Central States Center for Agricultural Safety and Health
University of Nebraska Medical Center, College of Public Health
Table of Contents

Section I
CS-CASH Summary, Relevance and Key Personnel ........................................... 3

Section II Program Project Highlights
Improving Safety and Health in the Cattle Feedyard Industry ........................... 4
Health and Safety Risks among Immigrant Cattle Feedyard Workers ............... 7
Agricultural Dust-Induced Airway Injury and Repair: An IL10 Centered Approach 10
Increasing Personal Protective Equipment Use by Point Source Protection Strategy 12
Enhancing the Health and Safety of Range Bison Herd Workers .................... 15
Surveillance of Agricultural Injuries ................................................................. 18
Evaluation ........................................................................................................ 23
Pilot Project Program ....................................................................................... 26
Emerging Issues ............................................................................................... 47
Outreach Program ............................................................................................ 53
Core Program Activity Database Year 9 ............................................................ 66
CS-CASH Publications Year 9 ........................................................................... 67
CS-CASH 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 UNMC. The Outreach Core has a special emphasis on vulnerable populations: women, veteran farmers, immigrant workers, and Native Americans. 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.

CS-CASH Relevance

The Central States Center for Agricultural Safety and Health (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, 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

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
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Section II. Program/Project Highlights || Research Projects
Improving Safety and Health in the Cattle Feedyard Industry || Dr. Aaron Yoder
Project Aims

1. Develop and implement a comprehensive feedyard safety and health training program
   To accomplish this specific aim we will:
   a) Review and develop bilingual training materials for a comprehensive feedyard worker safety and health training program;
   b) Obtain qualitative information about the safety culture among feedyard managers and workers using the multi sited ethnography method; and
   c) Refine and implement the comprehensive safety and health training program at fifteen participating feedyards in Nebraska and the region

2. Evaluate the efficacy of the comprehensive feedyard safety and health training program
   To accomplish this specific aim we will:
   a) Evaluate the injury and illness experience in the beef production industry using existing and newly collected injury and illness information; and
   b) Evaluate the effectiveness of the feedyard safety and health training program in reducing the number and cost of injuries and illness and improving the safety culture on feedyards.

In 2014, the occupational fatality rate was 116 fatalities/100,000 workers in the beef cattle ranching and farming industries (including feedyards). This rate was four times higher than the rate in the agriculture, forestry, and fishing sector overall (24.9/100,000) and 34 times higher than the rate in all industries combined (3.4/100,000). The cattle feedyard subsector also has exceptionally high non-fatal injury and illness rates. In 2013, hired workers in the beef cattle ranching and farming (including feedyards) had a "days away from work" rate of 258.8/10,000 while the rate for all industries combined was 99.9/10,000. These high injury, illness and fatality rates may be partly due to high turnover among feedyard employees. Many come to work in this industry with little experience and no safety training, and many come from Central America with limited language skills. 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.

Feedyards in the CS-CASH Region
51% of feedyards in the US are located in the CS-CASH seven states region with 556 cattle feedyards employing 6687 workers. In September 2020 Nebraska feedlots, with capacities of 1,000 or more head, contained 2.28 million cattle on feed (USDA NASS Survey).
Project Accomplishments Year 3.

- There are currently 13 feedyards enrolled in this research project. These yards are located in CO, ID, NE, SD and WY.
- The Feedyard Safety Advisory Board (FASB), created to gather input and promote health and safety more broadly in the feedyard sector, met twice in the reporting time period. The meetings (one face-to-face and one virtual) provided input on the program's safety trainings, materials and administration.
- Dr. Klataske (project ethnographer) has continued collecting safety culture information from feedyard managers and workers through site visits known as multi sited ethnography. He is currently in the process of submitting a manuscript based on the findings of his work.
- Created in years 1, 2 and 3, the Feedyard 15 training modules target the top 15 priority safety and health hazards on feedyards. Feedyard 15 training modules, in both English and Spanish, are currently in use on research feedyards.
- In addition to the 15 Feedyard 15 modules, several other optional feedyard specific modules have been developed including one on stress and one on fatigue.
- The project team continued the review and implement existing feedyard worker safety and health programs and materials for the expanding Feedyard 15 training program.
- Module training and evaluations are on-going. Following evaluation on research feedyards these training modules will be made available, at no cost to feedyards across the U.S.
- The project team has implemented and is evaluating a commendation program to recognize research project feedyards that conduct monthly safety trainings for twelve consecutive months. Workers receive safety related equipment (i.e. high visibility hats and vests) after completion of a specified number of trainings.

- CS-CASH Feedyard Flickr photos available free of charge to the public: https://www.flickr.com/photos/cscash/albums/72157708569289865
A train-the-trainer event was held in the fall of 2019 at our insurance partner’s facility, (Gallagher Insurance). Project participants attended this day-long training that featured best practices for using the Feedyard 15 training modules and discussions on the commendation program.

Information on the Feedyard 15 research project, training and commendation program, as well as non-project resources, were presented to the beef industry and safety and health professionals via trade shows, trade publications, press releases, peer reviewed publications and professional conference presentations.

Publications/Presentations/Book Chapters - Year 3:

Health & Safety Risks Among Immigrant Cattle Feedyard Workers in the Central States Region
|| Dr. Athena Ramos

Project Aims

1. Systematically explore and describe the health status and occupationally related risks among Latino immigrant cattle feedyard workers in Nebraska and Kansas;
2. Test the Ecological Stress-based Model of Immigrant Health and Safety, which predicts if workers’ intrapersonal mechanisms (i.e., stress appraisal, ethnic identity, and cultural values) mitigate culture-related occupational stress and negative health outcomes; and
3. Review, develop, evaluate, and disseminate bilingual (English/Spanish) health and safety and policy materials designed specifically for cattle feedyard operations.

Cattle production is an economic driver for the United States, producing $66.2 billion of economic impact in 2019. Cattle feedyards represent a $36.4 billion industry with the highest production concentrated in Texas, Nebraska, Kansas, Colorado, and Iowa. Much of the workforce is Hispanic/Latino, and many of these workers are immigrants. Unfortunately, limited data exists about the health and safety of immigrant feedyard workers. Understanding Latino immigrant cattle feedyard workers’ health status, unique risk and protective factors, and specific occupational educational and training needs are imperative to addressing the health and safety risks within cattle production and the long-term economic impacts of such problems.

Our team completed data collection with a total of 243 research interviews with immigrant cattle feedyard workers in both Nebraska and Kansas between May 2017-February 2020. We are working on data analyses and developing a series of journal articles to describe job-related health and safety risks among Latino immigrant cattle feedyard workers.

We have started to develop materials from this project including a bilingual English-Spanish feedyard safety picture glossary, labor and safety information for workers, and health education materials. To that end, we completed a bilingual flyer on farmworkers’ rights in Nebraska. The flyer is available online at https://www.unmc.edu/publichealth/feedyard/workforce/Resources-Recursos/worker-rights.html.

Our team has also contributed content to a Feedyard 15 supplemental module on stress management. Early this spring, we pivoted our focus to COVID-19 in an effort to be proactive to
respond to the ongoing pandemic and reduce transmission among agricultural workers and their families. Our team developed and disseminated two infographics related to COVID-19 – one focused on preventive strategies and the other on managing anxiety related to the pandemic. These infographics were promoted in Spanish through Facebook and reached over 64,000 people. We also created three Spanish video recordings for feedyard workers and their families on the following topics related to COVID-19: healthy eating, physical activity, and mental health in the time of social distancing. All COVID-19 related materials are available online at: https://www.unmc.edu/publichealth/feedyard/workforce/Resources-Recursos/COVID-19.html

Research finding were presented at the Midwest Rural Agricultural Safety and Health Conference and the Work, Stress, and Health Conference. We have also presented findings through various guest lectures at the University of Nebraska Medical Center and the University of Missouri. The project PI facilitated a panel discussion at the International Society of Agricultural Safety and Health (ISASH) Annual Conference on the global impact of COVID-19 on agriculture.

Team members have participated in professional development activities including completing the OSHA 10-hour general industry safety course, the Diplomado de Salud Ocupacional (community health worker certificate on occupational health) through the University of California Berkley’s Health Initiative of the Americas, ISASH annual conference, workshops on topics such as safety climate and occupational health psychology, and various webinars throughout the year. We continue to build relationships with organizational partners including Nebraska Cattlemen, University of Nebraska Extension, AgriSafe Network, Nebraska Migrant Education Program, Proteus, Nebraska Department of Labor, Nebraska Appleseed, and Legal Aid of Nebraska.
Publications:

Presentations:
Agricultural Dust-Induced Airway Injury and Repair: An IL-10 Centered Approach ||
Dr. Todd Wyatt and Dr. Jill Poole

Project Aims

The long-term goal of this project is to determine molecular targets and approaches to accelerate lung repair following agriculture dust-induced airway injury to improve the health of exposed workers. The central hypothesis of this proposed project is that the anti-inflammatory/pro-resolving IL-10 cytokine is central for enhancing repair response to agriculture dust-induced airway injury.

Specific Aims:

2. Identify the mechanism(s) of scavenger receptor A (CD204) in regulating the IL-10 response to agricultural dust using in vitro cell models and in vivo animal models.
3. Determine the relationships between systemic IL-10 levels, IL-10 pathway genetic polymorphisms, and pro-inflammatory cytokine hyper-responsiveness in persons with prior agricultural exposure.

Summary of Translational Impact:

Our goal is to develop improved approaches to therapeutics and practice that will positively impact respiratory symptoms and disease in agricultural workers exposed to organic dusts from large-scale animal production. Our studies are the first to focus on the repair and recovery response following agricultural exposure-induced airway injury.

Chronic inflammatory respiratory diseases including rhinosinusitis, asthma, bronchitis, and COPD affect approximately two-thirds of agriculture workers. Progressive symptoms of dyspnea, wheezing, cough, and airway flow limitation greatly add to the morbidity associated with farming. The numbers of animals in outdoor and enclosed spaces has risen to meet increased worldwide consumer demands. Despite modernization of facilities and improvements in outreach efforts, efficacious therapeutic options for reducing symptoms of airway disease are currently limited. Therapies such as inhaled corticosteroids with long-acting beta agonists have only been shown to have partial benefit when applied to exposed agricultural workers. An immediate need exists to understand the pathologic mechanism(s) responsible for lung disease in order to develop novel therapies to improve adverse respiratory consequences in exposed workers. The interleukin-10 (IL-10) pathway is a clinically relevant pathway to modulate and target for enhancing repair and recovery consequences following organic dust-induced injury. IL-10 may represent a “master switch” in regulating and promoting repair and recovery of agricultural dust-induced disease. We have found that IL-10 signaling in response to agricultural dust is dependent upon a particular receptor pathway, called scavenger receptor A, in the lung cells that generate it, the alveolar macrophage. Our findings justify
the approach for potential recombinant human IL-10 application, exploitation of the scavenger receptor pathway, and identification of key human IL-10 genetic polymorphisms to target. Such studies could ultimately lead to improved approaches to impact respiratory disease burden in affected workers.

**Publications in this project period:**


2. Schneberger, D., J. M. DeVasure, K. L. Bailey, D. J. Romberger, and **T. A. Wyatt**. Organic barn dust stimulates CCL9 expression in mouse monocytes through PKC-delta activation, Env Dis (Submitted).


**Presentations/Outreach in this project period:**


Use by Point Source Protection Strategy in Agriculture || Dr. Chandran Achutan
Increasing Personal Protective Equipment

Project Aims

Assess the participants’ baseline PPE use and exposures as potential targets for intervention;
Conduct a randomized controlled trial to test if the Point Source Protection Strategy (PSPS), placing customized PPE Boxes near targeted exposures, increases PPE use; and
Evaluate the feasibility and demand for the Point Source Protection Strategy (PSPS) and PPE boxes.

Farm Recruitment and Enrollment

In year two of the project recruitment efforts were expanded extensively via mailer and reached 2,720 farms located throughout Nebraska and Iowa. As of September 2020, a total of 19 intervention farms, with 27 participants enrolled. For control farms, a total of 19 farms with 26 participants are enrolled. Overall, there are 38 farms with 53 participants currently enrolled and participating.

Farm Hazard Assessment

Prior to PPE distribution, education and training, each farm was visited whereby a needs assessment was conducted through a questionnaire and farm walk through. These assessments informed the type of PPE participants would receive, and where customized PPE boxes would be installed. Exposures including noise, ammonia and dust levels were assessed and measured on farms which researchers were unsure of the risk, and thusly what level of personal protection was needed. Samples for ammonia and dust were measured at two different confined animal feeding operations following NIOSH methods. Noise dosimeters were also used to sample sound of various farm machinery and equipment.
**PPE Disbursement, Education & Training.**

All farms enrolled have been visited twice and received PPE, educational materials, and PPE use training. Each farm received combinations of the respirators, earmuffs, earplugs, safety glasses, and gloves relative to their unique exposures. Using a PSPS, customized PPE boxes were installed near targeted sites of exposure at intervention farms for a total of 63 PPE boxes installed. Grain bin/elevators (18 boxes) and Machine Shops (25 boxes) were the most frequented sites for box installation. See examples in photo below.
PPE Use Evaluation & Participant Feedback

Collection of PPE use is ongoing and collected quarterly in October, January, April and July months. Preliminary analysis indicates respirator and ear protection use among intervention participants is highest during the summer and fall seasons\(^3\) (90%). For both groups, reduction in the use of ear plugs, respirators, safety glasses and gloves were evident in participants January responses. Reasons included forgetting to use and not needing to use for reasons of travel. Overall, more data is needed at this time to discern whether intervention or control farmers are utilizing PPE more frequently.

Presentations.
3. A Farfalla, E Duysen, C. Achutan. Exploring Personal Protective Equipment Use and Perceptions Among Female Farmers. Presented at the 2019 International Society for Agricultural Safety and Health Conference in Des Moines, Iowa. (June)
Enhancing the Health and Safety of Range Bison Herd Workers || Dr. Clayton Kelling

Project Aims

1. Characterize injuries and hazards associated with working bison under contemporary conditions on tribal reservations and on non-reservation facilities.
2. Develop and implement intervention strategies to mitigate worker safety risks.
3. Assess outcomes and impacts of intervention strategies.
4. Disseminate updated intervention strategies widely to bison herd managers and workers.

Project Collaborations Expanded. This research project is a collaboration between the University of Nebraska Lincoln, School of Veterinary Medicine, the InterTribal Buffalo Council and the Central States Center for Agricultural Safety and Health. In this project period, as a result of the 1st Annual Bison Worker Safety Roundtable, new project partners were established including, the National Bison Association, the American Bison Center, The Nature Conservancy, US Fish and Wildlife Service (Wildlife Health), and the Department of Biological Services Fort Peck Community College.

Worker Injury, Hazards and Facility Surveillance.

Observational Surveys. Researchers continue to fill out an observational survey, designed to measure worker and animal safety hazards each year during tribal and non-tribal roundups.

Herd Manager Hazard Perception Survey. A manager perception survey determines the views of bison herd managers regarding: safety risks of environment and facilities, PPE and safety equipment, bison handling techniques, fear induced behavior, injuries sustained in the past year, and safe use of animal medication.

Annual Facility Safety Checklist. The safety bison facility checklist, that was created for this project continues to be used each year at research sites to catalog hazards and determine whether recommendations for change are followed. Recommendations are shared following each visit with bison herd managers. Interventions
to address worker safety issues are outlined in each report. Each hazard is linked to a picture allowing
the herd manager to visualize the concerns outlined in the report.

**Improvements to the Bison Worker Tailgate Training Guide**
The Bison Worker Tailgate Training Guide that was created in year 1 of the project was updated with
additional sections – First Aid and Head Chute Safety. The Guides were redistributed to all research
herds with the new sections.

**Workplace Safety Assessment Survey Refinement.**
Because of recommendations made at the 2019 Roundtable, the bison handling facility safety
assessment survey, developed specifically for this project, was further refined during this project
period. This hazard assessment instrument is used annually to determine improvements made to
each of the bison handling facilities enrolled in this project.

**On-site assessments and reporting.**
In this reporting year on site field assessments, continued to be conducted by trained study personnel.
Assessments of the hazards in animal handling are based on industry standards: use of electric
prods, collision with head gates, chute exit speed, injury, and crowding. Data from observations in the
field were recorded on paper forms for later entry into electronic databases. Reports were provided to
the herd manager at each site. The report uses pictures to demonstrate deficiencies or improvements
in handling facilities.

An overall facilities and animal handling safety score was calculated and tracked for each herd. Injury,
working condition, animal handling, and hazard score variables are currently being constructed and
compared between reservation and non-reservation facilities. Changes in these indicators will be
measured within each group.

**2nd Annual Bison Worker and Herd Health Roundtable.**
The 2nd Annual Bison Worker and Herd Health Roundtable was
held August 26, 2020 in Rapid City, South Dakota.
Rescheduled because of the COVID-19 pandemic, this meeting
was held as a hybrid event. The headquarters of the InterTribal
Buffalo Council are located in Rapid City and ITBC Board
requested that the local bison herd managers, workers and
ITBC staff attend in person, with the option of virtual attendance
for others who wanted to join. A COVID-19 Meeting Protocol
was developed using resources from the CDC Conference recommendations document, UNMC meeting recommendations and the Holiday Inn (venue) recommendations. These protocols were shared before and during the meeting. Some of the precautions included - all participants wore masks if within 6’ of another participant, seating was spaced 6’ apart, all meals were plated (no buffet), disinfectant was supplied to each participant, the microphone was disinfected between speakers. The day-long meeting focused on topics that had been identified as concerns during yearly observations including low stress handling (keynote address), bison behavior, affordable facility modifications for safer handling, bison hauling and a review of this research project. (See agenda to the right.) The meeting had 24 in person attendees and 59 attendees join via Zoom. The follow-up evaluations were positive, with 96% of the attendees agreeing that they learned something that will improve the safety of their operation and 100% agreeing that they would attend another roundtable in 2021.

**Presentations.**


Surveillance of Agricultural Injuries || Dr. Risto Rautiainen

Project Aims

1. Conduct annual agricultural health and safety surveys in the Central States region (IA, MN, MO, KS, NE, ND, SD)
2. Explore alternative surveillance methods for injuries and illnesses
3. Analyze administrative databases and tracking cases reported in the media.

Results of the 2018 survey.

Respondents. The online and mail survey response data included 3,268 operations and 4,657 operators. The response rate was 19.3%. Most operations were farms (n=2,420, 86.4%) vs. ranches (n=299, 10.7%), or both (n=81, 2.9%). The average ages were 60.9 for principal operators, 50.3 for second operators, and 38.6 for third operators. High percentage of principal operators were male (98%). Second operators were distributed more evenly; 50.9% male, 49.1% female; and third operators were primarily male (83.2% male, 16.8% female). A high percentage (89.0%) of principal operators reported farming/ranching as their primary occupation. Farming/ranching was the primary occupation for 73.5% of second operators and 67.6% of third operators.

Injuries. The 2018 FRHSS survey showed a very high injury rate for farmers and ranchers; 15.3 injuries / 100 operators in one year. This rate is about three times higher than the rate for hired agricultural workers reported by the Bureau of Labor Statistics. The injury rate was highest for first operators. Livestock and machinery were most frequent sources of injury. The average cost of medical care for injuries was $13,088, out-of-pocket and insurance-covered costs combined. When considering lost time, production losses and other direct and indirect costs, the cost of injuries is often much higher. Injury counts and rates are listed below by operator.

Table 1. Number and rate of injuries by operator

<table>
<thead>
<tr>
<th>Number of injuries</th>
<th>Operator 1</th>
<th>Operator 2</th>
<th>Operator 3</th>
<th>All operators</th>
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<tbody>
<tr>
<td>Number of operators</td>
<td>3,005</td>
<td>1,057</td>
<td>332</td>
<td>4,394</td>
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<tr>
<td>Injuries reported</td>
<td>None</td>
<td>2,586</td>
<td>957</td>
<td>299</td>
</tr>
<tr>
<td>One</td>
<td>343</td>
<td>84</td>
<td>29</td>
<td>456</td>
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<tr>
<td>Two</td>
<td>57</td>
<td>11</td>
<td>4</td>
<td>72</td>
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<tr>
<td>Three or more*</td>
<td>19</td>
<td>5</td>
<td>0</td>
<td>24</td>
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<tr>
<td>Total number of injuries</td>
<td>514</td>
<td>121</td>
<td>37</td>
<td>672</td>
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<td>Rate: injuries/100 operators</td>
<td>17.1</td>
<td>11.3</td>
<td>11.1</td>
<td>15.3</td>
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</table>

* Three or more injuries were counted as three (3).
Respiratory Conditions. The prevalence of (any) respiratory disease was 17.5 per 100 operators. The survey asked about respiratory conditions diagnosed by a physician. It is likely that this underestimates the true prevalence of respiratory conditions as many farmers/ranchers may have undiagnosed respiratory conditions. Female farm/ranch operators had a higher risk of respiratory diseases (OR: 1.20, 95% CI: 1.06 – 1.37). Plant-based (grain/feed/hay) organic dust exposure doubled the risk (OR: 1.95, 95% CI: 1.67 – 2.27) of respiratory illness. Dry regional climate (annual mean relative humidity higher than 65%) was expected to have a protective effect, but the relationship was insignificant (OR: 0.95, 95% CI: 0.8 – 1.13). The prevalence of respiratory conditions is presented in the table below.

Table 2. Respiratory conditions diagnosed by physician by operator

| Respiratory conditions       | Operator 1 | | | Operator 2 | | | | Operator 3 | | | | All operators |
|-----------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
|                             | Count      | %          | Count      | %          | Count      | %          | Count      | %          |
| COPD                        | 58         | 1.9        | 8          | 0.8        | 1          | 0.3        | 67         | 1.5        |
| Asthma                      | 132        | 4.4        | 47         | 4.5        | 12         | 3.6        | 191        | 4.3        |
| Farmer's lung               | 91         | 3.0        | 6          | 0.6        | 1          | 0.3        | 98         | 2.2        |
| Sinus disease (sinusitis)   | 151        | 5.0        | 51         | 4.8        | 8          | 2.4        | 210        | 4.8        |
| Nasal inflammation (rhinitis) | 183      | 6.0        | 45         | 4.3        | 4          | 1.2        | 232        | 5.3        |
| Environmental allergies     | 232        | 7.7        | 106        | 10.0       | 28         | 8.4        | 366        | 8.3        |
| None                        | 2,303      | 75.9       | 802        | 75.9       | 267        | 80.4       | 3,372      | 76.2       |

Hearing loss. More than half of the operators (53.8%) reported some level of hearing loss; either mild (34.9%), moderate (16.3%), or severe (2.6%). It is not known how many cases were diagnosed vs. self-diagnosed. It is not common for farmers to get regular hearing tests, and therefore it is possible that the prevalence of hearing loss is even higher than reported in the survey. The results are presented in the table below by operator.

Table 3. Diagnosed or self-assessed hearing loss by operator

<table>
<thead>
<tr>
<th>Hearing loss</th>
<th>Count</th>
<th>%</th>
<th>Count</th>
<th>%</th>
<th>Count</th>
<th>%</th>
<th>Count</th>
<th>%</th>
<th>All operators</th>
<th>Count</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>1,032</td>
<td>35.2</td>
<td>684</td>
<td>67.5</td>
<td>250</td>
<td>78.9</td>
<td>1,966</td>
<td>46.2</td>
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<tr>
<td>Mild</td>
<td>1,194</td>
<td>40.8</td>
<td>245</td>
<td>24.2</td>
<td>46</td>
<td>14.5</td>
<td>1,485</td>
<td>34.9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moderate</td>
<td>607</td>
<td>20.7</td>
<td>72</td>
<td>7.1</td>
<td>17</td>
<td>5.4</td>
<td>696</td>
<td>16.3</td>
<td></td>
<td></td>
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<tr>
<td>Severe</td>
<td>96</td>
<td>3.3</td>
<td>12</td>
<td>1.2</td>
<td>4</td>
<td>1.3</td>
<td>112</td>
<td>2.6</td>
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<td></td>
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<tr>
<td>Total responses</td>
<td>2,929</td>
<td></td>
<td>1,013</td>
<td></td>
<td>317</td>
<td></td>
<td>4,259</td>
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Skin conditions. One in five operators (20.2%) reported a skin condition that was diagnosed by a physician. The skin conditions were most frequent among first operators and least frequent among third operators. Nearly 11% of the operators reported having skin cancer. This prevalence is higher than observed in other studies of farmers. The type of skin cancer was not specified in the survey question, and the alarmingly high rate of reported skin cancers would require further study. The results for skin conditions are presented below.

Table 4. Physician diagnosed skin conditions by operator

<table>
<thead>
<tr>
<th>Skin conditions</th>
<th>Operator 1</th>
<th>Operator 2</th>
<th>Operator 3</th>
<th>All operators</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>2,349</td>
<td>893</td>
<td>289</td>
<td>3,531</td>
</tr>
<tr>
<td></td>
<td>77.4%</td>
<td>84.5%</td>
<td>87.1%</td>
<td>79.8%</td>
</tr>
<tr>
<td>Irritant dermatitis</td>
<td>84</td>
<td>25</td>
<td>5</td>
<td>114</td>
</tr>
<tr>
<td></td>
<td>2.8%</td>
<td>2.4%</td>
<td>1.5%</td>
<td>2.6%</td>
</tr>
<tr>
<td>Allergic dermatitis</td>
<td>36</td>
<td>23</td>
<td>4</td>
<td>63</td>
</tr>
<tr>
<td></td>
<td>1.2%</td>
<td>2.2%</td>
<td>1.2%</td>
<td>1.4%</td>
</tr>
<tr>
<td>Skin cancer</td>
<td>401</td>
<td>56</td>
<td>18</td>
<td>475</td>
</tr>
<tr>
<td></td>
<td>13.2%</td>
<td>5.3%</td>
<td>5.4%</td>
<td>10.7%</td>
</tr>
<tr>
<td>Other</td>
<td>164</td>
<td>60</td>
<td>262</td>
<td>240</td>
</tr>
<tr>
<td></td>
<td>5.4%</td>
<td>5.6%</td>
<td>4.8%</td>
<td>6.3%</td>
</tr>
</tbody>
</table>

Stress. Farmers experience work periods that involve long working hours, economic pressure from commodity prices and extreme weather events, social pressure from family and community relations, and other stressors that may lead to high stress, sleep deprivation, fatigue and other conditions. About half of the respondents reported experiencing some of these conditions, to the extent that it affects their work. The prevalence of specific conditions is shown in the table below.

Table 5. Conditions resulting from extended work periods by operator

<table>
<thead>
<tr>
<th>Conditions resulting from extended work periods</th>
<th>Operator 1</th>
<th>Operator 2</th>
<th>Operator 3</th>
<th>All operators</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>1,485</td>
<td>550</td>
<td>180</td>
<td>2,215</td>
</tr>
<tr>
<td>High stress level</td>
<td>910</td>
<td>263</td>
<td>78</td>
<td>1,251</td>
</tr>
<tr>
<td>Sleep deprivation</td>
<td>755</td>
<td>237</td>
<td>65</td>
<td>1,057</td>
</tr>
<tr>
<td>exhaustion/fatigue</td>
<td>932</td>
<td>270</td>
<td>74</td>
<td>1,276</td>
</tr>
<tr>
<td>Other</td>
<td>40</td>
<td>11</td>
<td>3</td>
<td>77</td>
</tr>
<tr>
<td></td>
<td>1.3%</td>
<td>1.0%</td>
<td>0.9%</td>
<td>1.2%</td>
</tr>
</tbody>
</table>

Musculoskeletal conditions. A high prevalence of musculoskeletal pain or discomfort (59%) was reported at all body sites combined. The highest prevalence was observed in lower limbs (34.8%), followed by lumbar (26.2%), shoulder (23.4%), and upper limb areas (16.9%). After adjusting for age, sex, and operator status; high stress level, sleep deprivation, and exhaustion/fatigue showed the
strongest associations with (any) musculoskeletal discomfort with the odds ratios ranging from 4.7 to 5.6. Forceful exertions, repetitive tasks, awkward postures, frequent manual labor, and vibration were also significantly associated with musculoskeletal discomfort at all sites with the odds ratios ranging from 1.8 to 2.7.

Table 6. Pain or discomfort in different body areas by operator

<table>
<thead>
<tr>
<th>Pain or discomfort in body area</th>
<th>Operator 1</th>
<th>Operator 2</th>
<th>Operator 3</th>
<th>All operators</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Count</td>
<td>%</td>
<td>Count</td>
<td>%</td>
</tr>
<tr>
<td>None</td>
<td>967</td>
<td>31.9</td>
<td>443</td>
<td>42.0</td>
</tr>
<tr>
<td>Head</td>
<td>135</td>
<td>4.5</td>
<td>51</td>
<td>4.8</td>
</tr>
<tr>
<td>Cervical</td>
<td>287</td>
<td>9.5</td>
<td>85</td>
<td>8.0</td>
</tr>
<tr>
<td>Shoulders</td>
<td>804</td>
<td>26.5</td>
<td>184</td>
<td>17.4</td>
</tr>
<tr>
<td>Chest</td>
<td>90</td>
<td>3.0</td>
<td>16</td>
<td>1.5</td>
</tr>
<tr>
<td>Elbows</td>
<td>210</td>
<td>6.9</td>
<td>35</td>
<td>3.3</td>
</tr>
<tr>
<td>Forearms</td>
<td>105</td>
<td>3.5</td>
<td>34</td>
<td>3.2</td>
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<tr>
<td>Lumbar</td>
<td>847</td>
<td>27.9</td>
<td>239</td>
<td>22.6</td>
</tr>
<tr>
<td>Wrist/hands</td>
<td>418</td>
<td>13.8</td>
<td>115</td>
<td>10.9</td>
</tr>
<tr>
<td>Thighs</td>
<td>122</td>
<td>4.0</td>
<td>21</td>
<td>2.0</td>
</tr>
<tr>
<td>Knees</td>
<td>879</td>
<td>29.0</td>
<td>180</td>
<td>17.0</td>
</tr>
<tr>
<td>Legs</td>
<td>297</td>
<td>9.8</td>
<td>70</td>
<td>6.6</td>
</tr>
<tr>
<td>Ankles/feet</td>
<td>457</td>
<td>15.1</td>
<td>113</td>
<td>10.7</td>
</tr>
<tr>
<td>Total</td>
<td>5,618</td>
<td>15.1</td>
<td>1,586</td>
<td>10.7</td>
</tr>
</tbody>
</table>

Overall, these results reveal a high burden of injury and illness among farmers and ranchers. Further reports in peer-reviewed publications and summaries on the CS-CASH website will discuss counts, rates, and contributing factors to these outcomes.

**Results - Aim 2**

**Nebraska Trauma Registry.** CS-CASH collaborates with the Nebraska Department of Health and Human Services (NDHHS) on injury surveillance. NDHHS conducts NIOSH-funded occupational surveillance, which includes occupational injuries. These data are collected from state designated trauma centers (hospitals) and from hospitals that voluntarily submit information. We will use an ICD-9 (and corresponding ICD-10) E-code- based system to identify probable and possible agriculture-related cases.

**Nebraska Electronic Health Information Initiative (NeHII).** NeHII is a system created to safely exchange health information in and around the state of Nebraska. The Health Information Exchange (HIE) allows providers and health insurers to see certain health, demographic and payment
information in each other’s records, with no cost to the patient. NeHII is transitioning into a new
database system that will enable creation of datasets for research. We continue to work with NeHII,
defining ways to identify individuals within the NeHII database who are likely involved in the
agriculture industry and extracting injury datasets for analyses.

**Enhanced Media Monitoring.** Mr. Madsen conducts an Enhanced Farm and Agricultural Injury Media
Monitoring program for CS-CASH. While the other surveillance systems produce statistical and
scientific content, the media monitoring system produces incident reports that can be used in
presentations and reports, illustrating the types of injuries that have happened and should be
prevented. Typically, about half of the cases from media monitoring are fatal injuries. We use
information from this system for both the surveillance program as well as the Centers Emerging
Issues program. In our comparison, published in the Journal of Agromedicine, we found that the
media monitoring produces nearly identical numbers of agricultural fatalities as the BLS Census of
Fatal Occupational Injuries, plus an equal number of non-fatal injury cases.
Evaluation || Dr. Mary Cramer

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, and
3. Evaluate CS-CASH Logic Model End Outcomes for social and economic impacts.

Aim 1. Assess the effectiveness of CS-CASH leadership and governance.
The evaluation team provides quantitative and qualitative data for continuous quality improvements. In June 2020, we administered the Internal Coalition Effectiveness (ICE©) Instrument to N = 39 CS-CASH principal investigators (fully funded and pilots) and the administrative team. Response rate was 90% (35/39). Respondents rated leadership effectiveness as 6.51 (i.e., 1 = not at all effective, 7 = highly effective). Respondent comments were overwhelmingly positive, and the most frequently cited themes were 1) excellence in organization and responsiveness, 2) well-executed community outreach services, and 3) keen ability to identify important emerging health and safety issues in the region. Respondents also offered helpful suggestions for improvements (e.g., distribute videos to the Ag community via the You Tube Channel and CS-CASH website; provide Zoom orientation to new pilot investigators; list Center outreach activities on a quarterly basis).

We conducted Field Visit Interviews in June 2020 with N = 6 new pilot investigators. The purpose of Field Visit Interviews is two-fold: 1) Center orientation (i.e., Access database, CS-CASH website, resources), and 2) feedback on Center strengths and areas for support/assistance. New investigators identified strengths as responsiveness of leadership team; research and community-based resources; the monthly meetings; and networking opportunities. Areas they requested assistance in were for locating their passwords; statistical support; and publication mentoring.

The Evaluation Team assembled the findings from the ICE survey and Field Visit Interviews into an Annual Governance Report, which will be shared with Center leaders in November 2020. The leaders will develop a response plan that will be shared with CS-CASH members.

Aim 2. Conduct quality assurance by tracking CS-CASH Logic Model Activities, Outputs, and Intermediate Outcomes.
We track progress on specific performance indicators using our online evaluation database, which is a repository for the process data. New pilot investigators receive on-boarding orientation to the database and reporting requirements. Complete database entries inform the Project Scoring Matrix,
Progress, and Fiscal Year Reports. We collaborate with our CS-CASH project leaders to identify and collect credible information, and we share findings with them for quality improvement.

In FY8, we conducted Social Network Analysis (SNA) to monitor the scope and depth of our key stakeholder partnerships, which are essential for dissemination of our work and to ensure that our Center products can influence best practices, policies, and technology. FY9 further SNA analysis revealed that few of our stakeholders were Hispanic (4%). Yet, in 2018 about 45% of agricultural workers were Hispanic—and mostly of Mexican origins. For crop-related farmworker, 83% are Hispanic. Thus, our Center will work to add Hispanic stakeholders to our network connections. A manuscript is under review.

**Aim 3. Evaluate CS-CASH Logic Model End Outcomes for social and economic impacts.**

We participate in Contribution Analysis by measuring the social and economic impacts of our Center’s projects and products in the region. We measured social impact of our Center by using a random sample survey—the Healthy Farmer Survey—that is administered every four years in our 7-state region. The survey measures farmers’ changes in knowledge, attitudes, and behaviors toward agricultural safety and health factors. *Healthy Farmer Survey 2020* was developed and distributed in January. In total, 509 surveys were completed with a response rate of 50.9%. Results are analyzed in consultation with Dr. Fernando Wilson, Professor of Health Economics, University of Utah and other
CS-CASH researchers conducting annual Agricultural Injury and Illness surveys. A peer-reviewed journal article is in development.

The *CS-CASH Project Scoring Matrix (PSM)* is an instrument that was developed by our Center leaders in 2017 - 2018. The PSM provides a weighting and ranking of valued Center outcomes and outputs. It serves to quantify annual and long-term goal achievements. It also is the basis for our Social Return on Investment (SROI) analysis to be completed in 2021. Data for the PSM are collected annually and from multiple sources. In FY9, the PSM score showed an 80% goal completion, which was slightly lower than anticipated and primarily due to numerous challenges associated with the COVID crisis (e.g., data collection, limited community outreach, etc).

The evaluation team continues participation with the Ag Centers Evaluator, Coordinator and Outreach (ECO) bi-monthly phone conference meetings to benefit our efforts with resources and shared learnings about evaluation practices.

### Abstracts Accepted for Presentation

### Publications
Pilot Project Program || Dr. Eleanor Rogan

An essential program within CS-CASH is the Pilot Program that supports pilot and feasibility projects, with the goal of enabling investigators to collect preliminary data to support 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/or feasibility projects funded from this Center will result in subsequent grant submissions to NIOSH or other funding agencies to advance agricultural health and safety research.

The projects selected for support by this program must address a critical issue in agricultural safety and health and clearly lead to future, more extensive study of the selected critical issue. In the first nine years of funding, CS-CASH has funded 54 pilot projects with funds from the CS-CASH NIOSH Agricultural Forestry and Fishing grant and funding from the University of Nebraska Medical Center Office of the Vice Chancellor of Research. Using data generated from these projects, investigators have generated $12,230,045 in additional funding (Figure 1).

Figure 1. (Ongoing projects highlighted.)

<table>
<thead>
<tr>
<th>Fiscal Year of Funding</th>
<th>Initial Awards ($)</th>
<th>Resulting Awards ($)</th>
<th>Pilot Grants Awarded #</th>
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<td>1</td>
<td>$120,000</td>
<td>$1,319,581</td>
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</tr>
<tr>
<td>8</td>
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<td>5</td>
</tr>
<tr>
<td>9</td>
<td>$138,742</td>
<td>$4,000</td>
<td>7</td>
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<td>$1,019,522</td>
<td>$12,230,045</td>
<td>54</td>
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</table>

Projects Funded Fiscal Years 1-9. (Ongoing projects highlighted.)

<table>
<thead>
<tr>
<th>Year</th>
<th>PI</th>
<th>Project Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y1</td>
<td>Jane Schuh</td>
<td>Grain dust exposure in the allergic lung</td>
</tr>
<tr>
<td>Y1</td>
<td>Murray Madsen</td>
<td>Rural Roadway Safety: Collisions between Motor Vehicles and Farm Equipment on Rural Roadways</td>
</tr>
<tr>
<td>Y1</td>
<td>Matthew Beacon</td>
<td>Ag Health NE: novel preventive health services model for NE farm families</td>
</tr>
<tr>
<td>Year</td>
<td>PI</td>
<td>Project Title</td>
</tr>
<tr>
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<td>-----------------------------</td>
<td>-------------------------------------------------------------------------------</td>
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<tr>
<td>Y1</td>
<td>Joseph Siu</td>
<td>Effects of Sleep Deprivation on Balance, Stress, and Recovery Among Farmers</td>
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<tr>
<td>Y1</td>
<td>Chandran Achutan</td>
<td>Preventing Hearing Loss Among Farmers by Point-Source Hearing Protection</td>
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<td></td>
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<td>Strategy</td>
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<tr>
<td>Y2</td>
<td>Kathy Morris</td>
<td>Prevention and Treatment of Agricultural Respiratory Disorders: A Pilot</td>
</tr>
<tr>
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<td>Educational Program for Rural Health Care NPs and PAs</td>
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<tr>
<td>Y2</td>
<td>Trish LeVan</td>
<td>Chronic Bacterial Colonization, Agricultural Exposure and COPD</td>
</tr>
<tr>
<td>Y2</td>
<td>Athena Ramos</td>
<td>Stress and mental health among Latino farmworkers</td>
</tr>
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<td>Y2</td>
<td>Dennis Holtz</td>
<td>Certified Safe Farm Pilot Program</td>
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<td>Gretchen Mosher Mosher</td>
<td>Pre-Professional Perceptions of Safety and Quality Concerns in Agricultural</td>
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<td>Work Environments</td>
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<td>Y2</td>
<td>Kay Slama</td>
<td>Development of a multi-state capacity to disseminate and evaluate the efficacy</td>
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<td></td>
<td>Jason Stratman</td>
<td>of a web-based stress-management program for agricultural producers</td>
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<td>Y3</td>
<td>Carol Anderson</td>
<td>AMH Ag Safety Program</td>
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<tr>
<td>Y3</td>
<td>Lea Pounds</td>
<td>Community Driven Solutions to Address Farm Injuries</td>
</tr>
<tr>
<td>Y3</td>
<td>Derry Stover</td>
<td>Nebraska Pesticide Poisoning Surveillance Review and Outreach</td>
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<tr>
<td>Y3</td>
<td>Gordon Moore</td>
<td>New Feedyard Hire Safety Orientation</td>
</tr>
<tr>
<td>Y4</td>
<td>Jill Poole</td>
<td>Mechanisms Underlying Inhalant Agriculture Organic Dust Exposure-Induced</td>
</tr>
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<td></td>
<td>Carolyn Sheridan</td>
<td>Systemic Bone Loss</td>
</tr>
<tr>
<td>Y4</td>
<td>Kelley Donham</td>
<td>Lungs for Life</td>
</tr>
<tr>
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<td>Athena Ramos</td>
<td>Health &amp; Job Hazards of Latino CAFO Workers in Missouri</td>
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<td>Y4</td>
<td>Clayton Kelling</td>
<td>Best Practices for Range Bison</td>
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<td></td>
<td>Janssen</td>
<td>Disseminating Prevention Messages Based on FACE Cases</td>
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<tr>
<td>Y5</td>
<td>Jill Kilanowski</td>
<td>Safety in the Agricultural Work Camp, Comic Book Developed and Evaluated for</td>
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<tr>
<td></td>
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<td>Latino MSAW Families</td>
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<tr>
<td>Y5</td>
<td>Paula Schulz</td>
<td>Cardiovascular Disease Risk and Physical Activity in Farmers</td>
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<tr>
<td>Y5</td>
<td>Kristina Bailey</td>
<td>Hyper-inflammatory responses to organic dust exposure in the elderly</td>
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<td>Y5</td>
<td>Kelly Cochran</td>
<td>Evaluation of Medication-Related Agricultural Injury Among Missouri Farmers</td>
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<tr>
<td>Y5</td>
<td>Kristi Warren</td>
<td>Contributions of Allergic versus Non-allergic Lung Injury with Ag Exposure to</td>
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<td></td>
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<td>Bone loss</td>
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<td>Joseph Siu</td>
<td>Development of a mobile application for agricultural safety, AgrSAFE</td>
</tr>
<tr>
<td>Y6</td>
<td>Laura McDougall</td>
<td>Creating Healthier Agricultural Communities</td>
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<tr>
<td>Year</td>
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<td>Title</td>
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<tr>
<td>Y6</td>
<td>Tonya Ford</td>
<td>United Support and Memorial for Workplace Fatalities</td>
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<tr>
<td>Y6</td>
<td>Jamie Arens</td>
<td>Navigating Cancer Prevention, Education and Detection for the Ag Worker</td>
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<tr>
<td>Y6</td>
<td>Bryan Weichelt</td>
<td>MAPPER Immersion: Developing an Augmented Reality prototype to Protect Lives ...</td>
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<tr>
<td>Y6</td>
<td>Natalie Roy</td>
<td>Building Capacity for Nurse Practitioners to Advance Total Farmer Health</td>
</tr>
<tr>
<td>Y7</td>
<td>Josie Rudolphi</td>
<td>Identifying the sources of stress and prevalence of anxiety and depression symptoms among young farmers and ranchers in the upper and western Midwest</td>
</tr>
<tr>
<td>Y7</td>
<td>Hideaki Moriyama</td>
<td>Development of ion channel blockers for Influenza D Virus</td>
</tr>
<tr>
<td>Y7</td>
<td>Chris Blanke</td>
<td>Gathering Local Data and Building Ag Partnerships to Better Reach Ag Families</td>
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<tr>
<td>Y7</td>
<td>Bryant England</td>
<td>Agricultural and Occupational Exposures in US Veterans with Rheumatoid Arthritis and Associations with Disease Severity</td>
</tr>
<tr>
<td>Y7</td>
<td>Susan Harris</td>
<td>ATV Aware: An All-Terrain Vehicle Research and Safety Program.</td>
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<td>Jana Davidson</td>
<td>Creating Enduring Resources for Farm Safety Education</td>
</tr>
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<td>Y7</td>
<td>Julie Rother</td>
<td>Project Blue Ribbon Outreach</td>
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<tr>
<td>Y8</td>
<td>Missy Berry</td>
<td>Investigation into the respiratory properties of snow molds</td>
</tr>
<tr>
<td>Y8</td>
<td>Christine Chasek</td>
<td>Investigating Opioid and Alcohol Risk and Misuse Among Rural Agricultural Workers</td>
</tr>
<tr>
<td>Y8</td>
<td>Katherine Schofield</td>
<td>Injury Prevention in Greenhouse and Nursery Workers Through Engineering Design</td>
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<td>Y8</td>
<td>Carey Wheelhouse</td>
<td>Improving Ag Worker Health and Safety Awareness through multimodal, case-based Physician Assistant Education</td>
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<td>Y8</td>
<td>Bethany Lowndes</td>
<td>Parkinson’s Care for Nebraskan in Agriculture</td>
</tr>
<tr>
<td>Y9</td>
<td>Dillon Clarey</td>
<td>Teledermatology and Increasing Access to Care in Agricultural Populations</td>
</tr>
<tr>
<td>Y9</td>
<td>Kelley Donham</td>
<td>Modeling Improved Access to Health Screening Through Deployment of a Mobile Clinic and Networking with a Rural Health Care Network</td>
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<tr>
<td>Y9</td>
<td>Jan Moore</td>
<td>Healthy Hearing, Healthy Aging</td>
</tr>
<tr>
<td>Y9</td>
<td>Progressive Ag Foundation</td>
<td>Building A Youth Mental Health Toolkit: Developing crucial resources to support children living and working in agricultural communities</td>
</tr>
<tr>
<td>Y9</td>
<td>Michele Bever</td>
<td>Promoting a Culture of Health and Wellness in the Rural Ag Community: A Collaborative Approach</td>
</tr>
<tr>
<td>Y9</td>
<td>Mahmoud Nour</td>
<td>Summary of Seven Central-State Region Injuries and Fatalities Involving Livestock Manure Storage, Handling and Transport Operations: 1975-2019</td>
</tr>
</tbody>
</table>
Active Pilot Project Reports

Investigating Opioid and Alcohol Risk and Misuse Among Rural Agricultural Workers || Dr. Christine Chasek

Specific Aims:

1. Investigate the feasibility of screening agricultural workers for substance use by administering SBIRT screenings in agricultural work environments and settings rather than a clinic-based setting.

   Objective 1: Implement SBIRT screenings in agriculturally based work environments to rural Nebraska residents utilizing the Extension model.

   Outcome: Screenings were held at 15 agriculturally based work environments (fairs, expos, conferences); 1961 people were approached, 290 surveys were collected with 135 Surveys being usable for data analysis. After COVID 19, screenings and data collection and education went to mail in surveys; 4000 surveys were mailed out; 969 surveys were returned.

   Objective 2: Investigate the feasibility of providing SBIRT screenings to agricultural workers in a novel setting.

   Outcome: The return or participation rate for in person events was 15% while the return rate for mail in surveys was 24%. Based on return rate, the surveys were more feasible for data collection.

   Qualitative data gathered during in person events indicates that when people were approached they didn’t feel the survey was relevant to them.

2. Determine the risk level of opioid and alcohol misuse among adults (≥19 years) in agricultural workers in Nebraska.

   Objective 1: Analyze the screenings completed to determine the level of alcohol and opioid misuse in agricultural workers using three levels established in the screening tool: low, moderate, severe.

   Outcome: At the completion of this aim, we expect to obtain the analysis results to inform us about the following: 1) the proportions of the screened individuals who are at low, moderate, and severe risk for alcohol and/or opioid misuse; and 2) demographic factors associated with moderate or severe risk for alcohol and/or opioid misuse. See tables.

Approximately 20.1 million people aged 12 or older had a substance use disorder related to their use of alcohol or illicit drugs. In 2017, the USDA reported rising mortality rates among working age rural adults due to prescription drug misuse and heroin abuse. This project was centered on taking substance use screenings (SBIRT) out of the clinic and into agricultural work settings using an Extension model. The goal of the project was to raise awareness among rural agricultural workers and producers about substance and prescription drug use, particularly about opioids and alcohol and gather data on the prevalence of substance use in the agricultural community. In addition to raising awareness, educational material was shared in hopes of influencing behavior change. The project
was designed to determine the feasibility of intervening using an anonymous, self-screening questionnaire to improve the health and safety of agricultural workers.

At the beginning of the project, staff were attending farm shows collecting data and complete the anonymous screenings at agricultural venues. Fifteen farm shows, Expo’s and conferences were attended to collect data and provide substance use screenings. At the screening events, participants filled out the substance use screeners and were given information on their results and educational materials based on their level of risk. Participants shared their own experiences with substance in a confidential setting and at times also expressed concern for others in their lives who were using substances. There was some hesitancy on the part of participants to fill out the screeners which was noted by all staff who attended the events. In April of 2020, after COVID 19 forced the termination of in person data collection, surveys and educational material were mailed out to area agricultural workers, farmers, and producers. This yielded a much higher return rate which was calculated as 24% compared to the return or approach and complete rate at the live events which was 15%. As a result of in person data collection and mail in surveys, a total of 1104 surveys were collected and analyzed.

Sociodemographic factors

<table>
<thead>
<tr>
<th>Sex</th>
<th>Age</th>
<th>Occupation Type</th>
<th>Place of Residence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>171</td>
<td>19-29</td>
<td>14</td>
</tr>
<tr>
<td>Male</td>
<td>898</td>
<td>30-49</td>
<td>26</td>
</tr>
<tr>
<td>No Answer</td>
<td>35</td>
<td>50+</td>
<td>1058</td>
</tr>
<tr>
<td>No Answer</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Retired</td>
<td>144</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total N=1404</td>
<td></td>
<td>(some choose two categories)</td>
<td>Eastern NE</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Screening Results
### AUDIT Results

<table>
<thead>
<tr>
<th>Score</th>
<th>Level</th>
<th>n</th>
<th>%</th>
<th>Score</th>
<th>Risk Level</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-7</td>
<td>Low risk</td>
<td>1030</td>
<td>93%</td>
<td>0</td>
<td>No Use</td>
<td>1082</td>
<td>98%</td>
</tr>
<tr>
<td>8-15</td>
<td>Medium risk</td>
<td>64</td>
<td>6%</td>
<td>1</td>
<td>Low level</td>
<td>21</td>
<td>2%</td>
</tr>
<tr>
<td>16-40</td>
<td>High risk</td>
<td>10</td>
<td>1%</td>
<td>2+</td>
<td>Moderate-High level</td>
<td>1</td>
<td>&lt;1%</td>
</tr>
</tbody>
</table>

Analysis was performed on the results of the alcohol screenings based on socio-demographics. Men scored significant higher in alcohol risk level (M=2.61, SE=.104) than women (M=2.11, SE=.172), t (1067)=1.96, p = .01, r=.06. According to age group, the group under 40 scored significantly higher on alcohol consumption (M=5.80, SE=1.46) than the group over the age of 40 (M=2.48, SE=.089), t (1102)=1.96, p > .001, r=.07. Analysis was not performed on the drug use screenings based on the low number of respondents who indicated that had used these substances including misuse of prescriptions.

**Community Collaborations:** There were multiple collaborators involved in the project when data was collected in person. The following is a list of community collaborations: AgriSafe, UNL Health and Wellness Team/Wellness in Tough Times, Nebraska Extension, Women In Ag, Nebraska Cattlemen Buffalo County Community Health Partners and CS-CASH.

### Publications and Presentations

6. Chasek, C. L. Southern Coastal Center for Ag Health and Safety, "Investigation Opioid and Alcohol Risk and Misuse Among Rural Ag Workers," St. Petersburg, FL. (September 27, 2019).

### Conference Proceedings


### Grant Funding

Chasek, C. L. (Principal), "Project Ag Aware: SBIRT in Agricultural Work Settings," Sponsored by NU, $149,496.00. (July 2019 - Present).

**Materials produced:** Wallet card with mental health resources.

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**Injury Prevention in Greenhouse and Nursery Workers through Engineering Design Innovation**

|| Dr. Katherine Schofield
Project Aims

2. Evaluate comparative risk factors for injury and severity based on worker, job, and injury event characteristics, including text narratives.
3. Determine areas of high injury prevention priority and engineering design feasibility
4. Innovate and test efficacy of an engineering intervention to prevent a high priority nursery industry injury using a contextual design approach

Results indicate 61 establishments incurred a combined 1229 injuries with an overall injury rate of 4.9 per $1 million of payroll, 13.5% of which resulted in lost-time. Workers under age 30 suffered 37% of all injuries; 29% of injuries were to women. High-severity injuries involved: moving/loading trees, erecting/maintaining greenhouses, and material handling. Frequent injuries involved: hand tools, material-handling, hand-digging, lifting/moving equipment, and operation of motorized vehicles. Ergonomic, material handling, and lifting-related injuries caused the largest percentage of injuries (38%). Tool and equipment-related causes resulted in 9% of total injuries.

We recruited an industry partner and deployed a mechanical engineering design team with four undergraduates, a graduate student, and faculty members to the host site. Hazards, challenges, and potential solutions were noted during multiple site visits. Twenty-two employees were interviewed (English and Spanish) to determine their concerns and injury risk factors. Potential projects were evaluated on a 3-month (rapid) timetable, host-site injury data analysis, on-site observations and staff interviews, ranking criteria metric: likely to use; saves time; injury frequency/severity reduction; cost; ease of implementation; timeframe; impact (time used/people); reduces ‘touches” ($0.16 a touch); client priorities; and worker priorities.

Subsequently, two projects were selected to reduce the worker risks of repetitive hole-punching in hanging basket pots with unsafe equipment; and repetitive lifting and carrying methods of plant inventory movement on greenhouse tables over uneven surfaces and narrow walking paths. The team designed, prototyped, and tested solutions specific to these problem areas, developing a **greenhouse plant transport cart** (Figure 1) and a **plant pot hole-puncher** (Figure 2). The cart reduced strain, fatigue, and lifting demands on staff members, and made table loading/unloading tasks easier. Additionally, the cart allowed a greater number of plants to be transported simultaneously (10/12...
versus 6/7). Together, these factors should improve navigation of walkways between tables and reduce risk of strain, trips, falls and contusions and lacerations caused by collision with tables. The hole-puncher eliminated electrical hazards, unguarded moving parts, and dust generation. The new, manual design improved ergonomic positioning and reduced force/grasp requirements, and reduced hole-generation from 14 seconds to ~2 seconds. **These design solutions are currently implemented into practice.** Post-intervention data collection was planned during the 2020 spring and summer growing season but was not feasible this year due to covid-19 restrictions.

Rescheduled post-intervention data collection is tentatively planned for spring 2021. Intellectual Property (IP) was initially sought on equipment designs but is no longer being pursued; designs will now be provided through a publication for agricultural stakeholders as the engineering solutions/prototypes may have a wider industry translation to other agricultural operations. Injury and (engineering) risk reduction publication timelines were delayed for this project approximately due to covid-19; the team expects publication submission in spring 2021 and fall 2021. In all, three graduate students and four undergraduates had the opportunity to be involved in this project.

**Outputs (to date)**


2. American Society of Mechanical Engineers. August 17-19, 2020 (Presentation and inclusion in conference proceedings)


Teledermatology and Increasing Access to Care in Agricultural Populations || Dr. Dillon Clarey and Dr. Jennifer Adams

| Specific Aim 1. Examine the impact of SAF TD on access to dermatologic care in underserved agricultural communities in rural Nebraska. |
| Specific Aim 2. Compare the diagnostic and management concordance of dermatologic diagnoses between PCPs and board-certified dermatologists. |
| Specific Aim 3. Analyze PCP dermatology knowledge prior to and following a series of monthly educational online conferences. |
| Specific Aim 4. Analyze patient and provider satisfaction with the teledermatology service. |

At the inception of our project, “Teledermatology and Increasing Access to Care in Agricultural Populations”, we sought to identify healthcare sites that would most benefit from a teledermatology service. This involved looking at rural areas in which dermatologic care is limited or absent. Once a site was established, we reached out to the administration to ask whether they would be interested. Prior to COVID, this involved a site visit in which we introduced the grant to the administration and providers, outlined the processes, and answered any questions or concerns. The first project site was the Mary Lanning Healthcare Blue Hill Medical Clinic in Blue Hill, NE, where we are currently working with one primary care provider. Following establishment of the site, we again conducted a site visit by which we distributed necessary materials such as written consent forms and iPads used to complete surveys. In June, we expanded our services to a second location at Beatrice Community Hospital and Health Services in Beatrice. This site includes two primary care providers. We are currently discussing a new collaboration with Faith Regional Health Services in Norfolk to expand our study to its third location. We are also hoping to expand the number of providers who use the teledermatology service in Blue Hill.

Approximately one month after implementation of the teledermatology platform in Blue Hill, the COVID-19 pandemic shutdown began. In-person consenting for studies unrelated to COVID was put on hold. Further, Blue Hill saw a reduction in in-person visits. Implementation of teledermatology at our second site, Beatrice Community Hospital and Health Services, was also delayed due to the pandemic. Consequently, subject accrual to date has been limited. Thus far, we have enrolled twelve patients into our study. Though the numbers are small, we are happy to report that all patients who have filled out their patient satisfaction follow-up survey indicated that they were satisfied with the
teledermatology service provided through this grant. We are hoping to increase our subject accrual in the months to come.

We are currently in the process of creating a virtual curriculum to teach providers regarding diagnosis and management of common skin diseases through pre-recorded lectures. We initially had hoped to conduct virtual live lectures but decided pre-recorded lectures would allow for more flexibility so that providers would be able to view them on their own time without concern for scheduling conflicts. We hope to finalize and distribute the curriculum in the next few weeks.

Overall, our progress has been slowed by the COVID-19 pandemic but the limited results we have gathered so far appear promising. We are focused on increasing our patient accrual numbers in the coming months through regular communication with our current sites and expansion of providers at both new and established sites.
Modeling Improved Access to Health Screening of Agricultural Populations Through Deployment of a Mobile Clinic and Networking with a Rural Health Care Network || Dr. Kelley Donham

1. To further develop a collaboration between our non-profit Rural Health and Safety of Eastern Iowa (RHSEI) with a regional health care network.

2. To improve and provide convenient access to basic health screening of rural and farm residents through deployment of a fully equipped mobile health screening and educational facility.

3. To train health care provider staff in agricultural medicine to enable them to better serve the rural and agricultural population.

4. To build the capacity of RHSEI – Mercy Alliance, that will enable us to offer the Certified Safe Farm program, which would be an extension of our prior grant from CS-CASH: “Toward a National Sustainable Certified Safe Farm (CSF) Program”

RHSEI established a strong partnership with Mercy Hospital of Iowa City that is formalized in a services agreement and a memorandum of understanding. We formed a general council between organizations that includes RHSEI’s Executive Committee and Mercy’s Chief Executive Officer, Communications Director, Vice President Medical Affairs, Outreach Health Coordinator, and Workplace Wellness Coordinator. This group meets quarterly for communication, evaluation, and planning.

RHSEI is meeting with Washington County Hospital to explore collaborative programming including preparing a network development planning grant proposal to HRSA and offering wellness services to county pork producers.

The COVID-19 pandemic caused RHSEI to alter our original goal of providing general wellness services from a mobile clinic. We determined we could not conduct clinical wellness screenings involving public gatherings. In May we considered an alternative approach: providing COVID-19 testing at rural sites. In our service area, there exist economic, geographic, transportation, and cultural barriers preventing many agricultural workers and other rural residents and families from accessible COVID testing. Our Mercy partners agreed that rural COVID testing was needed and worthwhile. CS-
CASH approved this change of focus provided that grant funds are not used to pay for testing where federally funded free tests were already available.

RHSEI arranged with the Iowa Department of Public Health and the Iowa State Hygienic Laboratory to obtain PCR testing kits and analysis free, for use in underserved rural and agricultural populations. RHSEI and Mercy have worked since June to develop procedures in advance of deploying the mobile COVID-19 screening service. Collaborative work groups are addressing overall project direction; laboratory testing; renovation of mobile trailer; site selection and set up; communication, publicity, and recruitment; and clinical and safety protocols. We expect to be in the field in October 2020. Mercy’s Outreach Health Coordinator and Workplace Wellness Coordinator attended the University of Iowa’s Agricultural Health and Safety Core Course in 2020. We will continue to encourage training of additional health care providers in Eastern Iowa.

Our current partnership with Mercy is serving to meld our resources and vision. Mercy is supportive of our long-term CSF vision. The current rural COVID-testing screening project is a step toward the long-term vision of providing a sustainable CSF program in Eastern Iowa.

Healthy Hearing, Healthy Aging || Dr. Jan Moore
Specific Aims

1. Document patterns of cognitive status in aging agricultural workers in Nebraska.
2. Determine the relationship between cognitive status, hearing status (degree of hearing loss), and age in agricultural workers.

Farmers and ranchers are exposed to high levels noise from equipment, and livestock. This exposure over their careers results in permanent hearing loss. Hearing loss and exposure to noise has been linked to negative health conditions such as cardiovascular disease, high blood pressure, and anxiety. In addition, hearing loss has been independently associated with negative changes in memory, problem solving, and thinking skills also seen in patients with progressive conditions such as Alzheimer’s Disease. The goal of our project is to evaluate the relationship between the severity of hearing loss in aging farmers and ranchers and
their ability to perform thinking and memory tasks. We do not know whether people with hearing loss caused by noise throughout their lives have different patterns of cognitive skills than people who begin to lose their hearing from aging alone. We are interested in investigating these abilities in both primary farm operators who tend to be men, and secondary operators who tend to be female spouses or partners.

Data will be collected on each participant’s lifelong exposure to sources of noise on the farm and during recreational activities such as operating motorized boats or hunting with firearms. We will assess hearing and complete a short screening test of memory and problem solving. Information on balance and falls will be collected. Our ability to recruit and test our local agricultural operators in 2020 has been put on hold as a result of the COVID-19 pandemic. Data were collected in 2019 at the Gateway Farm Expo. As soon as our current public health situation improves, we will be able to resume our study.

**Presentations:**

**Additional Grants:**
Building A Youth Mental Health Toolkit: Developing crucial resources to support children living and working in agricultural communities || Jana Davidson

Specific Aims

1. Conduct a Youth Mental Health Roundtable. The roundtable will bring together mental health professionals including professors, psychologists, directors and agricultural leaders working in the fields of rural health and rural stress.

2. Develop curriculum focused on youth mental health and stress to be used at Progressive Agriculture Safety Days throughout North America. The curriculum will include a lesson plan, along with developmentally appropriate group demonstrations and hands-on activities. Our target audiences will be youth ages 4 to 13 years of age.

3. Engage current and future stakeholders to secure future funding as we continuously grow and develop the project as the topic emerges.

4. Design various resources from the findings of our roundtable, which will be disseminated at various conferences, farm shows, and to parents of Progressive Agriculture Safety Day participants through take-home bags. The take-home bags have the potential to reach up to 80,000 to 100,000 participant’s parents each year.

5. Create a series of videos highlighting the project and key messaging. The videos will include interviews and discussions from the roundtable participants. Additional videos may be created for Progressive Agriculture Safety Day participants and parents highlighting coping strategies and interventions.

6. Measure the effectiveness of the project by conducting evaluations with Progressive Agriculture Safety Day coordinators, volunteers, participants, parents and others utilizing the curriculum and resources.

The purpose of this project is to shed light and develop vital resources on a very important and emerging issue of youth-related stress management and mental health. Ultimately, our goal is to continue to break the stigma around mental health and begin the conversation on how and where to seek help. At Progressive Agriculture Safety Day, we feel it is our responsibility to address both the physical and emotional well-being, health and safety of all children living on farms and in rural communities.

Roundtable. A project Roundtable was held at AgriBank in St. Paul, Minnesota thanks to the funding support of Progressive Agriculture Foundation 4-star sponsor, Farm Credit. The primary goal of this Roundtable was to identify the basic content and lay the foundation for the creation of a youth mental well-being and stress chapter to be used at Progressive Agriculture Safety Day events, including farm shows and other outreach efforts. The new curriculum will be launched in 2020 and will focus on understanding stress and emotions, coping strategies, and identifying resources. Dr. Susan Jones,
Professor Emerita in the School of Nursing and Allied Health at Western Kentucky University (WKU), served as moderator and the guest contributors included Monica Kramer McConkey, Rural Mental Health Specialist at Eyes on the Horizon, Thom Petersen, Minnesota Commissioner of Agriculture, Dr. Josie Rudolphi, Assistant Professor in the Department of Agricultural and Biological Engineering at the University of Illinois, Emily Wilmes, Director of the Rural Stress Task Force for the University of Minnesota Extension.

**Daily Learning Drops.** The postponement of many of our spring Safety Days due to school closings surrounding the COVID-19 pandemic and knowing more children would be home during spring planting season, we launched Daily Learning Drops. These daily reminders served as the perfect opportunity to continue our mission and deliver timely, hands-on safety and health messages and were great resources for both teachers and parents with children at home. A new video (or resource) on a different safety or health topic was delivered via Facebook each day at 11:00 a.m. CDT. In total, 70 drops were created with several focusing on youth mental well-being and stress management including:

- Mental Well-being/Stress (Stress Ball) [https://bit.ly/3dyW3gA](https://bit.ly/3dyW3gA)
- Positively Navigating into Summer (Mental Well-being) [https://bit.ly/3cUX5D0](https://bit.ly/3cUX5D0)

**Virtual Safety Days – Mental Wellbeing and Stress Topics**

With the success of the Daily Learning Drop series and the decision to suspend all in-person Progressive Agriculture Safety Days until further notice due to the continued concerns with COVID, we still knew we needed a way to reach youth. We piloted a Virtual Progressive Agriculture Safety Day with the National Education Center for Agricultural Safety (NECAS) in Peosta, Iowa. The 2-hour long virtual program was then made available to trained Safety Day coordinators to still offer this in
place of their planned 2020 event. In addition to NECAS and the Progressive Agriculture Foundation (PAF) staff, CS-CASH, Alliant Energy, and State Farm Insurance also participated. Using balloons, children learned to balance stressors and how to create a DIY stress ball. View the Virtual Safety Day playlist: https://www.youtube.com/playlist?list=PLyxOQ5fgytC88lX2IbLt05WGqrvs7hTt4

**Presentations.**

- Jana Davidson, Bernard Geschke, *Farm Safety Made Simple: Providing education, training and resources to guide hands-on learning that is fun, simple and safe,* 2020 International Society for Agricultural Safety and Health (ISASH) Virtual Conference.
- Jana Davidson, *“Explore Youth Farm Safety from your Home”*. 2020 American Farm Bureau Federation Virtual Health and Safety Conference.

**Promoting a Culture of Health and Wellness in the Rural Ag Community: A Collaborative Approach || Dr. Michele Bever**

**Specific Aims:**

1. Increase engagement of ag families in their own health care by utilizing trained community health workers to promote and administer preventative health screenings/assessments in the community and on the family farm.

2. Improve the local health system capacity to address ag-related health issues and exposures in farm families and agricultural workers

3. Partner to promote wellness and expand awareness of agricultural health and safety risks and how they can be prevented.

South Heartland District Health Department serves Adams, Clay, Nuckolls and Webster Counties in south central Nebraska. The perception among our area health care providers is that farm families and agricultural workers are less likely to access care for preventive services. For the farm families and agricultural workers who are not accessing preventative health care, this project is working to close the equity gap by improving access to and use of health care services by farm families and agricultural workers.

A first step was to expand local public health and health system knowledge and capacity to address ag-related health issues and exposures in farm families and agricultural workers by supporting public health, health care and first responder attendance to the UNMC Agricultural Health and Safety Course for Medical and Safety Professionals. Eight individuals completed this course in July 2020, including two (2) community health workers, one (1) public health nurse, two (2) emergency medical services representatives, and three (3) clinic providers/staff from two clinics that serve rural families in the health district. Attendance in this course accomplished our aim to expand local knowledge. Participant feedback included: "I think this course has given me more "context" for conversations and questions
to ask when working with various ag populations. "I learned a lot about injury risk for farmers or ranchers and toxic gas…” “I have implemented more farm safety education.”

South Heartland worked with clinic staff to determine ag-specific health risk questions for community health worker outreach assessments and clinic intake assessments. The goal is for health care providers to have a better understanding of the risks and exposures their patients encounter, so that they are better able to diagnose, treat, and manage the patient’s needs. The resulting short assessment includes questions on occupation and risk and/or exposure questions focused on key risk areas: blood pressure, blood work, hearing/hearing protection, sight/eye protection skin cancer/sun safety practices, respiratory exposures, chemical exposures, and depression/mental wellness. Community health workers will be using these assessments at outreach events and helping refer individuals and their risk information to health care providers. Providers will be using the intake assessments to understand the patient’s farm/Ag-specific health risks, address issues and risks with the patient, tailor the patient’s health plan, and refer patient to appropriate resources and community-based programs.
Parkinson’s Care for Nebraskans in Agriculture || Dr. Bethany Lowndes

Project Aims.

1. Evaluate Parkinson’s disease signs and disease prevalence in the agricultural community.
2. Identify user requirements for rehabilitation engineering and adaptive technology to enable individuals with Parkinson’s disease to complete agricultural tasks safely.

Parkinson’s disease significantly impacts daily life and ability to work for over 4,000 individuals in Nebraska. Agricultural workers may be at an increased risk for Parkinson’s disease compared to the general population. This proposal aims to measure symptoms, signs and diagnoses across Nebraska agriculture workers, explore feasibility of Parkinson’s disease (PD) monitoring, and identify specific user needs for safe work in agriculture.

Death Certificates have been reviewed by the Nebraska Department of Health and Human Services (DHHS) Parkinson’s Disease Registry for 5,819 individuals with PD. Of individuals diagnosed with PD, agricultural workers (mean=85 years) had a significantly higher age at death compared to non-agricultural workers (mean=82 years, p<0.05). Of agricultural workers diagnosed with PD, there was no significant difference in age at death for females vs males (p>0.05). By subtracting age at PD diagnosis from age at death, males live a significantly shorter time with PD than females (p<0.05). However, there is no difference in disease duration for agricultural vs non-agricultural workers (p>0.05) Non-agricultural workers and males diagnosed with PD at an earlier age (both at p<0.05).

We surveyed 21 agricultural workers on symptoms associated with early indicators of PD. Only six individuals incorrectly identified one of four scents on an olfactory test. Participants also reported other symptoms identified in individuals with PD prior to diagnosis (i.e. vivid dreams, constipation, and excessive daytime sleepiness). However, with the small sample size, this research is not able to
attempt to predict future onset of Parkinson’s disease using symptoms such as loss of smell in the agricultural community.

Using heuristics and usability design principles (Nielsen, 1995), we developed a kit for home data collection. Work is underway with the research information technology office to ensure data privacy and support this pilot feasibility study for monitoring PD in the rural community using a mobile device to self-record a mobility assessment task and complete finger-tapping tests. Kits will be sent out to users to evaluate usability and success in collecting useful data for analysis of symptoms related to PD.

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

Specific Aims.

1. Increase Physician Assistant (PA) student awareness of agricultural health and safety issues
2. Increase PA student medical knowledge regarding agricultural health and safety issues
3. Emphasize and enhance communication skills with agricultural patients
4. Increase health care access in agricultural communities

The UNMC Division of Physician Assistant Education is working to improve health outcomes of patients in Midwest agricultural communities. Through the grant, PA students have learned about agriculturally related health conditions such as respiratory disease secondary to dust inhalation, chemical exposures, and noise-induced hearing loss. Throughout their didactic curriculum, students have learned agricultural health content through traditional classroom learning, handouts, small group case-based learning, and simulated patient encounters. After completion of their classroom learning and simulation activities, UNMC PA students began clinical rotations, including a 12-week Family Medicine rotation in a rural, Midwest setting.

Students completed an initial survey of agricultural health knowledge and communication skills prior to their classroom learning and simulation activities. Students completed the same survey after their didactic learning phase in September 2019 and a final version of the survey after their clinical phase of education in September 2020.

Grant funding allowed for selected students with a high interest in agricultural medicine careers to attend the 2019 Midwest Rural Agricultural Safety and Health Conference in Marshalltown, IA. The conference allowed six PA students to engage in conversation with public health professionals regarding emergency preparedness, natural disasters, and mental health of agricultural communities.
Grant funding has also provided the opportunity to purchase Agricultural First Aid Kits and Personal Protective Equipment, such as ear plugs, for affiliated clinical sites to use when providing patient education. It was intended that these materials would be delivered through site visits from faculty, however, with travel restrictions due to COVID-19, these items are being distributed to affiliated sites through the mail. Students rotating at these affiliated sites will have the opportunity to provide comprehensive patient education through verbal communication, brochures, and supplies provided through grant funding.

In October 2020, we will be completing statistical analysis of our pre and post-survey, with the hypothesis that the UNMC PA Class of 2020 students will have improved their agricultural health and safety knowledge improvement, as well as increased confidence in communication skills over the course of the student learning modalities. Analysis will also include review of UNMC PA Class of 2020 patient logs to gain further data regarding agriculturally related diagnoses and patient needs in the Midwest.

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

**Specific Aim**

To classify, analyze and summarize all available injury and fatality cases that involve livestock manure storage, handling, and transport facilities and equipment in the CS-CASH 7 states region for the purpose of developing evidence-based injury prevention strategies to reduce the frequency and severity of these incidents.

Research was conducted to document, classify, analyze and summarize available injury and fatality data involving facilities and equipment for livestock manure storage, handling, and transport within the seven-state region served by the Central States Center for Agricultural Safety and Health (CS-CASH) in NE, IA, SD, ND, KA, MO, and MN. Data were initially drawn from the Purdue Agricultural Confined Spaces Incident Database (PACSID) that contained over 2400 individual U.S. cases of agricultural confined space related entrapment, engulfment, entanglement, asphyxiation and falls that were documented between 1975 and 2019. Data from these cases have been partially summarized and published (Issa et al., 2016; Issa et al., 2018; Nour et al., 2018; Nour et al., 2020; Cheng et al., 2020) but did not include an in-depth analysis of manure-related incidents.

19% of these 2400+ cases included storage, handling or transport of livestock wastes, including exposure to toxic gases. In addition to the injuries and fatalities data mined from the PACSID
database, data routinely obtained by CS-CASH professionals from their two sources: news clipping service and internet detection and notification system (Google Alert) were included. The PACSID database analyzed was comprised of 460 individual U.S. cases involving manure storage, handling, and transport equipment and facilities that were documented between 1975 and 2020. Of these, 133 cases were documented as having occurred in the targeted seven-state region.

Each case was identified and coded according to the protocol developed by Nour et al. (2018) to classify incidents related to livestock manure handling, storage, and transport. Of these cases, Iowa and Minnesota accounted for 79% of the total with swine operations accounting for 33% of cases when livestock type was known. Of the victims, Seventy-nine percent were male. Ages ranged from 1 to 85, with an average age of 38. Fifteen percent of the victims were age 21 and under. There were 13 incidents where more two or more victims were identified, including one incident involving four victims. It is believed that underreporting of incidents, especially non-fatal incidents, continues to be a barrier to achieving a more comprehensive understanding of the scope and magnitude of the problem.

Research findings will be used in cooperation with stakeholders to enhance the contents and delivery of evidence-based agricultural safety and health programs, promote safer work practices, and develop engineering design standards. The desired outcomes of this research included more effective strategies to protect farmers and farm workers who are at high risk of manure-related injuries. Findings, however, do provide sufficient insight to enhance the effectiveness of current injury prevention measures. A manuscript is in process.
Emerging Issues || Dr. Risto Rautiainen

Project Aims

1. Examine trends and identify emerging issues affecting the health and safety of farmers, ranchers, family members and agricultural workers. CS-CASH identifies emerging issues from monthly injury and fatality case reports from the Center’s media monitoring service, annual data from the Center’s injury surveillance project, reviews of the literature, and case reports from a network of experts in the field.

2. Respond to identified emerging issues without delay by investigating the problems and solutions and communicating preventive information to the affected populations and stakeholders. CS-CASH prepares and delivers coordinated evidence-based responses to identified emerging issues. The program also funds small grants to outside entities that are in position to respond. Proposals can be submitted at any time. The Center Director and the Pilot Projects Program team evaluate the proposals and issue expedited funding decisions.

Emerging Issue Funded Projects

CS-CASH Respiratory Fit Test Project || Carolyn Sheridan

Specific Aims

1. Develop a Respirator Fit Test Capacity Building Workshop Guidebook
2. Deliver workshops to provide training for respiratory fit testing for health care providers and safety professionals.

Creation of the Guidebook. Information to be included in the guidebook was researched, formatted, and making reviewed by a team including a Certified Industrial Hygienist. The respirator fit test workshop training was developed, and pilot tested, leading to revisions in the guidebook. Following the initial pilot tests and revisions, the new training and resource was used for respiratory fit test training in the Midwest region and nationally.

Pilot Testing. The guidebook was pilot tested in 2019 at the University of Iowa College of public health in conjunction with the Ag Medicine core course. Following the initial pilot program revisions were made to the Guidebook and training curriculum and a...
2nd training was completed at the University of Nebraska Medical Center during the CS-CASH Agricultural Safety and Health Training Course which reached 25 individuals.

Workshops. An agenda, handouts, and presentation were developed. Fit test kits were ordered and a “fit test pack” was created for each participant. Promotional materials (such as course flyer, emails) were also created to assist with recruitment of trainees. These materials are available upon request.

Trainings. In 2020, the Guidebook was used in 2 Agricultural Safety and Health training courses (University of Nebraska 140 and University of Missouri – 35) in a virtual zoom format. All participants of the respirator fit test workshop receive a hard copy (along with the online PDF version) of the content. Feedback from participants indicated the need for a new section dedicated to the “business case” for community-based respirator fit testing. This is additional curriculum is currently under development.

Survey Results. Pre-training surveys were developed to evaluate the educational needs of the training participants. In a pre-survey of 136 Ag Health and Safety Ag Medicine course participants, only 19% said that they felt confident in recommending a respirator fit test for a patient/farmer who wears a cartridge type respirator prior to the training. In addition, 88% responded that they are concerned about the health and safety of patients, clients, family members or friends who are involved in agriculture. This includes respiratory health and protection from respiratory hazards, further indicating the need for training. In the post-survey, 86% of (30/36) participants who took the post survey said they felt confident in recommending a respirator fit test.

This project presented opportunities to collaborate with other organizations to provide respirator fit testing helping to foster collaborations with many organizations. See Table 1.

Table 1:

<table>
<thead>
<tr>
<th>Location</th>
<th>Date</th>
<th>N Participants (actual or expected)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Missouri Pharmacy Gear Up for Ag Program</td>
<td>April 2020</td>
<td>35 virtual*</td>
</tr>
<tr>
<td>Missouri Rural Health and Agri Medicine Training</td>
<td>June 2020</td>
<td>35 virtual*</td>
</tr>
<tr>
<td>(Respirator Fit Testing and PPE in Ag)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I-CASH Respirator Fit Test Virtual Training</td>
<td>August 26, 2020</td>
<td>14 virtual*</td>
</tr>
<tr>
<td>I-CASH Respirator Fit Test Virtual Training</td>
<td>October 1, 2020</td>
<td>24 virtual*</td>
</tr>
<tr>
<td>Dakota Conference on Rural and Public Health</td>
<td>2021</td>
<td>50 -75 expected</td>
</tr>
<tr>
<td>Pesticide Applicators Certification Training Conference</td>
<td>July 2021</td>
<td>50 expected</td>
</tr>
</tbody>
</table>

*Virtual was provided in response to the COVID-19 pandemic.
New ATV Safety Design Features: Examining cultural acceptability and piloting an educational intervention among Midwestern youth in agriculture || Ag Health and Safety Alliance™

Specific Aims.

1. To use the Gear Up for Ag™ Program to examine current awareness, beliefs, and cultural acceptability of new ATV safety design features among Midwestern youth in agriculture.
2. Pilot test the effectiveness of revised Gear Up for Ag™ ATV safety resources by examining changes in beliefs or cultural acceptability following the training.

During the Spring of 2020, the Ag Health and Safety Alliance (AHSA) educational staff worked with an educational advisory panel (including experts in ag education, ATV safety specialists, and academics) to formulate three new questions for our standardized pre-survey. This also included detailed input on images (photos) to be used in the survey (Fig. 1).

The questions included the following:

- If participants have ever rolled an ATV or quad.
- Frequency of allowing extra riders when using an ATV or quad bike.
- Frequency of helmet usage when riding an ATV or quad bike.
- Familiarity with new ATV safety features (focusing on engineering controls and design such as crush protection, roll cages, wider frames, etc).
- Acceptance and barriers to use of the new safety features. Barriers included cost, comfort, task or interference, aesthetics, and others.

**Figure 1: The ATV Safety Questions in the Pre-Survey focus on ATV engineering controls and include many images.**
Due to the COVID pandemic of 2020, many of the initial spring/summer training locations (locations where the pre-survey would be administered) had to be rescheduled during the winter and spring of 2021. AHSA staff were in close communication with CS-CASH outreach representatives about the rescheduled dates. An extension may be necessary to complete these training locations and administer the pre-survey.

During the Spring of 2020, AHSA educational staff worked with our educational advisory panel to develop content for a 2-minute infographic on ATV Safety. The infographic is innovative because it focuses on new ATV safety design features, instead of focusing on administrative controls and PPE. The content (including graphic outline and text), voice-over recording (by a voice-actor), and music has been selected. The graphic designer is currently in the process of pairing the graphical images and text with the voice recording and music.

Due to the COVID pandemic of 2020, many of the initial spring/summer training locations (locations where the pre-survey would be administered) had to be rescheduled during the winter and spring of 2021.

AHSA staff are currently working with a student intern at Iowa State University to develop new safety content in the interactive presentation to fit with the motion graphic.

During the Spring of 2020, AHSA educational staff worked with our educational advisory panel to formulate three new questions for our standardized post-survey.

The questions included the following:
Changes in familiarity with new ATV safety features (focusing on engineering controls and design such as crush protection, roll cages, wider frames, etc).
Changes in perceived barriers to use of the new safety features.
Likelihood of sharing this new safety information with friends, co-workers, or family members.

An extension will be necessary to complete these training locations and administer the post-survey.
Telling the Story Project || Melissa Ploeckelman, Ellen Duysen, Scott Heiberger, Dr. Aaron Yoder, Stephanie Leonard

Storytelling is a basic mode of human interaction, and a fundamental way of delivering knowledge. Narratives have been shown to influence attitudes and change behaviors. US Agricultural Safety and Health Centers including the Great Plains Center for Agricultural Health (GPCAH), the Upper Midwest Agricultural Safety and Health Center (UMASH), the Central States Center for Agricultural Safety and Health (CS-CASH) and the National Farm Medicine Center are collaborating on a translation activity to convey the story of agricultural safety. While statistics and numbers are important to identify injury trends and emerging issues related to workplace health and safety, Telling the Story Project (TTS) takes a closer look, creating injury prevention messages that highlight personal stories based on first-hand experiences.

Research indicates that farmers are more open to safety messages after reading about a traumatic farm incident and that farmers generally consider other farmers and agricultural publications to be trusted sources of information. Telling the Story Project helps agricultural workers, and all who have been impacted by fatal and non-fatal agricultural workplace injuries (workers, family and community members), share their stories. Told in their own words, their experiences teach about what went wrong, and how to prevent or avoid similar incidents. A website has been developed as a platform for the personal narratives and a monthly rural radio program is being developed as a means to effectively deliver this content. The Website www.tellingthestoryproject.org. The project website hosts multi-media stories and prevention resources aimed at farmers, agricultural workers, communicators, educators and policy makers. The project has received extensive media attention in print, online and by broadcast media.

Project Outputs (reporting period).

- Drafted a press release titled, “Farm safety, mental wellness hit close to home for Extension educator,” that was sent to upper Midwest media outlets. The Minnesota Corn Growers Association featured the release on its website, https://www.mncorn.org/2020/05/05/farm-safety-mental-wellness-hit-close-to-home-for-extension-educator/.

- Submitted a “Telling the Story Project” abstract that was accepted by the Agricultural Safety and Health Council of America Safety Summit, March 2020. The abstract also was accepted for publication in the Journal of Agromedicine (Volume 25, Issue 3) as part of a special issue dedicated to the ASHCA Summit (https://www.tandfonline.com/loi/wagr20). The journal publication is scheduled for September 2020.

- Presented a lightning talk titled “Using Storytelling to Disseminate Ag Safety and Health Messages” as part of an ASHCA webinar, Sept. 17, 2020.
• Drafted a press release, titled “Farmer who is ‘lucky to be alive’ takes time for safety,” that was sent Sept. 17, 2020, to a list of more than 200 agricultural communicators nationally. The release linked to “UMASH Farm Safety Check: ATV.” The release was picked up by multiple outlets including Farm Progress, which scheduled the release to run on Sept. 21 (start of National Farm Safety and Health Week) on all 17 of its state publication websites, as well as some of its livestock and crop brands, and broadcast platforms.

• “Telling the Story Project” discussion guidelines, based on the stories, have now been added and can be used by educators, 4-H and FFA leaders, manager and others looking to start a positive conversation about safety. Classroom agriculture teachers reported that the guides are helpful and practical (e.g., can be given to substitute teachers to provide content for the day’s class). An example of the positive feedback came in a Sept. 8 email from Jessica Duncan, an FFA Advisor in Currituck County, North Carolina, who requested answer keys. The discussion guides are featured on the North Carolina State University Extension website, https://farmsafety.wordpress.ncsu.edu/educators/. Guidelines: https://tellingthestoryproject.org/discussion-guides/

• Work is progressing on a “Telling the Story Project” methods manuscript for submission to a peer-reviewed journal.

• The project has received extensive print, online and broadcast media attention, including US News &World Report, Nebraska and Iowa public television, and an editorial in the Omaha World Herald. Links to examples can be found at http://tellingthestoryproject.org/in-the-media/
Outreach Program || Dr. Debra Romberger

Project Aims

1. Integrate information from the Center’s Research, Evaluation and Pilot Program projects, as well as information from external sources, translating it into a coordinated outreach effort and effectively disseminate the information using a wide range of proven methods.

2. Develop and launch radio social marketing campaigns, innovative training webinars and eHealth web-based toolkits targeted to women in agriculture and to military veteran farmers.

3. Support and advance current information technology efforts that disseminate occupational safety and health information and education to workers, managers, educators, researchers and health and safety professionals in the agricultural industry.

4. Identify, evaluate and disseminate new technology products and applications to workers, managers, educators, researchers and health and safety professionals in the agricultural industry through crowdsourcing and citizen science.

Outreach Audience. In 2019 and 2020 the CS-CASH Outreach Program continued a coordinated outreach strategy directed at audiences that include agricultural producers, with a focus on women and veterans working in agriculture young workers, grain handlers, and health and safety professionals. The COVID-19 pandemic presented obstacles to the face to face outreach that has been the hallmark of the CS-CASH Outreach Team. By employing innovative training methods and strict safe training protocols the outreach team was able to conduct training throughout the spring and summer of 2020. Details of these events are outlined in this report.

Partnerships. The Outreach Program is strengthened by working in partnership with members of the AgriSafe Network, USDA Extension, National Agricultural Safety Database, Ag Health and Safety Alliance, Grain Safety Handling Coalition, Farm Bureau, Nebraska Public Power District, agriculture-related journals and rural newspapers, women in agriculture organizations, agri-insurance agencies, media organizations, members of the agricultural community and close collaboration with other NIOSH funded Agricultural Centers.

Translational Outreach. CS-CASH works with the Center’s research teams and partners to effectively translate research to outreach in the areas of pulmonary disease, feedyard safety, immigrant worker health, tribal bison worker safety, surveillance findings and emerging issues. Examples of this translational research is outlined in this report.

Emerging Issue Outreach. The Outreach team continues to use the Center’s vast surveillance database to detect emerging issues, allowing a rapid response to immediate concerns affecting the agricultural community. CS-CASH has actively responded to health and safety concerns including: the Avian Influenza outbreak, aflatoxin contamination in corn, increases in heat stress and fire dangers, the 2019 devastating flooding that has affected many farms and ranches across the Midwest and
most recently the COVID-19 pandemic. The CS-CASH response to COVID-19 in agricultural communities is detailed below.

CS-CASH COVID-19 Pandemic Response and Outreach

COVID-19 Think Tank. In collaboration with the AgriSafe Network and the Texas AFF Center, CS-CASH assisted with planning, sponsorship and administrative support for the AgriSafe COVID-19 Think Tank.

The Think Tank was a series of 9 webinars held April 2, 2020 – May 28, 2020 featuring content experts presenting on a wide variety of topics including (not a complete listing).

- NIOSH Centers for Agricultural Safety and Health Covid-19 Response (CS-CASH)
- Rural Epidemiology of Covid-19
- Covid-19 Resources and Guidance for Agricultural Operations and Communities
- Farm Financial Assistance Options During the Pandemic and Beyond
- Rural Healthcare Update and the Actions Related to Covid19 for Rural Healthcare Providers
- Farm Families Health Insurance Coverage in the U.S. and the Impacts of Covid-19
- Information on Protecting Feed yard Workers During the Covid-19 Pandemic (CS-CASH)
- Examine over 200 Covid-19 Training Topics and Resources for Agriculture
- Navigating Covid-19 on the Farm-

There were 1097 total attendees to the 9-week series. A post-webinar survey indicated that 95% of attendees agreed that the webinars were a valuable use of time and were satisfied or very satisfied with the webinars. These webinars are now enduring materials that can be accessed free of charge on the AgriSafe website: https://learning.agrisafe.org/products/weekly-think-tank-covid-19-ag-task-force-response-recordings#tab-product_tab_contents_9.

Feedyard Facility COVID-19 Playbook. In collaboration with the UNMC Global Center for Health Security, CS-CASH developed a guidebook containing information for feedyard facilities to follow in
order to protect their workers from infection with COVID-19. This guidebook was reviewed by content experts and was sent to Midwest feedyards, including CS-CASH research study feedyards. This playbook was also disseminated by Gallagher Insurance to their feedyard clients. This is a living document, with changes made as the pandemic progresses. The guidebook can be accessed on the CS-CASH website: https://www.unmc.edu/publichealth/cscash/_documents/Playbook-Feedyard-Facilities.pdf

Poultry Facility COVID-19 Playbook. As with the Feedyard Facility Playbook, the Poultry Facility COVID-19 Playbook was developed in collaboration with the UNMC Global Center for Health Security. Reviewed by content experts this resource provides information on keeping poultry facility workers safe during the COVID-19 pandemic. The number of poultry facilities in Nebraska has significantly increased in the past two years as Costco built a plant west of Omaha that, at full production, will process 2 million chickens a week. These birds will be raised in Nebraska, Iowa and Kansas. This playbook was disseminated to NE, IA and KS poultry facilities through partnership with the Lincoln Premium Poultry. The guidebook can be accessed on the CS-CASH website: https://www.unmc.edu/publichealth/cscash/_documents/Poultry-Facility-COVID-19-Playbook-05May20.pdf

COVID-19 Resources for the Ag Community. A COVID-19 resource guide geared toward the ag community is housed on the CS-CASH website as a Spark Adobe doc and is shared widely with stakeholders. Resources are updated and added regularly to the site: https://spark.adobe.com/page/UO9sw0b0vCIrQ/
Safety and Health Training Course – A Thank You to Essential Workers During the COVID-19 Pandemic. The 10th Annual Agricultural Safety and Health Course was held July 14-17 as a live Zoom training. As a Thank You to essential workers during the COVID-19 pandemic this training was held free of charge. Attendees could earn up to 36.75 hours of AMA, Nursing or EMS continuing education credits or 3 hours of academic credits for attending all 3 sessions. The response was excellent, 190 participants registered, 158 joined the live Sessions A (95% retention) and B (91% retention) and 136 registered for session C recorded sessions. A total of 3083.75 hours of CEU credit was awarded to 143 unique learners and 8 students received academic credit. A virtual farm tour, yoga during breaks (see picture above) and a virtual respiratory fit testing training were among the innovative educational techniques utilized.

Collaborative COVID-19 Survey. In collaboration with the Florida AFF Center and other AFF Centers, CS-CASH participated in dissemination of a joint COVID-19 impact survey of Extension personnel.

Fit Testing. CS-CASH personnel Dr. Chandran Achutan and graduate student Alex Farfalla have conducted extensive respiratory PPE fit testing for rural and urban health care providers throughout the pandemic.

Social Media Outreach to Spanish Speaking Agricultural Workers. A Facebook campaign was launched to reach Spanish speaking agricultural workers with COVID-19 prevention messaging. Targeted paid boosts were used to reach this audience. The number of post engagements set a record for the CS-CASH Facebook page. A report on the impact of this outreach was published in the Journal of Agromedicine: Ramos, A.K., Duysen, E., Carvajal-Suarez, M., & Trinidad, N. Virtual outreach: Using social media to reach Spanish-speaking agricultural workers during the COVID-19 pandemic. Journal of Agromedicine. 2020 Sept.12:1-4.
Non-Pandemic Related Outreach.

Social Media and Electronic Outreach. The Center creates content for distribution, including internet-based applications; print and radio media; in order to access farm families and workers on more than 500,000 farms and ranches in our Center’s region. Our comprehensive 25,430 member database made up of farmers and ranchers, public health officials and safety and health professionals has provided an effective, rapid method to reach farmers and ranchers with information on emerging issues as well as with other safety and health information. The CS-CASH website was accessed 5438 times in this reporting year. Social Media including Facebook (664 followers/29,688 post reaches/4500 post engagements) and Twitter has proven to be successful in reaching audiences throughout the year with information on emerging issues as well as general safety and health information. The CS-CASH Ag Safety and Health Photo Sharing site provides agribusiness, the media and safety professional images for use in the promoting safe practices with over 1400 copyright free images. The Feedyard Safety Photo Album contains 340 images.

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CS-CASH Facebook: https://www.facebook.com/unmccscash/
CS-CASH Website: https://www.unmc.edu/publichealth/cscash/
CS-CASH Photo Sharing Site: https://www.flickr.com/photos/cscash/
CS-CASH Twitter @UNMC_CSCASH
CS-CASH Introductory Video: https://www.youtube.com/watch?v=tWKytCifo0w

Boots on the Ground Outreach. Face-to-Face outreach continues as an effective method for the Center to demonstrate, train and discuss proven safety and health measures. During the COVID-19 pandemic, this mode of outreach was significantly reduced. When necessary, as with driving testing for safety certification, face to face outreach was conducted. Extreme measures were employed to protect the participants and trainers against transmission of COVID-19.

Tractor and Equipment Safety Training and Certification. The COVID-19 pandemic forced safety training programs across the U.S. to find alternative methods of delivering required safety training to young agricultural workers. CS-CASH and Nebraska Extension in partnership with AgriSafe, developed a plan for their annual tractor safety training course that was originally scheduled to be held at 12 sites across Nebraska in spring and summer 2020. Plans were implemented to protect the health of the students and trainers during the COVID-19 pandemic. Students attended the first day of the course online through the eXtension Foundation Campus website. After successfully completing the online course, the required driving test was available to the student at 5 locations across Nebraska. In order to protect students and trainers, cohorts were created of 3 to 4 students per 2-hour training and testing session. In order to ensure compliance, frequent messages outlining the safety
protocols were sent to parents and students prior to the training. All students and trainers were required to wear a mask at all times. Masks were provided along with instructions for proper use. All equipment was disinfected before and after each student completed their testing. Students who had a fever or persistent cough within 14 days of testing, or exposure to a COVID positive patient were required to reschedule their driving test. Using these safety protocols, 62 students received training and certification in the summer of 2020. Pictures taken during the trainings are shown below, on the cover and on page 1 of this report.
Cross-Center and Stakeholder Collaborations.

Members of the Outreach Program continue to participate in subgroups of the NIOSH AFF Evaluator, Coordinator, and Outreach (ECO) team.

U.S. Ag Center YouTube Channel. CS-CASH members continue to participate in the leadership of the USAg Centers YouTube group, including maintaining the videos and reporting of analytics. This channel has proven to be a successful collaboration between all 11 NIOSH Agricultural Safety Centers. The YouTube channel features 128 videos, produced and peer-reviewed by the Ag Centers including 17 produced by CS-CASH including a new CS-CASH introductory video: https://www.youtube.com/watch?v=tWKytCifo0w. The channel has had over 18,400 watch time hours with 1475 subscribers since its inception in 2013. https://www.youtube.com/user/USagCenters

Agricultural Safety and Health Conferences. CS-CASH sponsored agricultural safety and health conferences through this reporting period and members served on the planning committee of the MRASH, ISASH and ASHCA conferences. CS-CASH members serve on the Board for the ISASH and ASHCA organizations. CS-CASH partnered with the Washington, Colorado, Texas and California NIOSH AFF Centers to plan and present the Western Ag Safety and Health Conference in 2019. Dr. Risto Rautiainen is serving as the guest editor for a special conference edition of the Journal of Agromedicine. This edition will be published in fall 2020.

National FFA Convention. In partnership with CareerSafe Online, CS-CASH participated in the Safety Exhibit at the National FFA Convention in Indianapolis IN, Oct 2019. The CS-CASH outreach team provided ATV training on the ATV simulator to over 2500 students over a 3-day period. Photos below.
Educational Training

UNL Rwanda Agricultural Scholar Training. The Annual safety and health training for University of Nebraska at Lincoln Rwanda Scholars (n=47) took place June 1-5, 2020. This training is in preparation for their 3-month internships on farms across Nebraska. The training was via Zoom due to the COVID-19 pandemic. Innovative training methods included a virtual farm tour, group analysis and reporting of ag FACE investigations, yoga breaks, use of Kahoot (feedback software used for evaluation and fun), and interactive PPE demonstrations. The week was broken up by group discussions and reports and students provided daily feedback. Training evaluations were positive.

Virtual Progressive Agriculture Safety Days Videos. In collaboration with the Progressive Agriculture Foundation, CS-CASH Produced two videos for the PAF virtual safety days on hearing conservation and Sun Safety. These videos will be used a part of the Virtual Safety Days held across the U.S. during the pandemic.

UMASH Virtual Farm Show. In collaboration with Progressive Agriculture Foundation and Nebraska Extension CS-CASH created a live Facebook ATV demonstration for the UMASH Virtual Farm Show August 2020. The video of this event is now an enduring resource.
Pre-pandemic Face to face demonstrations, presentations and materials distribution. CS-CASH outreach personnel participated in agricultural farm shows and agribusiness events in the Center's seven state region. Outreach took place at Husker Harvest Days (NE) that included 3 grain handling safety trainings in collaboration with the Grain Handling Safety Coalition, FFA Conventions (NE, IN), AgConnect (MO), Women in Agriculture Conference (NE); Sustainable Ag Conference (SD) and Lake Region Extension Roundup (ND). CS-CASH provides training and demonstrations at these events, interacting with up to 500 people/day at some of the larger events. This Boots on the Ground outreach, reaches large numbers of farmers and ranchers in all seven of our regional states, encourages long-term community relationships to flourish and valuable new relationships to be established. New focus topics are presented each year.

Spanish Language Agricultural Safety and Health Resources. CS-CASH continues to work to translate all of their educational resources into Spanish. These materials are available to the public at farm shows, trainings and on the CS-CASH website: https://www.unmc.edu/publichealth/cscash/news/Spanish-resources.html.

Ag Media. Ag journalist Loretta Sorensen continues to create media-ready, Ag safety and health related stories for the Ag and rural newspapers, farm journals and radio and television stations. Story content is created using experts in the field with the final copy reviewed by two content experts. UNMC Public Relations and Loretta disseminate the articles through Midwestern media sources and the Associated Press. These articles are available to the media and to the public on the CS-CASH website as “Ag Stories Ready to Go”. UNMC supports a news-tracking service that provides metrics including the source running the article/interview, date, frequency, circulation, article size, ad value and page number. Link: https://www.unmc.edu/publichealth/cscash/news/index.html.

CS-CASH continues to support the maintenance, software updates and administration of the National Ag Safety Database. NASD has continued to grow with addition of training materials, videos and additional resources. Website analytics are shown below.

**Website Traffic**

**User Demographics**

![Website Traffic Chart]

**NASD Facebook Page**

[https://www.facebook.com/NASDOnline](https://www.facebook.com/NASDOnline)

In the period 9/1/2019 through 8/31/2020, we’ve increased the number of Followers from 208 to 271. The number of Page Likes increased from 199 to 259.

**Website System Updates**

1. Created an administrative view/report that shows a topographical list of categories in the database.
2. Made updates to the online contact form to address some errors in a particular use case of the submission process.
3. Updated the public and administrative search algorithms so that users can search for items using our internal alphanumeric ID.
4. Updated the query for the "What's New" search that there is a lower likelihood that the page appears sparsely populated.
5. Changed the functionality of collection links so that they no longer open new tabs/windows. The was primarily done to improve the consistency of the site behavior.
6. Security updates:
7. - Removed some sensitive files from being tracked by our revision control system.
8. - Forced the page to send users to the HTTPS (secure) version of the site
9. Refined the formatting of some site header images to stop them from over expanding on particular devices and views.
**Farm Women and Military Veteran Farmers Outreach || AgriSafe.**

**Specific Aims**

1. Increase outreach education for farm women and military veteran farmers working in agriculture of occupational health and safety practices.
2. Created and continue- Stories from the Field, which collects and shares stories that inspire other women and military veteran farmers to improve their health and safety while working on the farm.
3. Establish media relationships to bring awareness to issues of women and military veteran farmers to the broader agricultural community.

Since the inception of this CS-CASH/AgriSafe collaborative outreach project in 2016, AgriSafe has made significant progress working to serve the occupational health needs of women and veterans in agriculture. AgriSafe outreach has focused on ergonomics, respiratory and reproductive health. We have trained approximately 3,000 producers and employees. In May 2019 AgriSafe launched the Military Veteran Farmer project. We have hosted quarterly webinars on topics including prevention of hearing loss, sleeplessness, healthcare for rural veterans, and work-life balance for veteran farmers. The cumulative work on the Veteran outreach can be seen at [https://learning.agrisafe.org/veteranshealth](https://learning.agrisafe.org/veteranshealth). During this one-year period AgriSafe also responded to the global public health threat of the novel coronavirus disease, which has an impact across our nation including rural areas and the agricultural sector.

In this reporting period, AgriSafe strategically conducted outreach and associated program activities for farm women and military veteran farmers. AgriSafe conducts its outreach education based on evidence-based research. AgriSafe has sought out and attended local, regional, and national events to share information with ag health and safety managers, agribusiness and those in rural areas who serve agricultural populations. When on site demonstrations and engagement are not feasible, AgriSafe has utilized distance learning platforms, social media, and monthly newsletters to disseminate information. AgriSafe has been strategic in identifying and being responsive to media inquiries on ag health and safety topics.

**AgriSafe Outreach Related to Women and Veterans in Agriculture:**

- Presentation. National Farm Safety and Health Week-A focus on wellness and safety.
- Exhibit at Husker Harvest Days. Respiratory hazards, and respiratory protection as well as women’s health discussed at exhibit, gave away over 400 masks 3M 8110 and 8511 respiratory masks donated by 3m and CS-CASH.
- Presentation. NFSH week promotion, Gear up for Safety, Mental health and stress in ag.
• Interviews. Reproductive hazards for women working in Ag. [https://www.harvestpublicmedia.org/post/pregnancy-farm-comes-its-own-set-risks](https://www.harvestpublicmedia.org/post/pregnancy-farm-comes-its-own-set-risks) [https://will.illinois.edu/21stshow/program/how-the-g.m-workers-strike-affects-illinois-being-pregnant-while-working-on-a-farm-the-great-leap-at-steppenwolf](https://will.illinois.edu/21stshow/program/how-the-g.m-workers-strike-affects-illinois-being-pregnant-while-working-on-a-farm-the-great-leap-at-steppenwolf)

• Panel Presentation. Moldy Corn to mental stress- NE flood recovery and preparedness

• Presentation. Respiratory Health at Women in Ag Conference

• Live web stream promotion of AgriSafe webinars for ASAP week

• Media Presentations. Mindful and Meaningful Essential Conversations in Agricultural Health and Safety. 2 live segments-midday news hour.

• Presentation. Self-care female agriculturist- women’s health

• Presentation. COVID 19 etiology and PPE, focus on mental health

• News article. Layers of mental health stress as related to COVID 19.

• News article. Overview of Nebraska flood recovery and disaster preparation

• Presentation. Overview of women’s health general topics leading to utilize the Ag Health Risk Assessment for strategies

• Demonstration. Yoga stretches applicable for farmworkers, as well as use of mindful breathing exercises during agricultural safety and health courses.

• Presentation. Overview of the female producer role/hazards and resources to mitigate farm/ranch hazards

• Webinar. Learning When to Put the Work Away: Finding Balance for Veteran farmers (March 12, 2020) Shay Foulk

• Webinar. To Care is to Honor: Understanding the Unique Healthcare Needs of Veteran Farmers (April 30,2020) Heath Woockman

• Webinar. Sleepless in America (June 1, 2020) Susan Harris / Linda Emanuel

• Webinar. Veteran Farmers: Reducing Noise Exposure & Protecting Your Health (September 10,2020) Marjorie McCullagh / Linda Emanuel

AgriSafe Learning Lab for Veterans. The AgriSafe Learning Lab (ALL) is built on management software that allows participants to experience learning at a time that is right for them and ensures active listening before certificates are generated. In order to better promote and engage military veteran farmers, AgriSafe developed a dedicated space with ALL at [https://learning.agrisafe.org/veteranshealth](https://learning.agrisafe.org/veteranshealth). This site features on-demand webinar content specific for military veteran farmers health, including additional webinar topics which may be beneficial such as respiratory health, working with livestock and farm equipment safety.

Veteran Farmer Ag Health Risk Assessment Tool. University of Nebraska Medical Center, College of Public Health student Alyssa Damke is working on a project with AgriSafe that is focused on gaining a better understanding of the gaps in health care and professional competency when caring for Veteran farmers. This information will be used to develop an Agriculture Health Risk Assessment (AgHRA) e-tool designed specifically for the Veteran farmer to take as a self-assessment.

FarmHer Blog and Media Interviews. Linda Emanuel, RN AgriSafe Community Health Nurse has continued presenting health and safety information as part of the FarmHer podcasts. AgriSafe has
had media interviews on work related risks in reproductive health of farm women. Linda has also been a guest presenter and subject matter expert at UNMC’s Agricultural Medicine course in 2019 and virtually in 2020, with a focus on issues specific to women agriculturalist.

Responsiveness to Emerging Issues
During the fall of 2019, a number of professional conferences and media inquiries, focused on flood recovery, respiratory protection and working with wet grain. During the spring 2020 a new threat would emerge in the form of the novel coronavirus pandemic. AgriSafe with the support of CS-CASH hosted virtual stakeholder events to bring timely information to the agricultural industry, operators, employers and safety and health professionals. The 2-month series of 9 distinct webinars launched on March 23, with “What Ag Producers Need to Know About COVID-19” and continued in a weekly format, “COVID-19 Ag Task Force Response” from April 2nd – May 28th, reaching over 573 attendees.
<table>
<thead>
<tr>
<th>Category 1</th>
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<tr>
<td>Course/Curriculum (short course or training)</td>
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<tr>
<td>Focus Group</td>
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<td>Material Distribution</td>
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<td>Mtg/Conference</td>
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<td>On site safety audit</td>
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<td>Article/Report (non peer-reviewed)/poster</td>
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<tr>
<td>Booklet/Brochure/Factsheet</td>
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<td>Collaborations-new or expanded</td>
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<td>Newsletter</td>
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<td>Video/Multimedia Material</td>
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<td>Investigator Honors/Special Recognitions</td>
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| Grand Total                                     | 310                  |
CS-CASH Publications Fiscal Year 9


