



Great Plains Center for Agricultural Health 2019-20 Annual Report

Sept 30, 2020

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The Great Plains Center for Agricultural Health is located within the Department of Occupational and Environmental Health at the University of Iowa, College of Public Health, at 145 N Riverside Drive in Iowa City, IA, 52246

SECTION I: CENTER SUMMARY

The Great Plains Center for Agricultural Health and Safety (GPCAH) is a nationally recognized public health resource that develops and implements programs of research, intervention, translation, education, and outreach with the long-term goal of preventing occupational injury and illness among agricultural workers and their families. The Center serves a nine-state region: Illinois, Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, South Dakota, and Wisconsin. The Center addresses the health and safety needs of agricultural workers in America's most agriculturally intensive region, which has a significant burden of severe agricultural injuries and illnesses compared to other regions and industries. A full list of GPCAH program outputs from 2019-20 is provided in the Output Summary (pp. 18-25).

OVERALL GOALS

The overall goals of the GPCAH are to:

- 1) Serve as a regional and national resource for agricultural health and safety.
- 2) Conduct relevant and translatable research that provides evidence-based strategies to improve the health and safety of agricultural workers.
- 3) Develop and evaluate educational, outreach, and intervention programs to prevent disease, injury, and hazardous exposure among agricultural workers and their families.
- 4) Provide relevant and evidence-based assistance (*e.g.*, methods, training, and interventions) to health and safety professionals and community-based agricultural health organizations to enhance regional expertise to prevent agricultural injuries and illnesses.
- 5) Maintain and expand networks to promote agricultural health and safety research, training, and prevention programs and to track emerging issues that may put agricultural workers at increased risk of illnesses or injuries.

The Center includes four research projects aimed at reducing the burden of injury and illness throughout our region and has an Outreach Core to build the expertise in health and safety throughout the community, for professionals, community advocates, intermediaries, and farmers.

RELEVANCE

Agricultural workers experience high rates of occupational injury (including fatal injury) and illness when compared to other employed groups. As the region's most well-established agricultural health and safety resource in the nation's most agriculturally intensive region, the Center is highly relevant to agricultural workers, physicians, public health practitioners, and researchers committed to protecting the health and safety of agricultural workers. We describe relevance for each project and activity in Section III.

SECTION II: KEY PERSONNEL

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SECTION III: PROGRAM HIGHLIGHTS AND IMPACT

Planning and Evaluation Core

(T.R. Anthony)

The Planning and Evaluation (P&E) Core comprises ongoing activities that:

- 1) Ensure the efficient and effective management of Center *resources*,
- 2) Identify health and safety *needs* throughout the region,
- 3) Coordinate *communication* between Center personnel and Advisory Committees and stakeholders,
- 4) Develop and implement an evaluation program and respond to improvement recommendations to maximize the impact of our programs and projects on agricultural worker protection, and
- 5) Identify and respond to *emerging issues* that threaten the health and safety of agricultural workers throughout the region.

Below are the key activities and impact that the GPCAH has made to meet these objectives in the past year.

Evaluation

Key evaluation team efforts this past year included publication of our regional needs assessment and ongoing evaluation activities. The **Needs Assessment** study used data from the summer/fall 2018 survey of regional farmers, analyzed to understand the needs and stressors of farmers. Based on feedback from 540 respondents, we identified 14 categories of health and safety concerns and 10 categories of stressors. Frequency tabulations of these categories identified the following as key areas of greatest perceived health and safety **needs** of our region's agricultural workers: *chemicals (safe handling, effects, drift, storage), equipment / machinery (entanglement, operating, injuries), and health outcomes (respiratory issues, noise, stress, cancer, behavioral)*. The most frequently cited **stressors** among agricultural workers were *financial (commodity prices, input costs, other costs), climate/weather (too much/not enough rain), and workload management (workload, isolation, time management, labor shortage)*. These results and a discussion of their impact on how study investigators can reach farm workers are included in the manuscript:

Arora K, Cheyney M, Gerr FE, Bhagianadh D, Gibbs J, Anthony TR: [2020] Assessing Health and Safety Needs and Psychological Stressors among Agricultural Workers in the Midwest. *Journal of Agricultural Safety and Health*. 26(1): 45-58. <https://doi.org/10.13031/jash.13660> (PMC7250162)

Project Evaluation Activities included completion of mid-term evaluation of all Center projects. This effort determined the extent to which proposed activities were implemented as intended and examined barriers and challenges encountered in program implementation. The mid-term evaluation also assessed significant program modifications, current unmet needs relative to resources, and the extent to which project activities led to stakeholder satisfaction. Broad themes arising from these interviews were identified and shared with Center and project personnel to identify ways to maximize progress toward meeting our Center-wide objectives.

Coordinate Communication: Activities and Impact

Impacts of Advisory Committees: Progress in research and outreach are shared in monthly meetings with all Center investigators and staff, where everyone actively contributes ideas to help project teams build networks, tackle obstacles, and share lessons learned. Three quarterly meetings with our Regional Advisory Committee (RAC) focused on reviewing Center-generated outreach materials (e.g., Manure Gas and Roadway Safety outreach kits; COVID-19 videos and infographics), in which research findings are translated into guidelines and recommendations for farmers. In these meetings, our RAC members learn about how research informs these prevention messages and actively recommend improvements to strengthen these messages. The annual External Advisory Committee (EAC) meeting, delayed to August 2020 this year,

focused on receiving feedback and recommendations from advisors on project activities and emerging issues.

Impacts of MRASH: The GPCAH supported the 2019 Regional Midwest Rural Agricultural Safety and Health (MRASH) conference, held in Marshalltown, Iowa in November. Center personnel helped coordinate meetings, provided introductions at the event, and coordinated several roundtables. This two-day MRASH conference had 112 registered attendees, from seven U.S. states (IA, IL, MN, MO, NE, TN, and WI). The primary employment of attendees crossed multiple sectors, including research (25%), healthcare (21%), students (19%), non-profit organizations (19%), ag producers (6%), and public health (6%). Staff from both Minnesota and Nebraska AFF centers attended and participated. Three presentations were given by GPCAH personnel and two by investigators who received pilot grants. At the end of the conference, participants and the community were invited to participate in one of two workshops – Stop the Bleed or QPR Suicide Prevention. MRASH presentations were selected to provide attendees with skills and resources on fundamental safety and health hazards (*e.g.*, cancer, health outcomes, youth on the farm), updates on GPCAH surveillance activities, and a pilot grant writing workshop targeted to rural healthcare providers who also attended this conference. Cross-cutting panel sessions were incorporated into the program to enhance recognition of relevant topics:

- *Health and Safety Impacts of Emergencies and Disasters:* The Keynote provided lessons learned from the floods in NE and IA earlier that spring.
- *Marshalltown Tornado Response:* Kim Elder, director of Marshall County Emergency Management led a panel on the lessons learned from the 2018 tornado that destroyed downtown, providing considerations for how to plan for and respond during disaster.
- *What is Current in Mental and Behavioral Health:* A roundtable provided perspectives on resources and use of mental health services throughout rural communities in Iowa. Dan Brown, current GPCAH pilot grant recipient, coordinated the session.

Impacts of Social Media: The P&E Core implemented the Center’s social media communications strategy, which incorporates Facebook (FB), Twitter, and YouTube. These networks are used to disseminate safety messages and study findings to new individuals across a broad audience. In this project period, 161 Twitter posts and 253 Facebook posts were generated. Our Twitter followers are more engaged in scientific studies and reports, where we made over 35,398 impressions and gained 52 new followers. Our Facebook posts reached 29,415 unique individuals over the year, and the number of engaged readers exceeded 37,370 this year. Our most popular FB post shared a media story detailing a grain bin-related death (1.3K reached, 276 engaged). We did not pay for any “boosts” this year. Table 1 summarizes the most effective post topics for these two accounts.

Table 1: GPCAH Social Media Top Posts

Twitter	Facebook
Workplace fatalities (12/6/19) https://bit.ly/3kMfg7U	We are saddened to read about another grain bin-related death (shared article) (1/10/20) https://bit.ly/3kRgkRu
National Farm Safety Week (9/20/19) https://bit.ly/33eLAE1	Physical distancing on the farm (7/9/20) https://bit.ly/3n8MJFg
Agweek: farm injuries (1/08/20) No Twitter link since this was a retweet.	COVID-19 symptoms (6/4/20) https://bit.ly/339fZDP
Tool Selection for Women (9/20/19) https://bit.ly/3icsgvr	Agrsupervisortraining.com: Earn \$50 (Shared ad) (9/19/19) https://bit.ly/36hWZF1
Grain Bin Safety Poll (9/19/19) (Link not available; poll was active for only 48 hr)	Women in Farming: National Farm Safety Week (2/20/20) https://bit.ly/3436UeU

COVID-19-related posts were also popular (see Emerging Issues update). Post on this topic began in April 2020, with links to Center resources, starting with “Frequently Asked Questions” (FAQs) page. Two COVID-19 Facebook posts reached over 1,500 individuals. Our communications team worked with other Agriculture, Forestry and Fishing (AgFF) Centers to create and distribute a national COVID-19 media campaign to share details of the [CDC guidelines for agriculture workers and employers](#) once finalized on June 11, 2020. We have completed this at the end of September, sharing all 27 posts. These posts have reached (on average) over 3050 individuals via Facebook with over 170 engagements, and on Twitter they have reached (on average) 9,748 impressions and have had over 180 engagements. We have also shared our recent COVID-19 outreach videos (see Emerging Issues) on social media, receiving over 630 hits on Facebook, and over 2,400 on Twitter. We have posted nine new COVID-19 relevant videos on the [GPCAH YouTube channel](#) starting at the end of June 2020, which have been viewed over 700 times. Currently, three of our videos have been reviewed and posted on the [AgCenters’ YouTube channel](#), with more under review, and we are participating in the technical review of other AgFF center videos for this channel.

Impact of Press Releases: In 2019-20, the P&E Core prepared six press releases on CDC guidelines, pilot grant solicitation, two publications, and National Farm Safety week. The press release communicating the publication of the [CDC COVID-19 Guidelines](#) for ag workers (June 2020) was shared this with the AgFF Evaluation, Communication, and Outreach (ECO) group as a template for other Centers to customize and distribute. Pilot grants were announced with the April 2020 press release “Improve the safety and health of upper Midwestern farmers and agricultural workers with a \$30,000 pilot grant award.” This press release was accompanied by a social media campaign that included a once-a-week posting on Wednesdays until the end of the application period (July 1). In January, a press release for Dr. Kanika Arora’s manuscript “Study reveals Midwest farmers’ top concerns and stressors” was published and was picked up by the Gazette (Iowa) and Yahoo! Finance. Dr. Arora was also interviewed on Iowa AgriBusiness Radio Network. Dr. Corinne Peek-Asa’s publication in the American Journal of Industrial Medicine, which used surveillance data from the previous project cycle, was highlighted in the press release entitled “Studies may be underreporting farm injuries.” Dr. Peek-Asa was interviewed by Cedar Rapids, IA television network KCRG, and her study was highlighted in a Keloland.com article, “Farming is risky business.” A press release entitled “GPCAH works to keep agricultural communities inform about safety,” helped to advertise National Farm Safety week in September 2019, resulting in interviews of Dr. Cara Hamann, who discussed road safety and National Farm Safety and Health week on KLGR. The Democrat Star (Maryland) quoted the GPCAH in an article about grain entrapment cases in March.

Emerging Issues

NIOSH has provided the GPCAH with funds to address timely hazards throughout the project period. At the start of this center’s funding cycle (2016), manure gas fatalities were a regional concern and members of rural communities called with questions and concerns about pesticides drifting onto neighboring lands and into homes. In 2018, concerns regarding mental health – particularly as related to the national opioid addiction and later to farmer suicide – became regional priorities. In the current project year, we focused on continuing mental health activities and developed new COVID-19 activities, both regionally and nationally.

Emerging Issues: COVID-19

In early April, the GPCAH compiled and posted an [FAQ for COVID](#) answering questions coming in from farmers, rural communities, and the media. This document has been revised twice since its original posting to update relevant statistics and to reflect our improved understanding of COVID -19 risk and prevention strategies. From mid-April to the end of May, the GPCAH collaborated with NIOSH and other AgFF centers to develop recommendations for the national [CDC interim guidance for Agriculture Workers and Employers](#). While NIOSH coordinated approval across multiple agencies across the US, the GPCAH generated toolbox materials to be available when the CDC released the guidance document, published initially on June 11, 2020. In concert with other AgFF centers, the GPCAH identified materials needed to communicate risks and recommend prevention to farmers. Centers agreed that short educational videos may be more impactful than traditional posters to communicate prevention recommendations for COVID, and a series of topics were identified as priority for our national outreach effort, and we led the development of videos aligned well with our regional concerns a local expertise.



Figure 1: A screen shot from Part 1 of the Q&A face covering YouTube video series.

Given questions arising from the general public, GPCAH developed a detailed “how to” document for face coverings along with Q&A videos on the topic of cloth face coverings, a three-part series (why and when; medical concerns; how to select features). These videos were framed in a Q&A format to allow experts (a physician, industrial hygienists) to answer questions raised by the community. In addition, the GPCAH also created four video demonstrations on how to put on and take off four types of face coverings (dual ties; single tie; elastic straps around the head; straps around the ears), answering questions asked by Midwesterners. These demonstration videos also answer questions about laundering and storage for cloth face coverings and incorporate best practices for hand hygiene. In addition, the GPCAH generated an animated “Hierarchy of Controls” video in response to the AgFF Centers requested priorities, to help explain the concept identified in the CDC guidance. This animated video incorporates specific examples of each control element in this philosophy as it relates to COVID-19. This animated video explains the need for a multi-tiered approach to prevent the spread of the SARS-CoV-2 virus in the workplace and community. Finally, the AgFF Centers identified a need to communicate how to set up a COVID symptom screening program for farm workers, and we completed the final Q&A video on this topic. Tracking of the reach and use of these tools are underway.

Outcomes:

- These resources can be found on the GPCAH COVID-19 [webpage](#).
- The detailed guidance on Cloth Face Coverings: Selection Use and Maintenance can be downloaded as a [pdf](#).
- All nine videos can be found on the GPCAH [webpage](#) and the GPCAH [YouTube channel](#).
- The three-part Q&A series on cloth face coverings has been reviewed and accepted to the [U.S. Agricultural Safety and Health Centers YouTube channel](#) as well. The “Hierarchy of Controls” and “Symptom Screening during the COVID-19 Pandemic” videos are under review.
- Investigators (Anthony, Gerr) involved in making these videos have participated in other webinars ([Face Coverings](#) in August and [Precautions for Schools](#) in July) that shared these resources with over a thousand attendees from rural communities served by the GPCAH.

Emerging Issues: Mental Health

Center personnel have been actively working with regional stakeholders to understand farmworker needs for mental health services.

A pilot project titled 'Stress, coping, and social support among Farmers and their spouses in Iowa' is underway. The PI, Dr. Afifi, is faculty in the Community and Behavioral Health department at the University of Iowa College of Public Health and is well positioned to lead this project. The objective of this work is to explore in-depth how farmers and their spouses appraise various stressors and to examine mechanisms that may support farmers and their spouses to cope more effectively with stress. Interviews will be conducted separately with farmers and spouses. The information shared can lead to the development of community-based, peer-based interventions to limit the impact of stress on farmer and farming families' health and wellbeing. The project aims to interview 20 farmer and spouse pairs individually. The IRB process for this project was finalized and approval obtained just as COVID-19 resulted in research stoppage at the University. Since in-person interviews were considered to be most effective for obtaining the desired information, the project was paused until such a time where face-to-face interviews will be possible and after the 2020 fall harvest. We hope to begin the interviews in late Fall, pending COVID-19.

Because COVID-19 interrupted the original timeline, a survey to understand stress, coping strategies and wellbeing of farmers across the US in relation to COVID-19 was developed and is awaiting final IRB approval. Once approved, we will be recruiting farmers through listservs, through 4-H, and at agricultural events and conferences. Those interested will be provided with a link to an anonymous Qualtrics survey. Data will be analyzed and shared with organizations that work with farmers. Results can guide the development of supportive interventions to promote wellbeing among farmers.

This Emerging Issues team is compiling resources into a repository to host a national database of intervention studies related to farmer mental health (stress, coping, psychosocial wellbeing, etc.). The intent is to (i) Summarize peer reviewed academic literature on mental health interventions for farmers in the US and around the world and (ii) Identify the strength of the evidence for each study. This will begin by identifying and summarizing the US studies and will then expand to global studies.

Outcomes: New partnerships have been developed to ensure mental health activity content is relevant to rural agricultural workers. In addition to building networks within the mental health community, the GPCAH used \$30,000 of 2018-19 Emerging Issues funding to fund an additional pilot project (*Iowa Harm Reduction Coalition* pilot project, fully described in the *Pilot Project/Feasibility Grant* research project report). Two additional pilot projects performed in this period focused on mental health issues (Holmstrom at University of Minnesota; Moynihan at Minnesota Department of Agriculture). In October 2019, three additional pilot grant projects scored in the fundable range and all addressed mental health in farmers, also described in later section of this report (Brown at Iowa State University; Zabel at Minnesota Department of Health; Berman at University of Minnesota).

Instrumented Farm Vehicle Roadway Study (C. Hamann)

This research study investigates vehicle interactions with farm equipment on public roads that contribute to crashes involving rear-end collisions and dangerous passing maneuvers. Phase 1 of the study aims to develop and refine a device mounted on the rear of farm equipment that (a) measures farm equipment exposure to the roadway and the frequency with which cars approach the farm equipment and (b) measures the behavior of vehicle drivers as they approach the equipment. During Phase 2 of the study, the team developed and are currently deploying and evaluating a farm equipment roadway safety program at the community level.

Naturalistic Driving Data: Two periods of data collection (fall harvest and spring planting) in the intervention and control communities were planned for this year. During the fall harvest season, almost 1,800 videos were recorded. However, data collection for spring 2020 was cancelled due to the COVID-19 pandemic. The development of methodologies for processing video and GPS data continued. A procedure for detecting vehicles in the video recordings was designed and validated. In early March, test data was recorded using high-accuracy GPS units along with *SaferTrek* devices on a closed course. This data has been used to calibrate and determine the accuracy of the data being extracted from the video processing, (i.e., estimated distance and relative velocity between the farm equipment and a following vehicle). In addition, procedures for identifying roadway trips in the GPS data, excluding data points off the roadway (e.g., driving done in a field), and tabulating trip metrics are nearly finalized.



Figure 2: Mounted *SaferTrek* devices in weather-tight boxes.

Fall Safety Campaign: The fall 2019 campaign for the community engagement tasks of this project included deploying window clings in local businesses, hanging an intersection banner in town, and participating in community activities, including homecoming, trick-or-treating on the town square, and a career fair. We had about 100 businesses agree to hang window clings, demonstrating great support throughout the intervention community. These businesses agreed to display the window cling for approximately one year. The intersection banner was hung during harvest season, starting in the last week in September through to the end of October 2019. Our homecoming campaign included distributing t-shirts using a t-shirt cannon at the homecoming pep rally. Future Farmers of America (FFA) members also handed out 100 branded car air fresheners to individuals parking at the football game. The local high school hung a campaign banner at the entrance of the football field for the homecoming game and then through the rest of the football season. Announcements were made at all home football games stating, "It's harvest and that means more farm equipment on the road. Remember, we're on this road together—slow down, leave more space, and avoid passing. Safer roads are in our hands. Safety message brought to you by the Great Plains Center for Agricultural Health and Injury Prevention Research Center at the University of Iowa." Trick-or-treating was held on October 31 in the community's downtown square. Campaign involvement was led by the local insurance agency, which facilitated handing out 320 grocery tote bags to parents during the trick or treat

hours. A teen career fair was held on November 6 at the Williamsburg Recreational Center. Council advisory board members handed out remaining tote bags and car air fresheners to students.

Additional campaign activities were planned for spring 2020 (e.g., coasters and stickers to be distributed by local businesses, banner hanging and announcement at sporting events, intersection banner, etc.), but activities were cancelled indefinitely due to COVID-19. A process evaluation of the community advisory board was completed during summer 2020 to gain additional data on campaign success and the planned post-intervention intercept surveys were adapted to an online format and completed in the intervention community only.

Key Outcomes or Other Achievements: During this reporting period *SaferTrek* devices recorded approximately 1,800 videos (Phase 1). Significant progress was made on the community-based intervention objectives, including business engagement, school engagement, and community events during Fall 2019, but all further intervention activities have been cancelled due to the pandemic (Phase 2). Interviews were conducted with all 8 of the community advisory board members as part of a process evaluation and 100 online post-intervention surveys were conducted in the intervention in summer 2020.

COVID Interruption: All roadway data collection and intervention activities were stopped starting in March 2020. No further intervention activities are planned, due to the continued pandemic. One more harvest season (Fall 2020) of roadway data collection is currently underway.

Air Quality Improvements in Livestock Production Buildings (M. Nonnenmann)

Swine workers experience an elevated rate of lung disease, pulmonary symptoms, and decreased lung function compared to workers in other industries. Aerosols containing microorganisms in swine production contribute to exposure burden and disease transmission among both animals and workers. GPCAH data has demonstrated that two technologies can improve the air quality in small-scale swine farrowing rooms: a recirculating ventilation system with air filtration technology and a gas-fired heating system that vents to the outside. Modifications using proven disinfection technologies (e.g., ultraviolet light or UVC) within the ductwork of this system is being investigated as a technology that could be effective to reduce the burden of disease in both pigs and workers. Our long-term goal is to develop engineering guidelines for the swine industry that will be adopted by builders and swine producers to reduce occupational exposures, thereby reducing lung disease and infection in this working population. In Aim 1, we are evaluating the effectiveness of our technology to improve air quality in swine production. In Aim 2, we are optimizing our technology to control microorganisms in the air using filtration and UVC light during commercial swine production. In Aim 3, we are evaluating a bioaerosol treatment system on reducing airborne concentrations of microorganisms in a commercial swine farrowing building. Technology to reduce airborne dust and microorganisms will be evaluated across multiple field and laboratory experiments and tested in commercial swine farrowing. We expect that this work will result in novel engineering solutions to decrease dust, microorganism concentrations and subsequently reduce agricultural worker exposure in swine production. *This contribution is significant because successful demonstration and adoption of engineering technology would demonstrate a paradigm shift from the current approach to control inhalation hazards.*

Over the past project year, we have continued laboratory work on Aim 2 and began deploying the system in a new test building for Aim 3.

Aim 2: We completed experimental trials in the lab using aerosolized *E. coli* to assess the performance of the prototype filtration/ultraviolet (UVC) system. To evaluate system performance, we compared bioaerosol concentration “upstream” of the treatment system to concentrations measured “downstream” of the treatment system. We challenged the system by varying UVC intensity relative to the estimated maximum particle UVC dose at six levels. In the lab, we have demonstrated that a system operating at 1600 cfm, using MERV16, and at 2% of our maximum UVC was effective at inactivating *E. coli* bioaerosol.

Additional tests, however, are needed to examine dosing for other bioaerosols. Subsequent experimental trials examined the system effectiveness using aerosolized MS2 virus (n=33). We challenged the system across the system by again varying UVC intensities: Our preliminary results suggest that the system achieved approximately 100% reduction in “active” virus at 76% UVC system intensity, higher than what was needed for *E. coli* inactivation. Also, when we treated virus aerosol with both filtration at 2% UVC intensity, the virus aerosol concentration was below the limit of detection.

Aim 3: One of the challenges that we experienced in this and the prior project period was the onset of African Swine Fever in Europe and China. Fear of this virus spreading to the US has prompted many producers to limit access to farms. In late summer of 2019, our producer partner from Years 1 and 2 requested that we discontinue our field experiments at their production operations.

To make progress testing the system in the field to meet the intended goal of this aim, we have transitioned field experiments to the Mansfield Swine Education Center at Kirkwood Community College in Cedar Rapids, Iowa (“Kirkwood”). Since we had deployed in previous center funding periods in farrowing rooms, which were much smaller than production operations, we selected to deploy this unit in the swine finishing room at Kirkwood, which is more suitable for the size of the treatment unit constructed for production operations.

This transition allowed us to continue field experiments over the winter of 2019-2020. We installed our prototype system in October 2019 and started field experimentation in November 2019. We collected data to evaluate the ability of our prototype system to reduce dust and bioaerosol concentrations in swine finishing. Data compared dust and bioaerosol concentrations across a “treated” swine finishing room to these concentrations in a similar untreated / “control” swine finishing room that was adjacent to our treatment room. To date, we have collected 144 integrated 24-hour inhalable and respirable dust measurements comparing the treatment and control rooms. We have also collected 198 short-term bioaerosol samples to allow evaluation of the unit performance, comparing the concentrations upstream and downstream of the prototype system and to compare concentrations between treatment and control rooms. These samples were collected during 24 field site visits through March 2020.

Our preliminary analyses suggest a reduction in total bacteria bioaerosol room concentrations. Specifically, the average concentration of airborne bacteria in the treatment room was $4.38E+04$ colony forming units (cfu)/m³ (SD=3.85), but was two orders of magnitude higher at $1.02E+06$ cfu/m³ (SD=1.86) in the control room. At this time, however, the observed reduction was not statistically significant (p-value = 0.272), but additional data analyses are ongoing and future deployment will increase our sample size.

COVID Interruption Impacts: Our field and lab project activities were shut down from March 2020 to May 2020, although we were able to perform data analyses while working remotely. In June 2020, we resumed laboratory activities that includes continuing virus aerosol challenges to our UVC air treatment system. We have completed all our proposed laboratory and field activities for the current project period and are making plans for winter 2020 field deployment.



Figure 3. Untreated swine room air was drawn into the system (i.e., red arrow) with and treated UVC and MERV 16 filtration and returned to the room (i.e., blue arrows).

Surveillance of Injuries and Risk Factors in Using Workers' Compensation Data (M. Ramirez, C. Casteel)

The goal of this project is to improve the science of agricultural injury surveillance through two studies, one focused on surveillance of agricultural injuries captured through Workers' Compensation (WC) and State Trauma Registry and a second study focused on surveillance of agricultural hazards. For the first study, we are analyzing agricultural injury cases captured in three datasets: Nationwide Insurance Company, Iowa's Trauma Registry (Iowa Department of Public Health) and Iowa's Workers' Compensation system. The aims of this study are to (a) estimate the incidence of agricultural injury in Iowa reported through the three datasets and (b) compare agricultural injuries by severity, type, mechanism and demographics reported by farming operations across the three datasets. For the second study, we are evaluating a new agricultural hazard surveillance tool developed by the study team and experts from the GPCAH, including Regional Advisors. The aim of the second study is to evaluate the effectiveness of the Agricultural Hazard Surveillance tool to identify hazards that are associated with injuries on the farm.

Study 1: For Study 1, we identified three administrative data sources to characterize injuries, costs and trends: insurance data, state trauma data and state workers' compensation data. Insurance data provided unique information about costs of claims. Costs of agricultural injury claims exceeded \$21 million in one large insurance company with over policyholders from 22 states. Two-thirds of claims were medical only, while about 1/3 were death/disability claims. The costliest claims were system-wide injuries and injuries from falling or flying objects. Preliminary analysis of trauma and workers' compensation data are as follows. Trauma registry cases provided complete information on diagnoses, external cause and severity of cases that led to hospitalization or an emergency department visit: 92.5% male, with 66% for mild injury, 20% moderate, and 12% severe (ISS>16). The top causes of injury in this database were machinery (26.8%), falls (17.8%), struck by/against (12.4%), and natural/environmental (10.2%, mostly from animal-caused events). Data from the Iowa Division of Workers' Compensation Data (IWC) submitted by agricultural operations across the state also included medical information as well as mechanisms of injury. We identified a lower percentage of males injured (82.4%), and the top causes of injury in this data were strains (26.3%), slip/trip/falls (24.5%), and struck-by (17.4%). Quality control assessments are being conducted on cleaning and data management of the ITR and IWC datasets, with the goal of linking data across these two sources and comparing trends.

Study 2: For Study 2, a hazard surveillance tool was developed and implemented to characterize farms and injury histories. By the start of COVID-19 shutdowns in March, the team completed the 90-minute field visits of 108 farms in Iowa. We aimed initially to enroll 75 farms, but this was increased to 125 in order to capture additional sites across harvest, planting and growing seasons. For a subset of 45 farms, a second research team member conducted a replicate assessment, and a comparison of the two independent assessments using the same hazard assessment tool is underway. Data are being verified and analyses are underway. The hazard assessment checklist is being converted to a web-based app for future use in the field.

Hazard Assessment Checklist Components



Figure 4: Major categories in hazard assessment checklist

COVID Interruption Impacts: Because of COVID-19, the team was unable to complete farm visits after March 2020. Our revised target of 125 farm visits was not reached, completing only 108 from May 2019 through March 2020, and leaving no survey in the months of April. Thus, we were unable to conduct farm visits during spring 2020 (i.e., planting season). The number of visits completed, however, meets sample size target of 75.

Pilot/Feasibility Projects Program (N. Fethke)

The Pilot/Feasibility Projects Program strengthens the Center’s impact on agricultural safety and health by funding three to four pilot projects per year. The program is an incubator for new research, prevention, intervention, outreach, education, and translation activities. It also allows the Center to contribute to the development of the careers of newly trained agricultural safety and health professionals and to build regional capacity to respond to emerging issues.

Note that we received permission from NIOSH to change this project PI from Dr. Fred Gerr at the end of 2019 as Dr. Gerr announced his retirement. Dr. Gerr has been mentoring Dr. Fethke during the transition and is providing expertise in grant application reviews.

Three 18-month projects awarded in October 2018 were completed in March 2020. Three pilot projects that were awarded in October 2019 are currently ongoing. Proposals with awards to begin October 2020 were reviewed in August 2020; three have been selected for funding.

2018-20 (Projects Awarded Oct 2018, ended in March 2020):

Train-the-trainer program to promote safe respirator use for farmers and pesticide applicators. (Hoidal, Minnesota State Extension). This project addressed the significant lack of knowledge around respirator selection and use in rural Minnesota. The project developed and delivered six train-the-trainer respirator safety and fit testing workshops across Minnesota. The project resulted in 36 trained fit testers who have conducted almost 800 fit tests. Additional products include an [interactive map of fit testing locations](#) and a toolkit of outreach materials.

Airing out farm stress. (Moynihan, Minnesota Department of Agriculture). This project addressed the silence around the ways that stresses inherent in farming can affect the mental, physical, and emotional well-being of agricultural workers and farm family members. The team used radio programming on the Red Rivers Farm Network to air five pilot radio stories funded by GPCAH (60 second spots each with a 12-15 min companion podcast). The series reached well over 100,000 radio listeners on 19 stations in North Dakota, South Dakota, and Minnesota. The team enhanced the reach of this effort by creating deeper, complimentary 10- to 15-minute podcasts for each topic. As of mid-March 2020, almost 33,000 people had listened to GPCAH-sponsored episodes, while total listenership for all 25 episodes was more than 64,500. The podcasts repository is available at the [Red Rivers Farm Network website](#).

Opioid crisis response in farm communities: overdose prevention and training for farmers and agricultural workers. (Ziegenhorn/Novak (Co-PIs), Iowa Harm Reduction Coalition) This project conducted and evaluated opioid prevention training and outreach with agricultural employees and migrant farmworkers. They trained 381 rural or agricultural participants in 67 communities, disseminated 3,784 naloxone kits, and reached at least 315 additional people through secondary distribution. The team also collaborated with the Proteus Migrant Health Program. Many participants indicated they would pass overdose reversal and other risk reduction supplies onto others. These efforts resulted in at least 315 additional secondary recipients of overdose prevention and other risk reduction supplies.

2019-20: Projects Awarded Oct 2019 (all 18-month projects, and all are ongoing)

Stress on the Farm: Strategies to Help Each Other. (Brown, Iowa State University Extension and Outreach). This pilot project, will provide a culturally relevant suicide prevention “gatekeeper” training to the agricultural community in Iowa. The project anticipates providing at least fifty interactive trainings among between 2,500 and 5,000 agricultural producers and agribusiness professionals in Iowa.

Public Health Agriculture Related Mental Health Research (PHARMHR). (Zabel, Minnesota Department of Health). This project will design and evaluate mental health indicators using existing public health data on farmers and farming communities to inform public health practice and health care delivery.

The impact of drought conditions on occupational psychosocial stress among a Midwest farmers cohort. (Berman, University of Minnesota School of Public Health). This project uses an existing survey data from 518 Midwestern farmers across a 4-year period and apply a case-crossover longitudinal study design to estimate the association between drought conditions and occupational psychosocial stress. The results will fill an important research gap and inform resilience strategies to reduce environmentally mediated stress among agricultural workers.

2020-21: Projects to be Awarded Oct. 2020:

In summer of 2020, 11 applications were received and reviewed, and awardees were notified in late August 2020. Three applications were selected to receive funding, each for a 12-month project period (October 2020 – September 2021). Principal investigators are currently in the process of preparing responses to reviewers' critiques, modifying proposed budgets and budget justifications as needed, and obtaining documentation of notification of IRB approval (or exempt status). Once contracts are issued, we will announce the successful applicants.

Outreach Core

(B. Janssen, D. Rohlman)

The goals of the Outreach Core are to educate, translate, and communicate agricultural safety and health information and prevention strategies to rural and agricultural communities in the nine-state region. The high impact outputs and activities are presented for each of these outreach goals.

Educate

In 2020, the *Core Course* was held entirely online due to COVID-19 restrictions. Twenty-five people participated, representing twelve states including Alaska, Texas, and New York in addition to the GPCAH region. Participants included students (28%), veterinarians (24%), government employees (16%), nurses (12%), and other professions (20%). Eleven students were from Iowa. The topics covered remained the same as in previous courses, but presentation methods were varied to maintain student engagement, including recorded lectures, podcasts, and YouTube videos. The *Course* was held live from 8:00 am – 12:00 pm Monday-Friday, and 3-4 hours of asynchronous content was provided for each afternoon. The asynchronous activities included videos on safety and rescue demonstrations and an interactive virtual farm tour. Many of these materials came from our partners, including the Center for Food Security and Public Health, the National Pork Board, the National Educational Center for Agricultural Safety, and the National Institute for Occupational Safety and Health Agricultural Safety and Health Centers, including the Upper Midwest Agricultural Safety and Health Center.

The *Core Course* materials (PowerPoints) are publicly available at the [GPCAH website](#) and have been provided to other AFF centers, community colleges, and agricultural education programs. Online educational modules are being developed based on the *Core Course* materials at the [Ag Safety and Health training portal](#). Eight topics are available for use (*Overview of Agriculture, Forestry, and Fishing, Biological Risk Management, Livestock Handling, Occupational Diseases of the Lung in Agricultural Settings, Physical Risk Agents, Occupational Skin Disorders, Personal Protective Equipment, and Protecting Young Workers in Agriculture (Spanish and English)*). The Young Workers module was developed with funding from the National Children’s Center for Rural and Agricultural Health and Safety but is included with the other online modules. Other sites have expressed interest in using the modules, and Texas plans to incorporate the modules in their upcoming course. Additional online delivery modules are under development (*Transportation, Off-Road Vehicle Safety, Hazards Associated with Animal Handling, Pesticides*).

Translate

The Outreach Core regularly provides materials outreach teams across the region. Given the depth of materials available from the GPCAH, the Outreach Core has developed a format of “outreach kits”, suggested by regional advisors, particularly those at University of Missouri and Ohio State extensions. These Kits will allow regional safety and health advocates to develop expertise in new areas and to conduct their own safety and health outreach on these topics at farm shows and events they attend. Kits consist of visual materials, pamphlets and handouts, and a mini-curriculum to help partners talk about safety and health topics and appropriately respond to questions. The [Outreach Toolkits](#) for (a) Rural Roadway Safety and (b) Gas Monitor Use were reviewed by members of the *Regional Advisory Committee* at the November 2019 meeting and are available for use by all.

Communicate

The GPCAH communicates to farmers and their advocates using multiple formats to reach the diverse farming population across our nine-state region. This includes traditional newsprint, in-person interactions, and online. Before COVID stopped travels in March 2020, we attended events including Poweshiek County Ag Safety Days, National Association of County Ag Agents (NACAA), Ohio Farm Science Review, The National

FFA Convention, and Women, Land, and Legacy. Post-COVID, we participated in the Minnesota FarmFest in early August, sharing COVID resources and other GPCAH materials online.

The GPCAH Outreach Core partnered with Ag Health and Safety Alliance (AHSA) to deliver prevention materials to students at Kirkwood Community College attending a Gear Up for Safety Training. GPCAH materials were presented to Ag students, and an MS ASH student (V. Soupene) participated in the meeting and conducted a follow-up needs assessment surveys of these participants. Results were different from the non-student surveys conducted by the GPCAH Evaluation team, and results were slotted for presentation in the March 2020 Agricultural Safety and Health Council of America (ASHCA) North American Agricultural Safety Summit, communicating the different needs of younger ag students compared to older farm needs (The summit was cancelled due to COVID.)

In addition, GPCAH partnered with AHSA to provide training on hearing loss prevention, whole body vibration, sun exposure, respiratory protection, gas monitor use, and rural roadway safety. Trainings last between one and three hours and are held at agricultural businesses and as part of agricultural college courses in the US and Canada. Locations in the GPCAH region during the current reporting period included Sauk Community College (IL), Scales Mound High School (IL), University of Missouri, Iowa State University and Kirkwood Community College. Current training is now virtual.

GPCAH uses multiple electronic platforms for outreach. The GPCAH.org website highlights the latest research findings, provides social media links, and presents current events and timely messages on the home page. In addition, the website features several “resources” tabs, which include links to fact sheets, posters, newsletters, and *Safety Watch* articles. The GPCAH website has been updated to include all outreach materials curated by topic, links to *Safety Watch* columns and the Telling the Story website, and information about Outreach staff activities at farm shows and conferences. The GPCAH also makes active use of Facebook and Twitter, regularly amplifying prevention information for Emerging Issues such as manure gas hazards and generating community dialog about incidents related in *Safety Watch* columns and *Telling the Story* articles.

Electronic Newsletter: In this reporting period, we have updated the [Farm Families Alive and Well Newsletter](#) to an online only format. The newsletter was distributed four times to 1,800 farm families and other agricultural safety and health stakeholders. Over the past year, the GPCAH shared the following information via this newsletter: how to access educational materials used in the *Core Course*, COVID resources, results of the concerns/stressors survey (center Needs Assessment), and traumatic injury surveillance trends. Our Output Summary details additional stories.



Figure 4: Alive & Well Newsletter

Output Summary: September 2019 through September 2020

The table below summarizes the number of outputs over the one-year project period. Details on current project year outputs follow.

Table 2: Number of Output Types by Project Period

OUTPUT TYPE	Year 1 (2016 –17)	Year 2 (2017-18)	Year 3 (2018-19)	Year 4 (2019-20)
<i>Publications</i>	5	17	7	10
<i>Abstracts & Presentations</i>	14	28	31	11
<i>Lectures, Seminars, & Workshops</i>	14	33	48	27
<i>Consultations</i>	9	14	10	5
<i>Information to Policy Makers</i>	2	2	3	1
<i>Student Dissertations or Thesis</i>	3	4	3	2
<i>Press Releases, Media Stories</i>	27	50	79	49
Total Output Count	74	148	181	105

Published Manuscripts

1. Abdel-Rasoul GM, Salem EA, Elbadry AS, Hendy OM, **Rohlman DS**, Abdel-Latif AA: [2019] Neurobehavioral and Menstrual Disorders among Adolescent Females Environmentally Exposed to Pesticides, Menoufia Governorate, Egypt. *Egyptian Journal of Occupational Medicine*, 43(3):331-343. [doi: 10.21608/ejom.2019.47402](https://doi.org/10.21608/ejom.2019.47402). PMC7081947
2. Anger WK, Farahat FM, Lein PJ, Lasarev MR, Olson JR, Farahat TM, **Rohlman DS**: [2020] Magnitude of behavioral deficits varies with job-related chlorpyrifos exposure levels among Egyptian pesticide workers. *Neurotoxicology*, 77:216-230. [doi: 10.1016/j.neuro.2020.01.012](https://doi.org/10.1016/j.neuro.2020.01.012). Epub 2020 Jan 30. PMC7085493
3. **Arora K, Cheyney M, Gerr FE, Bhagianadh D, Gibbs J, Anthony TR**: [2020] Assessing Health and Safety Needs and Psychological Stressors among Agricultural Workers in the Midwest. *Journal of Agricultural Safety and Health*, 26(1): 45-58. doi.org/10.13031/jash.13660. PMC7250162
4. Donham KJ, Meppelink SM, Kelly KM, **Rohlman DS**: [2019] Health indicators of a cohort of Midwest farmers: Health outcomes of participants in the Certified Safe Farm Program. *Journal of Agromedicine*, 24(3):228-238. DOI: [10.1080/1059924X.2019.1591316](https://doi.org/10.1080/1059924X.2019.1591316) PMID: 30849293
5. Mendley SR, Levin A, Correa-Rotter R, Joubert B, Whelan E, Curwin B, Koritzinsky E, Gaughan D, Kimmel PL, Anand S, Ordunez P, Reveiz L, **Rohlman DS**, Saenz C, Scammell MK, Wright RO, Star RA: [2019] Chronic Kidney Diseases in Agricultural Communities Report from a Workshop. *Kidney International*, 96(5):1071-1076. [DOI: 10.1016/j.kint.2019.06.024](https://doi.org/10.1016/j.kint.2019.06.024) PMC7012362
6. Missikpode C, **Peek-Asa C**, Wright B, **Ramirez M**: [2019] Characteristics of agricultural and occupational injuries by workers' compensation and other payer sources. *American Journal of Industrial Medicine*, 62(11): 969-977. doi.org/10.1002/ajim.23040. PMC6944284
7. **Rohlman DS**, Davis JW, Ismail A, Abdel Rasoul GM, Hendy O, Olson JR, Bonner MR: [2020] Risk perception and behavior in Egyptian adolescent pesticide applicators: an intervention study. *BMC Public Health*, 2020 May 13;20(1):679. [doi: 10.1186/s12889-020-08801-7](https://doi.org/10.1186/s12889-020-08801-7). PMC7222587

8. **Rohlman DS**, Ismail AA, Bonner MR, Abdel Rasoul GM, Hendy OM, Ortega Hickey L, Wang K, Olson JR: [2019] Occupational pesticide exposure and symptoms of attention deficit hyperactivity disorder in adolescent pesticide applicators in Egypt. *Neurotoxicology*, 8(74):1-6. DOI: [10.1016/j.neuro.2019.05.002](https://doi.org/10.1016/j.neuro.2019.05.002). PMC6751012
9. Scott-Harp D, **Peek-Asa C**, **Rohlman DS**, **Janssen B**: [2019] More than time and money: A mixed-methods study of the barriers to safer cattle handling practices. *American Journal of Industrial Medicine*, 62(11):978-985. <https://doi.org/10.1002/ajim.23043>. PMC7069494
10. Swanton A, **Peek-Asa C**, Torner, J: [2020] Time to definitive care among severely injured farmers compared to other work related injuries in a Midwestern state. *Injury Epidemiology*, 7(33). doi.org/10.1186/s40621-020-00259-w. PMC7329543

Abstracts/Presentations Accepted for Scientific Meetings

1. Anthony T, Arora K: [2019] What is hurting farmers in Iowa? Data for injury prevention conversations with rural farmers. Midwest Rural and Agricultural Safety and Health Conference, Marshalltown, IA. Nov. 13, 2019
2. Casteel C, Ramirez MR, Estes RK, Faust K, Gerr F: [2020] Association between farm hazards and injury among Iowa row crop farmers. American Society of Agricultural and Biological Engineers 2020 International Meeting, Virtual Conference (AIM), July 13-15, 2020, Session 2000814
3. Duysen E, Heiberger S, Leonard S, Ploeckelman M, Yoder A: [2020] Telling the Story – Using Storytelling to Disseminate Agricultural Safety and Health Messaging. ASHCA Summit 2020, (virtual) Lightning Talk presented September 17, 2020.
4. Estes RK, Casteel C, Faust K, Gerr F, Ramirez MR: [2020] Compliance with recommended safety standards among high-risk farm equipment. Agricultural Safety and Health Council of America (ASHCA), 2020 Safety Summit. Abstract accepted (lightning talk provided virtually, Sept. 17, 2020)
5. Fethke N, Anthony T: [2019] Community outreach grant writing skills for rural health professionals. Midwest Rural and Agricultural Safety and Health Conference, Marshalltown, IA. Nov. 13, 2019
6. Faust K: [2019] Testing and use of the first PC-based tractor driving simulator to examine the impact of age and hypertension medication on selected driving performance measures. Midwest Rural Agricultural Safety and Health Conference, Marshalltown, Iowa. November 13, 2019.
7. Janssen B: [2019] Substantiating a Crisis: Understanding Farmer Mental Health in Iowa. American Anthropological Association Annual Meeting 2019, Vancouver, BC. November 22, 2019.
8. Nonnenmann M, Ubeda E, Anthony R, Sousan S, Altmaier R, Peters T, Ramirez A: [2020] Evaluation of a Prototype Aerosol Control Technology to Reduce Dust and Bioaerosol Concentrations in Swine Production. American Society of Agricultural and Biological Engineers 2020 International Meeting, Virtual Conference (AIM), July 13-15, 2020, Session 2001415.
9. Peek-Asa C, Hamann C, Ramirez M: [2019] Innovative collaborations to reduce rural roadway crashes. Safe States Injury and Violence Prevention Conference September 11-13, 2019 Atlanta, GA. (Covered both the farm equipment road crash surveillance project from last cycle and SaferTrek farm equipment roadway study)
10. Rohlman D: [2019] Occupational Pesticide Exposure Among Egyptian Adolescents: Changes Over Time, International Neurotoxicology Association, Germany. October, 2019

11. Rohlman DS, Campo S, TePoel M: [2020] Lightning Talk: Protecting and Promoting Health of Young Ag Workers via Supervisor Training. ASHCA Summit 2020, (virtual) September 2020.

Lectures, Seminars, or Workshops Delivered in Academic Settings

1. Anthony TR and Nonnenmann M: [2020] Human Health: Pathogens and Contaminants in Livestock Systems. Livestock and Poultry Environmental Learning Community Webinar Series, originally broadcast on May 15, 2020.
2. Fethke N, Anthony T: [2019] University of Iowa College of Public Health Pilot Grant Fair, Iowa City, IA. Nov. 25, 2019.
3. Hamann CJ: [2019] Impacting Road Safety Policy: Perspectives from a Public Health Researcher. UI College of Law Innovation, Business, & Law (IBL) Center Speaker Series. October 10, 2019. Speaker on the SaferTrek project.
4. Janssen B: [2019] Agriculture, Anthropology, and Public Health lecture, given to Anthropology Department, Contemporary World Problems Class, University of Iowa, Iowa City, IA. Fall 2019. Attended by 200 undergraduate students.
5. Janssen B: [2019] Safety policies - grain bin entry. Delivered to 15 undergraduate students. SW Community College, Creston, IA, October 3, 2019.
6. Nonnenmann M: [2019] Air Quality in Livestock Production Buildings: Evaluating a Prototype Aerosol Control Technology to Reduce Dust Concentrations in Commercial Swine Farrowing. Biomedical Sciences Seminar, Iowa State University. Nov 21, 2019. Seminar attended by 70 undergraduate students.
7. Rohlman DS: [2020] Introduction to Rural Health & Agrimedicine Agricultural Regulations in Occupational Safety and Health in Agriculture Introduction to Hierarchy of Controls in UMKC 7223 Rural Health & Agrimedicine course. University of Missouri – Kansas City. Guest Lecturer. Attended by graduate students.
8. Rohlman DS: [2020] Pesticide and Transportation in UMKC 7223 Rural Health & Agrimedicine course. University of Missouri – Kansas City. Guest Lecturer. Attended by graduate students.
9. Rohlman DS: [2020] Behavioral and Emotional Health / Total Farmer Health in UMKC 7223 Rural Health & Agrimedicine course. University of Missouri – Kansas City. Guest Lecturer. Attended by graduate students.
10. Rohlman DS: [2020] Occupational Pesticide Exposure: Exposure, Biomarkers, and Health Outcomes in EHS:668 Interprofessional Perspectives in Occupational Health and Safety course. University of Michigan. Guest Lecturer. Attended by graduate students.
11. Rohlman DS: [2020] Agricultural Safety and Health in OEH: 4240 Global Environmental Health course. University of Iowa. Guest Lecturer. Attended by graduate students.
12. Rohlman, DS: [2020] Epi Seminar: Occupational Pesticide Exposure: Exposure, Biomarkers, and Health Outcomes. University of Iowa. Guest Lecturer. Attended by graduate students.

Courses Taught in Agricultural Safety and Health

1. Agricultural Safety and Health Core Course: [2020] The 40-hour course completed by 25 attendees. Instruction provided by multiple GPCAH faculty and staff along with regional advisors (Sheridan, Neenan) and veterinary expertise from Iowa State (Bickett-Weddle, Iowa City, IA), Jun 8-12, 2020.
2. Rohlman D: [2020] Course in OEH: 6110 Rural Health and Agricultural Medicine. 3 SH. 8 graduate students.
3. Rohlman D: [2020] Course in OEH: 6120 Topics in Agriculture and Rural Health: Mental Health in Rural Communities. 3 SH. 7 graduate students.

Lectures, Seminars, or Workshops Delivered to the Agricultural Community

1. Cheyney M: [2019] Roadway Safety, Manure Gas Monitors, Hearing loss prevention, Mental Health Resources for Iowa, Whole Body Vibration displays, Gear Up for Safety (in collaboration with Ag Health and Safety Alliance), Kirkwood Community College, Cedar Rapids, IA. October 2, 2019.
2. Cheyney M: [2019] New materials for Healthcare providers display – Skin Cancer and Farmers, Hearing Loss Among Farmers, Whole Body Vibration, and Winter Hazard: Fall Prevention Midwest Rural and Agricultural Safety and Health Conference, Marshalltown, IA. Nov. 12-14, 2019.
3. Cheyney M: [2019] Lecture on overview of ag safety and health topics, given to Women Land & Legacy, Walcott, IA. December 6, 2019.
4. Cheyney M: [2019] Hearing loss prevention display, National FFA Convention & Expo, Indianapolis, IN. October 31-November 2, 2019.
5. Janssen B: [2019] Lecture on grain bin entry safety policies, given to SW Community College (15 agricultural students, Creston, IA. October 3, 2019.
6. Janssen B: [2019] Keynote Lecture on local food systems, given to Local Food Symposium (75 undergraduate students and community members), Grinnell College, Grinnell, IA. October 31, 2019.
7. Janssen B: [2019] Lecture on "Sustainability and Safety in Agriculture," given to Iowa City Rotary Club Meeting (75 Rotary members), Iowa City, IA. November 7, 2019.
8. Janssen B: [2019] Oral presentation on mental health, given to AAA Conference, Vancouver, Canada. November 22, 2019.
9. Janssen B: [2019] Lecture on "Sustainability and Safety in Agriculture," given to Vintage Cooperative (35 community members), Iowa City, IA. January 8, 2020.
10. Janssen B: [2020] Lecture on "Sustainability and Safety in Agriculture," given to SW Iowa Ag Research Association (50 community members), Iowa City, IA, March 5, 2020.
11. Meador E, Ubeda E, Altmaier R, Anthony TR, Peters T, Nonnenmann M: [2020] Engineering Solution to Reduce Airborne Bacteria in Swine Production. 2020 Iowa Governor's Conference on Public Health Webinar Series, originally broadcast on [May 1st, 2020](#).
12. Rohlman D: [2019] Rural PREP Grand Rounds: Mental health in rural communities – the example of the Midwest dairy farmer, Nov 21, 2019.

Consultation or Information Exchange

1. Request for information on skin cancer, hearing loss prevention, fall prevention, vehicle vibration, and ladder safety by Sherry Ulrich, occupational health nurse at Bayer Crop Sciences for 70 farmers representing 40 farms. January 30, 2020.

2. Interview request by David Geiger, reporter from Agribusiness News (television) about mental health month as it relates to agriculture. May 13, 2019.
3. Information exchange with Leah Guy, from Minnesota Department of Health, about causes of injuries to farmers in Iowa as collected by the Iowa Trauma Registry. November 25, 2019.
4. Janssen B: [2020] Consulted with Science Friday about Farmer Suicide. National Public Radio, March 13, 2020.
5. Request to use materials on hearing protection in e-learning courses by Michelle Bisby at SHEilds.org. Aug 6, 2020.

Information Provided to Policy Makers

1. Casteel, C: [2020] Washington DC Hill Visit for Injury Control Research Centers. February 2020.

Student Thesis/Dissertation (Accessible at [Iowa's Institutional Repository](#))

1. Faust K: [2020] Testing and Use of a PC-Based Tractor Driving Simulator to Examine the Impact of Age and Hypertension Medication on Selected Driving Performance Measures. PhD Dissertation completed May 2020.
2. Thornton K: [2020] Rural Residents' Perception of Off-Road Vehicle Insurance Coverage. May 2020

Press Releases and Media Stories

Media Stories

1. Casteel C & Brockman J: [2020] Engaging communities to stop the opioid epidemic. Op-ed: Des Moines Register, February 16, 2020. Cedar Rapids Gazette, February 14, 2020.
2. Chadde S: [2020] Farmer mental health. Midwest Center for Investigative Reporting (Interview with B Janssen on farmer mental health). January 23, 2020.
3. Colombe S, Hamann C: [2020] National farm safety and health week interview- roadway safety. KLGR 1490 AM/95.9 FM. September 21, 2020.
4. Colombe S, Hamann C: [2019] National farm safety and health week interview- roadway safety. KLGR 1490 AM/95.9 FM. September 16, 2019.

Safety Watch News Column in Lee Agrimedia Publications

1. Guse B, Leonard S: [2019] 'Two Minutes' – Farmer touts safety mantra years after close call. Iowa Farmer Today, Vol. 36, No. 7, September 14, 2019. [LINK](#) (*Trending article)
2. Janssen B: [2019] Don't rely on luck to get through next emergency, Article in Iowa Farmer Today, December 2019. [LINK](#)
3. Janssen B: [2019] No matter the ladder, keep safety in mind, Article in Iowa Farmer Today, October 2019. [LINK](#)
4. Janssen B: [2020] Preventing rural crashes critical amid health crisis. Article in Iowa Farmer Today, April 2020. [LINK](#)
5. Janssen B: [2020] Youths may be key to safer farms. Article in Iowa Farmer Today, February 2020. [LINK](#)

6. Leonard S: [2019] Farmer touts safety mantra years after close call, Article in Iowa Farmer Today, September 2019. [LINK](#)
7. Leonard S: [2020] Simple kits are first step to address radon hazard in homes, Article in Iowa Farmer Today, January 2020. [LINK](#)
8. Leonard S: [2019] Take CARE- Safety acronym invites farmers to Consider All Risks, in Each situation. Iowa Farmer Today, Vol. 36, No. 15, November 9, 2019. [LINK](#)
9. Leonard S: [2020] Radon test(ament): Simple kits are first step to address radon hazard in homes. Iowa Farmer Today, Vol. 36, No. 25. January 18, 2020. [LINK](#)(*Trending article)
10. Leonard S: [2020] Face masks have different purposes, protective levels. Iowa Farmer Today, Vol. 36, No. 33, March 14, 2020. [LINK](#)(*Trending article)
11. Leonard S: [2020] Choose Safety: As states open, take steps to protect each other. Iowa Farmer Today, Vol. 36, No. 41, May 9, 2020. [LINK](#)(*Trending article)
12. Leonard S: [2020] COVID upsurge demands all-hands effort. Iowa Farmer Today, Vol. 36, No. 50, July 11, 2020. [LINK](#)(*Trending article) (Article reprinted by Monticello church for newsletter)
13. Leonard S: [2020] Case count: Iowa leads as COVID rates rise in Midwest. Iowa Farmer Today, Vol. 37, No. 7, September 12, 2020. (Print issue is out, not yet available online)

Telling the Story Project – New Stories 2019-20

1. Leonard S: [2019] Brad. Article for Telling the Story Project about his injury from machinery entanglement. At [LINK](#)

Additional Media Stories with GPCAH Collaboration

1. Insight on Business: [2019] The Newshour with Michael Libbe: Farm Injuries – A Workplace Issue: [Podcast]. Nov 26, 2019. Interview with C Peek-Asa on farm injuries. At [LINK](#).
2. Iowa Ag Connection: [2019] Marshalltown Conference to Focus on Disaster Response, Recovery. Oct 18, 2019. Story includes interview with B Janssen on the MRASH conference. At [LINK](#).
3. Janssen B: [2020] Interview with Sky Chadde from Midwest Center for Investigative Reporting on Farmer Mental Health. USA Today, March 9, 2020.
4. Janssen B: [2020] Interview with Charis-Carlson about COVID-19 and local food. US News and World Report, March 19, 2020.
5. Janssen B: [2020] Interview with Steve Gravelle about COVID-19 and Spring planting. The Gazette, March 25, 2020.
6. Michaels S: [2020] Interview on Ag Safety and Health. WAND-TV, Decatur, IL. Jan 30, 2020.
7. Reed P: [2019] University of Iowa researchers say many farming-related injuries are under reported. *KCRG.com*. Nov. 25, 2019. Interview with C Peek-Asa about farm injuries. [LINK](#).
8. Rohlman D: [2020] Interview with Sarah Michaels from Agribusiness Today about Youth in Agriculture. Aired on WAND-TV (Illinois NBC affiliate covering Decatur/Champaign/Springfield) in Feb 2020.
9. Staff Writer: [2019] University of Iowa researchers say many farming-related injuries are under reported. Dec 6, 2019. Interview with C Peek-Asa on farm injuries. At [LINK](#) and [LINK](#)

10. Yost R: [2019] Farming is Risky Business. *Keloland.com*. Jan 13, 2020. Article discusses the 2015 GPCAH study on agriculture injuries and fatalities in 12 Midwestern states from 2005 to 2012. At [LINK](#)

Farm Families Alive and Well Newsletter Articles [LINK](#)

1. Anthony R: [2019] Director's Message: On-farm Stress, Mental Health and Resiliency. *Farm Families Alive and Well Newsletter* 25(4):4. Sept 2019.
2. Anthony R: [2020] Director's Message: Traumatic Injuries Experienced by Iowa Farmers. *Farm Families Alive and Well Newsletter* 26(2):2. March 2020.
3. Anthony R: [2020] I-CASH and GPCAH Provide COVID-19 Resources. *Farm Families Alive and Well Newsletter* 26(3):3. June 2020.
4. Anthony R: [2020] Director's Message. *Farm Families Alive and Well Newsletter* 26(4):2 Sept 2020.
5. Arora K, Patterson J: [2020] What are Midwestern farmers' top concerns and stressors? *Farm Families Alive and Well Newsletter* 26(2):1 March 2020.
6. Crawford K: [2020] COVID-19 Prevention on the Farm: Q&A Video Series about Cloth Face Coverings. *Farm Families Alive and Well Newsletter* 26(4):3 Sept 2020.
7. Foushee R: [2020] Agricultural Safety and Health: The Core Course 2020. *Farm Families Alive and Well Newsletter* 26(4):1 Sept 2020.
8. Janssen B: [2019] Director's Message. *Farm Families Alive and Well Newsletter* 25(5):2. Dec 2019.
9. Janssen B: [2019] Farm Emergency Response Planning at MRASH. *Farm Families Alive and Well Newsletter* 25(5):2. Dec 2019.
10. Janssen B: [2020] Director's Message. *Farm Families Alive and Well Newsletter* 26(3):2. June 2020.
11. Janssen B: [2020] Seasonal Message Focuses on Persistent Ag Issue. *Farm Families Alive and Well Newsletter* 26(3):4. June 2020.
12. Patterson J: [2019] Opportunities for on-farm safety resources: Two studies need farmer participation. *Farm Families Alive and Well Newsletter* 25(4):1. Sept 2019.
13. Patterson J: [2019] Great Plains Pilot Grants: Making a Difference. *Farm Families Alive and Well Newsletter* 25(4):4. Sept 2019.
14. Patterson J: [2020] University of Iowa now offering interactive online agricultural safety and health classes to the public. *Farm Families Alive and Well Newsletter* 26(2): March 2020.
15. Patterson J: [2020] Reminder! Opportunities for on-farm safety resources: Two studies still need farmer participation. *Farm Families Alive and Well Newsletter* 26(2): March 2020.

Press Releases

1. Patterson J: [2019] Press release about 2019 joint conference brings disaster response in rural areas, emergency response planning, mental and behavioral health, and more to the forefront. Oct 17, 2019
2. Patterson J: [2019] Press release about how studies may underreport farm injuries. Sept 9, 2019. [LINK](#)
3. Patterson J: [2019] Press release: Great Plains Center for Agricultural Health works to keep agricultural communities informed about safety. Sept 9, 2019. [LINK](#)

4. Patterson J: [2020] Study reveals Midwest farmers' top concerns and stressors. Press release about GPCAH research study distributed to media, extension, online, and GPCAH contacts. Jan 30, 2020. [LINK](#)
5. Patterson J: [2020] Preventing and controlling COVID-19 on the farm. Press release about the release of the CDC guidelines and how GCPAH can help farmer workers understand recommendations. [LINK](#)
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