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Great Plains Center for Agricultural Health

2022-3 Annual Report

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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

2023 GPCAH Annual Report

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SECTION 1: CENTER SUMMARY

The Great Plains Center for Agricultural Health (GPCAH) is a nationally recognized public health resource that conducts research and provides education and outreach to improve the health and safety of farmers throughout nine states in the Midwestern US: **Illinois, Indiana, Iowa, Kansas, Minnesota, Missouri, Nebraska, Ohio, and Wisconsin**. The Center was founded in 1990 and continues to bring together multidisciplinary expertise with an established record of developing and implementing programs of research, intervention, translation, education, and outreach to protect agricultural workers and their families. This 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.

The research questions being investigated in our center are formulated to: *reduce the burden of back pain* from a lifetime of tractor use, *reduce injuries from farm vehicles* on roadways, and *improve the respiratory health of livestock producers* and the animals they raise. Research is developing innovative technologies needed to close gaps in knowledge (whole-body vibration) and equipment (air quality systems) and develops innovative partnerships to bring new collaborators with unique skills to contribute to agricultural injury reduction. The lessons learned from our research initiatives are translated into outreach materials by being incorporated into national educational curricula, disseminated through partners, and incorporated into multimedia discussions (social media, print media-*Safety Watch*, and *FarmSafe* podcasts) to aid in the dissemination and uptake of these best practices. The Center has established systems to foster communication, identify and build strategic partnerships, and assess the needs of the agricultural community. Our evaluators work within all projects and Cores to maximize our ability assess the Center's contributions to improved health and safety outcomes for our region's farmers.

OVERALL CENTER GOALS

Goal 1: Coordinate activities across all Center Cores (Evaluation and Planning, Outreach, Research) to maximize our ability to improve the safety and health among agricultural communities. To maximize the significance, innovation, and impact of Center activities, the Center conducts ongoing feedback, problem solving, and networking opportunities to strengthen efforts of Center investigators and to maximize Center collaboration.

Goal 2: Conduct basic and applied research targeting critical hazards to protect agricultural workers throughout the region, including vulnerable workers. We have three funded research projects to address the burden of injuries in the region and to address NIOSH priorities. We also coordinate a pilot/feasibility program explicitly oriented building research capacity across our region and coordinate an emerging issues project to address priority issues that emerge over time.

Goal 3: Generate, evaluate, and disseminate guidance to speed the adoption of evidence-based best practices to protect farmers/farm workers. New knowledge developed in Goal 2 is translated, evaluated, and disseminated through partners.

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 3.

SECTION 2: KEY PERSONNEL

Center Director:	T. Renée Anthony, PhD Renee-Anthony@uiowa.edu 319-335-4429
Deputy Director:	Nathan Fethke, PhD Nathan-Fethke@uiowa.edu 319-467-4563
Center Coordinator:	*open*
Evaluation Director:	Kanika Arora, PhD Kanika-Arora@uiowa.edu
Outreach Director:	T. Renée Anthony, PhD Renee-Anthony@uiowa.edu
Outreach and Evaluation Coordinator:	Marsha Cheyney, MPH Marsha-Cheyney@uiowa.edu

Research Project Leaders:

Pilot/Feasibility Projects:	Nathan Fethke, PhD nathan-fethke@uiowa.edu
Advancing Whole-Body Vibration:	Nathan Fethke, PhD nathan-fethke@uiowa.edu
Community Roadway Campaign	Cara Hamann, PhD cara-hamann@uiowa.edu Laura Schwab-Reese, PhD (Purdue University) LSchwabR@purdue.edu
Control Technology in Swine Buildings	Matt Nonnenmann, PhD (University of Nebraska) matthew-nonnenmann@uiowa.edu Thomas Peters, PhD Thomas-M-Peters@uiowa.edu

SECTION 3: PROGRAM HIGHLIGHTS AND IMPACT

Evaluation and Planning Core
(T.R. Anthony)

The Evaluation & Planning (E&P) Core provides strategic leadership to help the Great Plains Center for Agricultural Health achieve its mission, namely, to prevent agricultural injury and illness and improve safety and health among agricultural communities, by advancing knowledge through scientific research and prevents agricultural injury and illness through education, outreach, and intervention programs. This core provides structure and programmatic and financial infrastructure needed to meet our aims:

(1) Provide strategic leadership and effective administration,

(2) Foster communication and collaboration between Center and its many stakeholders,

(3) Conduct systematic evaluation of all center activities, and

(4) Identify, prioritize, and address emerging issues that arise over the upcoming project period.

This Core facilitates communication with leaders and practitioners in agricultural safety and health by promoting information exchanges at regional and national meetings and with other stakeholder groups to develop new partnerships to make progress toward our common mission of protecting people. To identify hazard priorities, we perform injury surveillance, conduct needs assessments, and routinely solicit feedback from stakeholders on emerging trends. To reach farmers more efficiently, the *E&P Core* has developed a regional *farmer registry* to invite interested farmers in participating in safety and health discussions and research. Our Evaluation Team develops innovative tools to track progress, report and measure outputs, and map all Center contributions to improvements in farmer health and safety in our region's intensive row crop and livestock production operations. This Evaluation Team will lead structured reviews of the strategic plan and the communication plan and will lead the Center administration evaluation process to provide feedback on the effectiveness of this Core.

Below are the key GPCAH activities that helped move us towards meeting these objectives in the past year.

Evaluation

The GPCAH Evaluation Team has compiled a longitudinal evaluation of the impact of GPCAH projects over the successive funding cycles. This report summarizes the results of applying two theory-driven frameworks (Contribution Analysis and Translation Research Staging) to evaluate the impact of efforts in portfolio projects (air quality and road safety projects) and aggregate-level efforts to reduce the burden of injury and illness among farmers in our region. Using these models, the Evaluation Team has attempted to assemble sufficient evidence demonstrating "plausible association" between program activities and outcomes, particularly as the Center's portfolios progress from research to practice over time. The team is presenting this paper at the October 2023 American Evaluation Association (AEA) conference in Indianapolis, IN.

Farmer/Rancher Registry

To reach farmers more efficiently, the *E&P Core* has developed a regional *farmer/rancher registry* to invite interested agricultural workers to participate in safety and health discussions and research. With input from regional advisors, we created an operation manual, which includes including security, recruitment tools, and the registration mechanism. This, IRB-approved program provides a way for farmers to sign up ("register") to be contacted about new research studies that may be useful to improve the health and safety on their farm. Description and registration details are available online (https://gpcah.public-health.uiowa.edu/farmer-rancher-registry/). We completed soft roll-out at the January 2023 WEMSA meeting in Green Bay and at the June 2023 ISASH meeting in Tampa. We began farmer registration and recruitment in August at the MN FarmFest and the Farm Progress (IL) shows. Example materials are shown in Figure 1.

Figure 1: Example of Farmer/Rancher Registry promotion materials

Coordinate Communication: Activities and Impact

***Advisory Committees**:* Our advisory committees continued to provide valuable feedback and ideas from across our region, leading to improvements in outreach and educational materials and providing new connections with experts and producers to help us all protect farmers. Our *Regional Advisory Committee (RAC)* brought together outreach and research experts from the region to share ideas about products developed by the GPCAH and our partners. In November 2022, the RAC gave input on new products including Suicide Prevention Posters, a revised Mental Health and Farm Workers web page, relevant topics, voices, and a website makeover for Season 2 of the *FarmSafe* Podcast. They also provided guidance on dissemination of our Pilot Grant RFAs and provided support for our new plan to mentor pilot grant awardees (June 2023); gave ideas for topics for a 2023 skills development workshop at the November MRASH. This group also helped disseminate information to their networks.

Social Media GPCAH's *E&P Core* continues to implement the Center's social media communications strategy by reaching out to audiences on Facebook, Twitter, and YouTube, disseminating safety messages and event promotions, and sharing study findings. Between Sept. 29, 2022 – Sept. 15, 2023, 60 Twitter posts and 95 Facebook posts were generated and shared.

Our Twitter followers tend to be more engaged in scientific studies and reports. In the past year, we reached 6,156 and gained 13 new followers. Table 1 shows our most popular tweets of the past year. The total Twitter engagement percentage for the year is calculated by dividing the *total engagement* (likes and retweets) by the *number of tweets of published* during the past year (60) to get the *average engagement per post* (4.6). Then, by dividing *the average engagement/post* by the number of followers (380) and multiply by 100, we computed a 1.2% *engagement rat*e. The target of 1% engagement rate is typically considered to be "very high" for an organization on Twitter (0.02% is "very low").

Our Facebook followers increased from 651 to 653, and 586 individuals "like" our page, nearly a 1% increase since September 2022. Facebook has recently suggested a new metric for gauging Facebook performance: divide your total post engagements (likes, comments, shares = 775) by the total reach of your

page (15,330) and multiplying by 100 (= 5.1%) to compute an engagement rate. A Facebook engagement rate of 5% indicates "exceptionally well."

In the next project period, we will develop and test new strategies to maintain and improve our 5% engagement rating, as this engagement rate reflects how successfully we connect with our audience, resulting from both higher impressions and increased traffic. Our most popular Facebook post this year was a promotion of our *FarmSafe* podcast that interviewed Carrie Klumb, MPH, with 5,150 reached and 27 engagements. We coordinated posting of the episode and social media with Ms. Klumb before we posted the episode and shared promotional materials for her to share. She reached out to her communications team at the Minnesota Department of Health, which increased traffic to our social posts as well as the podcast itself.

Table 1: GPCAH Social Media Top Five Posts

Twitter	**Facebook**
FarmSafe Podcast: Zoonotic Diseases with Carrie Klumb https://bit.ly/46aOrLZ	FarmSafe Podcast: Zoonotic Diseases with Carrie Klumb http://bit.ly/45PEiV6
Register for Core Course https://bit.ly/45Y5rFt	Registration open for the Core Course https://bit.ly/3PHawMT
FarmSafe Podcast: When is Noise Too Loud? https://bit.ly/3Rk4D9z	Marsha and Jenn are at the annual WEMS event https://bit.lysTdVz4
Gain CE in June through the Core Course https://bit.ly/3ECOUuG	FarmSafe Podcast: What's your normal? With Lesley Kelly https://bit.ly/3LpwNMl
Call for MRASH abstracts https://bit.ly/44TQQcM	FarmSafe Podcast: Rural Preparedness with Aaron Yoder https://bit.ly/46fu688

Emerging Issues

Emerging issues funds were used to support a survey on respirator use and fit testing, with the dual goal of improving our understand the need for regional assistance and to identify where farmers might go to receive fit testing—both to prepare and respond to avian influenza outbreaks as well as for pesticide applications. Ms. Emma Smaellie (an MS industrial hygiene student) conducted surveys of farmers to identify: trends of respiratory protection use, proportion of those who have been fit-tested for respirators they use, and preferences for organizations to seek guidance from fit-testing. Development of respirator fit testing train-the-trainer program for qualitative fit testing was completed, with hands-on training provided in November 2022 at MRASH (Cedar Rapids, IA) as part of the GPCAH-sponsored "skills development workshop," which evaluated these materials. Our fit-testing training guides have sense been adopted by the Ag Health and Safety Alliance training and are now incorporated into pesticide respirator fit testing training materials.

Ms. Smaellie's farmer survey identified barriers to use of respiratory (lack of access, inconvenience, "none"), but 66% of farmers had not ever been fit tested. Examination of where they would go for fit testing identified that likely places they preferred were: extension offices, agribusinesses, and fire departments. Several mentioned local schools as an option, so a second phase of the study surveyed FFA instructors, 66% of whom were interested in receiving fit testing training, and 77% of whom were willing to provide fit testing to their community. However, when sharing the cost of kits, 75% indicated the cost was too prohibitive. Informing FFA instructors about seed grant money to make these events feasible was an important finding from this work. See this thesis for more details.

Outreach Core
(T.R. Anthony)

The long-term goal of our Outreach Core is to reduce injury and illness among agricultural workers throughout the region by providing a multi-tiered approach to disseminating health and safety information in a way that maximizes adoption by agricultural workers. Our objective is to speed the uptake of agricultural safety and health programs, practices, and policies among intermediary organizations that engage with the agricultural workforce. We will achieve this by (1) expanding our educational programs, (2) translating and disseminating research into effective prevention messages, and (3) creating mechanisms that facilitate communication between the Center, intermediaries, and end users. Our primary target audiences are healthcare providers (including those serving migrant and seasonal farmworkers), employers (including supervisors of young agricultural workers), and media communicators who can influence perceptions and behaviors through their portrayal of the agricultural industry. These activities will position the GPCAH as a regional and national resource to reduce injury and illness and promote well-being among workers in the agricultural community.

To achieve this mission of the GPCAH, the Outreach Core has three main aims:

(1) Build capacity and expertise among practitioners to protect vulnerable workers by expanding the adoption of agricultural safety and health educational materials throughout the region and nationally.

(2) Translate agricultural safety and health research findings using a multimedia approach to encourage adoption of evidence-based practices among stakeholders and target audiences.

(3) Build new and nurture existing stakeholder partnerships with intermediary organizations to foster bidirectional communication channels

Below summarizes a few highlights of high impact activities during this first year of this project.

Training

The GPCAH Agricultural Safety and Health Core Course was offered virtually in 2023, with in-person full-day tours and demonstrations held at the Iowa State University agricultural center in Ames, IA (June 2, 2023). This course educated 5 graduate students (credit seeking) and 10 continuing education students. Our CE students included five medical students from the Rural Iowa Scholars Program, two investigators from the new Illinois AgFF center, and a new faculty member from the University of Missouri-Kansas City Pharmacy school (replacing Kelly Cochran) who is considering continued offering of this course at UMKC. In this summer course, we changed the format to meet synchronously for one day a week for five weeks (Fridays) to see if a stretched schedule improves registration and satisfaction/learning compared to a full immersive week. The new format of 1 day/week was generally favored over running through the course for a straight week, with the following alternative schedules also favorable: 2 days/week for 2 weeks to 2 half-days per week for 4 weeks, all ranking better than 40 hours straight through. One participant indicated: "*So glad the course was extended to a whole month. I had never taken it before this, but I think the old way would have been more overwhelming for all involved. This was well-paced and thorough!*" All attendees who completed the feedback identified specific changes to their practice that they will apply from this course. In addition to hosting our own course, we also provided speakers to assist with Dalhousie University's revision of their undergraduate version of the Core Course (slotted for second-year undergrads in Fall 2023).

In this project period, our last three online modules for the Core Course were finalized: Illness and Injury Prevention (Jan 2023), Off-Road Vehicle Hazards (June 2023), and Musculoskeletal Disorders (August 2023). Since the first module was deployed in 2016, we have had students complete 1644 courses.

Occupational Lung Diseases (12/17), Occupational Skin Disorders (9/18), and Physical Agents (2/16) are the most widely used courses (Fig. 2), and these modules have been incorporated into Core Course curriculum offerings with our partner institutions as asynchronous materials.

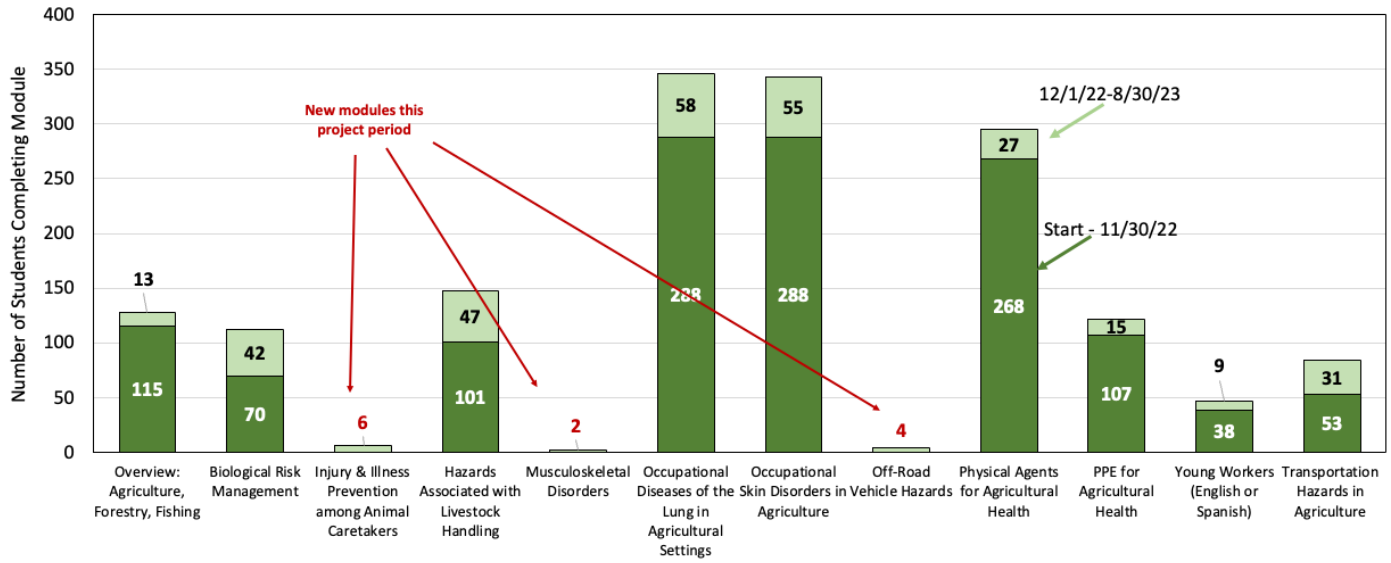

Figure 2: Number of persons who have completed each training module, by topic.

In this new project period, we formed a new collaborative educational project. With a non-profit organization that works with seasonal and migrant farmworkers (Proteus Inc.) and with UI Hospitals and Clinics, we are developing a new training program to reach health aides and clinic providers (Ag Health 101). After initial meetings identified practical concerns (time restrictions, varied farm operations, etc.), the Outreach Core focused on developing self-paced audio lessons, with accompanying one-page handouts for each audio chapter, to be used to reinforce lessons and foster conversations with workers. Throughout this project period, content was developed, both audio files and handouts (Fig. 3). In 2023-4, the team will reconvene to review the structure and materials and devise a strategy to roll this out in 2024 to health aides, with an evaluative component to determine improvements needed, additional topics, and what materials are most needed to translate into Spanish for farmworkers.

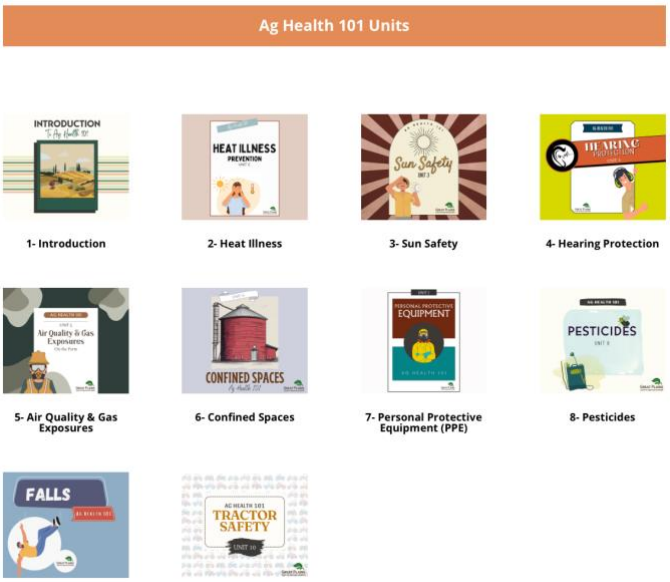

Figure 3: Content topics for the new Ag Health 101 audio course, now under review

GREAT PLAINS
Center for Agricultural Health

Translation

The GPCAH Outreach core translates research findings into multimedia formats to encourage the adoption of evidence-based practices.

This year, we developed and aired Season 2 of the *FarmSafe Podcast*. Two Ag Health and Safety students led the content development and interviews, resulting in 19 episodes and a total run time of 4 hr 19 min (Fig. 4). This season focused on new topics, including women safety on the farm, mental health, cattle feedyard safety, pesticides, and using technology to enhance safety and health. Four episodes featured voices from our neighboring Ag Centers, three from investigators within our own Center, and two from an external advisor (Kaci Buhl, from the Pesticide Educational Resources Collaborative). A special memorial episode was a cross-center collaboration to discuss the impact of Dr. Paul Gunderson on the profession and on the professional development of many researchers across the many NIOSH Ag centers. This memorial episode was featured at the June 2023 ISASH meeting.

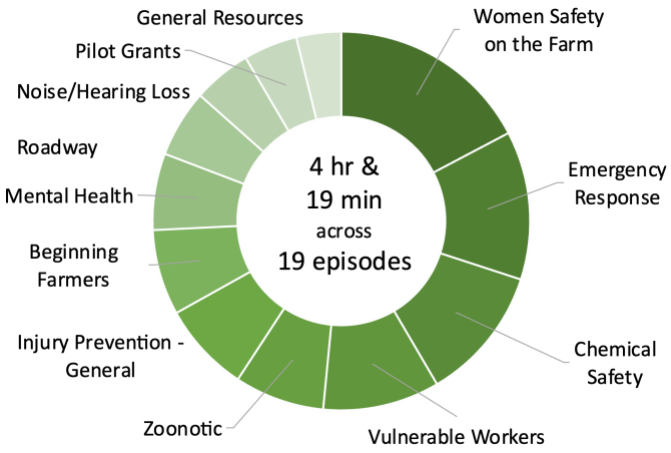

Figure 4: Topics and run time of episodes across Season 2 of the *FarmSafe Podcast.*

The most downloaded episodes were the Women in Agriculture and Safety Issues (Season 2, Episode 2, Sept 2022), with twice as many listens as average. The Sleep episode (Season 1, Episode 14, Oct 2021) continues to be downloaded, with a spike of listening during the harvest activities in November 2022. Across both seasons, our podcasts have been downloaded 1902 times.

Additional new materials have been generated and distributed, including mental health/suicide prevention materials. These were adapted from construction industry (D. Rohlman) to raise awareness about mental health in farming communities. Our regional advisors provided suggestions for improvement, and then we sought expertise from Lesley Kelly, a Canadian farmer and mental health advocate who had participated in the *FarmSafe Podcast.* She provided culturally relevant suggestions to improving these materials for farmworkers. Additionally, new posters have been prepared to share best practices generated from GPCAH activities, including on anhydrous ammonia (pilot), cost of injury (surveillance), gas monitor use (emerging issues), respirator seal check (emerging issues), and tractor safety (podcast). These are under final review by our regional advisors before sending to ag educators across the region and then promotion to partners through the web.

Additional other translational activities in the Outreach Core included sharing messages in the Safety Watch column in *Iowa/Illinois/Missouri Farmer Today* publication (Sun Safety, ATVs on the Road, Anhydrous Ammonia, and Disaster Preparation). We also promoted best practices in the *Farm Families Alive and Well Newsletter* and provided hands-on demonstrations at farm/safety shows, community colleges, and conferences across the region. We shared heat illness prevention with over 250 elementary and high school students in June and July Progress Ag Safety Days. We demonstrated gas monitor operation and use at the UMASH Safety Pavilion at the Minnesota Farmfest and let 90 farmers test how well their hearing protection worked both at Iowa State farm tours and at the 2023 Farm Progress Show, using 3M E-A-Rfit validation system kit.

New and Existing Stakeholder Education

We have established new networks to build community and collaborate with intermediary organizations to identify specific needs of their target audiences and to expand their capacity to integrate safety and health content into their programs, policies and practices. We brought together the Community of Practice for Ag Educators, starting with those offering the Core Course throughout the U.S. We established a "Early Career Ag Professionals" group to determine interest and concerns regarding safety on the farm. Topics identified included grain entrapment, exposure to gases in livestock buildings and PPE requirements, and mental health/stress. There was also a discussion about transitioning into the primary operator role on family farms.

Through a subcontract with AgHSA, we partnered to deliver outreach material to 496 students across the region: Iowa State (Ames, IA and Sutherland IA), South Central Community College (Mankato, MN), Professional Ag Students Conference (Ankeny, IA), Morningside Community College (Sioux City IA), Iowa Lakes Community College (Estherville IA), Dordt University (Sioux Center, AI), and Kirkwood Community College. Beyond our region, the AgHSA shared information with 697 young adults in programs in Texas and Arizona as well as throughout Canada (Alberta, Saskatchewan, Manitoba, Ontario, Quebec, Prince Edward Island, and Nova Scotia).

Figure 5: AgHSA presentation at the Iowa State Ag450 Course, demonstrating GPCAH materials on manure gases.

The GPCAH sponsored the development of AgHSA materials, including providing technical reviews, for the Respirator Storage Motion Graphic and the Always Check The Label motion graphic for pesticide handlers. The AgHSA shares GPCAH resources with students including manure gas hazards, including hearing conservation information and the E-A-Rfit validation system and gas monitor tools for manure gas hazard training. The AgHSA has adopted GPCAH materials (e.g., respiratory protection, hearing protection, manure gas safety) into their in the Gear Up for Ag™ program curriculum and promote GPCAH resources on their online platform.

In addition, the AgSHA and GPCAH developed a respiratory protection fit testing guide to be used for agricultural workers applying pesticides. This guide incorporates GPCAH fit testing protocols, and the content was reviewed by respiratory protection experts in the GPCAH. These materials have been integrated into the Gear Up for Ag™ educational program, respiratory fit testing workshops, and social media campaigns.

***MRASH**:* The GPCAH helped coordinate and sponsor the regional Midwest Rural Agricultural Safety and Health (MRASH) conference. In 2022, the conference was hybrid, with the theme of "Re-imagining a Safe and Healthy Future for Agriculture."

Figure 6: Illustration of registration promotion for 2022 Skills workshop at MRASH, conducted by GPCAH.

The GPCAH sponsored a pre-conference skills development workshop, dedicated to training people to conduct qualitative respirator fit testing (Fig. 6). Ten people registered, but only four showed up due to early snowstorms impeding travel. Two of the

attendees have let us know that they have used the information to conduct respirator fit testing at their workplace.

Partners at Minnesota, Nebraska, and National Children's AgFF Centers as well as several agricultural safety and health non-profits participated in MRASH conference planning. Regional Advisory Committee members in Missouri, Illinois, and the Ag Health & Safety Alliance, along with personnel from all AgFF centers in our region, contributed expertise to the session presentations. GPCAH Center personnel helped coordinate meetings, managed social media, provided introductions at the event, coordinated several roundtables, and coordinated evaluation for the event. This one-and-a-half-day hybrid conference had 69 participants from 12 U.S. states (Fig. 7), representing ag safety and health non-profits, insurance companies, healthcare systems, research universities, government offices, and agribusiness. We also had several agricultural producers participate in this years' conference, and we welcomed an international attendee from Slovenia.

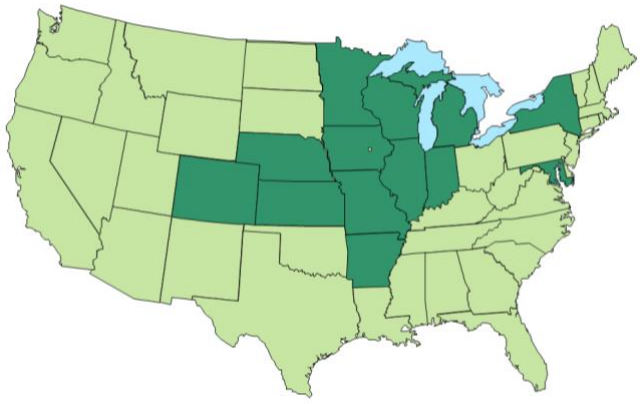

Figure 7: 2022 MRASH participant map.

The keynote session (Russell, Iowa Farm Service Agency) addressed the ways that strategic investment in technology can shape a safe and healthy future for agriculture. Cross-cutting panel sessions were incorporated into the program to enhance recognition of relevant topics, including:

- *Implementing ROPS Programs through Media Advocacy: Key Factors in OSH Evidence-Based Practice Adoption* - A panel including ROPS program advocates from Iowa (Janssen, Curnick), Missouri (Downs, Funkenbusch), Kansas (Larson), and the National ROPS Rebate Program (Milkovich, Yoder) described specific barriers and opportunities and how they used the principles of media advocacy to craft messages and campaigns that are appropriate for their audiences.
- *Ag Health and Safety in Audio Media:* This panel discussed the benefits and challenges of using audio formats to meet farmers and talk about safety and health. The GPCAH (Anthony) and AgriSafe (Emanuel) discussed podcasts and Ag Health and Safety Alliance (Sheridan) talked about using talk radio, all as ways to share agricultural safety and health messaging with farmers and rural community members. They also shared lessons learned about which topics resonated strongly with listeners, how the format allows for quick responses, and how to measure the impact of these efforts.
- *Additional Presentations:* Sessions provided information on evaluating the effectiveness of national social media campaigns, how the method of applying pesticides can impact respiratory health, the relationship between hearing loss and cognitive status in aging farmers, associations between county ordinances allowing Off-road vehicles on public roads and crash rates, using technology to make farming safer and more efficient, mental health, surveillance of agricultural injuries, and the importance of childcare for farm families.

Pilot/Feasibility Grant Program
(N. Fethke)

The Pilot/Feasibility Projects Program is a vibrant and vital component of the GPCAH. The Program strengthens the Center's impact on agricultural safety and health (ASH) by operating a competitive funding opportunity using two "tracks," one designed to support new academic research and the other to support community-based education/outreach/translation projects.

Academic-Track Awardee Characteristics. A key goal of the Program is to support investigators new to the field of agricultural safety and health.

Community-Track Awardee Characteristics. A key goal of the Program is to support regional organizations in their efforts to develop, implement, evaluate, and deliver evidence-based ASH services (e.g., educational programming for agricultural workers).

Program Highlights

We have streamlined the community-track application submission process. Specifically, we have implemented a new, two-step process that requires potential applicants to first submit a brief Project Concept about six weeks in advance of the deadline for complete applications. We then provide feedback to the applicant within two weeks, to include suggestions to incorporate into the full application. We also offer an opportunity for community-track applicants to discuss their projects with Program personnel, who may provide additional suggestions and help connect applicants with content experts. Our intent is to maximize the likelihood that community-track applicants submit proposals that align with Program goals and the Center's strategic priorities.

For the 2022-2023 project year, the Program received seven Project Concepts and 11 full applications for pilot funding (10 academic-track and one community-track). Applicants were affiliated with community organizations and academic institutions in Iowa (4), Indiana (3), Illinois (2), Nebraska (1), and Wisconsin (1). Applications addressed a broad range of high priority regional ASH topics, including mental health, slips/trips/falls, and respiratory health.

Two applications were funded, both in the academic track:

Ting Xia, PhD, Assistant Professor of Mechanical Engineering, Northern Illinois University
Application of an innovative, kinematics-based risk of falls assessment method to examine slips, trips, and falls in the agricultural sectors – a methodology validation study

Matt Comi, PhD, Assistant Professor of Sociology, Utah Valley University (in collaboration with the National Farm Medicine Center in Marshfield, WI)
Safety and health on automating dairies: an exploration (SHADE)

Key Achievements in the Past Year

Anisa Kline, PhD received a 2021-2022 GPCAH academic-track pilot grant to both interview and survey Latino H-2A agricultural workers in Ohio regarding how factors such as work arrangements and farm location impact the safety and health of this vulnerable population. Then a PhD candidate, the GPCAH pilot grant was a component of Dr. Kline's doctoral research. She conducted more than 130 interviews at more 60 farms across nearly two dozen counties in Ohio to recruit and obtain information from study participants. In February 2023, Dr. Kline presented results from her research at a panel discussion co-sponsored by the Ohio State University Extension Office and the Ohio Commission on Hispanic and Latino affairs.

Advancing Whole-Body Vibration (WBV) Exposure Control in Agriculture *(N. Fethke)*

Mechanized row crop production exposes agricultural workers to whole-body vibration (WBV), a key risk factor for back problems. Suspension systems of the seats in agricultural machines can reduce WBV exposures. However, the performance of seat suspension systems varies (i) between-operators under controlled conditions in the laboratory and (ii) within-operator under variable conditions in the field. Both circumstances limit our understanding of how effective seat suspensions are in reducing WBV exposures. This project offers methodological improvements to the assessment of seat suspension system performance under actual production conditions.

This project involves a WBV measurement campaign among a large number and variety of agricultural machines. Ultimately, our goal is to instrument 40 machines across several farms and then, for each time that each machine is used over a period of many weeks, to measure vibration both at seat pad and at the base of seat suspension. The resulting data will then be used to (i) estimate the magnitude and precision of between-day, between-operator, and within-operator contributions to the variability in seat suspension performance and (ii) empirically address ambiguities in the ISO's WBV standards.

Because of the large number of machines and prolonged, multi-week measurement campaign we have planned, using typical ("gold-standard") measuring equipment is cost-prohibitive. Therefore, in the early project stages, we are developing a low-cost WBV measurement system. Our system includes additional features to help us understand the variability in seat suspension performance, such as machine start-up detection (to enable remote sensing), GPS (to track machine location and speed), automatic detection of operator presence (to ensure our analyses include only periods when an operator is on the seat), and sensors/algorithms to estimate operator posture (e.g., leaning forward or reclining, which influences seat suspension performance).

Key Achievements in the Past Year

In the first project year, we have focused on designing the electronics of our low-cost WBV measurement system. The circuit design and most components have been finalized (Fig. 8 has details), and we have begun the process of validating the system.

Validation experiments involve mounting our system to a human-rated motion platform, driving the motion platform with accelerations of known amplitude and frequency, and then comparing the output from our system to that of reference measuring equipment.

We are validating our system against the requirements specified in ISO:8041-1 (*"Human response to vibration – Measuring instrumentation"*). While our validation work is ongoing, preliminary results suggest that the output from our system is within 1% of the output from reference measuring equipment, well within the required ISO tolerance (<6%). We remain on-track to begin field-based pilot testing in Spring 2024.

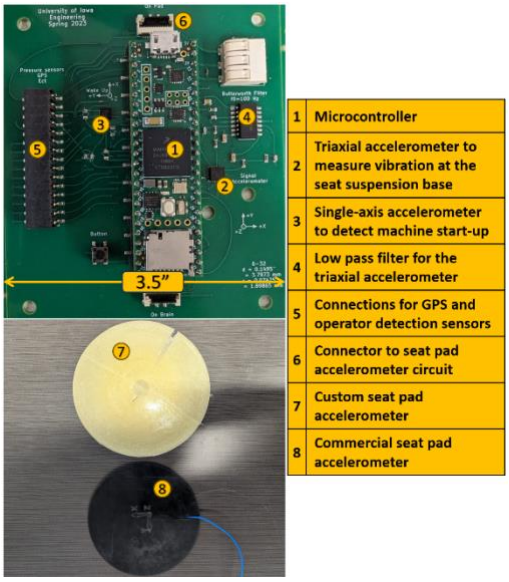

Figure 8: Image of low-cost Whole-Body Vibration measurement system's components

Community Campaign to Reduce Farm-Vehicle Roadway Crashes
(C. Hamann, L. Schwab-Reese)

Motor vehicle crashes are a leading cause of injuries and fatalities in the agricultural industry, and drivers of passenger vehicles are most often at fault. This project uses a novel approach to improve rural driver behaviors around farm vehicles on the roadway through a community-level intervention packaged into a Toolkit and disseminated through Extension Educators. The long-term goal of this project is to reduce the burden of agricultural injuries and fatalities from motor vehicle crashes and increase rural roadway safety.

The *central objectives* of the proposed study are to develop a "We're on This Road Together" Toolkit and training module, then evaluate its reach and implementation. All aspects of this study will strive for equity and inclusivity (e.g., representation of historically underrepresented groups in advisory board and translation of campaign materials to Spanish). Our team has a unique combination of interdisciplinary expertise in agricultural and road traffic injury prevention and development and evaluation of community-based behavioral interventions. To achieve these objectives, we propose two specific aims:

(1) Translate the "We're on This Road Together" community-level rural roadway safety campaign to a Toolkit that can be implemented directly by community groups.
(2) Evaluate the implementation and impact of the "We're on This Road Together" campaign Toolkit.

Figure 9: Graphic example that will be included in the toolkit to use for both digital and physical materials in the community campaign.

Key Achievements in the Past Year

In this first year, we have accomplished multiple goals under Aim 1. We have secured an advisory board, with one member from the original community advisory board that built the "We're on This Road Together" campaign and key Extension stakeholders from Iowa (Iowa State University) and Illinois (University of Illinois Urbana-Champaign). We have identified key toolkit features and have started drafting the toolkit by obtaining data through focus groups with extension educators. We have formulated our focus group guide and hosted seven focus groups comprised with both Iowa and Illinois Extension educators. We deidentified and transcribed the transcripts from each focus group to conduct content analysis. To analyze the focus group data, we first created a coding framework with a set of six main categories. Our team utilized MAXQDA software to code the transcripts by applying the main categories to text segments within the transcript. We are in the process of applying these findings from the content analysis to create surveys for further analysis. The team has started drafting the toolkit outline and materials to be included. Once we complete the analysis, we will then be able to finalize the toolkit materials.

Over the next four years, we will then build, pilot, and evaluate our toolkit. Stage one will involve constructing the toolkit to include professional development and intervention training, materials, and evaluation. Iowa State Extension educators will pilot the toolkit, and based on their feedback, the team will revise the materials accordingly. Stage two will consist of Purdue University Cooperative Extension Educators implementing the toolkit into their local communities. We will provide training on the toolkit activities, supplies, and support for implementation into their local communities.

Design and Evaluation of a Control Technology for Dust and Bioaerosol in Swine Buildings

(M. Nonnenmann, T. Peters)

Swine production workers are exposed to dust and bioaerosols (e.g., zoonotic organisms), and there is a need to develop scalable, cost-effective engineering control recirculating ventilation systems that are effective and scalable for use across a range of swine building designs. This project uses a participatory approach with swine industry stakeholders to design, optimize and field-validate a prototype miniaturized recirculating ventilation system. The long-term goal of this project is to optimize a **recirculating ventilation system (RVS)** to control worker exposure dust and bioaerosols in livestock production buildings.

Our *long-term goal* is to develop an RVS to control dust and bioaerosols in livestock production buildings and translate our findings using the National Institute for Occupational Safety and Health (NIOSH) research to practice (r2p) approach. The primary objectives of this project are to demonstrate the effectiveness of a low-cost (≤$500), **miniaturized RVS (mRVS)** to control dust and bioaerosols when integrated into swine buildings. We will communicate with stakeholders to identify optimized design and cost parameters, and we build and evaluate the mRVS technology performance in swine production. Our research team integrates a swine industry Stakeholder Advisory Group (SAG) (e.g., swine producers, producer associations, building designers, swine industry educators, veterinarians) involvement with NIOSH investigators experienced with translating research findings. Our team has experience with RVS design, cost and contaminant simulation, field validation, and evaluation. Our rationale is that effectively translating research findings about mRVS effectiveness, costs, and cost-savings into solutions that address specific barriers identified by stakeholders will lead to adoption, and concurrently improve worker and animal health in the swine industry. This project consists of three aims:

(1) Communicate with stakeholders to develop design criteria for the mRVS
(2) Refine and optimize the mRVS to meet design criteria
(3) Conduct field validation of the optimized mRVS

Key Achievements in the Past Year

Aim 1: Communicate with stakeholders to develop design criteria for the mRVS

We collected opinions of swine producers, producer associations, building designers, swine industry educators and veterinarians related to mRVS design characteristics (*i.e.*, materials), production costs and parameters of the experiment (*i.e.*, phase of swine production) we are planning on conducting in Year 3 (Aim 3: Study 2). We organized one focus group with only two producers in attendance, below our target of 6-8. Therefore, we changed our approach to conduct phone interviews to gather these opinions. To date, we have conducted 15 interviews with producers, swine industry experts in production, and swine building construction.

Most interviewees indicated that mRVS use will be beneficial in mitigating pig diseases or reducing hog morality and labor costs associated with attending sick animals, especially for nursery and sow units. Most wean-to-finisher producers would adopt the technology if it were mandated by the integrators. Interviewees identified the following as suitable construction materials that would not corrode or rust under swine production conditions: aluminum, polyvinylchloride plastic, wood, or polyester fabrics. Interviewees suggested using mRVS filters that are washable and reusable. Installation location(s) for these devices should be in a building location with easy access to electrical outlets, (*e.g.*, middle of the room or near heaters) and out of the way for daily chores. Information for production costs has been difficult to gather given most interviewees did not pay for any costs associated with feed, veterinary services, or

medication. Nursery and sow units have been identified as the most appropriate phase of production for future testing as problematic swine pathogens persist (*e.g., E. coli*) and are costly. For example, producers have suggested that mortality in the nursery phase has a cost of at least $10/pig. Our plan is to continue interviews targeting producers, veterinarians, and swine industry producer organizations to gather additional information on mRVS design characteristics and production costs.

Aim 2: Refine and optimize the mRVS to meet design criteria

The mRVS design continues to be revised based on materials suggest by interviewees. To date, we have modified the mRVS prototype from the original design as follows: created an ultraviolet light 254 nm – C (UVC) and lighting harness to support the weight of the bulbs, replaced the unpainted steel ventilation duct with aluminum to reduce weight/cost, and increased the fan size to allow for increased airflow in the design. Activities for Aim 2 will continue during Year 2 of the project. Further design modifications will be made as additional cost information is gathered (Aim 1).

Aim 3: Conduct field validation of the optimized mRVS

Aim 3, Study 1 was conducted in January 2023 – March 2023. This field study consisted of installing and operating the prototype mRVS designed with filtration and UVC treatments in an educational swine production facility. The mRVS airflow rate targeted five room air changes per hour (ACH) and was operated over a 13-day period. The mRVS "treatment room" (TR) was matched with a "control room" (CR) with a similar number of piglets in each room (*i.e.*, n=166, TR and n=165, CR). During this study, we compared room concentrations of inhalable dust, respirable dust, room concentrations of bioaerosols as well as bioaerosol concentrations both "upstream" and "downstream" of the UVC plenum of the mRVS.

Approximately 240 dust samples and 540 bioaerosol samples were collected across the TR and CR for this study. The arithmetic mean inhalable and respirable dust concentrations were 2.70 mg/m^3 (SD= 0.83) and 0.16 mg/m^3 (SD=0.10) respectively, for the TR and 3.14 mg/m^3 (SD= 1.27) and 0.17 mg/m^3 (SD=0.06) respectively, for the CR. None of the dust concentrations were significantly different across TR and CR, however, the difference in inhalable dust concentrations across TR and CR approached significance (*i.e.*, p=0.07). Geometric mean concentrations in the TR for total bacteria, *staphylococcus* and gram-negative bacteria were 4.92 x 10^4 (GSD=1.73) colony forming units per cubic meter (CFU/m^3), 2.22 x 10^4 CFU/m^3 (GSD=2.11) and 1.43 x 10^4 CFU/m^3 (GSD=3.79), respectively. The geometric mean concentrations were higher for all bacteria in the control room, suggesting the mRVS was successful at controlling bioaerosol concentrations. Specifically, control room concentrations for total bacteria, *staphylococcus* and gram-negative bacteria were 9.36 x 10^4 (GSD=1.17) CFU/m^3, 3.69 x 10^4 CFU/m^3 (GSD=1.37) and 5.19 x 10^4 CFU/m^3 (GSD=1.76), respectively.

Our average mRVS flow rate was 598 cubic feet per minute (CFM) (SD=43) during the experiment, which is lower than a flow rate of 696 CFM needed for five ACH in the treatment room. On Day 1 of the experiment the mRVS flow rate was approximately 926 CFM (SD = 169). On Day 7 of the experiment, the mRVS flow rate was approximately 205 CFM (SD=51) from dust loading. Therefore, the mRVS MERV 13 filter was changed. On the last day of the experiment, the mRVS flow rate was 371 CFM (SD=102), suggesting increasing dust loading. Additional design for dust control is needed. For example, impaction or cyclone technology may be used to prolong filter life. Also, as suggested by our interviewees, washable, reusable filter technology will be explored for use in the mRVS. We may increase mRVS flow rates to increase dust control. We may also increase the UVC dosing for the bioaerosol targeting a 1-log reduction for gram-negative bacteria (*e.g., E. coli*). *E. coli* has been suggested as a problematic pathogen in the nursery stage of swine production in Aim 1. The information collected in Aim 3, Study 1, is being used to inform mRVS design characteristics to be implemented in Year 2.

Output Summary: October 2022 through September 2023

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 for Project Period 1

OUTPUT TYPE	*Year 1 2022-23*
Publications	11
Abstracts & Presentations	6
Lectures, Seminars, & Workshops	20
Consultations	18
Grant Funding	1
Information to Policy Makers	1
Student Dissertations or Thesis	2
Press Releases, Media Stories	39
FarmSafe Podcasts	17
Total Output Count	**115**

Published Manuscripts

1. Faust K, Casteel C, Gerr F, Cavanaugh J, Boonstra DE, Anthony TR, Soupene VA, & Ramirez MR. [2023] Development of a Checklist to Identify Injury Hazards on Row Crop Farms in the Midwestern United States. *Journal of Agricultural Safety and Health*. 29(1):15-32. (doi: 10.13031/jash.15269)
2. Gibbs JL, Sheridan C, & Rohlman DS. [2023] Infographics Enhance Agricultural Health and Safety Programs for Young Adults. *Journal of Agromedicine*. 28(1):86-89. PubMed PMID: 36303133. (doi: 10.1080/1059924X.2022.2140733)
3. Gibbs JL, Sheridan C, Sullivan D, Rautiainen R, Nonnenmann MW, & Wyatt TA. [2023] Self-reported respiratory health symptoms and respiratory protection behaviors of young adult hog producers in the United States. *American Journal of Industrial Medicine*. 66(9):794-804. PMID: 37443418. (doi: 10.1002/ajim.23515)
4. Henneberger, P.K., Rollins, S.M., Humann, M.J. et al. [2023] The association of forced expiratory volume in one second with occupational exposures in a longitudinal study of adults in a rural community in Iowa. *International Archives of Occupational and Environmental Health*. 96, 919-930. PMID:37225876. (doi: 1007/s00420-023-01979-4)
5. Liang Y, Casteel C, Janssen B, Wang K & Rohlman DS. [2022] Organizational Resources and Social Support Influences on Stress and Depression: A Comparison among Cooperative and Non-Cooperative Farmers. *Journal of Agromedicine*. 28:2, 177- 186. (doi: 10.1080/1059924X.2022.2134243)
6. Roeder SK, Wilder DG, & Fethke NB. [2022] Novel methods to detect impacts within whole-body vibration time series data. *Ergonomics*. 65(12): 1609-1620. PMID: 35148664 (doi: 10.1080/00140139.2022.2041735)
7. Soupene VA, Casteel C, Nonnenmann M, & Rohlman DS. [2022] Safety Measures, Pesticide Concerns and Resources Utilized among Young Adult Workers: A Brief Report. *Journal of Agromedicine*. 7:1-6. PMID: 36469529. (doi: 10.1080/1059924X.2022.2155748)
8. Sousan S, Anthony TR, Altmaier R, Gibbs JL, & Nonnenmann M. [2023] Use of prototype side stream filtration system to control dust levels in a commercial swine farrowing building, *Journal of*

Occupational and Environmental Hygiene. In press. PMID: 37582250. (doi: 10.1080/15459624.2023.2247457)

Other Publications

1. Tsai K, Nonnenmann M, Rohlman D, & Baker K. (2023) Development of Shortened Enrichment Methods for Detection of Salmonella Typhimurium Spiked in Milk. ACS Food Science & Technology 3 (5) 831-837. DOI: 10.1021/acsfoodscitech.2c00310
2. Erlandson G, Magzamen S, Sharp JL, Mitra S, Jones K, Poole JA, Bradford M, Nonnenmann M, Reynolds SJ, Schaeffer JW. (2022) Preliminary investigation of a hypertonic saline nasal rinse as a hygienic intervention in dairy workers, Journal of Occupational and Environmental Hygiene, 20 (1) 14-22. DOI: 10.1080/15459624.2022.2137297
3. Boles C, Zisook R, Buerger A, Hamaji C, Mathis C, Lauer D, Brewster RK, Knight Meachum K, Nonnenmann M, Unice KM. (2022) Semi-Quantitative Microbial Risk Assessment (sQMRA): A Narrative Review and Proposed Framework for Health and Safety Practitioners. J Public Health Emerg; 6 (34). DOI: 10.21037/jphe-22-1

Abstracts/Presentations at Scientific Meetings

1. Hamann C, Schwab Reese L & Peek-Asa C: [2022] Toward a better understanding of collaboration with cooperative extension in the dissemination of agricultural safety and health programs. SAVIR 17 Conference, #20. March-April 2022, Washington DC, Abstract in *Injury Prevention*. 28(Suppl 1): A6-7 (doi: 10.1136/injuryprev-2022-SAVIR.17)
2. Ghanbari, A, Hamann C, Reyes M, Jansson S, Hulscher K, Kruger A, Peek-Asa C: [2022] Naturalistic study of vehicle interaction with farm equipment on Iowa's roadways. Poster presentation given at *Midwest Rural Agricultural Safety and Health* (*MRASH) Conference,* Cedar Rapids, IA, Nov. 2022.
3. Archer M, Proctor A, Patterson J, Cheyney M, Anthony TR: [2023] Evaluation of the FarmSafe Podcast: Planning, Promotion, and Lessons Learned. Poster presented at *International Society for Agricultural Safety and Health (ISASH) Conference*, Tampa, Florida. June 18-21, 2023.
4. Cheyney M, Davidson J, Duysen E, Ploekelman M, Yoder, A: [2023] Innovations in Outreach. Oral presentation given at *International Society for Agricultural Safety and Health (ISASH) Conference*. Tampa, FL, June 18-21, 2023.
5. Sheridan CS, Gibbs JL, Nonnenmann M, Rohlman D, Anthony TR: [2023] Development of a guide and resources to improve community capacity for respirator fit testing according to WPS guidelines. *International Society for Agricultural Safety and Health (ISASH) Conference*, Tampa, FL
6. Sheridan CS, Emmanuel L, Anthony TR: [2022] Ag Safety and Health in Audio Media. *Midwest Rural Agricultural Safety and Health (MRASH) Conference*, Cedar Rapids, IA.

Lectures, Seminars, or Workshops Delivered in Academic Settings

1. Fethke N: [2023] *"Innovating Ergonomics."* Seminar delivered to the University of Iowa Department of Occupational and Environmental Health; August 31, 2023. Content included discussion of prior GPCAH-supported whole-body vibration research and a brief update on progress of this project.
2. Nonnenmann M: [2023] Industrial Hygiene Paradigm – a Research Case Study. June 1, 2023. The Core Course. GPCAH, University of Iowa, Iowa City, IA.
3. Nonnenmann M: [2023] Ergonomics in Agriculture. June 20, 2023. The Core Course. GPCAH, University of Iowa, Iowa City, IA.
4. Nonnenmann M: [2023] Agricultural Health and Safety: An Industrial Hygiene Case Study. July 20, 2023. Agricultural Health and Safety Course for Medical and Safety Professionals. Central States Center for Agricultural Safety and Health. University of Nebraska Medical Center, Omaha, NE.

5. Archer A: [2023] GPCAH resources on hearing protection, skin cancer prevention, FarmSafe Podcast, with the opportunity to sign-up for more information. 2023 CPH Mandela Washington Fellows Networking Reception. Iowa City, IA. July 19, 2023.

Courses Taught in Agricultural Safety and Health

1. Ag Health and Safety Alliance conducted eight Gear Up for Ag™ courses for community colleges and universities throughout the GPCAH region, reaching 496 students, promoting resources generated by the GPCAH.

Lectures, Seminars, or Workshops Delivered to the Agricultural Community

1. Nonnenmann M: [2023] 5th Annual Bison Worker Safety & Herd Health Roundtable. June 13-15, 2023. CS-CASH in collaboration with the Intertribal Buffalo Council, Flandreau, SD.
2. Rohlman DS: [2023] CASA – Young Workers in Agriculture. Webinar for AgSafe Alberta. 60 mins. Jan 31, 2023.
3. Cheyney M, Bentley M, and Smaellie E: [2022] Plinko Ladder Safety Game. National FFA Convention. Indianapolis, IN. Oct 26-28, 2022.
4. Cheyney M. [2022] Shopping for Safety interactive needs assessment tool. Midwest Rural and Agricultural Safety and Health Conference. Nov 16-17, 2022.
5. Anthony TR: [2022] Respiratory Fit Testing Train-the-Trainer pre-conference workshop. Midwest Rural and Agricultural Safety and Health Conference. Nov 16-17, 2022.
6. Cheyney M and Patterson J: [2023] Tools of the Trade: Creating a Ladder Safety Plinko Game. Presented to 350 EMS personnel and 60 high school students. Wisconsin Emergency Medical Services Association Conference. Green Bay, WI. Feb 2-3, 2023.
7. Cheyney M, Faust K, Sindt B: [2023] Heat Illness Prevention and Sun Safety. Presented to over 250 students (elementary, high school) and adults at the Progress Ag Safety Days at National Education Center for Agricultural Safety (NECAS). Peosta, IA. June 8 and July 6, 2023.
8. Patterson J and Archer A: [2023] Farmer/Rancher Registry and FarmSafe Podcast. International Society of Agricultural Safety and Health Conference. Tampa, FL. Jun 19-21, 2023.
9. Cheyney M, Faust K, and Archer A: [2023] Use and Maintenance of Manure Gas Monitors, FarmSafe Podcast, Farmer/Rancher Registry. Minnesota Farmfest. Aug 1-3, 2023
10. Cheyney M and Archer A: [2023] Ag Safety and Health Education at GPCAH, FarmSafe Podcast, Farmer/Rancher Registry. National Association of County Agricultural Agents Annual Meeting. Des Moines, IA. Aug 13-15, 2023.
11. Cheyney M, Archer A, Presnall E: [2023] Hearing Loss Prevention, EARfit testing, FarmSafe Podcast, Farmer/Rancher Registry. Farm Progress Show. Decatur, IL. Aug 29-31, 2023.

Core Course Modules

Online modules are all available for training at: https://gpcah.public-health.uiowa.edu/core-course-online-modules/ Final modules completed for this project during this project year were:

1. Bicket-Weddle, D, Rood K, ROhlman D, Nonnenmann M, Morrison L, Mohling K: [2023] *Illness & Injury Prevention Among Animal Caretakers* [online module].Training Source.
2. Gerr F, Buikema B, Fethke N, Nonnenmann M, Morrison L, Rohlman DS, Mohling K: [2023] *Musculoskeletal Disorders Among Agricultural Workers* [online module].
3. Jennissen C, Denning G, Rohlman DS, Morrison L, Nonnenmann M, Mohling K: [2023] *Off-Road Vehicle Hazards* [online module].

Consultation or Information Exchange

1. Cheyney M: [2023] Request from and Iowa FFA Advisor for safety and health materials to go into bags her chapter is delivering to 250 farmers during Harvest season. Sept 27, 2023.
2. Anthony TR: [2023] Request from Erin Jordan at the Gazette. Provided guidance to understanding hazards, regulations, and inspections to help understand an amputation event at a grain bin. Sept. 11, 2023.
3. Anthony TR: [2023]. Request from Ben Harrold at Missouri Farmer Today. Provided information on NIOSH AgFF Centers and our GPCAH projects. August 25, 2023.
4. Anthony TR: [2023] Request from lecturer at University of Iowa to use the zoonotic diseases episode of the FarmSafe podcast in course Finding Patient Zero (infectious diseases). Sept 12, 2023.
5. Archer A: [2023] Additional agricultural safety and health information requested by 10 Mandela Washington fellows after attending networking reception. July 19, 2023.
6. Rohlman DS: [2023] Carly Steuber, PharmD, faculty at University of Missouri – Kansas City. Attended GPCAH ASH Core Course in Summer 2023. Planning to restart the rural health elective at UMKC in fall 2024. Requests GPCAH as resource for that course. (July 2023)
7. Cheyney M: [2023] Request to serve on the advisory board for Harwood grant application by Grain Handling Safety Coalition. June 28, 2023.
8. Nonnenmann M: [2023] Direct reading instrumentation for the measurement of methane for fire prevention in agricultural settings. Private Inquiry. (May 2023)
9. Cheyney M: [2023] Request for information on families vulnerable/at risk for negative impacts from SF542 (the Iowa Bill on Child Labor) for Matter-of-Fact program. May 8, 2023. Program aired June 18, 2023, LINK)
10. Cheyney M: [2023] GPCAH materials featured in Calworksafety.com's "Heat Illness: A Real Menace" page. June 7, 2023.
11. Cheyney M: [2023] Request from Catherine Rylatt for information on several ag safety topics (Electrical, Fire Extinguisher, Tractor/PTO, Sun/Hearing, Chainsaw, Stop The Bleed) for use in an FFA-sponsored Ag Safety Day for teens in North Carolina. Feb 5, 2022.
12. Patterson J: [2023] Request for Lighting and Marking Guidelines handout by the Dubuque County Extension & Outreach Office. Jan 12, 2023.
13. Rohlman DS: [2022] Request for feedyard safety resources by Brian Wood at DoL/OSHA. Dec 16, 2022.
14. Rohlman DS: [2022] Request for information about mental health crisis in agricultural communities. Dec 5, 2022.
15. Rohlman DS: [2022] Request for "You Okay?" tokens to give to farmers by Iowa State Extension after lecture at Iowa Governor's Safety Conference keynote. Nov 21, 2022.
16. Anthony TR: [2022] Request from Brian Yarrow, Farm Broadcaster from KFRM 550 AM, to use podcasts on Ag Perspectives program. Nov 4, 2022.
17. Cheyney M: [2022] GPCAH roadway safety materials used in the I- CASH Fall 2022 Lighting and Marking Seasonal Campaign. October 2022.
18. Cheyney M: [2022] Request for hearing loss prevention posters by audiologist in eastern Iowa for use in clinic. Sept 26, 2022.

Grant Funding

1. Sheridan C, Gibbs JL. Pesticide Educational Resources Collaborative (PERC) 2-year Ag Community-based program grant. $100,000. Awarded in July 2023. We attribute this funding to support Gear Up for Ag™ programs more targeted for safe pesticides handling to GPCAH investment in AHSA development of the safe agrochemical resources, including the ongoing development of the

Respirator Fit Test Guide for Pesticide Handling, "The Label is Your Guide" motion graphic, and "Take Care of your PPE Proper Respirator Storage" motion graphic.

Information Provided to Policy Makers

1. Anthony TR & Rohlman D: [2023] Washington DC Hill Visits for Ag Centers, Total Worker Health Centers, and Educational Research Centers. Feb 2023.

Student Thesis/Dissertation

1. Smaellie, EK: [2023], Recommendations for addressing barriers to respirator fit testing among farmers and agricultural workers. MS Thesis, August 2023. At LINK
2. Arabi, S: [2022] Monitoring of civil infrastructure: A deep-learning-based computer vision approach (Order No. 29162037). PhD Dissertation. Iowa State University. Available from ProQuest Dissertations & Theses Global. (2677059326). At LINK

Media Stories and Press Releases

Media Stories

1. Anderson ML: [2023] The Cost and Risks of People Entering Bridged Silos. Powder Bulk Solids newsletter, Sept 22, 2023. LINK
2. Chadde, S: [2023] GRAPHIC: Number of agricultural fatalities has decreased, but industry remains dangerous. Investigate Midwest, Sept 21, 2023. LINK
3. Herrold B: [2023] Farm-safety efforts adapt. Missouri Farmer Today, Sept 5, 2023. [Anthony TR quoted] LINK
4. Cheyney M: [2023] Illinois AgrAbility to host health, safety tent at 2023 Farm Progress Show. WAND TV. Aug 15, 2023. LINK
5. Iowa Pork Producers Association: [2023] Virtual Tour of Iowa Pig Barn Educates Public Health Students. Iowa Pork Producer Newsletter, July 2023. LINK
6. Saner R: [2023] Safety risks of older tractors on the farm. Rural Radio Network. June 8, 2023. (GPCAH tractor safety data quoted) LINK
7. Saner R: [2023] Safety risks of older tractors on the farm. IANRnews.com. June 1, 2023. (GPCAH tractor safety data quoted) LINK
8. Sheridan C, Gibbs J, Spencer M, and Gibbins : [2023]. Highly Pathogenic Avian Influenza (HPAI) in the Agricultural Community. NIOSH Science Blog. Feb 8, 2023. (References GPCAH Outreach materials). LINK
9. Napsha J: [2022] Grain bin rescue: Westmoreland firefighters get training to save trapped farmers. Westmoreland Tribune TribLIVE (Pennsylvania). Oct 6, 2022. (GPCAH website quoted in article) LINK
10. Young-Puyear C: [2022] Rural Issues: Saving lives and limbs. Agrinews. Oct 4, 2022. (References GPCAH hearing loss prevention outreach materials) LINK
11. Villamaino E: [2022] Not-so-good vibrations (and how to minimize them). Country Folks. October 11, 2022. LINK
12. Block F, Shillcock G & Eller D: [2022]. Explosion, fire in Marengo fuel plant leads to injuries and evacuation. Des Moines Register, Dec 8, 2022. [Anthony TR quoted] LINK

Safety Watch News Column in Lee Agrimedia Publications

1. Janssen B: [2022] Safety details reduce crashes on rural roads. *Iowa Farmer Today*. Oct 7. *LINK*.

2. Janssen B: [2022] Fire prevention important for winter and spring. *Iowa Farmer Today*. Nov 21. *LINK*.
3. Janssen B: [2022] 'Fall Feel Good' connects farmers with help. *Iowa Farmer Today*. Dec 9. *LINK*.
4. Bentley M: [2023] Disaster prep critical for ag operations. *Iowa Farmer Today*. Jan 16. *LINK.*
5. Janssen B: [2023] Basic skills, technique can reduce chainsaw risk. *Iowa Farmer Today*. Feb 13. *LINK.*
6. Archer A: [2023] Anhydrous ammonia can be deadly, but there is time to react. *Iowa Farmer Today*. Mar 13. *LINK.*
7. Janssen B and Curnick J: [2023] 'Luckiest grandpa in the world' takes steps to keep family safe. *Iowa Farmer Today*. Apr 6. *LINK.*
8. Archer A: [2023] Precautionary advice for ATV handling on roadways. *Iowa Farmer Today*. May 12. *LINK.*
9. Janssen B: [2023] Assess ag chemicals for summer safety. *Iowa Farmer Today*. Jun 9. *LINK.*
10. Archer A: [2023] Staying safe in the sun. *Iowa Farmer Today*. July 7. *LINK.*
11. Janssen B: [2023] Lawn mowers put young children at risk. *Iowa Farmer Today*. Aug 11. *LINK.*
12. Archer A: [2023] Study aims to understand and reduce rural crashes. *Iowa Farmer Today*. Sep 8. *LINK.*

Farm Families Alive & Well Newsletter Articles *LINK.*

1. Olson G and Patterson J: [2022] Global health and safety: Farmers are the solution and an important part of the transformation. Alive & Well Newsletter. 29(1):1. Dec. LINK
2. Patterson J: [2022] Promoting Extension Ladder Safety at the FFA Convention. Alive & Well Newsletter. 29(1):4. Dec. LINK
3. Patterson J: [2022] Recommended podcasts: Listen, learn, and stay safe on the farm. Alive & Well Newsletter. 29(1):6. Dec. LINK
4. Cheyney M and Patterson J: [2023] GPCAH Outreach at Wisconsin Emergency Medical Services Association 2023 Conference & Expo. Alive & Well Newsletter. 29(2):3. Mar. LINK
5. Kuehn T and Archer A: [2023] I-CASH and GPCAH Welcome New Staff Members. Alive & Well Newsletter. 29(2):4. Mar LINK
6. Mohling K: [2022] Agricultural Safety and Health Core Course. Alive & Well Newsletter. 29(3):1. Jun. LINK
7. Anthony TR: [2023} Director's Message. Alive & Well Newsletter. 29(3):2-3. Jun. LINK
8. Archer A: [2023] Recent "Safety Watch" article offers advice for proper ATV handling on roadways. Alive & Well Newsletter. 29(3):3. Jun. LINK
9. Patterson J: [2023] Come visit GPCAH at our outreach events this summer. Alive & Well Newsletter. 29(3):4. Jun. LINK
10. Patterson J: [2023] Call for pilot grant applications. Alive & Well Newsletter. 29(3):6. Jun. LINK
11. Archer A: [2023] FarmSafe Podcast: Upcoming Episodes. Alive & Well Newsletter. 29(3):8. Jun. LINK
12. Patterson J: [2023] Enroll in the new GPCAH Farmer/Rancher Registry and learn about opportunities to participate in studies that may improve health and safety on the farm. Alive & Well Newsletter. 29(3):9. Jun. LINK
13. Cheyney M: [2023] Great Plains Center for Agricultural Health (GPCAH) Summer Events. Alive & Well Newsletter. 29(4):5. Sept LINK
14. Faust K: [2023] Virtual Reality Farm Tours!! Alive & Well Newsletter. 29(4):4. Sept. LINK

FarmSafe Podcasts (all available at LINK)

1. Proctor A: [2022] *FarmSafe Podcast: Women in Agriculture and Stress* [Audio podcast episode]. In *FarmSafe*. GPCAH. Oct 11, 2022.
2. Proctor A: [2022] *FarmSafe Podcast: Women in Agriculture and PPE* [Audio podcast episode]. In *FarmSafe*. GPCAH. Nov 8, 2022.
3. Proctor A, Bentley M: [2022] *FarmSafe Podcast: Thanksgiving and Agriculture* [Audio podcast episode]. In *FarmSafe*. GPCAH. Nov 24, 2022.
4. Proctor A: [2023] *FarmSafe Podcast: Women in Forestry* [Audio podcast episode]. In *FarmSafe*. GPCAH. Feb 9, 2023.
5. Proctor A: [2023] *FarmSafe Podcast: What's Your Normal?* [Audio podcast episode]. In *FarmSafe*. GPCAH. Feb 23, 2023.
6. Proctor A: [2023] *FarmSafe Podcast: March Mudness* [Audio podcast episode]. In *FarmSafe*. GPCAH. Mar 22, 2023.
7. Patterson J: [2023] *FarmSafe Podcast: Get Inspired: Pilot Grants* [Audio podcast episode]. In *FarmSafe*. GPCAH. Mar 27, 2023.
8. Proctor A: [2023] *FarmSafe Podcast: Cattle Feedyard Safety: Stop, Think, Then Act* [Audio podcast episode]. In *FarmSafe*. GPCAH. Apr 17, 2023.
9. Proctor A: [2023] *FarmSafe Podcast: Cattle Feedyard Safety: Safety Climate Improvement Strategies* [Audio podcast episode]. In *FarmSafe*. GPCAH. Feb 23, 2023.
10. Proctor A: [2023] *FarmSafe Podcast Zoonotic Diseases: Tips for Healthy Animal Handling* [Audio podcast episode]. In *FarmSafe*. GPCAH. May 17, 2023.
11. Proctor A: [2023] *FarmSafe Podcast: Using Technology to Prepare for Rural Emergency* [Audio podcast episode]. In *FarmSafe*. GPCAH. May 31, 2023.
12. Patterson J: [2023] *FarmSafe Podcast: Remembering Paul Gunderson* [Audio podcast episode]. In *FarmSafe*. GPCAH. June 14, 2023.
13. Proctor A: [2023] *FarmSafe Podcast: Safely Sharing the Road with Farm Vehicles: SaferTrek Project* [Audio podcast episode]. In *FarmSafe*. GPCAH. Jul 12, 2023.
14. Proctor A: [2023] *FarmSafe Podcast: Pesticide Handling Safety for Licensed and Unlicensed Applicators* [Audio podcast episode]. In *FarmSafe*. GPCAH. Jul 26, 2023.
15. Proctor A: [2023] *FarmSafe Podcast: Discussions on Glyphosate* [Audio podcast episode]. In *FarmSafe*. GPCAH. Aug 8, 2023.
16. Proctor A: [2023] *FarmSafe Podcast: When is Noise Too Loud?* [Audio podcast episode]. In *FarmSafe*. GPCAH. Aug 24, 2023.
17. Proctor A: [2023] *FarmSafe Podcast: Pesticide Application Technology: Drones vs Boom* [Audio podcast episode]. In *FarmSafe*. GPCAH. Sep 9, 2023.

Press Releases

Press Release promoting MRASH 2022: Re-imagining Safe and Health Future for Agriculture (Patterson, Oct. 6, 2022) LINK

This announced the hybrid MRASH conference one month before the event, the first face-to-face meeting since the pandemic. It promoted speakers, tours, and skills workshop.

It was covered and posted in NewsBreak (LINK), the Nebraska Ag Connection (LINK), Missouri Department of Health & Senior Services (LINK), among others, to promote the conference.