



Great Plains Center for Agricultural Health 2018-19 Annual Report

October 1, 2019

Report Period: September 1, 2018 – September 29, 2019

CDC/NIOSH Grant U54 OH007548

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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 2018-19 is provided in the Output Summary (pp. 18-27).

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 directly to 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.

Evaluation

Evaluation of the GPCAH included the completion of a *regional farmer needs assessment* and performing an *analysis of traumatic injuries* to identify the injury burden for our farmers.

Farmer Health and Safety Needs The main objective of the farmer needs assessments was to identify (i) health and safety needs and (ii) agriculture-related stressors. Mailed surveys were completed by 338 owner/operators (12% response rate), and 202 farm show attendees completed the same survey at live events in Minnesota, Iowa, and Nebraska. The top three of the 419 responses to the open-ended question of health and safety needs were in the category of: (1) chemicals (*e.g.*, safe handling, pesticide drift, chemical storage), (2) equipment/tools (*e.g.*, PTO entanglement, equipment maintenance, operating machinery), and (3) health outcomes (*e.g.*, respiratory issues, hearing loss, chronic conditions). More participants (N=501) identified their major stressors (Fig. 1), where the most common responses were categorized into (1) financial (45%), (2) climate/weather (22%) and (3) workload and management (*e.g.*, time management, work intensity, shortage of labor, employee relationships, 16%). These results were shared with GPCAH Internal and Regional Advisory Committees and were presented at the International Society for Agricultural Safety and Health (ISASH) meeting in August. The range of stressors identified by farmers has *been communicated to mental health advocates* and crisis center volunteers throughout the region in various ways, such as through in-service training and in radio interviews.

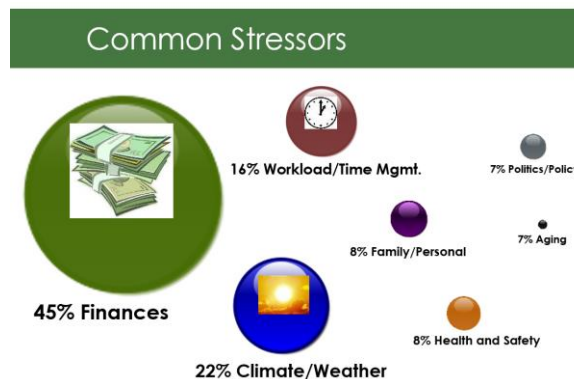


Figure 1: Slide of self-reported stressors identified farmer interviews, June – October 2018. Shared with stakeholders throughout the region.

Injury Burden Additional evaluation of the region’s burden of farmer injury included evaluating the Iowa Trauma Registry as a surrogate for our multi-state region. Acute trauma cases reported by 122 acute care facilities in Iowa were examined to identify causes and outcomes for 1981 cases of ag-related injuries identified across 2014-17. Falls accounted for 22% of traumatic injuries where medical attention was sought, and, combined, various transportation events accounted for 20% of all injuries, dominated by non-traffic (189) and animal riding (106) events (Fig. 2). Information has been shared with Internal, External, and Regional Advisors and will be shared with rural medical providers in November’s joint meeting with Midwest Rural Agriculture Safety and Health and Iowa Rural Health Association.

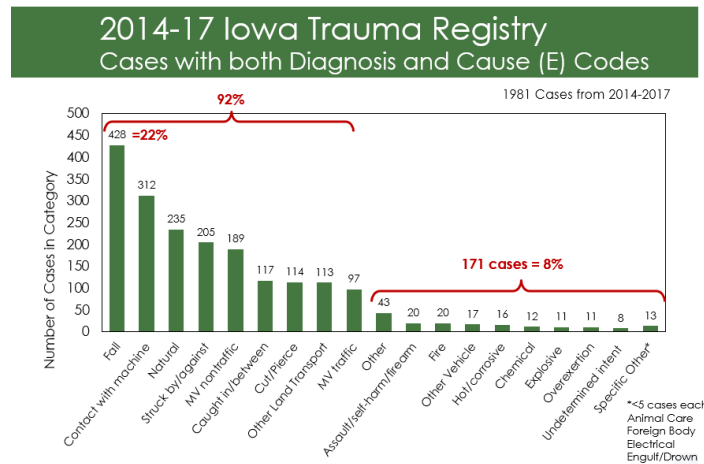


Figure 2: Analysis of Cause Codes for the 1981 traumatic injuries to Iowa Farmers in 2014-17.

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 outreach materials (e.g., Whole Body Vibration displays and handouts; Center “Success Stories”), 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 provide improvements to strengthen these messages. GPCAH partners have reviewed needs assessment findings, participated analysis of survey responses by completing pile sorting activity, and participated in mental health awareness activities important to the region.

Impacts of MRASH: In November of 2018, the GPCAH co-supported the 2018 Regional Midwest Rural Agricultural Safety and Health (MRASH) conference, held in Council Bluffs, Iowa. The Central States Center for Ag Safety and Health (NE AFF Center) also co-sponsored this event. Center P&E provided assistance to the meetings coordination, provided introductions at the event, and coordinated several roundtables. This two-day MRASH conference had **97 attendees registered**, from ten U.S. states (CA, CO, IA, ID, IL, KS, MN, MO, NE, and WI). GPCAH personnel gave six presentations, RAC members gave five, and investigators who received pilot grants gave one presentation. At the end of the conference, a current pilot grant recipient (Neenan) conducted the Anhydrous Ammonia Safety Workshop on site (22 firefighters; visited displays and booths). MRASH presentations were selected to provide attendees with skills and resources on fundamental safety and health hazards (e.g., livestock safety, noise exposures, and injury surveillance) as

well as updates on resource availability, evaluation methods, and behavioral health. Crosscutting panel sessions were incorporated into the program to enhance recognition of relevant topics:

- *Immigrant Farm Worker Health & Safety*: A 4-hour pre-conference session expanded on topics introduced at MRASH 2017, providing insights into interacting with these vulnerable workers and identifying future trends.
- *Planning & Management: Keys to Reducing Stress and Improving Resilience in Agriculture*: Dick Wittman discussed how to treat a farming operation like any other business – SOPs, policies, rules. A panel of three local farmers provided their perspectives on incorporating safety into farming production practices and provided feedback on where they could use information on how to improve these policies.
- *Storytelling*: A roundtable with perspectives on how to use storytelling to motivate change, incorporating perspectives from the *Telling the Story* project (see *Outreach Core*).

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 (e.g., Fig. 3) and study findings to new individuals across a broad audience. In this project period, 161 Twitter posts and 347 Facebook posts were generated. Our Twitter followers are engaged in scientific studies and reports, where we made over 97,587 impressions and gained 53 new followers. Our Facebook posts reached 77,450 unique individuals over the year and the number of engaged readers exceeded 8300 this year.

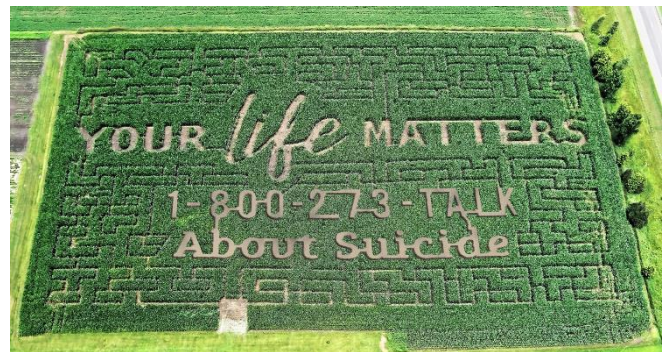


Figure 3: Image of corn maze at Govin’s Meats and Berries Farm was posted on GPCAH’s Facebook. This post linked to the original article (August 8, 2019) in the [USA Today](#), namely ‘Your life matters’: Wisconsin farm promotes suicide prevention awareness in annual corn maze. The GPCAH post has reached 274 people, with 66 reactions, comments and shares, and 73 engagements over the first 3-weeks.

Our most popular FB post shared the new [Pesticide Drift Story Map](#). The initial response reached 2344 organically, and we reached another 3014 farmers and ranchers with a “boost” (\$29). Since the paid campaign ended, an additional 2612 people have organically accessed the post. Media stories detailing farmer injuries, where we provide links to our resources continue to be popular with several posts reaching well over 1000 individuals. Table 1 summarizes the most effective post topics and links.

Table 1: GPCAH Social Media Top Posts

| Twitter | Facebook |
|---|--|
| Whole Body Vibration study results, Fethke https://t.co/mjvMDvN4Sb | Check out our new Pesticide Drift Story Mapping Project http://bit.ly/2AXInub |
| Washington Post, farm children fatalities https://t.co/77SCf1myaE | It’s time to register for the Core Course http://bit.ly/30Cy4q3 |
| Ammonia safety https://t.co/r4RSCx8crP | We’re sorry to read about another child death on the farm http://bit.ly/2NC3xF9 |
| Pilot Grant announcement https://t.co/hFBnxevytw | No day off for local farmers working through severe weather http://bit.ly/2ZxCQI0 |
| Register for mental health in-service training https://t.co/2jN36CzsEf | Manure Pit Death: A Preventable tragedy http://bit.ly/2HtrFpL |

Impact of Press Releases: In 2018-19, four high-impact press releases were prepared. A release regarding the publication of Dr. Fethke’s whole-body vibration study findings ([Fethke PI, Sept 2018](#)) was picked up by six media outlets, leading to four interviews, a YouTube video, and inclusion in NIOSH’s Research Rounds ([Vol 4, No. 8](#), Feb 2019). A press release was prepared to help the lead investigator of the Agritourism pilot project (Meyer, [Nov 2018](#)) to increase visibility and workshop enrollment. The rollout of the Pesticide Drift Story Map web site (emerging issue, Jan 2019) resulted in coverage in three media outlets, two interviews ([WHOTv13](#)), and inclusion in an agricultural podcast. A press release shared in preparation for Mental Health Awareness Month (emerging issue, May 2019) was covered in [print](#) media and [TV](#), and our web site continues to host [resources](#) for media and campaign kits for media and other AFF Centers.

Emerging Issues

NIOSH has provided the GPCAH with funds to address timely hazards throughout the project period. At the start of this cycle, manure gas fatalities were a regional concern. In 2016, rural communities called with questions and concerns about pesticides drifting onto neighboring lands and into homes. In 2018, concerns regarding mental health – namely opioid addiction and farmer suicide -- became regional concerns with few answers. Activities this past year addressed all three of these topics.

Emerging Issues: Manure Gas

This year brought the final phase of efforts to develop hands-on tools for livestock producers and examine ways to bring awareness to the farming population. Displays were generated (Fig. 4), with input from hog producer safety experts, for use as informational and hands-on experiences for farmers working with manure in confinement operations. The display allows users to perform equipment tests (“bump”) of demo or their own monitors. Displays were deployed at a co-op, an agricultural equipment and services store, and a county extension office. While attendance at the passive displays was low, the agricultural store trained their workers and purchased equipment for their customers; and, the extension group requested training at upcoming manure management courses.

Outcomes: How-to videos are available [online](#), and kits will be available for regional outreach to use at upcoming farm shows.

Emerging Issues: Pesticide Drift

A critical emerging issue addressed in the 2017-18 project period focused on understanding pesticide drift cases that have occurred throughout the region. This issue became urgent as media covered regional and national cases of dicamba drift damaging crops. The GPCAH was contacted by two farmer-led non-profit organizations in Iowa who were interested in understanding the extent of pesticide drift in the Midwest and how it may affect human, crop, and livestock health. GPCAH obtained more than 900 pesticide drift cases from state-based drift reporting agencies from Iowa (2010-15), Indiana (2012-16), and Michigan (2014-16). These narrative case files were reviewed, and data were extracted (including meteorological conditions, application factors, and damage) to identify trends associated with drift cases. In May 2018, GPCAH co-sponsored a *Pesticides and Public Health in Iowa* networking meeting. An outcome of this

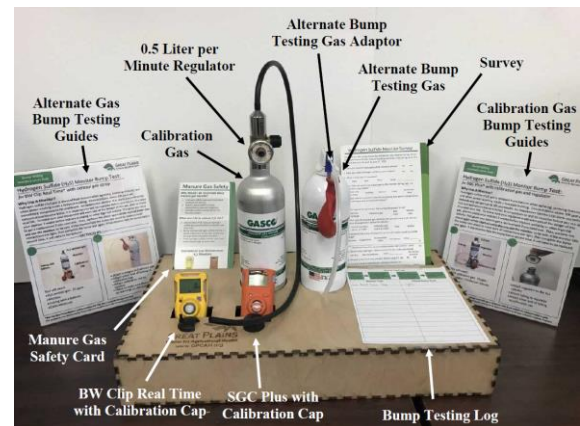


Figure 4: Educational display designed for deployment in farm services/supply stores, co-ops and extension. Surveys included for evaluating display and its materials.

meeting was agreement among the stakeholders to translate the drift data into materials useful for pesticide applicators, educators, and the public.

Outcomes: In June 2018, GPCAH developed an interactive story-mapping website to communicate case and trends for the Iowa and Indiana drift databases. The team integrated hazard information, recommended protective measures and application guidelines for the top five drifted chemicals in Iowa (Fig. 5). Quality control should be completed for Indiana story maps in October 2019. The “Check out our new Pesticide Drift Story Mapping Project” was the most engaged Facebook post this year (Table 1), and these interactive materials are available for training pesticide applicators.

Emerging Issues: Mental Health

Due, in part, to commodity prices and international politics affecting the farmer finances throughout the region, Center personnel have been actively working with regional stakeholders to understand farmworker needs for mental health services.

Figure 6 illustrates the timeline of activities the GPCAH has undertaken to bring together stakeholders, skills and attention to this issue. The stage was set with setting mental health topics identified as “priority topics” for the 2018 pilot grant solicitation and including questions on “stressors” in the 2018 farmer needs assessment survey. As we approached the Sept. 2018 National Farm Safety and Health Week, Gibbs (Center Coordinator) and Schultz (local clergy), coauthored an opinion editorial to inform the community about the pressures farmers are facing and discuss suicide prevention. The article was picked up in several newspapers in the region, drawing attention to farmer mental health needs in the Midwest. In response to local clergy in rural Iowa concerned about parishioner suicide, the GPCAH worked alongside experts at the Johnson County Crisis Center (now called CommUnity) who provide phone/text/chat crisis services statewide and nationally. The goal of the session was to provide clergy with knowledge about current social stressors/risk factors among farmers while also providing clergy with skills using the QPR (Question, Persuade, and Refer) format. This session identified gaps between traditionally urban call center volunteers and rural farm workers, and discussions regarding the need to revise training scenarios to reflect the needs of rural citizens.

On May 3, 2019, the GPCAH co-sponsored the Rural Mental Health Roundtable for Iowa stakeholders. Partners also included Iowa Department of Ag and Land Stewardship (IDALS), CommUnity Crisis Services, and representatives from producer groups, extension, and mental health service providers. We convened and openly discussed concerns and observations regarding mental health across Iowa.

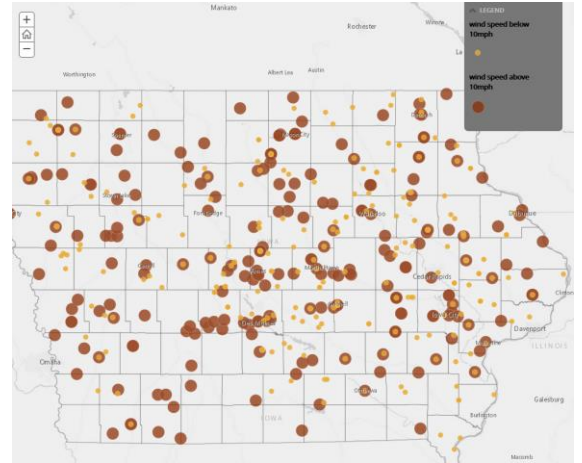


Figure 5: Illustration of pesticide drift cases reported in Iowa, by wind speed. Caution is advised when applying during winds above 6 mph, and application with wind at or above 10 mph is not recommended (dark red).

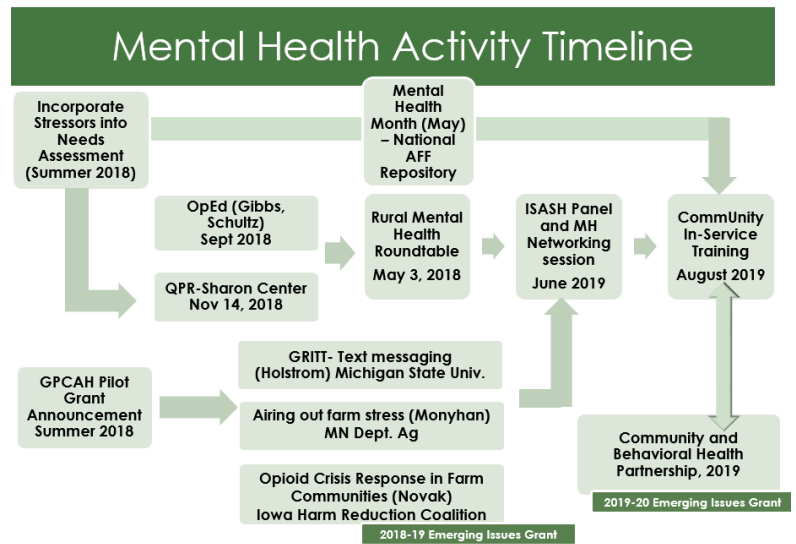


Figure 6: Mental Health Activity timeline for GPCAH.

Meanwhile, throughout May, we gathered and promoted resources for National Mental Health Awareness month. The GPCAH has compiled regional [resources](#) and helped coordinate a national campaign across all NIOSH-funded Ag centers. This campaign was aimed to amplify messages and build a safe space for farmers and rural residents to open up about their stresses and seek support for mental health, as necessary. The GPCAH made 38 Facebook posts on mental health topics, reaching 4,282 individuals. One of the more engaging posts was a video interview of Brandi Janssen (Outreach Core Co-PI) on WHOtv, which provided resources to help manage mental health challenges. GPCAH contributed to four media stories during May, including discussions about contributions by Diane Rohlman (Outreach Core Co-PI) for the Dairy Girl Network’s “Let’s Talk about Mental Health” webinar.

Center planning staff helped to coordinate a Mental Health roundtable at the ISASH meeting (June 2019) and a networking session, attended by 50 ISASH participants. Surveys on stressors and stigma were completed by attendees, used for discussions, and shared back to participants (and NIOSH via NORA). Priorities from this group yielded rankings similar to farmers, and both have been incorporated into outreach efforts to explain these stressors to mental health / crisis outreach personnel (Fig. 7).

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 has earmarked \$30,000 to fund an additional pilot grant in 2018-19 with an emphasis on mental health. Three of the top four scoring proposals focused on various aspects of mental health, and Emerging Issues funding was directed toward the Iowa Harm Reduction Coalition pilot project, fully described in the Pilot Project/Feasibility Grant research project report. A collaborative investigation with a Community and Behavioral Health expert is planned for the 2019-20 project year.



Figure 7: August 2018 training with CommUnity to discuss current farmer stressors and concerns.

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 will develop, deploy, and evaluate a farm equipment roadway safety program at the community level.

Development of the data collection device is a collaboration with faculty, staff, and students in the UI College of Public Health, the Department of Electrical Engineering, and the National Advanced Driving Simulator. The device consists of a camera, GPS, data processors, and rechargeable power supplies contained inside a rugged, weather resistant case, which is mounted to the farm equipment using strong magnets. Video and GPS data are recorded when the farm vehicle is moving faster than 8 miles per hour, a threshold that can be customized for each piece of farm equipment. Pilot data collection during the fall 2017 harvest with seven local operators resulted in nearly 24 hours of roadway data and more than 120 vehicle passes.

During 2018, the team made numerous updates to the device design, which led to improvements in battery life, error tracing, and device status (such as video recording “on/off”). Twenty-two data collection devices were deployed on farm equipment over 100 times in two community sites during both the fall 2018 harvest and spring 2019 planting seasons. The fall 2018 data collection yielded 148 hours of roadway data and 578 vehicle passes (Fig. 8). The team has also been collaborating with researchers at Iowa State University, who are working on processing the video data collected thus far to determine count of following and opposing vehicles, distance between following vehicle and farm equipment, and speed profiles.

Phase 2 is also underway. The study team has: met with the Community Advisory Board throughout the past year, completed 200 pre-campaign intercept surveys (100 in intervention community and 100 in control community), developed campaign name and messages, and kicked-off the campaign by participating in the local Fourth of July parade (Fig. 9). Fall activities are currently being planned for continued campaign implementation.



Figure 8: Screenshot from video processing, identifying following and opposing vehicles and their respective distance from the farm equipment (camera mounted on farm vehicle, rear-facing).



Figure 9: Research team and Community Advisory Board members at the Fourth of July parade during community campaign kick-off.

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. Our data demonstrates 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 may 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 will evaluate the effectiveness of our technology to improve air quality in swine production. In Aim 2, we will optimize our technology to control microorganisms in the air using filtration and UVC light during commercial swine production. In Aim 3, we will evaluate 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.*

High impact accomplishments for 2018-19 (Year 3) include completing the objectives of Aim 2. We performed experiments (n=24) aerosolizing bacteria challenging our bioaerosol treatment system (Fig. 10). Before entering the treatment section, the airborne concentrations of bacteria ranged from 5.56×10^5 colony-forming units per cubic meter (CFU/m³) to 2.91×10^5 CFU/m³. The airborne concentrations of bacteria exiting the system ranged from 2.31×10^5 CFU/m³ (no treatment), 3.20×10^3 CFU/m³ (filtration only) and 0.00×10^0 CFU/m³ (with UVC treatment). Airborne bacterial concentrations in swine production facilities have been reported as high as 2.2×10^9 CFU/m³, therefore, further evaluation of the air treatment system on a swine farm is needed (Aim 3).

These data suggest that *filtration air treatment technology alone* may not be sufficient to eliminate bacterial loading of the air. Furthermore, the addition of UVC technology may offer additional reduction in bacterial loading of air in animal facilities. We have also performed initial experiments (n=8) optimizing our experimental setup to aerosolize virus, using the MS2 bacteriophage as the test bioaerosol. Preliminary analyses suggest that the airborne concentrations of virus were 3.5×10^{11} plaque forming units per cubic meter (PFU/m³) upstream from the treatment system and 3.6×10^7 PFU/m³ downstream of our system without control technology in place. We anticipate completion of lab testing of this viral system by December 2019.

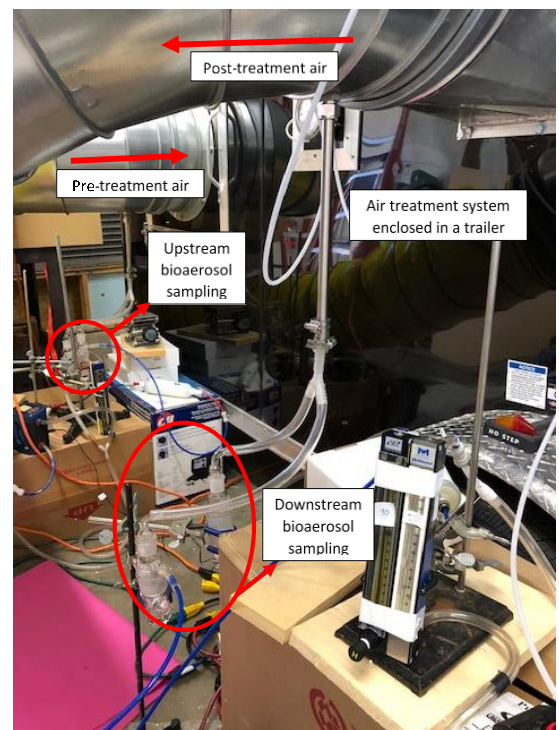


Figure 10. Upstream and downstream sampling of bioaerosol to evaluate air treatment system performance (Aim 2).

In the upcoming year, we plan to perform field studies for Aim 3 during the winter months (December 2019 – March 2020). A current barrier to complete Aim 3 is the heightened biosecurity among swine farms due to African swine fever virus in Asia and Europe. These heightened security measures have limited access to swine farms. We are currently looking for a field location to complete Aim 3. Lastly, we analyzed farrowing room air samples and air and gas concentration results from Year 2, and findings were presented at the 2019 International Society of Agricultural Safety and Health conference (available at [LINK](#)).

Surveillance of Injuries and Risk Factors in Using Worker's 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 a second study focused on surveillance of agricultural hazards. For the first study, we are analyzing agricultural injury cases captured in three datasets: The Nationwide Insurance Company's Iowa based WC program, 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 for identifying hazards associated with agricultural injury.

Dataset Evaluations

Nationwide Insurance. A total of 1,000 injury claims from agricultural policy holders from 23 states (AR, AZ, GA, IA, IL, IN, KS, MD, MI, MN, MO, MS, NE, NH, NY, PA, SC, SD, TN, TX, VT, VA, and WI) from 2010-2016 were examined. The most frequent claim type was medical claims (67% of all claims filed), followed by temporary disability (21%), permanent disability (12%), and death (0.5%). All claims cost \$21.5 million. While the median costs of claims were highest for death (\$289,554) and permanent disability (\$135,210), the most costly claims overall were from a permanent disability claim (\$16 million) followed by a temporary disability claim (\$3.3 million). Iowa Trauma Registry. A total of 2543 cases from 2005-2014 were identified as "farm-related" in this database. From these cases, the majority of patients were male, and the main causes of injury were from machinery (27%), falls (18%) and struck by/against (12.4%). Twenty percent of cases were categorized with moderate to major injuries (severity scores 9+). Iowa Workers' Compensation. Farm-related injuries were captured using the Standard Industrial Classification code for Agriculture. For years 2005-2017, 3771 records were available and processed. The main causes of injury were from twisting/lifting/holding/reaching (26%), falls (25%), and struck by/against (17%).

Hazard Surveillance Tool

The team developed an agricultural hazard surveillance tool with a field guide and piloted the tool at five farms. In this project period, we have enrolled 47 farms: 39 have received a farm visit to complete the hazard surveillance tool, and eight are scheduled to receive a farm visit. Farms are eligible to participate in the study if they farm row crops. Study staff have recruited farms for the study through local farming events, social media and through a subscription list for a national farm journal.

Of the 39 farms with completed hazard surveillance tools, three (8%) experienced a worker fatality, 11 (28%) had worker injuries requiring more than first aid and another 11 (28%) had worker injuries requiring first aid. The 39 farms have been in operation for a median of 50 years (range= 2 – 182 years).



Figure 11: Study staff using surveillance tool during farm visit.

Pilot/Feasibility Projects Program (F. Gerr)

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.

In 2018-19, continued efforts were made to increase the quantity and improve the quality of pilot grant submissions. In August of 2018, GPCAH personnel presented pilot grant writing workshops at both the Missouri (N=25) and the Ohio (N=46) Rural Health Association meetings. In 2019, Gibbs also presented this workshop at the Illinois Rural Health Association (August 7, 65 attendees, Champaign, IL). These live events, combined with links to the 2018 webinar, were associated with another increase in pilot grant applications for summer 2018 and 2019 submissions: 18 applications were received, up from 15 in 2018 and 11 in 2017. The Center has scored pilot grants and selected three potentially high-impact projects suitable for the 2019-20 funding cycle.

Two 18-month pilot projects wrapped up in March 2019. Impacts relative to the pilot grant program are highlighted from their final project reports below.

Agritourism, Chase (PI), Iowa State University

- Trained 81 participants covering topics including Food Safety Best Practices: Food, Farm and Consumer, Understanding Legal Risks in Agritourism, Public Play Area Safety, Pesticide Safety for Agritourism Destinations, Protecting Animals and Humans from Biosecurity Risks, and Farm Emergency Preparedness and Planning.
- Investigators worked with a subgroup to provide hands-on assistance to six agritourism locations.
- Developed checklist materials for course attendees and others to download (items 15680-15685 at <https://store.extension.iastate.edu/product/15680>)

H₂S and Swine Dust Inflammation, Charavaryamath (PI), Iowa State University

- New collaborative partnership between investigator and Dr. Nonnenmann (GPCAH investigator), building resources in the region and improved collaborations between industrial hygienists and toxicologists.
- Manuscript under preparation (with graduate student, Shrestha, as co-author)
- Co-presented with Wyatt (CSCASH), Nonnenmann (GPCAH), and Schneberger (CCHSA, Canada, 2012-13 pilot-grant recipient from Univ. Nebraska Medical Center)

Descriptions of the four pilot grant projects first awarded in the 2018-2019 project period are provided below. All of these are 18-month projects, with funding ending in March 2020.

1. Train-the-trainer program to promote safe respirator use for farmers and pesticide applicators

Hoidal (PI), Minnesota State Extension, Minneapolis, MN

To address the significant lack of knowledge around respirator selection and use in rural MN, this project will develop and deliver a series of train-the-trainer respirator safety and fit testing workshops across Minnesota. The project team will develop a portfolio of outreach materials to be used by rural healthcare professionals, extension educators, agricultural coop health and safety managers, and other state-based pesticide safety education programs.

2. Growing resiliency in tough times (GRITT): A text-messaging mental health intervention for farmers

Holmstrom (PI), Michigan State University / Michigan State Extension, East Lansing, MI

The purpose of the proposed project is to develop a text messaging-based mental health intervention to educate agricultural workers about (1) farm-related stress and (2) coping strategies and available resources to manage that stress. The intervention will be tested among 325 agricultural workers in Michigan to assess feasibility, usability, and acceptability. Workers will also be surveyed on farm stress and coping strategies, the use of adaptive coping strategies, and perceived social support. Reductions in perceived stigma surrounding mental health, farm stress, and the use of maladaptive coping strategies will also be examined. (Fig. 12 illustrates communication for this pilot grant awardee.)

3. Airing out farm stress Moynihan (PI), Minnesota Department of Agriculture, St. Paul, MN

This project aims to address 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 will use radio programming on the Red Rivers Farm Network to air five 60-second programs that will each reach a listening audience of more than 100,000 North Dakota, South Dakota, and Minnesota farmers. The team will enhance the reach of this effort by (1) creating deeper, complimentary 10- to 15-minute podcasts for each topic and (2) harnessing the power of social media that project partners bring. Evaluation will include tracking audience interactions via social media, podcast downloads, and requests for access to stories and materials. The podcasts repository is at <https://www.rfn.com/transformation/>.

4. Opioid crisis response in farm communities: overdose prevention and training for farmers and agricultural workers Ziegenhorn/Novak (Co-PIs), Iowa Harm Reduction Coalition, U of Iowa, Iowa City, IA

This project aims to conduct and evaluate opioid prevention training and outreach with two important agricultural populations in Eastern Iowa, specifically agricultural employees and migrant farmworkers. The team will conduct six community “train-the-trainer” sessions with over 120 farmers and agricultural employees and will collaborate with the Proteus Migrant Health Program to conduct six migrant health outreach sessions to 50 migrant farmworkers. The team uses a community-engaged, peer-to-peer approach to adapt an established opioid overdose prevention training for agricultural populations. The goal is to prevent opioid overdose among agricultural workers and to build capacity to respond to the opioid crisis in agricultural communities. Pre- and post-assessments will be conducted for evaluation purposes. (Note: Funding for this fourth project came from the GPCAH Emerging Issues Project)

Amanda Holmstrom, PhD, is an associate professor in the Department of Communication in the College of Communication Arts and Sciences at Michigan State University.

"Farmers are under huge amounts of stress that affects their physical and mental health as well as their relationships with families and friends."

The GPCAH funds pilot projects (up to \$30,000 per project) intended to promote innovative outreach and research efforts to prevent agricultural injury and illness. The pilot program supports both community-based organizations and academic researchers.

GPCAH PILOT GRANTS: MAKING A DIFFERENCE!

Dr. Holmstrom and her team are using their GPCAH funding to study a text messaging-based mental health intervention on smartphones that may help farmers overcome multiple barriers to accessing information about stress and coping strategies.

Figure 12: The GPCAH worked with project investigators to advertise the pilot grant program by sharing successes of pilot project investigators. These are available on the [pilot grant announcement web page](#).

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

The *Agricultural Safety and Health: Core Course* was offered at the University of Iowa the week of June 10-14, 2019. Thirty-four trainees participated, including veterinarians, health care providers, safety professionals, pharmacists, graduate students, and producers, who came from 10 U.S. states and Canada. The Iowa *Core Course* is listed as an elective for the Pharmacy Program at the University of Missouri (UM), and we had two students from UM take the course for university credit. In addition to field trips to the National Educational Center for Agricultural Safety and a local producer's farm, we offered training on respirator fit testing by Carolyn Sheridan from the Ag Health and Safety Alliance who had a pilot grant from the Central States Center for Agricultural Safety and Health (CS-CASH). As part of the *Core Course*, the *Agricultural Safety and Health Networking Reception* was held on Monday night. Course trainees participated in a networking activity, which encouraged them to interact with poster presenters and demonstrations, including gas monitor use and maintenance, hearing protection fit checks, roadway safety signage displays, and an ATV tilt table. The reception is jointly sponsored by the Heartland Center for Occupational Health & Safety (a NIOSH Education and Research Center), the Great Plains Center, and the Healthier Workforce Center of the Midwest (a NIOSH Total Worker Health Center of Excellence).

The *Core Course* was also offered in Nebraska, Texas, and Australia, where 102 additional attendees were trained. In the Spring of 2019, Kelly Cochran from the University of Missouri (UM)-Kansas City developed a graduate course, Rural Health & Agrimedecine (PHARM:7489CC) offered to UM students in Kansas City, Springfield, and Columbia. Dr. Cochran completed the Iowa *Core Course* in 2017 and worked with the GPCAH to develop her curriculum. Dr. Rohlman provided several lectures in the new UM course (Introduction to Agricultural Safety and Health, Pesticide Exposure, Transportation Hazards in Agriculture, and Behavioral Health/Total Farmer Health). Course materials are publicly available online ([LINK](#)) and have been provided to other AFF centers, community colleges, and agricultural education programs.

Online course modules continue to be developed as an alternative to concurrent course attendance. Three modules were released during the previous project period: *Occupational Diseases of the Lung in Agricultural Settings*, *Physical Agents*, and *Skin Disease*. Two new courses are now available, *Introduction to Agricultural Safety and Health* and *Personal Protective Equipment*. These titles have been made available to our partners in other states and have been incorporated into the graduate courses at the University of Iowa (OEH:6110-Rural Health and Agricultural Medicine) and the University of Missouri (PHARM:7489 - Rural Health & Agrimedecine). A three-module program focusing on veterinarians is in development. Completed training modules are available online, at [LINK](#).

Translate

The Outreach Core translates research findings to communicate best practices to diverse audiences. In the past year, the Outreach team has continued to refine our materials that are presented at conferences and farm shows, incorporated into print media stories, and included in curricula for the *Core Course*. Translated topics during this cycle include *sun safety*, *skin cancer prevention*, *heat illness*, *whole body vibration*, *winter weather hazards*, and *surveillance* of agricultural injuries and illnesses.

The Outreach Core also continues to raise awareness about persistent issues in agriculture. Given the Center's long history, we have an extensive portfolio of high-quality materials that we distribute at farm shows and events, as well as through our partners. For example, Iowa's Center for Agricultural Safety and

Health (I-CASH) paid to distribute 5000 GPCAH Hearing Protection cards through all Iowa State University Extension and Outreach and Farm Service Agency Offices as part of their summer 2019 seasonal campaign. The cards were combined with a box of formable earplugs for the offices to distribute to their visitors. An additional 150 cards and sets of earplugs were requested by the Louisa County Extension office for use in their agricultural programming later in the year.

Between-center collaboration among outreach specialists from the GPCAH, the Central States Center for Agricultural Safety and Health (CS-CASH), and the Upper Midwest Agricultural Safety and Health Center (UMASH) have included *Telling the Story*, a new translation activity to convey the story of agricultural safety. *Telling the Story* develops injury prevention messages that highlight personal stories of first-hand experiences with agricultural injuries. In this project period, new stories include hydrogen sulfide exposures, livestock injuries, and ATV hazards. The *Telling the Story* website ([LINK](#)) has had 15,600 visitors since its release in conjunction with the 2018 ISASH. The project has been covered by numerous media outlets, including *US News and World Report*, *Iowa Farmer Today*, *Ag Industry News*, *Brownfield Ag News*, and *RFD-TV*. The project was featured as a plenary panel during the 2018 MRASH conference, a round table at the 2019 ISASH conference, and an integrated session in the *Iowa Agricultural Safety and Health: Core Course* in 2019. Evaluation of the overall impact of this effort is being led by the UMASH project team.

Communicate

GPCAH outreach uses multiple formats to reach the diverse farming population across our nine-state region including traditional newsprint, in-person interactions, and online (stories, fact sheets, posters). In collaboration with Iowa’s Center for Agricultural Safety and Health (I-CASH), we have written 12 monthly Safety Watch columns, a regular feature in *Iowa Farmer Today*, *Missouri Farmer Today*, *Illinois Farmer Today*, and *Midwest Marketer*. These weekly publications have a print circulation of 146,900 households and have online presence. Columns use incident profiles, research translation, and policy information to promote best practices in agricultural safety and health. Topics this year included mowing safety, roll-over protection, livestock-related injuries, and safe grain handling. Also in collaboration with I-CASH, *the Farm Families Alive and Well Newsletter* has transitioned to an electronic only distribution. This allows for longer articles and a more interactive format where readers can directly follow links to additional information. Four quarterly issues of the newsletter were distributed to nearly 2000 recipients during the reporting period.

WHOLE BODY VIBRATION

WBV occurs when the shaking motion of a vehicle is transmitted through the body of the operator.

The vibration experienced in the body depends on the type of vehicle, type of seat, vehicle speed, and terrain (gravel, field, paved).

HEALTH Effects

- Low back pain
- Headaches
- Muscle fatigue and cramping
- Loss of balance
- Dizziness
- Increased blood pressure

How Much is Too Much?

| | Average Daily Operation Time before Reaching Recommended WBV Exposure Limits | |
|-------------------|--|---------|
| | 4 hours | 8 hours |
| ATVs | ● | |
| Utility equipment | ● | |
| Tractors | ● | |
| Road vehicles | | ● |
| Combines | | ● |

Prevention Strategies

- ✓ **Maintenance:** keep tires inflated
- ✓ **Seat:** should not bottom out during use
- ✓ **Posture:** minimize forward leaning posture when driving
- ✓ **Terrain:** slow down on rough terrain
- ✓ **Rest:** stop and take breaks regularly

GREAT PLAINS
Center for Agricultural Health

Figure 13: Whole Body Vibration outreach material based on Dr. Fethke’s musculoskeletal study findings.

Outreach personnel have attended ten farm shows, agricultural safety days, and producer conferences, providing educational and prevention messages directly to farmers and attendees at shows. In this past year, these included the Minnesota Farmfest (Fig. 14), Sioux Falls Farm Show, Husker Harvest Days, the Iowa Corn Growers Meeting, and the Ohio Farm Science Review. The GPCAH has collaborated at outreach events with Nebraska and Minnesota AFF Centers and with the Marshfield Clinic in Wisconsin, with the goal of making safety and health integral to the agricultural industry. In addition, Outreach Co-PI Diane Rohlman was a presenter at Child Agricultural Injury Prevention Workshops in Des Moines, IA and Marshfield, WI, which were hosted by the National Children’s Center for Rural and Agricultural Health and Safety. The GPCAH and Southeast Center for ASH (Kentucky) represented the US ASH centers at the National Association of County Ag Agents annual meeting in September 2019.

In 2017, we began a collaboration with Carolyn Sheridan, executive director of the Ag Safety and Health Alliance. Ms. Sheridan incorporated Center materials into her community workshops and “Gear Up for Safety” events in western Iowa, Nebraska, and South Dakota during this reporting period. Topics were defined based on feedback Ms. Sheridan received at the 2018 American Farm Bureau Safety Conference and include PPE (hearing and respiratory protection) selection and use and gas monitors. This year, Ms. Sheridan presented GPCAH materials to nearly 800 stakeholders across the region: Clay County, IA Farm Bureau Annual meeting (400); Sauk Valley Community College and Scales Mound High School in Whiteside County, IL (100 students); South Central College in Mankato, MN (90 students); Iowa State University (47 students); and Lakeland College in Alberta, Ontario (150 students). Additional meetings are being scheduled for the upcoming year.

The [GPCAH website](#) curates the considerable number of resources developed by the Center over its long history. Change to the website hosting required a small change in address, but the transition appeared seamless.



Figure 14: Marsha Cheyney using the interactive “lighting and marking” display at the Minnesota Farmfest to lead farm families through optimal locations to put lighting and marking on tractors and farm implements (August 2019).

Output Summary: September 2018 through September 2019

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

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

Published Manuscripts

1. Douphrate DI, Fethke NB, Nonnenmann M, Rodriguez A, Gimeno Ruiz de Porras D (in press). Reliability of observational- and machine-based teat hygiene scoring methodologies. *Journal of Dairy Science*. doi: [10.3168/jds.2019-16351](https://doi.org/10.3168/jds.2019-16351).
2. Fethke NB, Schall MC, Merlino LA, Chen H, Branch CA, Ramaswamy M: [2018] Whole-Body Vibration and Trunk Posture During Operation of Agricultural Machinery. *Annals of Work Exposures and Health*; 62(9):1123-1133. PMID: 30239568. doi: [10.1093/annweh/wxy076](https://doi.org/10.1093/annweh/wxy076)
3. Butler-Dawson J, Galvin K, Thorne PS, Rohlman DS: [2018] Organophosphorus pesticide residue levels in homes located near orchards. *Journal of Occupational and Environmental Hygiene*, 15(12):847-856. PMC6372327. doi: [10.1080/15459624.2018.1515489](https://doi.org/10.1080/15459624.2018.1515489)
4. Janssen B: [2018] Small Farms, Big Plans: Mechanization and Specialization as Measures of “The Middle”. *Culture, Agriculture, Food and Environment*, 41(2):96-104. doi: [10.1111/cuag.12221](https://doi.org/10.1111/cuag.12221)
5. Kates AE, Dalman M, Torner JC, Smith TC: [2019] The nasal and oropharyngeal microbiomes of healthy livestock workers. *PlosOne* (open access). 14(3): e0212949 (19 pp). PMC6413945, doi: [10.1371/journal.pone.0212949](https://doi.org/10.1371/journal.pone.0212949) [Pilot Grant]
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*. In Press, doi: [10.1002/ajim.23040](https://doi.org/10.1002/ajim.23040)
7. Nordgren TM, Charavaryamath C: [2018] Agriculture occupational exposures and factors affecting health effects. Review. *Current Allergy and Asthma Reports*, 18:65. PMC6644660, doi: [10.1007/s11882-018-0820-8](https://doi.org/10.1007/s11882-018-0820-8). [Pilot Grant]

Abstracts/Presentations Accepted for Scientific Meetings

1. Arora K, Cheyney M, Gerr F, Gibbs J, Anthony TR: [2018] Assessing agricultural health and safety needs: A comparison of survey modalities. Evaluation 2018, Cleveland, OH, Oct 28-Nov 3, 2018.
2. Arora, K: [2019] A Needs Assessment of Agricultural Health and Safety Concerns in the US Midwest. International Society for Agricultural Safety and Health Conference (ISASH); Des Moines, IA, June 24-27, 2019. (Poster)
3. Baidwan NK, Gerr F, Casteel C, Ramirez M: [2018] Farm-related injuries: Cost and risk estimations by the type of injury claims. National Occupational Research Symposium, NIOSH, 2018. (Oral)

4. Charavaryamat C, Wyatt T, Nonnenmann MW, Schneberger D: [2019] Agricultural Organic Dust-Induced Respiratory Disease. International Society for Agricultural Safety and Health Conference (ISASH); Des Moines, IA, Jun 24-27, 2019. (Panel)
5. Cheyney M: [2018] MRASH Display
6. Cheyney M, Hartis A: [2019] Manure Gas Safety: Use of Gas Monitors. International Society for Agricultural Safety and Health Conference (ISASH); Des Moines, IA, Jun 24-27, 2019. (Educational Display)
7. Duysen E, Yoder A, Leonard S, Heiberger S, Ploeckelman M: [2019] Telling the Story: Using Storytelling to Disseminate Agricultural Safety and Health Messaging. World Social Marketing Conference; Edinburgh, Scotland, Jun 2019. [Poster]
8. Gibbs J: [2019]: Updates on pesticide drift in Iowa. Practical Farmers of Iowa Conference, Jan 18, 2019. Ames, IA. 45 attendees, including farmers and agronomists attended this session for continuing education credits.
9. Gibbs J, Rudolphi J, Jones-Bitton, A, O'Hara P, Moynihan M, Chasek C, Holstrom A: [2019] What's Next? Overcoming Mental Health Stigma in Agricultural Communities. International Society for Agricultural Safety and Health Conference (ISASH); Des Moines, IA, Jun 24-27, 2019.(Panel)
10. Gilroy N and Griffith G: [2018] Development of the SaferTrek device.
11. Godwin, K: [2018] Empowering youth: Building the capacity of agricultural youth safety programming in Iowa. Midwest Rural Agricultural Safety and Health Conference (MRASH); Council Bluffs, IA, Nov 27-28, 2018.
12. Hartis A: [2019] Hydrogen sulfide monitor education for use in agricultural operations. 4th Annual Occupational Health & Safety Student Research Conference, Iowa City, IA, Apr 26, 2019. (Poster)
13. Heiberger, Duysen, Ploeckelman, Leonard, Yoder: [2019] Promoting Behavior Change through Storytelling. International Society for Agricultural Safety and Health Conference (ISASH); Des Moines, IA, Jun 24-27, 2019. (Panel)
14. Holmstrom, A. Addressing Stress with Text. Mental Health Roundtable Flashtalk. International Society for Agricultural Safety and Health Conference (ISASH); Des Moines, IA, June 24-27, 2019. **[Pilot Grant]**
15. Janssen B: [2018] The Business of Biodiversity: Local Food and Agrobiodiversity in Iowa. American Anthropological Association Annual Meeting, San Jose, CA. Nov 14-18, 2018.
16. Janssen B, Donham K, Swanson J, Leinenkugel K, Schaefer K: [2019] Leveraging Statewide Partnerships to Promote Agricultural Safety & Health. International Society for Agricultural Safety and Health Conference (ISASH); Des Moines, IA, Jun 24-27, 2019.(Oral)
17. Kopale A, Gibbs J, Anthony TR: [2018] Pesticide drift story-mapping project. . Midwest Rural Agricultural Safety and Health Conference (MRASH); Council Bluffs, IA, Nov 27-28, 2018.
18. Leonard S, Duysen E, Heiberger S, Ploeckelman M, Sheets L, Howell D: [2018] Storytelling: How to make positive changes when lives change. Midwest Rural Agricultural Safety and Health Conference; Council Bluffs, IA, November 2018. (panel presentation) Morley E: [2018] Healthcare seeking behaviors among Midwest farmers. Midwest Rural Agricultural Safety and Health Conference (MRASH); Council Bluffs, IA, Nov 27-28, 2018.
19. Liang Y, Janssen B, Rohlman DS: [2018] Using Participant Observation to Identify Health and Safety Hazards among Midwest Refugee Farmers. Midwest Rural Agricultural Safety and Health Conference (MRASH); Council Bluffs, IA, Nov 27-28, 2018.
20. Liang Y, Rohlman DS: [2019] Behavioral Health Needs and Resources among Cooperative Dairy Farmers. International Society for Agricultural Safety and Health Conference (ISASH); Des Moines, IA, Jun 24-27, 2019. (Poster)
21. Meyer K: [2019] Agritourism destination safety and health best practices workshops. International Society for Agricultural Safety and Health Conference (ISASH); Des Moines, IA, Jun 24-27, 2019. **[Pilot Grant]**

22. Morley, E: [2018] Healthcare seeking behaviors among Midwest farmers. Midwest Rural Agricultural Safety and Health Conference (MRASH); Council Bluffs, IA, Nov 27-28, 2018.
23. Nonnenmann M, Anthony TR, Sousan S, Altmaier R, Gibbs J, Ramirez A: [2019] Air quality in livestock production buildings: evaluating a prototype to reduce dust concentrations. International Society for Agricultural Safety and Health Conference (ISASH); Des Moines, IA, Jun 24-27, 2019. (Oral)
24. Nonnenmann MW: [2019] Animal Agriculture and the One Health Approach. Western Agriculture Safety and Health Conference; Seattle, WA, Aug 7-9, 2019. (panel)
25. Olsen G, et al: [2018] Increased opportunities and collaborations by utilizing rural venues for a Midwest health and safety conference. . Midwest Rural Agricultural Safety and Health Conference (MRASH); Council Bluffs, IA, Nov 27-28, 2018.
26. Olsen G: [2018] Increased opportunities and collaborations by utilizing rural venues for a Midwest health & safety conference. Midwest Rural Agricultural Safety and Health Conference (MRASH); Council Bluffs, IA, Nov 27-28, 2018.
27. Pieper F, Hamann C, Askelson N, Bash-Brooks W: [2019] Sharing the road with farm equipment: Driver rural roadway perceptions and beliefs. International Society for Agricultural Safety and Health Conference (ISASH); Des Moines, IA, Jun 24-27, 2019. (Oral)
28. Reyes M & Hamann CJ: [2019] Naturalistic study of farm equipment and vehicle interactions on Iowa's roadways. Mid-Continent Transportation Research Symposium, Ames, IA. Aug 21, 2019.
29. Rohlman D, Simmes D, Buhl K, Forsyth P: [2019] One Sip Can Kill: Helping medical professionals recognize paraquat poisoning. International Society for Agricultural Safety and Health Conference (ISASH); Des Moines, IA, Jun 24-27, 2019. (Poster)
30. Rohlman D: [2018] Review of targeted safety and health interventions for youth working in agriculture, 2010-2017. Midwest Rural Agricultural Safety and Health Conference (MRASH); Council Bluffs, IA, Nov 27-28, 2018.
31. Rohlman D: [2019] Child Agricultural Injury Prevention Workshop. International Society for Agricultural Safety and Health Conference (ISASH); Des Moines, IA, Jun 22-3, 2019.

Lectures, Seminars, or Workshops Delivered in Academic Settings

1. Anthony TR: [2019] Ag related incidents - West Texas Fertilizer explosion; Grain Dust Haysville KS. *Death at Work*. 11 undergraduate students (4 contact hours)
2. Janssen B: [2018] Racism and Occupational Health in *Occupational Health*. Graduate students. Oct 30, 2018. (75 mins)
3. Janssen B: [2018] Farm to School lecture, given in *Food Culture and Agriculture*, U Minnesota, Morris. Undergraduate students, Nov 6, 2018. (50 mins)
4. Janssen B: [2018] *Sustainable Agriculture and Feeding People*. Heartland Global Health Consortium's Symposium – Too Much, Too Little: Nutrition around the Globe. Des Moines University, Des Moines, IA. Nov 9, 2018.
5. Janssen B: [2019] Hazards Associated with Livestock. *Rural Health and Agricultural Medicine*. University of Iowa. 5 graduate students.
6. Janssen B: [2019] Rural Health Disparities. *Health, Equity, and Social Justice*. University of Iowa, Iowa City, IA. Grad students.
7. Janssen B: [2019] Local Food: Sustainable Jobs and Healthy People? *Fundamentals of Public Health*. University of Iowa, Iowa City, IA. Undergraduate students.
8. Janssen B: [2019] Agriculture, Anthropology, and Public Health. *Contemporary World Problems*. University of Iowa. Iowa City, IA. Undergraduate students.
9. Janssen B: [2019] Food, Farming, and Health. *Health, Work, and Environment* course. University of Iowa. Iowa City, IA. Undergraduate students.

10. Rohlman D: [2019] Neurobehavioral effects of organophosphorus pesticides, with a focus on rodent in vivo, background on pesticide use and human exposure. *E-lecture, Utrecht University* (30 mins).
11. Rohlman DS: [2019] Seminar Series: Pesticides, Children, and Rural Communities National and International Challenges. *School of Health & Social Development Seminar, Deakin University, Geelong, Australia. (invited speaker)*
12. Rohlman DS: [2018] Studying Pesticide Exposure in Egyptian Agricultural Workers. *Studying Pesticide Exposure in Egyptian Agricultural Workers. (invited speaker)*
13. Rohlman DS: [2018] Sustainable Agriculture and Feeding People. *Heartland Global Health Consortium Annual Symposium, Heartland Global Health Consortium, Des Moines, Iowa. (invited speaker)*
14. Rohlman DS: [2019] Lecture series (Behavioral Health and Total Farmer Health; Introduction to Agricultural Safety and Health; Pesticide Exposure; Transportation Hazards in Agriculture) in PHARM 7489 – *Special topics in Pharmacy: Rural Health and Agricultural Medicine* course. University of Missouri – Kansas City. **(guest lecturer)**

Courses Taught in Agricultural Safety and Health

1. Janssen B: [2018] Topics in Agriculture and Rural Health: The Culture of Agriculture. 8 graduate students, 15 contact hours. Fall 2018.
2. Rohlman D: [2019] Rural Health and Agricultural Medicine. 5 graduate students, 45 contact hours Spring 2019.
3. Rohlman D: [2019] Topics in Agriculture and Rural Health: Research Methods in Rural Health. 5 graduate students. 15 contact hours. Spring 2019.
4. Agricultural Safety and Health Core Course: [2019] The 40-hour course completed by 34 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 10-14, 2019.

Lectures, Seminars, or Workshops Delivered to the Agricultural Community

1. Anthony TR: [2018] GPCAH: Pit Gases and Testing Equipment. National Pork Board Safety Roundtable, Oct 3, 2018. National Pork Board, Clive IA. Attended by 20 safety and health managers at swine production companies.
2. Cheyney M: [2018] Rural Roadway Safety – Lighting and Marking. Husker Harvest Days, Grand Island, NE, Sept 11-13, 2018.
3. Cheyney M, Hartis A, Rohlman D: [2018] Presentations about hearing loss prevention, manure gas safety, and rural roadway safety. Gear up for Ag Safety day, Kirkwood Community College, Cedar Rapids, IA, Oct 2018. 120 undergraduate students.
4. Cheyney M: [2019] Cold Weather Hazards. Sioux Falls Farm Show, Sioux Falls, SD, Jan 22-24, 2019.
5. Cheyney M: [2019] Safety Signs. Poweshiek County Farm Safety Day, Brooklyn, IA, May 23, 2019. 354 Elementary students.
6. Cheyney M: [2019] Hearing Loss Prevention. NECAS Farm Safety Day, Peosta, IA, Jun 12, 2019. 120 Elementary students.
7. Cheyney M: [2019] Hearing Loss Prevention. NECAS Farm Safety Day, Peosta, IA, Jul 9, 2019. 100 Elementary students.
8. Cheyney M: [2019] Rural Roadway Safety – Lighting and Marking. Know before You Go, Iowa Corn Growers meeting, Urbana, IA, Aug 1, 2019.
9. Cheyney M: [2019] Rural Roadway Safety. Collaborative booth with National Children’s Center and UMASH at Minnesota Farmfest, Redwood Falls, MN. Aug 6-8, 2019.
10. Cheyney M: [2019] AFF Outreach Materials for Ag Agents. National Association of County Agricultural Agents (NCAA) Annual Meeting, Fort Wayne, IN. Sept 8-10, 2019.

11. Cheyney M: [2019] Whole Body Vibration and others. Ohio Farm Science Review, London, OH. Sept 17-19, 2019.
12. Gibbs J: [2019] Cold Weather Hazards. Western Farm Show, Kansas City, MO. Feb 22-24, 2019.
13. Gibbs J, Afifi R: [2019] Mental health and suicide risk in agricultural communities. Presented to CommUnity Crisis Services, Coralville, IA, Aug 6, 2019. Attended by 20 CommUnity staff and volunteers as well as community members interested in providing mental health services to rural and farming communities.
14. Gibbs J, Gerr F: [2019] Rural community outreach pilot grant writing workshop: Examples in agricultural health and safety. This workshop served to provide pilot grant writing guidance for community outreach groups at the Illinois Rural Health Association, Champaign, IL, Aug 7, 2019. (65 attendees)
15. Gibbs J: [2018] Mental health and suicide risk in agricultural and rural communities. Sharon Center United Methodist Church QPR Training with Johnson County Crisis Center, Kalona, IA. November 14th, 2018. 25 attendees.
16. Gibbs J: [2018] Mental health and suicide risk in agricultural and rural communities. Iowa City Chapter P.T.O., Sept 14, 2018. 18 attendees.
17. Gibbs J: [2019] Updates on pesticide drift in Iowa. Practical Farmers of Iowa Conference, Ames, IA, Jan 18th, 2019. 45 attendees. (invited speaker)
18. Gibbs J, Mosher G: [2019] Mental health and the agribusiness workforce: ISASH Networking Reception. The session featured flash talks and provided opportunities for participants to present their diverse research, model programs, and other projects. International Society for Agricultural Safety and Health Conference, Des Moines, IA. Jun 26, 2019. 45 attendees.
19. Janssen B: [2018] Occupational and Environmental Health in Agriculture. Scattergood Friends School, Sept 11, 2018. 8 attendees. (60 minutes)
20. Janssen B: [2018] Agricultural Safety and Health in Iowa. Iowa Agricultural Bankers Committee, Oct 16, 2018. (invited speaker)
21. Meyer K, Chase C: [2018-19] Agritourism destination safety and health best practices workshop. This workshop was hosted by Iowa State University Extension and funded by the GPCAH Pilot Projects Program. Three workshops were hosted in three counties [Blackhawk (25), Johnson 925), Polk(21)] to 73 attendees. [**Pilot Grant**]
22. Neenan D and Imhof J: [2018] Anhydrous ammonia safety training program. Fire department, EMS responders, and general community training; at: Monticello, IA, Ridgeway, IA; Peosta, IA; Treynor, IA.; Lakota, ND; McVile, ND; Garland, NE; York, NE; Grisham, NE; Lincoln, IL; Versailles, MO. [**Pilot Grant**]
23. Neenan D: [2018] Anhydrous safety training for firefighters and emergency responders. Midwest Rural Agricultural Safety and Health Conference (MRASH); Council Bluffs, IA, November 29, 2018. Council Bluffs, IA. 30 attendees. [**Pilot Grant**]
24. Nonnenmann M: [2019] Project Ideas presented at the National Pork Board Unified Research Committee Meeting, Litchfield Park, AZ. Jan 9, 2019. (invited speaker)
25. Nonnenmann M. [2019] Respirator fit and use. JWV Pork. Washington, IA. Aug 14th, 2019
26. Rohlman D: [2018] Case study in musculoskeletal disorders. AgriSafe Nurse Scholar program.
27. Rohlman DS: [2019] Let's Talk About Mental Health. 2019 Compeer Financial Women's Seminar, Compeer Financial, (invited lecturer): In 4 IL locations: Macomb, Galena, Ottawa, and Edwards
28. Rohlman DS: [2019] Let's Talk About Mental Health. Dairy Girl Network Behavioral Health Mini-Series, Dairy Girl Network, Iowa City, Iowa. (invited lecturer)
29. Rohlman DS: [2019] Farm Health and Safety. Joint meeting of the North American Fruit Explorers and the Northern Nut Growers Association Conference, Iowa City, IA. Jul 28-31, 2019.
30. Rohlman DS: [2019] Agricultural Exposures: Organophosphate Pesticide Poisoning and Prevention. Rural PREP Grand Rounds. Jan 24, 2019.

Consultation or Information Exchange

1. Anthony TR: [2019] Pig producer with COPD in Ontario had questions regarding ways to minimize exposures when working in pig barns. Aug 28, 2019:
2. Anthony TR: [2019] Occupational physician in Sioux Falls, IA reached out for information on the Core Course and Certified Safe Farm to discuss education available to his colleagues at a medical clinic. Aug 8, 2019.
3. Anthony TR: [2019] Community member emailed requesting information about mental health and wellness for a project aimed at educating individuals and families about mental health topics. Aug 24, 2019.
4. Anthony TR: [2019] Writer (David Geiger) from Agribusiness News requested an interview for TV about mental health month. May 13, 2019.
5. Cheyney M: [2019] Jessie Higgins from United Press International called requesting an interview about safety during the harvest season. Aug 29, 2019.
6. Gibbs J: [2018] President of the Iowa City chapter of the Philanthropic Educational Organization requested a speaker about women's issues in farming. Sept 14, 2018.
7. Gibbs J.: [2018] NIOSH Western States Communications Manager (Liz Daily) requested the Press Release for Nate Fethke's Whole Body Vibration Paper. Oct 1, 2018.
8. Gibbs J: [2019] Colleen McRoberts, Crisis Services Coordinator at CommUnity Crisis Services and Food Bank requested a presenter about stress and suicide rates and culturally specific factors related to overcoming stigma and mental illness in farming communities for employee in-service. Jun 6, 2019.
9. Nonnenmann M: [2019] Project Ideas discussed with National Institute of Antimicrobial Resistance Research & Education (NIAMRRE), Ames, IA. Apr 10, 2019.
10. Ramirez MR, Gibbs J: [2018] Greg Swanson from John Deere requested information on roadway safety when farm equipment is on the roads during fall harvest. Sept 13, 2018.

Information Provided to Policy Makers

1. Gibbs J: [2019] Mental Health Networking Session, ISASH; June 27, 2019, Des Moines, IA. Coordinated networking session at ISASH to bring stakeholders into a room to discuss needs and opportunities to address mental health needs of North American farmers. Incorporated survey of needs and actions taken to reduce stigma from 50 participants. Policy makers attended.
2. Janssen B, Anthony TR, Gibbs J, Afifi R: [2019] Mental Health Roundtable. May 3, 2019, Des Moines, IA. Met with Iowa Department of Ag and Land Stewardship, CommUnity Crisis Services, Extension, and representatives from producer groups and mental health providers. 29 attendees. Discussed resources, challenges, and path forward.
3. Nonnemann M: [2018] Meeting with Agricultural College faculty. Cedar Rapids, IA. Nov 26, 2018.

Student Thesis/Dissertation (Accessible [here](#))

1. Godwin K: [2019] Farmer suicide and access to care in Iowa. MS Thesis, Agricultural Safety and Health, University of Iowa. May 2019.
2. Hartis AE: [2019] Hydrogen sulfide monitor education for use in agricultural operations. MS Thesis, Occupational and Environmental Hygiene (Industrial Hygiene), University of Iowa. August 2019. (Emerging Issue)
3. Morley E: [2019] Healthcare seeking behaviors among Midwest farmers. MS Thesis, Agricultural Safety and Health, University of Iowa. May 2018.

Press Releases and Media Stories

Safety Watch News Column in Lee Agrimedia Publications

1. Janssen B: [2018] Prevent grain-related injuries. *Iowa Farmer Today*. Oct 2018. [LINK](#)
2. Janssen B: [2018] Experts recommend SOPS for safety. *Iowa Farmer Today*. Dec 2018. [LINK](#)
3. Janssen B: [2019] Suicide prevention is a community-wide effort. *Iowa Farmer Today*. Feb 2019. [LINK](#)
4. Janssen B: [2019]. Rollover protection a critical safety strategy for small farms. *Iowa Farmer Today*. Apr 2019. [LINK](#)
5. Janssen B: [2019] Doctor can help reduce physical toll of farm work. *Iowa Farmer Today*. Jun 2019. [LINK](#)
6. Janssen B: [2019] Recent deaths reinforce need for safe driving, ROPS. *Iowa Farmer Today*. Aug 2019. [LINK](#)
7. Leonard S: [2018] ‘Think twice’: 30 years later, a survivor offers plea to farmers. *Iowa Farmer Today*. Sep 2018. [LINK](#)
8. Leonard S: [2018] Recent H₂S cattle deaths a reminder for precautions. *Iowa Farmer Today*. Nov 2018. [LINK](#)
9. Leonard S: [2019] Tale of the ring neck and the ‘safety lady’. *Iowa Farmer Today*. January 2019. [LINK](#)
10. Leonard S: [2019] Broadcaster shares run-in with steer that broke her hand. *Iowa Farmer Today*. Mar 2019. [LINK](#)
11. Leonard S: [2019] Man counts good fortune following ATV accident. *Iowa Farmer Today*. May 2019. [LINK](#)
12. Leonard S: [2019] Mowing mistakes on slopes can claim lives, limbs & mowing reminders. *Iowa Farmer Today*. Jul 2019. [LINK](#)

Telling the Story Project – New Stories 2018-19

1. Leonard S and Nelson J: [2019] Jerry and Julie (hydrogen sulfide exposure) [LINK](#)
2. Leonard S: [2019] Susan (livestock injury) [LINK](#)
3. Leonard S: [2019] David (ATV injury) [LINK](#)

Media Stories following Mental Health Op Ed – Sept. 2018 National Farm S&H Week

Op Ed, J. Gibbs and E. Schultz (2018), Guest Column for The Gazette, Cedar Rapids, IA (Sept. 26, 2019) [LINK](#)

Picked up by several local media outlets:

1. Gibbs J, Schultz E: [2018] In times of strife, farmers connect with the church. *Kalona News*. Sep 20, 2018.
2. Gibbs J, Schultz E: [2018] In times of strife, farmers connect with the church. *Des Moines Register*. Sep 12, 2018. [LINK](#)
3. Gibbs J, Schultz E: [2018] In times of strife, farmers connect with the church. *Cedar Rapids Gazette*. Sep 18, 2018 [LINK](#)

Media Stories following Whole Body Vibration Press Release – Nov. 2018

Gibbs J, Fethke N and Snee T. (2018). Press release: With longer hours spent on farm equipment, whole body vibration and lower back pain is a concern to some farmers. This press release resulted in news coverage including:

1. Bennett C: [2018]. Farmers’ back pain: Whole lotta shakin’ goin’ on. *AgWeb Farm Journal*. Nov. 19, 2018. [LINK](#)
2. CDC/NIOSH: [2019] Harmful vibrations vary by farm machine. *NIOSH Research Rounds*. Feb 20, 2019. [LINK](#)
3. College of Public Health: [2018] UI study looks at machinery vibration, back pain among farmers. Oct 2 2018. [LINK](#)

4. DiGiacomo J: [2018] Vibrations from vehicles take a toll on farmers' backs. *The Daily Iowan*. Oct 11, 2018. [LINK](#)
5. Druley K: [2019] Bad Vibrations: What workers at risk of whole-body and arm-hand vibrations should know. *Safety+Health (NSC Congress and Expo)*. May 26, 2019. [LINK](#)
6. Staff Writer: [2018] Study links use of farm machinery to back pain and other health problems. *KCRG News*. Oct 4, 2018. [LINK](#)
7. Staff Writer: [2019] NOT good vibrations give farmers MSDs. *Industrial Safety & Hygiene News*. Feb 25, 2019. [LINK](#)
8. Ramm M: [2018] UI Study: Machine vibrations may contribute to farmers' back pain. *The Gazette*. Oct 19, 2018. [LINK](#)
9. Voss L: [2018] Interview: New study hoping to inspire healthier equipment for farmers *CBS 2/Fox 28*. Oct 1, 2018. [LINK](#)

Media Stories following Pesticide Drift Website Press Release – Jan. 2019

University of Iowa researchers launch new website to map pesticide drift. T. Snee (2019). Covered by five media outlets:

1. Staff writer: [2019] University of Iowa website to map pesticide drift. (Reprinted from the *Pollinator Stewardship Council's Feb 2019 newsletter*) *American Bee Journal* (Feb 2019). [LINK](#)
2. Staff writer: [2019] Programs: Pesticide Drift. The University of Iowa has created story map of pesticide misuse cases from 2010-2017, complete with ArcGIS files for download. *Practical Farmers*. (2019). [LINK](#)
3. Staff writer: [2019] Protecting Farmers' Health. *Iowa Magazine*. Sept 2019. [LINK](#)
4. Staff writer Whotv.com: [2019] Map Tracks Cases of Chemical Drift. Feb 13, 2019. [LINK](#)
5. University of Iowa College of Public Health: [2019] Interactive map tracks pesticide drift. *InSight*. Spring 2019. [LINK](#)

Additional Media Stories with GPCAH Collaboration

1. Charis-Carlson J: [2018] Down on the Farm: In the Midwest, injured agricultural workers are telling their stories to help others avoid the same fate. *US News & World Report*. Oct 24, 2018. [LINK](#)
2. Colombe S: [2019] Roadway Safety, in conjunction with NFSW, KLGR Ag Radio. Farm Director interviewed Dr. Cara Hamann on roadway safety, aired Monday 9/16/2019. [LINK](#)
3. Beck M: [2018] Wind-blown pesticides an issue in courtrooms, communities across the U.S. Harvest Public Media. *Iowa Public Radio*. Aug 13, 2018. (Gibbs, Interview). [LINK](#)
4. Ecklund M: [2018] *Muscatine Journal*. Muscatine farmer shares safety stories through new online project. Sept 19, 2018. [LINK](#)
5. Epstein-Moninger S: [2018] The Sky is not the limit- a special feature on undergraduate student Matt Finely, who worked on the Instrumented Farm Vehicle Study. *University of Iowa Office of Strategic Communications*. [LINK](#)
6. Fitzpatrick A: [2019] Iowa organization works to break stigma of mental illness in agricultural communities. *The Daily Iowan*. May 5, 2019. [LINK](#)
7. Janssen B: [2018] National Farm Safety and Health Week interview with Tim Harwood. *1540 KXEL*. Waterloo, IA Sept 17, 2018.
8. Janssen B: [2018] IDALS press release quote (with Secretary Naig). National Farm Safety and Health Week. *IDALS*. Sept 17, 2018.
9. Janssen B: [2019] Interview with Kate Payne about meat packing plants. *Iowa Public Radio*, Jan 4, 2019. [LINK](#)
10. Janssen B: [2019] Farmer Health in the Off-season. Interview with Gene Lucht, *Iowa Farmer Today*. Jan 17, 2019.
11. Janssen B: [2019] Farmer health in the off-season. *Iowa Farmer Today*. Jan 2019.

12. Janssen B: [2019] Farm Stress. Eastern Iowa Farmer Magazine. Mar 2019.
13. Janssen B: [2019] Farm Stress. Iowa Farmer Today. Mar 2019.
14. Janssen B: [2019] Farm suicide rates. PolitiFact. Mar 2019.
15. Janssen B: [2019] Farmers and mental health. Des Moines Register. Apr 2019.
16. Janssen B: [2019] Workers' Memorial Day. KCRG TV 9 (ABC). Apr 2019.
17. Janssen B: [2019] Farmer stress and mental health. The Daily Skimm Podcast. May 2019.
18. Janssen B: [2019] Farm stress and mental health. WHO TV (NBC) Agribusiness Report. May 2019
19. Janssen B: [2019] Farmer mental health. Iowa Watch. Jun 2019.
20. Local Food Initiative: [2019] Mental Health Awareness Month: Learn about how you can support mental health for farmers. *Department of Natural Resources and Parks Blog*. May 29, 2019. [LINK](#)
21. Meyer K and Adcock L: [2018] Workshop offers agritourism safety and best practices information. *Iowa State University Extension and Outreach Newsletter*. Dec 20, 2018. [LINK](#)
22. Prochnow J: [2018] Iowa farmers facing increased mental health concerns. *The Daily Iowan*. Sep 23, 2018. [LINK](#)
23. Prochnow J: [2018] New program through UI center seeks to end farming-related accidents. *Daily Iowan*. Sep 2018. [LINK](#)
24. Shanahan J: [2018] Iowa farmers facing increased mental health concerns. *Daily Iowan*. Oct 2, 2018. [LINK](#)
25. Snee T: [2018] Telling stories, protecting farmers. *IowaNow*. Sep 9, 2018. [LINK](#)
26. Staff Writer: [2019] Mental Health Awareness Month focuses on farmers. *WhoTV*. May 28, 2019. [LINK](#)
27. Staff Writer: [2018] Anhydrous Ammonia Safety Training in Council Bluffs, IA. University of Nebraska-Lincoln. *CropWatch Magazine*. Nov 1, 2018. [LINK](#)
28. Staff Writer: [2018] Anhydrous Ammonia Safety Training offered to public. *UNMC Newsroom Newsletter*. Oct 30, 2018. [LINK](#)
29. Staff Writer: [2018] For farmers, harvest time poses greater safety threats. *Cedar Rapids Gazette*. Sept 29, 2018. [LINK](#)
30. Staff Writers: [2019] *IowaNow*, How the University of Iowa Helps Farmers. [LINK](#)
31. Staff Writer: [2019] *The Bolvine*, For May Mental Health Awareness Month, Dairy Girl Network is offering a mini-series on behavioral health topics. May 6, 2019. [LINK](#)
32. Staff Personnel: [2019] *Telegraph Herald*, Agricultural safety course. June 12, 2019 YouTube Video [LINK](#) **[Core Course]**
33. TransFARMation podcast: Shifting the Conversation about Mental Health. Jun 17, 2019. [LINK](#) **[Pilot Grant]**
34. TransFARMation podcast: It's OK to Not Be OK. Jun 3, 2019 [LINK](#) **[Pilot Grant]**
35. TransFARMation podcast: The Ostrich Syndrome. May 20, 2019 [LINK](#) **[Pilot Grant]**
36. TransFARMation podcast: A Survivor's Journey. May 6, 2019 [LINK](#) **[Pilot Grant]**
37. TransFARMation podcast: There is Life after Farming. Apr 19, 2019 [LINK](#) **[Pilot Grant]**
38. TransFARMation podcast: How Not to Let the Farm Wreck Your Marriage. Apr 3, 2019 [LINK](#) **[Pilot Grant]**
39. UNMC Staff Writer: [2019] UNMC's Agricultural safety and health center to co-host a child agricultural injury prevention workshop in Des Moines, June 23-24. *UNMC Newsroom*. May 21, 2019. [LINK](#)
40. Wade L: [2019] Years later, little action on recommendations for Iowa's pesticide inspections. *IowaWatch*. Jan 22, 2019. [LINK](#)
41. Wade L: [2019] Years later, little action on recommendations for Iowa's pesticide inspections. *Iowa State Daily*. Jan 23, 2019. [LINK](#)

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

1. Anthony TR: [2019] Director's Message: Persistent Hazards AND Emerging Issues. *Farm Families Alive and Well Newsletter*. 25(2):2. Mar 2019.
2. Anthony TR: [2019] Director's Message: On-farm Stress, Mental Health, and Resiliency. *Farm Families Alive and Well Newslette.r* 25(4):2-3. Sept 2019.
3. Anthony TR: [2018] Director's Message: Training and Outreach. *Farm Families Alive and Well Newsletter* 24(4):1,3. Sept 2018.
4. Cheyney M: [2018] GPCAH Field Activities. *Farm Families Alive and Well Newsletter* 24(4):1. Sept 2018.
5. Hartis A: [2019] GPCAH testing local hydrogen sulfide monitors. *Farm Families Alive and Well Newsletter* 25(2):3. Mar 2019.
6. Leonard S: [2018] Telling the Story. *Farm Families Alive and Well Newsletter* 24(4):2. Sept 2018.
7. Patterson J: [2019] Researchers launch new website to map pesticide drift. *Farm Families Alive and Well Newsletter* 25(2):1. Mar 2019.
8. 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.
9. Patterson J: [2019] Great Plains Pilot Grant: Making a Difference. *Farm Families Alive and Well Newsletter* 25(4):4. Sept 2019.