R, Duysen E, Gibbons J. (2024). Support for Existing Expertise: Community-focused training initiatives to improve the safety and health of Tribal buffalo herd workers. CDC NIOSH Science Blog. Retrieved from: <https://blogs.cdc.gov/niosh-science-blog/2024/04/22/tribal-buffalo-safety/>

Other Outputs

Dr. Samuelson was invited to participate in a technical discussion involving making tractor, ATV, and UTV safety discussions more culturally appropriate for indigenous youth, led by Dr. Mike Pate (Utah State University).



Evaluating the Safety of Agricultural Vehicle Ingress/Egress for Aging Producers

Bethany Lowndes, PhD

Project Aims

1. Determine variability of agricultural vehicle ingress and egress patterns and safety behaviors.
2. Measure performance of agricultural vehicle ingress and egress for individuals aged 40 years and over.
3. Design fall-prevention design interventions and assess feasibility to address safety risks associated with agricultural vehicle ingress/egress.

Significance

Falls from agricultural vehicles for aging producers may result in serious, potentially career-ending injuries. This research leverages novel observational techniques and an assessment of strength, balance, and ingress/egress performance to design user-centered interventions for the reduction of producer fall and injury. This project aims to assess behaviors and safety risk of tractor ingress/egress and pilot interventions to reduce the safety risk for producers.

Accomplishments

We have received IRB approval. We have refined our remote monitoring system to record and categorize ingress/egress behaviors in the field. The team has presented on the work we have completed as we prepare for data collection in 2024-2025.



(Left) Demonstration of AG-OMS Machine learning algorithm identifying high safety risk behavior during tractor egress. (Right) Diagram of handrails on one tractor to compare with user behavior (high, medium, low safety risk) and interaction with these handles. This is important for informing future design modifications or other interventions.

Presentations

Feasibility of integrating electromyography and computer vision for occupational safety during tractor ingress and egress. Applied Human Factors and Ergonomics Conference. Nice, France. July, 2024.

Feasibility of the Integration of Electromyography and Computer Vision for Tractor Ingress and Egress Safety American Society of Agricultural and Biological Engineers Annual Meeting. Anaheim, CA. July, 2024.

Publications

Lowndes B, Gutierrez A, Pitla S, Rumuri S, Siu J, Yoder A. (2024). Feasibility of Integrating Electromyography and Computer Vision for Occupational Safety during Tractor Ingress and Egress. In: Pedro Arezes and Anne Garcia (eds) Safety Management and Human Factors. AHFE (2024) International Conference. AHFE Open Access, vol 151. AHFE International, USA. <http://doi.org/10.54941/ahfe1005301>

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Intellectual Property

Ag-OMS: This system provides feedback to agriculture workers during machine ingress/egress in order to promote safety. *Preliminary Patent (22082PCT)*



Distribution of Worker Educational Materials and Personal Protective Equipment in Response to Highly Pathogenic Avian Influenza in Dairy and Poultry Facilities

Matthew Nonnenmann, PhD, CIH

Project Aims

- 1. Develop HPAI hazard identification educational materials for dairy and poultry farms.**
 - 2. Disseminate HPAI educational materials and Worker PPE Kits to dairy and poultry farms in the CS-CASH region.**
-

Significance

Highly pathogenic avian influenza (HPAI), also known as bird flu (H5N1), is a highly contagious viral infection that primarily affects poultry production in the United States (US). Several HPAI outbreaks have impacted the poultry industry resulting in significant economic burden. Recent outbreaks have resulted in flock depopulation within the 7-state region of the CS-CASH. On May 30th, 2024, in Sioux County, Iowa, HPAI impacted 4.2 million commercial egg-laying chickens, resulting in the depopulation of the flock. Workers, and farm families may be exposed to the virus during the outbreak and depopulation procedures. Additional health and safety resources are needed to respond to this outbreak. CS-CASH has a strong history of collaborating with state Extension efforts related to HPAI (e.g., producing guidance documents and providing personal protective equipment) for the poultry and dairy industries. CS-CASH has well established partnerships with poultry producers and workers. We have the expertise to address the gaps in knowledge and preparedness capacity needed related to the currently ongoing H5N1 HPAI threat facing agriculture in the United States.

HPAI can spill over to other animal species as well as humans. For example, the dairy industry has experienced an outbreak of H5N1 HPAI that has resulted in spillover to workers. This is the first time that HPAI has been found in cattle. The scale of the threat to workers is currently unknown. Preliminary information suggests that HPAI is more concentrated in the milk of dairy cattle during infection, therefore parlor workers and hospital workers may be at greater risk of being exposed to the virus. In May 2024, following the first detection of H5N1 in a dairy worker, CS-CASH responded immediately, collaborating with Nebraska Extension to provide guidance documents and 500 PPE kits to dairy producers.

Purpose

The purpose of this project is to develop and disseminate HPAI educational materials (e.g., posters highlighting infection prevention practices, flyers that can be taken home by workers) and Worker PPE Kits to dairy and poultry farms in the CS-CASH region (Nebraska, Iowa, Minnesota, South Dakota, North Dakota, Missouri, and Kansas). Developed educational materials, in both English and Spanish, will be uploaded to the CS-CASH and Nebraska Extension websites, social media, and newsletters, shared and co-branded with other Ag Centers and safety organizations. Further, access will be facilitated by using QR codes for owner/operator/worker access by mobile devices.

Impact

This project will improve emergency preparedness capacity on dairy and poultry farms to address ongoing and future HPAI outbreaks. Specifically, we will provide educational resources to farms that will allow for the recognition of HPAI symptoms among poultry, dairy cows, and workers, as well as guidance on procedures to put into place in the event of an HPAI outbreak. These materials in both English and Spanish are cleanable (laminated), and they can be used in communal areas as well as work areas on the farm. This project will also provide model Worker PPE Kits to farms that will allow workers to protect themselves in an HPAI event with necessary safety equipment. The kits will show types of PPE that the farms can test and supply to exposed workers, not only to protect against viruses but also to other hazards. Dairy and poultry products are a key component of the food supply, and any emergency that affects their production or distribution can have implications for public health.



Surveillance of Agricultural Injury, Illness, and Stress in the Central States Region

Risto Rautiainen, PhD

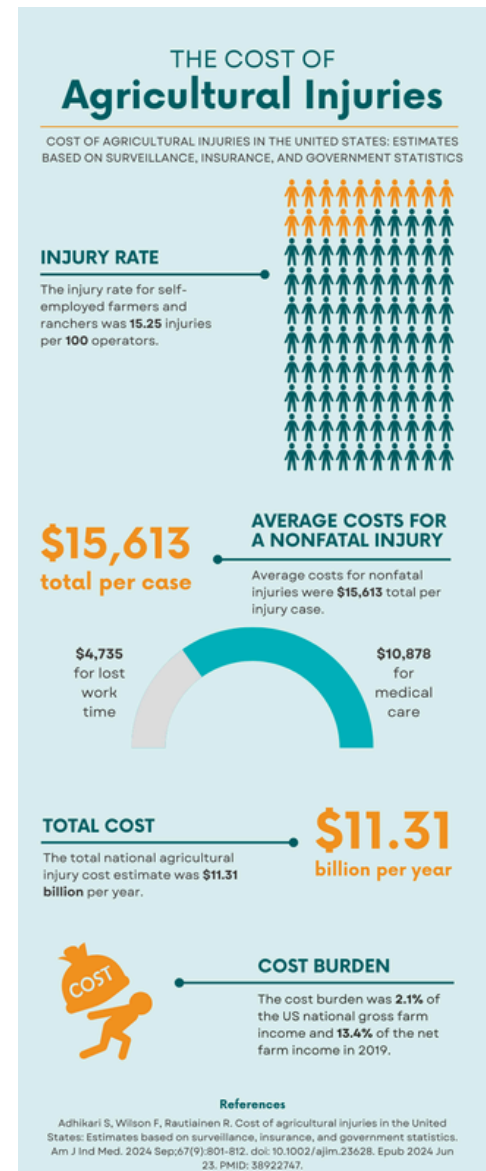
Project Aims

1. Implement regional surveys of injuries, illnesses, exposures, and preventive measures among self-employed farmers and ranchers.
2. Identify mental health conditions and evaluating the association of mental health and injury among young agricultural producers.
3. Collecting print and electronic media information of agricultural injuries and fatalities and disseminating it to stakeholders and the public.

Farm & Ranch Health & Safety Survey

CS-CASH conducted the third round of the Farm and Ranch Health and Safety Surveys (FRHSS). Surveys forms were mailed to 17,497 farm and ranch operations in the seven-state region. The first mailing occurred in May 2023 and the second mailing in November 2023. We received 1,942 responses (11.1% return rate) with completed information for 2,367 individual producers. Data were entered and merged with two previous rounds increasing the total number of responding individual producers to 10,282 in the combined 2018, 2020, and 2023 dataset. Analyses of the new datasets are ongoing, with the first manuscript focusing on asthma prevalence and risk factors among farmers and ranchers.

Four articles were published during the reporting period. Doctoral candidate Rishad Ahmed reported on seasonal characteristics risk factors of farm injuries by season. CS-CASH faculty collaborated with investigators from other centers in a report that focused on the value of individual injury case stories in injury prevention. Dr. Rautiainen participated in a European effort evaluating Eurostat and national agricultural injury data and related under-reporting in EU countries. Doctoral candidate Suraj Adhikari and co-investigators published a landmark paper on national agricultural injury costs in the US. This is the first national estimate since Dr. Paul Leigh's paper, which was based on 1992 data. The key findings of the paper are summarized in the infographic to the right.



Mental Health & Injury Surveillance

It has been a challenge to recruit and retain young adult agricultural producers into the cohort study. We have recruited participants via mail and email using data purchased from US Farm Data, a private agricultural data service company. We have also recruited in-person at farm shows and during training events in partnership with the Ag Safety and Health Alliance and the Gear Up for Ag Programs. Further, we posted recruitment information online; however, when IP addresses and open text options were checked in the screening form, these efforts yielded very few legitimate responses. Despite the challenges, we have started to administer bi-monthly, online surveys to the young adult farmers in our cohort. The surveys are sent within the first week of the month.

Injury Data Collection & Dissemination

Media monitoring data collection continues with monthly updates on recent agricultural injury cases reported in print and electronic media. Summaries by state and specific source have been made available to stakeholders and legislators to inform safety policy needs. Collaboration with Marshfield Medical Clinic enables making injury and fatality data available to the public through the AgInjuryNews.org platform. Special injury case reports have been compiled for outreach events and requests from the media.



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Overall, the Surveillance project is on track and continues to enhance understanding of agricultural health and safety risks. The program contributes valuable injury and illness data on self-employed farmers and ranchers who are excluded from governmental surveillance programs. Dissemination efforts include eight presentations in major conferences and workshops.

Presentations

Rautiainen R. Central States Center for Agricultural Safety and Health. Oral presentation. American Society of Agricultural and Biological Engineers. Anaheim, CA. July 31, 2024.

Rautiainen R, Beseler C. Safety practices and priorities reported by farm and ranch operators in the central United States. Oral presentation. American Society of Agricultural and Biological Engineers. Anaheim, CA. July 31, 2024.

Rautiainen R. Agricultural Injury and Illness Surveillance in the United States. Panel presentation (Chair). International Society of Agricultural Safety and Health. Portland, OR. June 19, 2024.

Rautiainen R, Orji I. Occupational Injury and Illness Characteristics among Agricultural Producers in the Central United States: CS-CASH Surveillance Data. Oral presentation. International Society of Agricultural Safety and Health. Portland, OR. June 19, 2024.

Rautiainen R (presenter), Vogel C, Dong J, Duysen E. Risk factors associated with personal protective equipment usage rates in the central states by generalized multilevel models. Midwest rural and agricultural safety and health conference. Dubuque, IA. November 9, 2023.

Rautiainen R. Economics of safety: focus on agriculture. Oral Presentation. 2024 Ag Summit & Expo. Council Bluffs, Iowa. February 7, 2024.

Rautiainen R. Counting fatal and non-fatal agricultural injuries in Finland: Developing support services. Presentation. SafeHabitus Policy Workshop. Brussels, Belgium. April 9, 2024.

Beseler C, Rautiainen R. Applying machine learning to predicting injuries in female operators based on work, exposures, and health variables. Oral Presentation. International Society of Agricultural Safety and Health. Portland, OR. June 18, 2024.



Publications

Ahmed R, Du Y, Haynatzki G, Tucker S, Ramos AK, Rautiainen RH. (2024). Seasonal Patterns of Injury Characteristics Among Farmers and Ranchers in the U.S. Central States. *Journal of Agromedicine*, 29(4), 653–664
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Ploeckelman M, Heiberger S, Rautiainen R, Johnson A, Charlier D, Yoder A, Duysen E. (2024). The Use of Injury and Fatality Narratives to Convey Agricultural Safety and Health Messages and to Develop Effective Resources Through Collaborative, Multi-Disciplinary Approaches (Tell a Story, Save a Life). *Journal of Agromedicine*, 29(4), 645-652. [doi: 10.1080/1059924X.2024.2386105](https://doi.org/10.1080/1059924X.2024.2386105). PMID: 39155497.

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Adhikari S, Wilson F, Rautiainen R. (2024). Cost of agricultural injuries in the United States: Estimates based on surveillance, insurance, and government statistics. *American Journal of Industrial Medicine*, 67(9), 801-812. [doi: 10.1002/ajim.23628](https://doi.org/10.1002/ajim.23628). Epub 2024 Jun 23. PMID: 38922747.



EVALUATION

Evaluation has been integrated into every aspect of CS-CASH activities to support NIOSH's Evaluation Capacity Building Plan. The evaluation of our research, pilot projects, and outreach cores are designed with the goal of providing evidence of impact and measurable outcomes using contribution analysis based on a valid theory of change.

Evaluation

Cheryl Beseler, PhD

Project Aims

1. **Assess the effectiveness of CS-CASH leadership and governance.**
 2. **Conduct quality assurance by tracking CS-CASH Logic Model activities, outputs, and intermediate outcomes.**
 3. **Evaluate CS-CASH Logic Model end outcomes for social and economic impacts.**
-

Significance

Evaluation has been integrated into every aspect of CS-CASH activities to support NIOSH's Evaluation Capacity Building Plan. The evaluation of our research, pilot projects, and outreach cores are designed with the goal of providing evidence of impact and measurable outcomes using contribution analysis based on a valid theory of change. Examples include the FarmResponse curriculum, which has been delivered to over 1,000 participants and was entered into the Suicide Prevention Research Center's Best Practices Registry. The curriculum has been presented at two conferences and a paper published in a journal aimed at reaching rural healthcare professionals. Impact can also be seen from pilot projects. The knowledge acquired from a pilot project aimed at understanding colorectal screening (CRC) perceptions and attitudes in agricultural operators resulted in a study that sent 1,200 FIT kits for CRC screening to rural residents in heavily agricultural areas in Nebraska to improve screening rates. Subsequent funding based on this pilot is being used to develop a social media campaign that resonates with agricultural operators to increase CRC screening rates. Other impacts can be seen in the scientific papers published and presentations at conferences.

Accomplishments

Center Governance

Assessment of the functioning of CS-CASH was measured using the CS-CASH Internal Coalition Effectiveness (ICE) Survey in July of 2024. Results were presented to the CS-CASH membership in October of 2024.

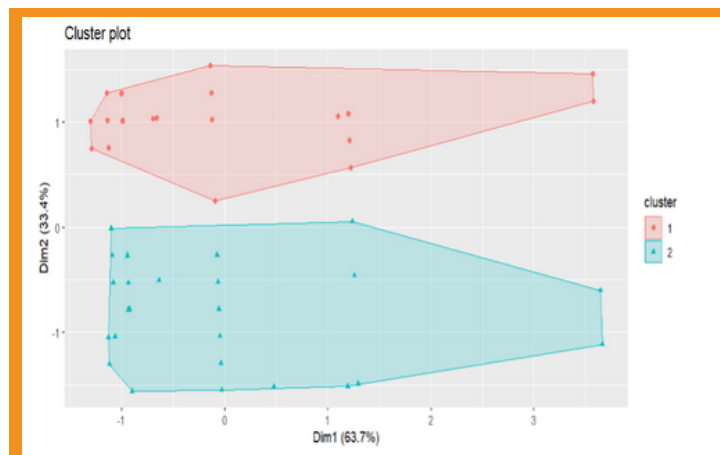
The CS-CASH evaluator is involved in the Evaluation, Communication, and Outreach (ECO) meetings that promote cross-center collaboration. A manuscript evaluating the success of the NIOSH YouTube chainsaw videos has been produced and is ready for submission. Dr. Beseler has been involved in the Childhood Ag Safety Network (CASN) and has assisted with its campaigns and evaluation to promote youth safety on farms. A manuscript reporting on a needs assessment has been produced and is ready for submission to the Journal of Agromedicine.

Core Projects

Evaluation activities on the cattle feedlot project included an analysis to assess the reach in the RE-AIM model. Participants data was analyzed to understand who was signing up and using the Feedyard-15 safety modules and which modules they were using. In a cluster analysis we found that the larger feedlots were using the trips, slips, and falls and the ATV safety training. The smaller feedlots were using the emergency response, extreme weather, feed mill safety and tractor loading safety videos. There was a clear grouping of these cattle feedyards based on the type of safety modules they employed (see figure below). Many of the feedlots that enrolled in the program were not consistently using the safety training modules. Work is underway to interview managers to better understand the barriers and facilitators for using these safety training modules.

This work was presented as a poster at the 2024 ISASH conference (Beseler C, Adhikari S, Ramos A, Yoder A. Growing the Feedyard-15 Program: Who is enrolling and what training modules are they using? International Society of Agricultural Safety and Health, Portland, OR).

Additional work is being done to evaluate the reach of the Feedyard-15 by conducting a Social Network Analysis of organizations involved in the cattle feedyard industry in North Dakota. The survey has been designed and sent out electronically and personal interviews are being scheduled to collect data about what these organizations know about safety trainings currently used and what contacts they have with key informants in the industry.



Pilot Projects

Dr. Beseler has continued to work with pilot project grantees to successfully complete their projects. In the past year, she worked with Dr. Shinobu Watanabe-Galloway to successfully secure a grant to continue her work on colorectal cancer screening in agricultural populations and published a second paper related to the pilot project. Dr. Beseler assisted Dr. Roger Aby in analyzing and publishing a paper on the safety evaluation of automated farm machinery. She has also assisted Dr. Edwin Brokesh and Tawnie Larson in analyzing data from their Ag safety needs assessment survey in Kansas.

Outreach

The AgriSafe FarmResponse curriculum was presented at the annual conference of the National Rural Health Association in New Orleans LA on May 8, 2024. Drs. Tara Haskins and Cheryl Beseler presented the curriculum and its evaluation in a 75-minute presentation to approximately 70 rural healthcare professionals, the target audience for this curriculum. The publication related to the curriculum and its

evaluation in a 75-minute presentation to approximately 70 rural healthcare professionals, the target audience for this curriculum. The publication related to the curriculum and its evaluation was published in the Online Journal of Rural Nursing and Health Care on May 3, 2024. The addition of this curriculum to the Suicide Prevention Research Center's Best Practices Registry was recognized at the 2024 ISASH conference where AgriSafe was awarded the ISASH Practitioner Achievement Award.

Evaluation of the Question, Persuade, Refer (QPR) program revealed that at least 95% of participants reported feeling more capable of talking to a distressed individual after having completed the training. Nearly all were satisfied with the training content and presentation. Based on a psychometric assessment of the questions, the evaluation design was improved by adding a pretest and questions were added and changed to try to gain additional useful information about the training's applicability to rural residents, especially those involved in agriculture.

Data collected by outreach coordinator Ellen Duysen at the 2024 Nebraska Women in Ag conference was the basis for a project for a student in the Summer Undergraduate Research Program. The student learned to conduct a literature review, analyze data, and present a research study at the research symposium. Dr. Beseler worked with the student to produce a poster and is currently working on the manuscript.

Presentations

Beseler C, Adhikari S, Ramos A, Yoder A. Growing the Feedyard-15 Program: Who is enrolling and what training modules are they using? International Society of Agricultural Safety and Health. Portland, OR. June 2024.

Publications

Beseler CL, Haskins T, Stoltzfus M. 2024. FarmResponse: Promoting agricultural competency to improve behavioral health outcomes in rural communities. Online Journal of Rural Nursing and Health Care, 24(1), 131-149.

<https://doi.org/10.14574/ojrnhc.v24i1.758>

Aby GR, Shutske JM, Reid JF, Beseler C, Issa, SF. 2024. Identification of advantages and limitations of current risk assessment and hazard analysis methods when applied on autonomous agricultural machineries. Journal of Agricultural Safety & Health, 30(2), 35-52. [doi: 10.13031/jash.15873](https://doi.org/10.13031/jash.15873)

Beseler CL, Kim J, Leypoldt M, Subramanian R, Robinson T, Funkenbusch K, Foster J, Harris S, Yoder A, Hymel E, Watanabe-Galloway S. (2024). Investigating FIT kit completion for CRC screening in younger adults in rural areas. Discover Social Science and Health, 4:41. <https://doi.org/10.1007/s44155-024-00102-3>



PILOT & FEASIBILITY PROGRAM

The Pilot and Feasibility Program has been an essential component of the CS-CASH since the Center was established in 2011. This program supports projects with funding up to \$20,000 over 18 months. The program goal is to enable investigators to collect preliminary data to support the submission of grant applications for independent, longer-term, larger projects related to agricultural safety and health. The central hypothesis of this program is that pilot and feasibility projects funded from this Center will result in subsequent grant submissions that advance agricultural health and safety research or will result in development of new safety technologies, products, or enduring resources. The projects selected for support by this program must address a critical issue in agricultural safety and health.

Pilot & Feasibility Program

Eleanor Rogan, PhD

Aims

The aim of the CS-CASH Pilot Program is to enable investigators to collect preliminary data to support the submission of grant applications for independent, longer-term, larger projects related to agricultural safety and health.

The goal of the program is that pilot and feasibility projects funded from this Center will result in subsequent grant submissions that advance agricultural health and safety research or will result in development of new safety technologies, products, or enduring resources.

Significance

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 (see table on next page).

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.



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

Grant Year	# of Pilot Projects	Peer Reviewed Articles	Presentations Oral/Poster	Initial Funding	*Additional Funding
Y1	5	0	20	\$95,000	\$1,319,581
Y2	7	1	25	\$100,000	\$1,275,712
Y3	5	1	3	\$60,780	\$15,000
Y4	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
Y7	7	5	4	\$140,000	\$120,000
Y8	5	7	13	\$100,000	0
Y9	7	6	8	\$138,742	\$3,149,499
Y10	8	6	9	\$140,000	\$9,518,731
Y11	5	8	10	\$100,000	\$125,612
Y12	6	5	9	\$120,000	\$411,000
Y13	6	NA	NA	\$100,000	NA
TOTAL	77	58	143	\$1,434,522	\$22,193,827

*Additional Funding includes all grant years including indirect costs.

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 (Sept 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.

Pilot Grantee Peer-Reviewed Publications (Sept 2023-Aug 2024)

Aby GR, Shutske JM, Reid JF, Beseler C, Issa, SF. (2024). Identification of advantages and limitations of current risk assessment and hazard analysis methods when applied on autonomous agricultural machineries. *Journal of Agricultural Safety and Health*, 30(2), 35-52. [doi: 10.13031/jash.15873](https://doi.org/10.13031/jash.15873)

Ahmed R, Du Y, Haynatzki G, Tucker S, Ramos AK, Rautiainen RH. (2024). Seasonal patterns of injury characteristics among farmers and ranchers in the US central states. *Journal of Agromedicine*, 29(4), 653-664. <https://doi.org/10.1080/1059924X.2024.2387645>

Beseler CL, Kim J, Leyboldt M, Subramanian R, Robinson T, Funkenbusch K, Foster J, Harris S, Yoder A, Hymel E, Watanabe-Galloway S. (2024). Investigating FIT kit completion for CRC screening in younger adults in rural areas. *Discover Social Science and Health*, 4:41. <https://doi.org/10.1007/s44155-024-00102-3>

Chasek C, Watanabe-Galloway S, Rutt R, Olson A, Yoder A. (2023). A cross-sectional study of alcohol, opioid use, and anxiety in agriculturally based occupations. *J Rural Health*, 39(4), 816-823. [doi: 10.1111/jrh.12749](https://doi.org/10.1111/jrh.12749). PMID: 36759592.

Applied Human
Factors &
Ergonomics
2024 Best Paper
Award Winner

Lowndes B, Gutierrez A, Pitla S, Rumuri S, Siu J, Yoder A. (2024). Feasibility of integrating electromyography and computer vision for occupational safety during tractor ingress and egress. In: Pedro Arezes and Anne Garcia (eds) *Safety Management and Human Factors*. AHFE (2024) International Conference. AHFE Open Access, vol 151. AHFE International, USA. <http://doi.org/10.54941/ahfe1005301>

Poole JA, England BR, Sayles H, Johnson TM, Duryee MJ, Hunter CD, Baker JF, Kerr GS, Kunkel G, Cannon GW, Sauer BC, Wysham KD, Joseph AM, Wallace BI, Thiele GM, Mikuls TR. (2024). Serum alarmins and the risk of incident interstitial lung disease in rheumatoid arthritis. *Rheumatology (Oxford)*, 63(7), 1998–2005. [doi: 10.1093/rheumatology/kead535](https://doi.org/10.1093/rheumatology/kead535). PMID: 37812235; PMCID: PMC11215989.

Poole JA, Thiele GM, Ramler E, Nelson AJ, Duryee MJ, Schwab AD, Gleason A, Hunter CD, Gaurav R, Wyatt TA, England BR, Mikuls TR. (2024). Combined repetitive inhalant endotoxin and collagen-induced arthritis drive inflammatory lung disease and arthritis severity in a testosterone-dependent manner. *Am J Physiol Lung Cell Mol Physiol*, 326(3), L239–L251. [doi: 10.1152/ajplung.00221.2023](https://doi.org/10.1152/ajplung.00221.2023). PMID: 38086040; PMCID: PMC11280680.

Schwab AD, Nelson AJ, Gleason AM, Schanze OW, Wyatt TA, Shinde DD, Xiao P, Thomas VC, Guda C, Bailey KL, Kielian T, Thiele GM, Poole JA. (2024). Aconitate decarboxylase 1 mediates the acute airway inflammatory response to environmental exposures. *Frontiers in Immunology*, 15, 1432334. [doi: 10.3389/fimmu.2024.1432334](https://doi.org/10.3389/fimmu.2024.1432334). PMID: 39351225; PMCID: PMC11439662.

Schwab AD, Wyatt TA, Moravec G, Thiele GM, Nelson AJ, Gleason A, Schanze O, Duryee MJ, Romberger DJ, Mikuls TR, Poole JA. (2024). Targeting transitioning lung monocytes/macrophages as treatment strategies in lung disease related to environmental exposures. *Respiratory Research*, 25(1), 157. [doi: 10.1186/s12931-024-02804-3](https://doi.org/10.1186/s12931-024-02804-3). PMID: 38594676; PMCID: PMC11003126.

Schwab AD, Wyatt TA, Nelson AJ, Gleason A, Gaurav R, Romberger DJ, Poole JA. (2024). Lung-delivered IL-10 therapy elicits beneficial effects via immune modulation in organic dust exposure-induced lung inflammation. *Journal of Immunotoxicology*. 21(1), 2332172. [doi: 10.1080/1547691X.2024.2332172](https://doi.org/10.1080/1547691X.2024.2332172). PMID: 38563602; PMCID: PMC11137733.



2023-2024 Funded Pilot Projects

Find more information about each project in the following pages.

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)

Ongoing Projects

Surveillance of Needs, Wants, and Perception of Agriculture Health and Safety Programs in Kansas

Edwin Brokesh, PhD, & Tawnie Larson (Kansas State University)

The Classroom Component: Hands-on, Experiential Learning of Safety and Health Golden Rules Aimed at Children Living in Rural and Agricultural Elementary Schools

Jana L. Davidson (Progressive Agriculture Foundation)

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 (University of Iowa)

Creating a Generation of Agriculture Safety and Health Influencers: Youth Peer-to-Peer Engagement Strategies to Foster Positive Change

Laura L. Rice, PhD (University of Minnesota)

Jana L. Davidson (Progressive Agriculture Foundation)

Factors Associated with Severe Livestock Work-Related Injuries

Ruth Woiwode, PhD (University of Nebraska-Lincoln)

Elliot J. Dennis, PhD (University of Nebraska-Lincoln)



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Adverse Health Outcomes From Pesticide Exposure in the Female Agricultural Workforce

Muhammad Zahid, PhD

Project Aims

1. Monitor urinary pesticide and their effects on estrogen metabolism before and after the application season.
 2. Survey the effectiveness of training and awareness of ongoing safety programs for female applicators.
-

Significance

Pesticide exposures may be similar for men and women applicators. Acute and chronic exposure to agrochemicals has been shown to have significant effects on human health and, depending upon type, dose, and exposure length, may lead to cancers or neurological disorders. Biological characteristics of women enhance their vulnerability to these chemicals.

Project Summary

Monitoring urinary pesticide levels in agriculture workers is the first important step in designing exposure preventive strategies. However, relating the one-time measure directly to adverse health outcomes from long exposures is difficult. We propose to monitor urinary pesticides and their possible adverse effect on estrogen metabolism. Pesticides are endocrine disrupters, and we anticipate that we will see that effect through estrogen metabolism in the urine of women who have been exposed to agrochemicals during the application process. The balance of estrogen metabolism is one of the essential critical factors for a healthy life, and pesticides can affect that balance and, through a series of events, lead to adverse health outcomes.

There is a critical need for research investigating agrochemical exposure to female pesticide applicators. We aim to enroll female pesticide applicators and collect pre- and post-season urine samples. We will measure pesticide levels in urine and their estrogen metabolic profile before and after the spraying season. Finding urinary pesticide levels will indicate that additional safety education and training interventions are necessary for these exposed applicators.

Changes in estrogen metabolism in post-application samples will further our understanding of how specific chemicals modulate estrogen metabolism and provide pilot data for more in-depth research into the effects of agrochemical exposure in female applicators.

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

Jonathan Ulmer, PhD

Project Aims:

1. Build an understanding of school-based agriculture teachers' knowledge and teaching of agriculture safety.
2. Identify safety-related courses at Kansas State University that can be used in an agricultural safety program.

Significance

Instruction in safety in the agriculture industry needs to be improved. The current state of instruction and knowledge at the college and high school levels has yet to be discovered. Three approaches will be used to assess the current state of agriculture safety instruction. A survey will be conducted with current Kansas agriculture teachers on their knowledge of and about safety. An assessment of current safety classes, programs, and offerings at Kansas State University will be conducted to improve opportunities. Finally, interviews will be conducted with current high school power, structural, and technical teachers to collect best practices for creating a culture of safety in high school laboratories.

Project Summary

The Kansas State University Institutional Review Board has approved the project. An undergraduate has been hired and has begun creating the instrument for data collection. The graduate student has been reviewing course catalogs and Extension resources. The instrument should be piloted in October 2024, with data collection beginning in November 2024.



Occupational Health Hazards Posed by Airborne Neonicotinoid Dust from Seed Treatments

Darrin Thompson, PhD

Project Aims

1. Demonstrate that neonicotinoid-containing dust is a major source of occupational exposure during planting and harvest seasons.

1a. Test the hypothesis that dust is a source of exposure for agricultural workers.

Building on prior findings of NEO contamination in surface water, groundwater, and drinking water, and widespread exposure, the study is analyzing treated seed extracts and deploying samplers to measure NEO levels in dust across Iowa. Dust samples will be measured during planting and harvest seasons, to assess occupational exposure risks.

1b. Test the hypothesis that NEO concentrations in dust are a more significant source of human exposure compared to drinking water.

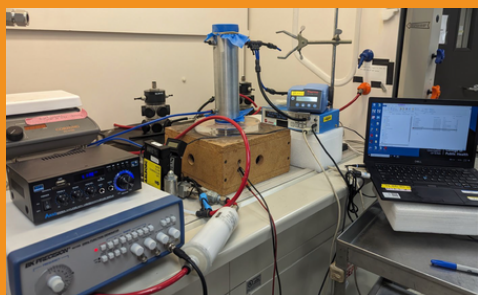
NEO concentrations detected in dust will be compared to other potential sources of exposure like drinking water. NEO levels in dust will be compared to concentrations detected in drinking water and urine samples collected from agricultural workers in Iowa.

Significance

Neonicotinoids (NEO), commonly used as seed treatments for crops like corn and soybeans, can be found in airborne dust, potentially posing unique exposure risks to agricultural workers. Few studies have examined the health impacts of this exposure in the US. This study is examining whether NEO-containing dust is a significant exposure pathway for agricultural workers.

Project Summary

During the first two months of the project, the research team has been working to analyze dust extracts from treated seeds. In partnership with Drs. Peter Thorne and Andrea Adamcakova-Dodd, of the University of Iowa's College of Public Health, we have used an Acoustical Dust Aerosol Generator/Elutriator (ADAGE) (left photo) to measure particle size distribution of dust from treated corn and soybean seeds. This research is ongoing, but preliminary results suggest that dust from seeds is highly variable. The right photo shows a filter with dust collected from a soybean seed, before and after.



*(Left) Acoustical Dust Aerosol Generator/Elutriator (ADAGE)
(Right) Filter with dust collected from a soybean seed using ADAGE, before and after*

Cardiovascular Disease Risk of Latino Migrant Farmworkers: A Descriptive Study

Maria Jose Sanchez Roman, MD, MPH

Project Aims

1. **Estimate cardiovascular disease (CVD) risk by objectively measuring blood pressure, body mass index, waist circumference, hemoglobin A1C, and lipids levels at health fairs near farmworkers' housing sites.**
2. **Evaluate the relationship between CVD risk and key individual-level health beliefs, behaviors, and demographic characteristics (e.g., age, language proficiency, education, regular source of care).**
3. **Evaluate the feasibility (e.g., compliance with protocol, staff training, recruitment) and acceptability (e.g., participants' satisfaction, experience) of health fairs tailored for Latino migrant farmworkers in Spanish and at housing sites.**

Significance

Cardiovascular disease (CVD) remains a leading cause of mortality globally and nationally; however, it remains underdiagnosed among Latino migrant farmworkers. Latino migrant farmworkers may be at greater risk of CVD due to factors associated with the traveling nature of their job, having limited access to care, high job demands, health behaviors, and lower socioeconomic status. CVD risk estimates in Latino migrant farmworkers have not been reported in Nebraska and there is a lack of health promotion interventions for this population. The purpose of this cross-sectional descriptive study is to objectively measure risk factors for CVD including hypertension, diabetes, obesity/overweight, and lipids along with health behaviors and beliefs among Latino migrant farmworkers to estimate CVD risk. Findings from the study will inform future research and interventions aiming to educate Latino migrant farmworkers on CVD prevention in a culturally tailored manner and improve health outcomes.

Project Summary

Working with our community partners for recruitment, we held four health fairs and completed data collection with a total sample size of 126 individuals. We concluded data collection in August 2024.

Preliminary findings show that biometrics collected demonstrate that 49.6% of participants had high systolic blood pressure (>130 mmHg), 16.8% had pre/diabetes (A1C >5.7%), 74.8% were overweight/obese (BMI>25), 31.1% had high cholesterol (>200 mg/dl), and 73.1% had high triglycerides (>150 mg/dl). Smoking was reported by 16.8% of participants, and 40.3% reported at-risk drinking (AUDIT-C >4). Only 35.6% engaged in moderate physical activity in the last month. Findings showed that 17.6% had never visited a medical provider because they didn't see the need and due to

cost. More than half reported having health insurance while in the U.S., but most sought care in their countries of origin. About 12.6% have never checked their blood pressure and 40.3% had never had their glucose measured. 90% of participants reported a high level of satisfaction with the health fairs.

Presentations

A 4th year medical student at the University of Nebraska Medical Center, who contributed as member of the research team for this study, presented on his experience in his medical Spanish immersion class in July 2024.



Surveillance of Ticks and their Pathogens in Bison Worker Populations

Shaun Cross, PhD

Project Aims

1. Collect ticks from bison herds and survey them for known pathogens.
2. Dissemination of educational material for prevention of tick borne disease (TBD).

Significance

Vector-borne diseases (VBDs) pose significant risks and challenges for public health both within the United States and globally. The Central States region is at an emerging risk for several different debilitating tick-borne diseases as the major tick disease vectors are established or are migrating into and establishing in this region. Of particular concern and risk are the Indigenous communities, especially those that work closely with bison (called buffalo here). Handling buffalo during the annual roundups, medical treatment, and processing entails close contact with animals. This can facilitate the movement of ticks from buffalo to their handlers, putting the workers at risk for tick bites and potential exposure to tick borne diseases (TBDs). Best preventative measures and practices protect both livestock and workers to these pathogens. In this pilot project, we will assess the risks for buffalo and their handlers to TBDs.

Project Summary

Since our funding began in Spring of 2024, we have had success on both aims of our project. For Aim 1, we have coordinated with members of the Winnebago tribe in Nebraska to perform field collections of ticks from their buffalo pasture. Additionally, as part of the annual Bison Worker Safety and Herd Health Roundtable hosted by CS-CASH and the InterTribal Buffalo Council (ITBC), we were able to collect ticks from the buffalo as it was harvested as well as matching blood samples. We are currently screening these initial samples through molecular approaches (quantitative polymerase chain reaction; qPCR). We also disseminated more than 1,000 citizen science packets to tribal members for collection and shipment of ticks to the University of Nebraska Medical Center.



(Left) Dr. Cross provides an educational presentation regarding ticks and tick-borne diseases at the 2024 Bison Worker and Herd Health Roundtable while wearing a "tick suit". The suit highlights 'hotspots' for where ticks prefer to go on the human body and where an individual should look most carefully for ticks.

(Right) Participants at the roundtable, hosted by the Winnebago Tribe at the WinnaVegas Casino and Resort in Sloan, Iowa.

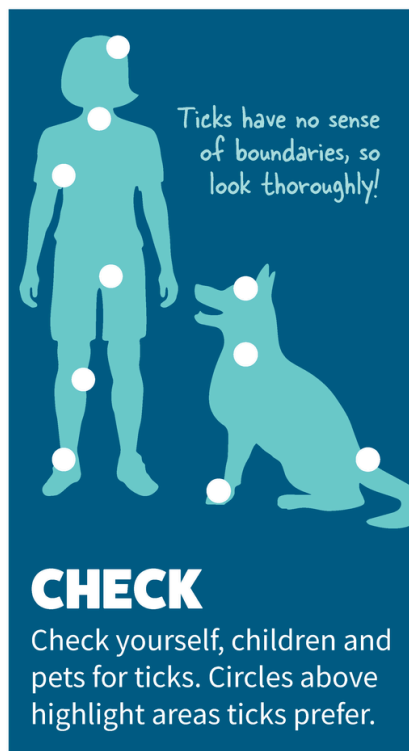
For Aim 2, we worked closely with our collaborators (Dr. Louise Lynch-O'Brien) from Tick Tag Go at the University of Nebraska-Lincoln. We gathered educational materials and created a presentation to train participants at the annual roundtable in ticks and TBDs. This provided a unique opportunity to treat this as a focus group to explore the prior knowledge regarding ticks and TBDs as well as perceived impacts (e.g. likelihood to implement preventative practices). We had 27 participants at the annual Roundtable, of which 100% responded to our survey. We found the presentation to be impactful as 96.3% of participants agreed that they learned something new, 92.6% agreed that they now have adequate resources to find information on TBDs, and 70.4% agreed they would implement preventative practices following the discussion. We look forward to continuing to meet with individual tribes to discuss these concepts as 44.4% of participants would like additional programs regarding TBDs in their own communities. This information has been drafted as a publication and we anticipate submitting it this year.

DON'T LET TICKS KEEP YOU INDOORS.

Ticks are active year-round - not just in the summer. By following precautionary measures against ticks and practicing safe tick removal, you will be ready to enjoy the great outdoors!



PREVENT
Use EPA-approved repellents (DEET, picaridin, etc.). Tuck pants into socks.



Ticks have no sense of boundaries, so look thoroughly!

CHECK
Check yourself, children and pets for ticks. Circles above highlight areas ticks prefer.



Got the willies?
Take a shower & throw clothes in dryer on high for 30 minutes!

REMOVE
Use tweezers, grasp tick as close to the skin as possible and pull straight out.

An example of some of the educational material developed by Dr. Louise Lynch-O'Brien and team at Tick Tag Go at the University of Nebraska-Lincoln. These educational materials were disseminated to participants at the 2024 Bison Worker and Herd Health Roundtable.

Surveillance of Needs, Wants, and Perception of Agriculture Health and Safety Programs in Kansas

Edwin Brokesh, PhD, & Tawnie Larson

Project Aims

1. Use online surveys to assess the needs, wants, and perception of agriculture safety and programming in the state of Kansas. Use these findings to determine the next steps in developing and agriculture safety and health program throughout the state.
2. Use the findings from this project to seek additional funding for educational programming, outreach, and research to reduce the risk of work-related illnesses and injuries in the agricultural sector, including those in vulnerable worker populations.

Significance

This feasibility study aims to gather information through online surveys of Kansans on their needs, wants, and perception of agriculture safety and health programming in the state. The data gathered will determine the next steps in developing an agriculture safety and health program throughout the state.

Based on the findings, the leadership team plans to seek additional funding for education programming, outreach, and research to reduce the risk of work-related illnesses and injuries in the agricultural sector, including those in vulnerable worker populations.

Project Summary

In February 2024, the team worked with the K-State Research and Extension (KSRE) Communications Department to draft and publish a news article for the kickoff of the anonymous survey. The article was published online and in print throughout Kansas and featured in an interview on the Agriculture Today radio program. The incentive for survey-takers was a pair of purple knit gloves with the KSRE logo. Facebook and Instagram were used to promote the survey, Facebook advertising was purchased with a reach of nearly 6,000. Print advertising in the weekly Grass and Grain agriculture newspaper was also utilized for three weeks, this



Image of graphic used on social media, print advertising, farm shows and sent to KSRE offices.

newspaper covers the eastern two-thirds of the state and reaches approximately 9,000 readers each week. CS-CASH shared their Kansas email list which was utilized to send one email to the list asking recipients to complete the survey. Cards were printed that featured the gloves and survey link, these were distributed at farm shows and sent to each of the 105 Kansas Counties of KSRE. Project leadership manages a website, Kansas Agriculture Safety and Health (KASH), which was the location of the survey link for users to begin. Qualtrics was used to conduct the survey, which was offered in both English and Spanish. The survey included 25 questions ranging from the type of production the people are involved in to the types of agriculture health and safety programming that they would like to see in Kansas.



LEARN MORE ABOUT THIS WORK

Visit www.k-state.edu/kash/

Or use your smartphone to scan the QR code.



The survey resulted in 522 responses, with 338 completed surveys. While the survey results were anonymous, participants were voluntarily routed to a different survey where they could provide mailing information for the gloves. There were 237 people that wanted the gloves, of those 108 people also indicated that they were willing to be involved in additional research with the group and provided their email address and/or their telephone number. The additional research will be a focus group comprised of a portion of the 108 that indicated they are interested. The focus group will review the survey findings and provide feedback on the best approach to develop materials and outreach throughout the state.

The survey ended on August 15th, 2024. The Kansas State University (KSU) research team is working with CS-CASH evaluator, Dr. Cheryl Beseler, to analyze the data. Once the data is in a useable form, the focus groups will meet to review.



The Classroom Component: Hands-on, Experiential Learning of Safety and Health Golden Rules Aimed at Children Living in Rural and Agricultural Elementary Schools

Jana L. Davidson

Project Aims

- 1. Develop a hands-on, educational agricultural safety learning experience for elementary school students in grades Kindergarten–6th grade.**
 - 1a. Provide volunteers (Key Facilitators) with on-line training and resource kits for hands-on activities and demonstrations**
 - 1b. Develop a marketing, communications, and curriculum toolkit for each Key Facilitator.**
 - 2. Develop a reporting and evaluation toolkit for each Key Facilitator to measure the effectiveness of the project.**
 - 3. Create a Peer-to-Peer Engagement Module and an opportunity for high school students and teens to get involved and develop life skills, with guidance from a caring adult mentor.**
 - 4. Establish a cost structure to help sustain the Classroom Component long-term by identifying ways to fulfill, distribute, and warehouse the resource kits, a database to store Key Facilitators information/reporting, and the addition of staff support/intern to maintain and grow the program.**
-

Significance

The Progressive Agricultural Foundation (PAF) successfully developed and evaluated a novel safety and health-oriented educational platform for its Progressive Agriculture Safety Day® (PAF Safety Day) program. The new classroom-based delivery mode was designed to expand the program’s reach and increase the ease and accessibility to potentially lifesaving learning to agricultural and rural youth.

The new classroom-based design allowed elementary school-aged children to learn to make safer and healthier decisions without having to leave the classroom, while using the same key principles and incorporating the hands-on learning approach used by the PAF Safety Day program over the past three decades. This delivery mode allows for easy adoption in communities that lack resources preventing them from having a traditional community-based or school-based PAF Safety Day program. Flexibility allows lessons to be taught over a period of several days, weeks, or even months throughout the school year. During the pilot, Key Facilitators implementing the program took part in an on-line, self-paced training course in the PAF Training Center and were asked to conduct a minimum of four (4) separate lessons. Each interactive-focused session offers a comprehensive overview of one critical safety and health topic at a time.

Project Summary

Number of grades involved:

- Pre-school: 1
- Kindergarten: 3
- 1st grade: 0
- 2nd grade: 1
- 3rd grade: 3
- 4th grade: 4
- 5th grade: 3
- 6th grade: 1
- After-school program (grades 1-5): 1



elementary school students were involved in the pilot

Participating states:

- Delaware
- Illinois
- Kansas
- Kentucky
- Minnesota (2)
- Montana
- Nebraska (2)
- North Dakota
- South Carolina
- West Virginia
- Wisconsin
- Wyoming

Key Facilitators spent an average of



hours on the pilot

This included training, travel, pre-planning, and classroom visits. (The lowest was 3 hours and the highest was 25 hours)

“ I loved the ability to be able to present inside the classroom. I felt that the connection made with the kids helped with the overall learning experience. They really looked forward to the topic that was being taught in each session and we were able to dive deeper into the topic than we do at the traditional Progressive Agriculture Safety Day.
-Key Facilitator”

100% of Key Facilitators said:

- The resources provided by the Progressive Agriculture Foundation were helpful
- They would recommend this program to a friend or colleague

Key Facilitator Evaluation Comments (N=16)

- Working with autism youth and seeing them understand what we are asking them to do and being able to do it. Rewarding!
- Hearing students comment that they will share what was learned with others whether it be at home or with peers.
- Students really enjoyed the program and the follow up evaluation indicated they retained information
- The students enjoyed the lessons and the hands-on activities and demonstrations. The materials in the tool kit box were very intriguing to students and really helped me teach the concepts better than we have done in the past.

- In the chemical look-a-likes, I do not feel 4 is enough.
- The final lesson, Weather Safety, was far, far too much material for 30 minutes.
- I felt very rushed to complete some of the lessons, particularly the ATV safety lesson
- The pre and post-tests were hard for the second graders to comprehend. I had to read out loud and make substitutions for words. I did modify a few of the activities to take it down to a second-grade level.

Changes Implemented in Response to Evaluations

For the pilot, we assigned four (4) topics for each Safety Day Coordinator. For the 2022-2023 school year, we allowed the Safety Day Coordinators to select the four (4) topics they were most interested in and personalized their resource kit. For the 2023-2024 school year, we offered one standard resource kit containing materials for all lessons, which allowed ease in packing and shipping kits. We also tried eliminating some consumable items that can be easily or affordably located at local retailers or inside the classroom.

An additional topic has been added – mental wellbeing and stress management.

For the 2023-2024 school we found a way to implement the classroom-based program into the on-line coordinator portal and the PAF Training Center, improving accessibility.

Upon recommendations from the Key Facilitators, we are working to make updates to the pre- and post-evaluation surveys.

Additional Funding

The Progressive Agriculture Foundation received additional support for this work from CHS Inc.

Other Media

Building the Foundation for Safety. (ongoing). Blog post. Retrieved from: <https://pafsafetydaynewsroom.squarespace.com/foundation-blog>



Focus Group Study of Iowa Farming Parents on Their Attitudes Regarding Firearm Storage in Homes and Firearm Injury Prevention Efforts

Marc F. Doobay, MPAS, PA-C

Project Aims

- 1. Identify current practices, attitudes, and perceptions of firearm and ammunition storage in the homes of parents of adolescents in rural farming and ranching families.**
 - 2. Determine how parents of adolescents in rural farming and ranching families feel about current programs and proposed legislation to improve firearm storage.**
 - 3. Ascertain what parents of adolescents in rural farming and ranching families believe would be the most effective programming and messaging to improve safe storage practices of firearms and ammunition.**
-

Significance

Firearm-related injuries are the leading cause of child and adolescent death in the United States. Rural areas have higher rates of firearm-related unintentional and suicide deaths. A survey study of 1,400 adolescents at the 2019 Iowa FFA Leadership Conference revealed over 85% lived in a home with a firearm, many of whom reported unsafe storage of firearms and ammunition.

We have been performing exploratory focus group sessions and semi-structured interviews with parents of adolescent FFA members in rural Iowa farming communities. These sessions aim to understand rural families' current firearm and ammunition storage practices, their openness to safer practices, and the most effective messaging and programming to reduce firearm-related injuries and deaths among adolescents in farming and ranching communities.

The Iowa Social Science Research Center (ISRC) has supported our team in conducting Focus Groups and semi-structured interviews. The ISRC also provided support for instrument consultation, assistance with focus group planning, IRB submissions for additional modifications, and web survey programming and deployment. The ISRC provided two staff members to serve as moderator and assistant moderator, with the purpose of consenting study participants and collecting qualitative data at the Focus Groups. The ISRC also provided necessary materials and recording equipment to conduct the Focus Groups. Data is stored locally in ISRC network folders maintained by the University of Iowa ITS.

Study findings from our focus group sessions will be used to design and construct effective evidence-based messaging and outreach programming for farming/ranching families on safe storage practices of firearms and ammunition in

their homes and to develop a targeted media campaign. Identified parental attitudes regarding firearm safety legislation may be used to help inform legislatures and the actions they might take.

Upon completing this pilot/feasibility project, we expect this work to inform messaging and safety programming that will increase the use of safe storage practices of firearms and ammunition in the homes of rural families and, in turn, decrease firearm-related deaths and injuries among rural adolescents. The impact of this pilot/feasibility project's injury prevention messaging and the curriculum on safe storage of firearms and ammunition designed for farming/ranching families may serve as an educational model for widespread interventional programming for families throughout rural America.

Project Summary

Focus Group Script

A moderator script was developed by the research team and the ISRC provided consultation on the script. The script contained an introduction and ground rules section, followed by an opening question asking parents what they feel is the most important issue surround youth and firearm. Nine additional questions were asked during the focus group discussion, and topics included 1) current firearm and ammunition storage practices in the home, 2) willingness to change storage practices, 3) best messaging and best methods to educate and access families on safe storage, 4) best individuals or groups to deliver messages or education on safe storage, 5) gauging comfort in inquiring into other neighbors'/families'/friends' storage practices where their children/adolescents may spend time, 6) the role of healthcare providers regarding safe storage, 7) the use of firearms by youth, 8) opinions on current and proposed storage laws, and 9) discussion of suicide by firearms among rural individuals with depression and other mental illnesses. The script included a primary question for each topic area as well as 1-5 question prompts to help guide the conversation and explore topics in more detail. Most questions were allotted approximately 10 minutes to discuss, with variations in duration as appropriate.

Survey

The study team developed a 37-item quantitative survey to assess 1) firearm storage, 2) firearm use, 3) firearm injuries, 4) firearm safety education, 5) perceptions relevant to the topic and 6) demographics. The survey was developed for both in-person (printed) deployment and web deployment.

Recruitment

The study team led recruiting efforts for participation in focus groups through a variety of methods. Initially, a convenience sample of Iowa FFA chapters was used to recruit one parent from FFA chapters across the state. The study team reached out to FFA Advisors, statewide, to assist with recruitment. Three advisors assisted us with holding sessions at their schools. Each chapter was provided a \$500 incentive to recruit 8-12 parents for a focus group.

Focus Groups

To date, six exploratory focus group sessions and two semi-structured interviews have been conducted with parents of adolescents from rural Iowa farming communities. Focus group recordings have been transcribed by ISRC field staff and reviewed by the moderator and assistant moderator for accuracy.

Coding and analysis of the data is ongoing. Results will be widely disseminated at the completion of the study.

Additional Funding

\$7,500.00 in funding was provided by the Children’s Miracle Network to support this project.

Date of Focus Group	Location	Participants (N)
4/10/2024	Webster City, IA	9
4/27/2024	Sioux Central, IA	8
5/22/2024	Fort Madison, IA	2
8/2/2024	Zoom	4
8/5/2024	Zoom	3
9/4/2024	Zoom	3
9/7/2024	Zoom	1
9/17/2024	Zoom	1
Total		31

Presentations

Healthcare in the Heartland Fall Conference. October 2, 2023

National Research Conference for the Prevention of Firearm-Related Harms. Chicago, Illinois. November 1-3, 2023



Creating a Generation of Agriculture Safety and Health Influencers: Youth Peer-to-Peer Engagement Strategies to Foster Positive Change

Laura L, Rice, PhD
Jana L. Davidson

Project Aims

1. Gain a better understanding of what influences youth involved in agriculture to make safer and healthier decisions.
2. Develop new resources to assist teens to teach their peers and younger children about agricultural safety and health.
3. Identify ways to recognize success through capturing and sharing feedback from evaluations, contests, and storytelling.

Significance

The mission of the Progressive Agriculture Safety Days is “to provide education, training and resources to make farm and ranch life safer and healthier for all children and their communities.” Since 1995, more than two million youth and adult participants have been reached through our traditional, one-day events that offer age-appropriate, engaging hands-on activities and demonstrations on relevant topics. While we take great pride in our program’s past success, we remain driven by the sobering statistics reveal that a child dies about every three days due to agriculture-related incidents, while every day at least 33 children are injured.

Project Summary

A large body of evidence shows that peer instruction benefits student learning. This project will focus on gaining a better understanding of what influences youth involved in agriculture to make safer and healthier decisions; developing new resources to assist teens to teach their peers and younger children about agricultural safety and health; and identifying ways to recognize success through capturing and sharing feedback from evaluations, contests, and storytelling.

Upcoming Project Activities

- **Safety Days:** For 2024, 535 PAF Safety Day applications were received. Many of these Safety Days utilize 4-H & FFA teens as PAF Safety Day volunteers (content presenters, group leaders, etc.). We are collecting information on volunteers, so we should be able to report the number of 4-H and FFA members involved.

For all seven states within the CS-CASH region, the Progressive Agriculture Safety Day® program has a strong presence.

State	2024 Applications
Iowa	60 (11%)
Kansas	14 (3%)
Minnesota	12 (2%)
Missouri	17 (3%)
Nebraska	24 (4%)
North Dakota	16 (3%)
South Dakota	4 (1%)

Future Project Goals

- Identify social media influencers (both teens and young adults) to help support the project and mission of the Progressive Agriculture Foundation® and Progressive Agriculture Safety Day® program.
- Create a top 10 “What to Do” and “What Not to Do” when it comes to teens teaching their peers about ag safety and health. If possible, develop into a video series to incorporate into training.
- Establish a teen influencer contests and awards for the 2025 PAF Safety Day program year to include essays, audio and/or video public service announcements (PSA).

Presentations/Outreach

2024 Ignite by 4-H Ultimate Teen Summit in Washington, D.C. March 13-17, 2024.

- Jana Davidson offered a teen workshop sponsored by Nutrien on “Becoming a Safety and Health Influencer: Youth peer-to-peer engagement strategies to foster positive change.” Connected with more than 100 teens through workshop and career connection round-tables moderated.

2024 Wisconsin Farm Technology Day. Cadott, Wisconsin. August 13-15, 2024.

- The Progressive Agriculture Foundation offered a Safety Zone working with WI State FFA Officers to conduct the safety stations.

2024 National FFA Convention. Indianapolis, Indiana. October 22-25, 2024.



Factors Associated with Severe Livestock Work-Related Injuries

Ruth Woiwode, PhD

Elliot J. Dennis, PhD

Project Aim

1. Identify and quantify the primary drivers of animal worker-related injuries in the United States.

Significance

The primary metric used by the livestock industry for describing experience or qualifications for employment is a self-reported one: years of experience. Self-reported measures are widely recognized to be the least reliable, which in this instance likely translates to a poor understanding of risk level for the livestock workforce. A better understanding of objectively measured skill level is likely to lead to improvements in worker training, job satisfaction, and retention, while reducing risk and associated costs.

Project Summary

Cattle handling data was made available from Colorado State University. These data provided insight into the merit of handler skills.

A novel Skill Assessment Tool (SAT) was developed for objective measurement of skill level. Participants with previous cattle handling experience were surveyed to determine the number of years of experience working with cattle and other livestock, what training they had received, whether and to what extent they had been injured while working with cattle, and to self-rate their skill on a 5-point scale. Following this survey, participants completed 10 cattle handling tasks and self-evaluated their performance. Using the novel SAT developed by the investigators, 19 participants were scored on their execution of 10 cattle handling tasks. Self-reported scores were compared to independently assigned scores, and history of injury (sustained from working cattle) were evaluated for all participants.

Our findings are consistent with known tendencies for male participants to overestimate their skills, and we were surprised to find that in our work, both male and female participants scored their performance higher than independently assigned scores. Perhaps our most notable discovery was that for males who rated their experience as 2 or 3 on a 5-point scale, these participants reported no previous injuries sustained from working with cattle. However, males who rated themselves as more experienced as denoted by a 4 on the same scale, 100% reported injuries sustained from working with cattle, and of that group, 71% reported having formal training. This finding suggests that current industry metrics are limited in their ability to identify or mitigate risk for cattle workers, and more work is needed to quantify skill level and characteristics of handlers that are related to safety.

Additional Funding

Based on the preliminary data collected, we were successful in securing a USDA-NIFA Foundational and Applied Science New Investigator Seed grant for \$300,000 to continue this work over a two-year period. We are actively recruiting individuals of any skill level with previous cattle handling experience to participate in this work.

Presentations

International Society of Agricultural Safety and Health. June, 2024.





OUTREACH PROGRAM

The Central States Center for Agricultural Safety and Health (CS-CASH) outreach program promotes interventions that the agricultural workforce, their families, and communities can effectively adopt and sustain across the region and the nation, thereby contributing to long-term improvements in agricultural worker health and safety.

Outreach

Debra Romberger, MD

Project Aims

- 1. Identify information from CS-CASH research, pilot projects, and external research, and translate these findings into comprehensive outreach training, demonstrations, media messaging, and targeted resources, focusing on translating research relevant to vulnerable worker populations and exploring data that will uncover emerging issues.**
- 2. Implement injury prevention safety training and disseminate targeted education to workers in high-risk agricultural industries.**
 - Emphasize training vulnerable populations, including immigrant and migrant workers, Indigenous peoples, and young and beginning farmers, using proven communication channels and training modalities in collaboration with trusted partners.**
 - Improve health outcomes for agricultural workers by training rural health care providers using continuing education courses and hands-on training.**
- 3. Increase the capacity of rural healthcare professionals to identify, refer, and treat agricultural workers who may benefit from mental health services and resources by using the innovative FarmResponse training.**
 - Provide training to rural community members using a Gatekeeper Question, Persuade, Refer (QPR) training modified for agricultural communities, enabling trainees to identify and refer agricultural workers who may benefit from mental health services and resources.**

Accomplishments

The CS-CASH outreach program promotes interventions that the agricultural workforce, their families, and communities can effectively adopt and sustain across the region and the nation, thereby contributing to long-term improvements in agricultural worker health and safety. Throughout the past year, the outreach team conducted training and responded to emerging issues serving agricultural producers and workers, vulnerable worker populations, and rural healthcare providers. We continue to work with partner organizations, including the AgriSafe Network, Ag Health and Safety Alliance, USDA Extension Service, AgrAbility, Grain Handling Safety Coalition, Farm Bureau, Women in Agriculture Organizations, agri-insurance, media organizations and journalists, and other NIOSH-funded Ag Centers.

Working with CS-CASH researchers and other content experts, we have generated new educational resources, demonstration materials, and training curricula shared with workers at the more than 408,000 farms and ranches in the CS-CASH region. Critical safety and health information is shared during training at agricultural events, by media outlets, through social media, and via the Center's extensive

communication database. Monitoring surveillance data has allowed a rapid response to immediate concerns affecting ag workers, including the H5N1 outbreak in dairy facilities in 2024. Face-to-face outreach at agriculture-focused events has continued to be an effective method to train, demonstrate, and discuss proven safety and health measures and rapidly disseminate information on emerging issues.

Using novel, innovative outreach, CS-CASH has worked with AgriSafe and other trusted partners to specifically address stress, mental health, and suicide in agricultural workers, train grain handling workers, and conduct train-the-trainer fit testing with USDA Extension. Our partnerships are essential in providing sustainable, far-reaching outreach.

From Benchtop to Boots on the Ground: Transforming Data into Outreach Materials

The outreach team works to move safety and health research information from CS-CASH investigators into educational resource materials, training curricula, and emerging issue outreach. Examples of how data was transformed into outreach in the past year are shown in the following pages. See additional information in each project report.

Emerging Issues Program

Educational (electronic and hardcopy) materials and training curriculum developed in response to the H5N1 outbreak in dairies and to flooding following hurricanes in the southeast.

Developed materials in collaboration with Nebraska Extension, the Southwest Agricultural Safety Center, Nebraska Public Health Associations and CS-CASH researcher Dr. Matthew Nonnenmann in response to the H5N1 outbreak in dairy farmers. Educational resources included recommendations for appropriate personal protective equipment, symptoms of exposure in both cows and humans, and links to additional resources were developed. Sample PPE packs were developed and along with educational materials were disseminated to 800 workers in Nebraska, North Dakota, and Iowa dairies. This work is ongoing with the funding of a NIOSH H5N1 project to Dr. Nonnenmann.

Materials on safe farm recovery following an agricultural flood event were updated from the 2019 flooding and customized for the 2024 flooding following the 2024 hurricanes in the southeast. These materials were disseminated and included in 2 flood recovery presentations on RFD-TV.



Communications Specialist Kelsey Irvine and two graduate students packed sample H5N1 PPE packs for Central State dairies.

Pilot & Feasibility Program

In 2023-2024 the outreach and evaluation teams worked with each of the 6 new pilot program investigators to ensure that their research proposals include a plan of for translation and dissemination of findings.

The Exposome and Organic Dust-Induced Lung Injury

Dr. Todd Wyatt's work inspired two female focused respiratory protection resources. Created in collaboration with the Ag Health and Safety Alliance, one resource is geared toward [female poultry producers](#) and the other [informs women working agriculture about how to choose and fit a respirator](#).

Multiple Methods Approach to Study the Impact of Stress among Latino Immigrant Cattle Feedyard Workers in the Central States Region

Dr. Athena Ramos' research team continued to create flyers and informational videos for the project's Feedyard Health Fairs. These bilingual videos educate the participants about what to expect and how to interpret the results that they receive. These resources can be used by other healthcare professionals who wish to conduct health fairs in occupational settings. CS-CASH outreach materials have been translated into Spanish, shared with project participants and placed on the [Feedyard Safety team's website](#). The project website was developed and is maintained by the outreach team.



LEARN MORE ABOUT THIS WORK

Visit go.unmc.edu/immigrant-workforce

Or use your smartphone to scan the QR code.



Improving Safety Climate and Safety Culture in the Cattle Feedyard Industry

The outreach team continued to work closely this year with Dr. Aaron Yoder to review and refine the Feedyard 15 safety training modules. Additional bilingual training materials have been developed and translated by the outreach team in response to advice from the Feedyard Safety project advisory board. These materials have been disseminated during feedyard safety trainings, at industry conferences and are available on the [Feedyard Worker Safety project website](#). The project website was developed and is maintained by the outreach team.



CHECK OUT THE FEEDYARD WORKER SAFETY WEBSITE

Visit go.unmc.edu/feedyard-safety

Or use your smartphone to scan the QR code.



Establishing a Community-Based Training Network to Enhance Bison Herd Workers Safety on Tribal Lands

The outreach team is continues to work with Dr. Mystera Samuelson to create a culturally appropriate, worker-informed safety training guide. During the 2024 Bison Worker Safety Roundtable, additional information was gathered that will be incorporated into this resource. The outreach team developed and maintains the [Bison Worker Safety website](#).



CHECK OUT THE BISON WORKER SAFETY WEBSITE

Visit go.unmc.edu/bison

Or use your smartphone to scan the QR code.



Surveillance of Agricultural Injury, Illness, and Stress in the Central States Region

The outreach team worked closely this year with Dr. Risto Rautiainen to track injuries and fatalities in our 7-states region using [news clip data](#), and to develop prevention resources in response to emerging issues and reoccurring threats to safety and health.



VIEW NEWS CLIPPING DATA

Visit go.unmc.edu/fatalities-injuries

Or use your smartphone to scan the QR code.








Evaluating the Safety of Agricultural Vehicle Ingress/Egress for Aging Producers

The outreach team worked with Dr. Lowndes to recruit study participants through the Center's social media platforms and newsletter. We look forward to translating and disseminating the results of this project via outreach activities.



CS-CASH Social Media Platforms & Stakeholder Reach

MEDIA	REACH
 <p>Website go.unmc.edu/cs-cash</p>	<ul style="list-style-type: none"> • 15,179 total views in the year • 6,132 unique users in the year
 <p>Facebook @unmccscash facebook.com/unmccscash</p>	<ul style="list-style-type: none"> • 933 followers • 482 posts in the year • 4,568 content interactions (including reactions, shares, and comments) in the year
 <p>Instagram @unmccscash instagram.com/unmccscash</p>	<ul style="list-style-type: none"> • 116 followers • 455 posts in the year • 392 post engagements (likes, comments, and saves) in the year
 <p>Flickr @cscash flickr.com/photos/cscash</p>	<ul style="list-style-type: none"> • 3,096 copyright free ag safety and health photos taken by CS-CASH members • 1,013,306 lifetime views
 <p>U.S. Ag Center YouTube @USagCenters youtube.com/usagcenters</p>	<ul style="list-style-type: none"> • U.S. Ag Center collaborative channel • CS-CASH created 31 of the videos • Channel videos have 793,965 views, 785,684 watch time hours

CS-CASH Newsletter

The CS-CASH newsletter is sent to 2,982 agricultural employers, safety professionals, researchers, industry stakeholders and the Center's partners four times a year. The newsletter informs readers about new CS-CASH educational resources, funding announcements, and training opportunities as well information from our community and research partners. We invite new subscribers to sign up for the newsletter.



LEARN MORE ABOUT THE NEWSLETTER

Sign up & view past issues.

Visit go.unmc.edu/cs-cash-newsletter

Or use your smartphone to scan the QR code.



Regional Print & Live Media Interviews

CS-CASH members continued to offer their expertise to regional and national newspapers, agricultural trade journals, radio, podcasts, and TV, addressing health and safety issues relevant to agricultural audiences. Some of the 2023-2024 articles and broadcasts can be found on the CS-CASH website.



VIEW REGIONAL PRINT & LIVE MEDIA INTERVIEWS

Visit go.unmc.edu/cs-cash-other-media

Or use your smartphone to scan the QR code.



Since December 2023, CS-CASH has published a monthly column entitled "For the Health of It" in Farm Progress Media Ag Journals and in their electronic journal. The online article consistently ranks among the top 5 viewed articles. Each article is translated into Spanish. This is the first monthly column for Nebraska Farmer that has been available in both English and Spanish.



READ THE AUGUST 2024 COLUMN

Visit <https://www.farmprogress.com>

Or use your smartphone to scan the QR code.



In September 2024, the Center's outreach with young farmers was highlighted in a Christian Science Monitor feature article.



READ THE FULL ARTICLE

Visit csmonitor.com/World/Making-a-difference/2024/0912/farm-safety-tractors-teens-ellen-duysen

Or use your smartphone to scan the QR code.



Dr. Aaron Yoder, Dr. Athena Ramos and Ellen Duysen appear as regular guests on RFD-TV's "UNMC Health Matters", an hour-long program broadcast nationally. In 2023-2024 the outreach team discussed planting and harvest safety, H5N1 outbreak in dairies and prevention of zoonotic disease.



WATCH PAST EPISODES

Visit rfdtv.com/shows/rural-lifestyle-shows/rural-health-matters

Or use your smartphone to scan the QR code.



Associated Press Ag Safety & Health Media Releases

Ag journalist Loretta Sorensen continued to create articles monthly on topics related to translated research, emerging issues, and topics of regional concern. The articles are sent to the Associated Press for distribution and have been run in newspapers and journals across the U.S. In addition, Ms. Sorensen writes a quarterly CS-CASH safety column in the print and online agricultural magazine Grit. After publication, the articles are posted on the CS-CASH website and shared on the Facebook page for use by others in their outreach endeavors. These articles provide the media with contact information for experts in ag safety.



VIEW MEDIA RELEASES

Visit go.unmc.edu/cs-cash-news

Or use your smartphone to scan the QR code.



Collaboration with Regional & National Organizations

Partnerships are the Center’s superpower! Working with our trusted collaborators and an extensive network of organizational contacts we have been able to multiply our impact and reach. Some of our partnerships in the past year are listed below.

CS-CASH Collaborative Outreach, September 1, 2023 - August 31, 2024

COLLABORATING ORGANIZATION	PROJECT NAME	DESCRIPTION
NE Extension	ATV Aware	In collaboration with Nebraska Extension we support the maintenance of the ATV Simulator, a full sized ATV on a rocker table that is transported on a trailer. This training device was used during 9 trainings across Nebraska, including the Nebraska State Fair and several other large multi-day events.
Grain Handling Safety Coalition (GHSC)	Safe Grain Handling and Ag Infectious Disease Trainings	In collaboration with the GHSC, CS-CASH outreach members presented webinars and in-person training to grain handling industry workers on Grain Bin Entry, Lock Out/Tag Out, Heat Stress, Respiratory Protection, and completed series of infectious disease trainings that were funded through an OSHA Susan Harwood grant.
NE Extension	National Safe Tractor and Machinery Operation Program (NSTMOP) Course and “Hand-on” Safety and Health Fair	In partnership with Nebraska Extension, CS-CASH provided hands-on training at 8 sites in 2024 to fulfill requirements for young workers to become certified to operate tractors and equipment. Using the National Safe Tractor and Machinery Operation Program (NSTMOP) curriculum and extensive add-on trainings such as Stop the Bleed, emergency response, PPE, and ATV Aware, 56 students received certification. Students successfully completing this training are able to receive an animal husbandry permit from their DMV state office.
OSHA Grain Handling Safety Alliance	OSHA Alliance Stand-up for Grain Safety Kick-off Event	For the 5th year, CS-CASH in collaboration with the Grain Handling OSHA Alliance Coalition and others assisted in planning, executing, and training for the Alliance Stand-Up for Grain Safety Week: standup4grainsafety.org

Continued onto next page.

COLLABORATING ORGANIZATION	PROJECT NAME	DESCRIPTION
Progressive Agricultural Foundation (PAF)	PAF Safety Days Presentations	CS-CASH continues a long-term, successful partnership with PAF presenting at 10 safety day trainings and providing resources at Safety Days throughout the CS-CASH 7-states region. Training curriculum and age-appropriate resources included hearing conservation, sun safety, zoonotic disease, stress reduction techniques and respiratory protection.
National Extension	eXtension.org website	CS-CASH outreach member Dr. Aaron Yoder was instrumental in the development of the Farm & Ranch eXtension in Safety and Health (FReSH) Community of Practice (CoP) at eXtension.org. This collaborative effort between universities, industry, and government provides user-friendly information for the general rural population, agricultural producers, and agricultural safety and health professionals. New resources were added and the website received an update.
Pennsylvania State University (PSU), Ohio State University (OSU)	AgSafety4u	Developed by Dr. Aaron Yoder in collaboration with PSU and OSU, AgSafety4u (Level 2) is a web-based training module that provides an overview of identification and control of hazards common to farms and agriculturally related rural businesses, focusing on hazards associated with machinery, structures, equipment, animals, chemicals, and outdoor environment. Dr. Yoder continued to provide updates and expanded the web-based training tool this past year.
Safety for Youth	National FFA Convention	Dr. Yoder is one PI on the Safety in Agriculture for Youth (SAY) grant, a project funded by the US Department of Agriculture (USDA), National Institute of Food and Agriculture to develop a sustainable and accessible national clearinghouse for agricultural safety and health curriculum for youth. In collaboration with SAY, CS-CASH participates annually in a 3-day safety exhibit at the National FFA Convention reaching approximately 2,500 with educational training.

Agricultural Safety Center Outreach Collaborations

The CS-CASH outreach team maintained and established cross-center collaboration with all centers in multiple areas of mutual interest over the past year. Coordinated outreach efforts with other Centers is described below.

Cross-NIOSH AFF Center Proposed Outreach Collaborations

COLLABORATING NIOSH AFF CENTERS	PROJECT NAME	DESCRIPTION
All	US Ag Center YouTube Channel	<p>CS-CASH continues to work with all of the NIOSH AFF Centers on the USAg Center YouTube Channel. Established in 2013, the AFF Centers collaborated to initiate a joint YouTube channel to raise awareness of agricultural, forestry and fishing occupational hazards; provide information to prevent AFF injuries and illnesses; increase the visibility and sphere of influence of the AFF Centers; and establish a model of collaborative work that can be replicated by other organizations.</p> <p>Dr. Aaron Yoder continued to serve as the USAg Center YouTube webmaster, maintaining the site and adding videos and Ellen Duysen continued to manage the comments and reporting site analytics to the Centers.</p>
All	Ag Centers' Evaluators, Coordinators and Outreach (ECO) Group	<p>Our Center members collaborate with other NIOSH-funded Ag Centers through the Evaluators, Coordinators, and Outreach (ECO) group. In 2012, the ECO group launched with the goal to enhance cross-center collaboration through 1) sharing resources and learning, and 2) workgroups focused on collective outreach campaigns. The ECO group meets regularly and functions as a foundation for center collaboration and public communications for the national AFF safety and health initiative.</p>
Ag Centers and Ag Safety Organizations in the Midwest	Coordinated Outreach at Farm Shows	<p>CS-CASH continued to partner with other regional Ag Centers and safety organizations with “boots on the ground” outreach at large farm shows across the Midwest. Sharing space and coordinating trainings allows us to save money, provide impactful ag safety and health training and education to large numbers of agricultural workers, and demonstrate coordinated efforts of the NIOSH AFF program. In 2024 CS-CASH collaborated with other organizations at large events including Husker Harvest Days, FarmFest and Farm Progress.</p>

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COLLABORATING NIOSH AFF CENTERS	PROJECT NAME	DESCRIPTION
UMASH and National Children's Center for Rural and Agricultural Health and Safety (NCCRAHS)	Telling the Story Project	Since 2016, CS-CASH has partnered with UMASH and NCCRAHS on the "Telling the Story Project," a translation activity that conveys injury prevention messaging through personal narratives, based on first-hand experiences. These stories and relevant prevention messaging and resources are stored on a dedicated website that has accessed over 23,586 times by 10,112 unique individuals. A manuscript detailing this project was published in 2024.



Agricultural Safety and Health Training Course

Since 2011 CS-CASH has hosted a 34-hour Agricultural Safety and Health Course at the UNMC College of Public Health. The course includes a 4-hour farm tour. As a "Thank You to Healthcare Providers", this course has been offered free of charge since 2020. Dr. Aaron Yoder and Ellen Duysen serve as the course directors. Dr. Kelley Donham, founder of the original course in 1990, continues to teach a portion of the content. Since 2011, over 1,100 participants have received training and been eligible for AMA, Nursing, and EMS continuing education credit (34 hours) through the UNMC Center for Continuing Education and UNMC graduate-level academic credit (3 hours). In 2024 there were 107 online and in person attendees. Students have included rural and urban health care professionals, veterinarians, public health professionals, Extension Educators, and Public Health and Pharmacy graduate students.



LEARN MORE ABOUT THIS WORK

Visit go.unmc.edu/ag-safety-course

Or use your smartphone to scan the QR code.



CS-CASH OUTREACH ACTIVITIES BY THE NUMBERS

SEP 1, 2023 - AUG 31, 2024

156

course/curriculum, material distribution, training demonstration, workshop, conferences

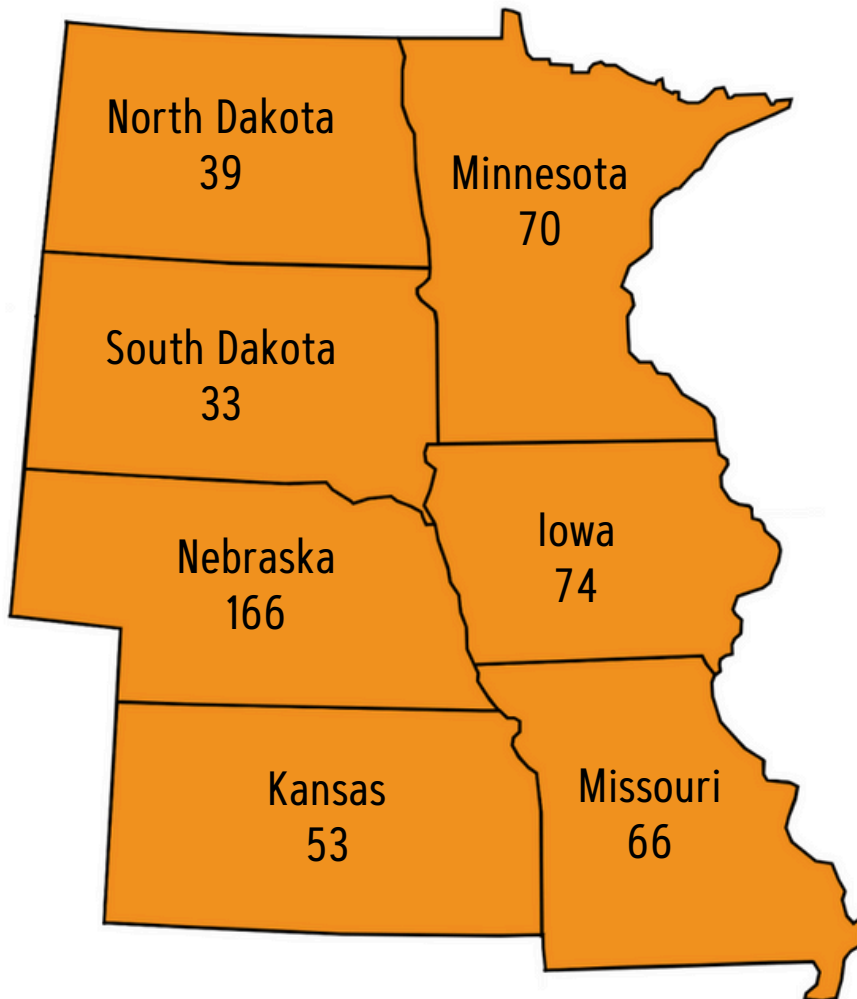


480

oral presentations, posters, reports, non-peer reviewed articles, educational materials, consultation, interviews, newsletters, videos



REGIONAL OUTREACH ACTIVITY



Mental Health Awareness: Increasing Capacity among Agricultural Communities

Collaboration with AgriSafe

Project Aims

1. Increase the capacity of health professionals to identify, refer, and treat farmers that may benefit from mental health services/resources.
2. Increase the capacity of rural citizens to identify and refer farmers that may benefit from mental health services/resources.
3. Implement evidence-based suicide prevention training to agricultural communities.

Significance

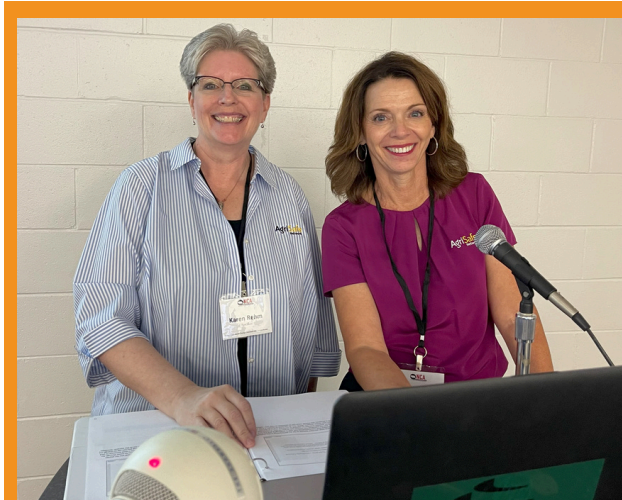
Public health interventions that decrease mental health stigma while increasing mental health awareness are of high priority among Midwest farmers. AgriSafe and CS-CASH are committed to increasing mental health awareness via a community-based approach with evidence-based trainings for rural healthcare clinicians, and rural agricultural communities.

AgriSafe’s Total Farmer Health® (TFH) model is a holistic method to integrate the principle of a healthy mind and healthy body. AgriSafe applies the principles of TFH to connect with producers in a meaningful way and to identify hazards threatening both physical and mental health. The Total Farmer Health model guides our mental health awareness outreach as we pursue our goal of creating healthier rural communities.

Since 2022, farm and ranch families as well as health care professionals strongly supported and attended mental health trainings. They participated in follow-up conversations regarding mental health disparities and strategies. Additionally, AgriSafe experienced an increase in mental health training requests within the CS-CASH seven state Midwest region.

Accomplishments

AgriSafe’s Mental Health Awareness (MHA) project team has developed and implemented outreach strategies to market, register and schedule trainings. Efforts were directed toward two mental health trainings: QPR (Question, Persuade, and Refer) for Agricultural Communities and FarmResponse® targeting health care providers.



Teaming up with local clinical and community health professionals who desire to better serve the healthcare needs of the agricultural population, is the motivation behind the Total Farmer Health Coach program. The concept is simple. To provide more “boots on the ground” trained professionals to connect agricultural producers, their families and agricultural businesses with AgriSafe curriculum. This innovative approach to outreach is impactful in creating healthier outcomes for rural communities.

QPR (Question, Persuade and Refer) is an evidence-based practice listed on the National Registry of Evidence-based Practices and Polices. QPR for Farmers and Farm Families is a 1.5-hour training course designed to describe the unique challenges farmers face that may lead to stress, depression, and suicide, and implementing the QPR components with someone at risk for suicide.

CALM (Conversations on Access to Lethal Means) is a 1.5-hour practical intervention listed as an evidence-based practice in the [Suicide Prevention Research Center's Best Practices Registry](#). The training educates learners on identifying signs of suicidal crisis, methods to effectively intervene, resources of support, and teaches why access to lethal means matters.

The MHA team focused on expanding accessibility of digital and print promotional flyers and health communications media releases via a diversity of platforms. Additionally, AgriSafe added a second suicide prevention training, CALM (Conversations on Access to Lethal Means), to expand outreach efforts in rural regions. Three AgriSafe healthcare professionals, including a Midwest R.N., are now trained to deliver CALM trainings virtually or in-person.

AgriSafe, in collaboration with CS-CASH evaluator Cheryl Beseler PhD, has begun the review of the CALM evaluation survey to improve data collection for CALM trainings in the fall of 2024. The 2023 and 2024 metrics met or surpassed the initial goals:

<p>2023 QPR Metrics: Goal: 90 Actual trained: 89 99% of goal reached!</p>	<p>2024 QPR & CALM Metrics: Goal: 120 Actual trained: 313 261% of goal reached!</p>	<p>469 total educational training hours in suicide prevention</p>
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FarmResponse® is 3.5-hour health provider training that addresses farm and ranching cultural competencies, financial stress, land ownership, and legal issues as well as the work of agriculture relevant for communication, and collaborative mental health strategies. This training is delivered on-demand through AgriSafe's Learning Lab for the busy healthcare professional. Upon successful completion, healthcare professionals receive a continuing education credit that can be used for their professional license renewals. The 2023 and 2024 registrations and program completion indicate a strong interest and need for continued outreach collaboration.

<p>2023 FarmResponse® Metrics: Registrants: 51 Course completions: 21</p>	<p>2024 FarmResponse® Metrics: Registrants: 147 Course completions: 95</p>
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The **AgriStress Provider Directory** is a place where farmers, producers, and their loved ones can search for a mental health professional who is knowledgeable about issues affecting agricultural communities. These mental health professionals have also completed the FarmResponse® course and indicated a commitment to serving ag communities. Twenty-five professionals are listed on the AgriStress Provider Directory and ready to serve the mental health needs of agricultural producers in the CS CASH region.

Highlights from the 2023-2024 Programs

- Application accepted in the Suicide Prevention Resource Center best practice registry for FarmResponse®.
- Published FarmResponse® evaluation data in collaboration with CS-CASH evaluator Cheryl Besler in the online journal of Rural Nursing and Health Care.
- Received the 2024 ISASH Practitioner Award for AgriSafe’s work to develop and promote the FarmResponse® course for healthcare providers.
- Revised QPR evaluations surveys and improved data collection after collaborative data review with Cheryl Besler PhD, CS CASH surveillance and evaluator.

Presentations

Women in Agriculture, Finding Work/Life Balance. Panel discussion. Nebraska Husker Harvest Days.

The Culture of Agriculture–A look at your mental wellness. Panel discussion. Swine Veterinarian Lemman Midwest Regional Conference.

Optimizing the Health of the Female Producer. Presentation. CS-CASH & UNMC’s Agricultural Health and Safety Course for Medical and Safety Professionals.

Publications

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<https://doi.org/10.14574/ojrnhc.v24i1.758>

Other Media

Mental health topic discussions continue via the AgriSafe podcast: “Talking Total Farmer Health”. AgriSafe Community Health Director and Nebraska producer, Linda Emanuel hosts conversations with a variety of mental health experts and agricultural producers regarding real stressors and practical strategies to offload stress. There have been 577 podcast listens.



LISTEN TO TALKING TOTAL FARMER HEALTH

Visit agrisafe.org/podcasts/talking-total-farmer-health/

Or use your smartphone to scan the QR code.





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NIOSH AFF 1U540H010162

