



Great Plains Center for Agricultural Health 2017-18 Annual Report

September 30th, 2018

Report Period: September 30, 2017 – August 31, 2018

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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 in 2017-18 is in the Output Summary (pp. 14-22).

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.

Our 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, 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 and Needs Assessment

In addition to ongoing assessment of the progress of Center research and outreach activities, the P&E Core has been surveying farmers and their advocates to identify regional concerns. Through email and direct interaction, over 300 farmers have identified their top health and safety concerns, the type of resources that would be most helpful, and their preferred sources for safety and health information. We have also begun surveying rural healthcare providers to understand the health concerns of their farming patients and to identify what additional resources medical providers need to better inform and care for their farming patients. We look forward to summarizing these survey responses over the next few months to identify both the needs of these groups and to optimize educational and outreach strategies targeting prevention of agricultural injuries and illnesses that are important to farmers.

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”), where 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 shared RAC-reviewed hearing loss prevention, sun exposure, and manure gas safety posters with their farming populations.

Impacts of MRASH: In November of 2017, we co-sponsored the Midwest Rural Agricultural Safety and Health Conference (MRASH), a forum to improve the technical expertise among health and safety professionals and community-based health organizations. Ninety participants from eight states and one Canadian province attended. Diverse speakers were invited to this regional health and safety conference, and new partnerships were formed. Experts were brought in to contribute content for the agenda and to introduce them to new contacts (MRASH attendees), which extended collaborative networks to improve the regional expertise in agricultural safety and health. Insurance contacts were incorporated into a best business practices session (Iowa Farm Bureau, Arthur J. Gallagher & Co). A session devoted to constructing effective messages was led by the Communication Studies Chair of Central College in Pella, IA (the host location for the 2017 meeting). The GPCAH hosted a panel discussion on effective social media messaging in agriculture, hosting speakers from the Iowa Agriculture Literacy Foundation, Iowa State Extension, and the Women, Food, and Agriculture Network. Immigrant farm worker health issues were addressed by

speakers from the Iowa Center for Immigrant Leadership and Integration and from the Director of the Iowa Center on Health Disparities, who has agreed to lead a workshop in conjunction with the upcoming 2018 MRASH session.

Impacts of Social Media: The P&E Core implemented the Center’s social media communications strategy, which incorporates Facebook, Twitter, and YouTube. These networks are used to disseminate safety messages and study findings to new individuals across a broad audience. In 2017-18, our social media was viewed over 120,000 times, with over 6,500 active engagements with these messages. The most engaging topics included ATV/UTV safety, fall prevention, machine/equipment safety, and pesticides. Our social media messages were shared more than 500 times. The majority of content was shared by farmers or rural community members (27%), the National Ag Safety Database (11%), safety non-profit organizations (11%), and other academic institutions (11%). On social media, the most engaging posts included personal stories, quotes, and unique artistic image content (e.g., photos, cartoons, and videos). Social media posts highlighting student research, outreach activities, and the *Safety Watch* column have resulted in the most engagement and the most shares. The Center collaborates with other U.S. Ag Centers on bimonthly “Evaluation, Coordinator, and Outreach” (ECO) calls. In this past year, we contributed to discussions on effective use and management of social media. The GPCAH P&E Core has also helped distribute social media kits for national ECO activities during National Farm Safety and Health Week (September 2017) and Ag Safety Awareness Week (March 2018).

Impact of Press Releases: Once research projects generate new scientific findings relevant to preventing agricultural injuries and illnesses, the P&E Core generated press releases to share these findings throughout the region. We targeted rural newspapers and agricultural news outlets during dissemination. Press releases have focused on both new scientific studies and national agricultural safety and health campaigns. In 2017-18, three research articles were identified as having potentially high impact: drunk driving and farm vehicle operation on roadways ([LINK](#)), low-cost hydrogen sulfide monitor performance ([LINK](#)), and trends and characteristic of farmer suicide ([LINK](#)). Press releases were generated and shared, with their impact tracked (see Output Summary, pp. 20-22). In addition, we also generated editorials and press releases for local media prior to national ag safety campaigns and the annual 40-hour *Agricultural Safety and Health: Core Course* ([Outreach Core](#)) to increase general awareness of agricultural health and safety, focusing on timely issues relevant to production activities or regional concerns.

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.

Figure 1 summarizes the cases reported in each state, by crop to which the pesticide was being applied. Of all drift cases examined, 44% were associated with application to corn. Iowa had the

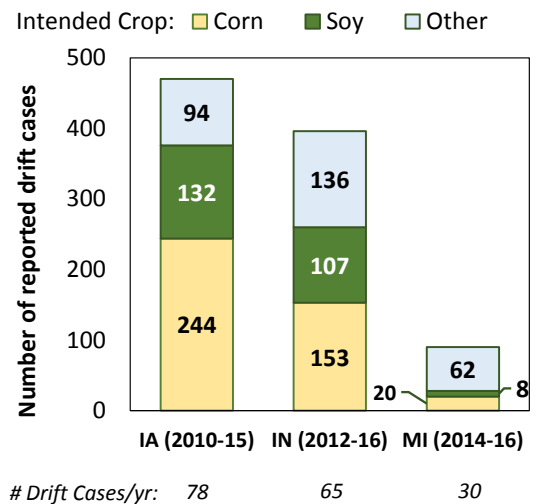


Figure 1: Pesticide drift case report summary, by state and intended target crop

highest number of reported cases per year, but also has the largest acres of farmland (30.7 million acres), twice that of Indiana (14.7) and three times Michigan (10.3). Using 2012-planted acreage, across all three states, an average event rate was determined: 3.0 pesticide-drift cases per million acres of soy and corn planted. Drift cases in Indiana resulted in 4.2 (soy) and 4.9 (corn) reports per year per million acres of crop planted, almost twice that of Iowa (2.4 soy and 2.9 corn). Michigan rates were substantially lower at 1.3 (soy) and 2.5 (corn). While the number of cases were higher in Iowa, interventions to reduce drift occurrence in Indiana may also be important because more cases are reported per planted acre. Of the 956 total pesticide drift case reports, 224 (23%) resulted in exposures to people.

The most commonly identified pesticides involved in drift cases were six herbicides (2,4-D, acetochlor, atrazine, glyphosate, metolachlor, and saflufenacil) and three fungicides (pyraclostrobin, prothioconazole, and tebuconazole). More than 40% of all cases involved spraying when winds exceeded 10 mph, higher than what is recommended. In approximately one third of the cases, the application site was less than 25 feet from the reported area of drift concern. Trends in aerial vs land application, contractor vs farmer applicator, and type of damage or exposure were investigated, with between-state differences examined to identify interventions to reduce pesticide drift. Interventions should not only protect crops but could also reduce the likelihood of human exposure.

In May 2018, GPCAH co-sponsored a *Pesticides and Public Health in Iowa* networking meeting with researchers, educators, and public health professionals to identify collaborations, information needs, and dissemination networks for pesticide safety efforts. Representatives from the Good Neighbor Program (University of Northern Iowa), the Iowa State University Pesticide Safety Education Program, Extension, Iowa Department of Natural Resources, Practical Farmers of Iowa, and others participated to learn about current activities across the state. Thirty-four stakeholders attended the meeting. A summary of the pesticide drift case findings was shared, and discussion included ways to integrate these findings into pesticide applicator classes.

An outcome of this meeting was agreement among the stakeholders to translate the drift data into materials useful for pesticide applicators, educators, and the public. In June 2018, GPCAH began developing an interactive story-mapping website to communicate case and trends for the Iowa and Indian drift databases. The team will integrate hazard information, recommended protective measures and application guidelines for the top five drifted chemicals in each state. Narratives will be written to be useful for state pesticide training programs. GPCAH looks forward to continued efforts in the development and promotion of this interactive website in the upcoming year, with input from regional advisors. Regional news outlets incorporated preliminary findings into news stories (NPR Harvest Public Media, Aug 2018; Midwest Center for Investigative Journalism, Jan 2018) and have requested notification once information is publicly available.

Instrumented Farm Vehicle Roadway Study (C. Hamann)

This research study investigates vehicle interactions with farm equipment 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 power supplies contained inside a rugged, weather resistant case, which is mounted to the farm equipment using strong magnets (**Figure 2**). 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”). Additional testing was conducted this spring and summer on a self-powered sprayer, a towed sprayer, a planter, and a hay baler. Twenty-two data collection devices are being prepared and the team is identifying operators in two community sites for data collection during the fall 2018 harvest. In addition, the team, with input from a diverse group of researchers, identified the variables that determine data to be extracted from the video and GPS data. The team has collaborated with researchers at Iowa State University, who will process the video data once it is collected. The development work for Phase 2 has also commenced, with the study team identifying and contacting potential Community Advisory Board members, planning intercept surveys, and developing communication strategies. Finally, there was a change in principal investigator of this project during this reporting period (from Peek-Asa to Hamann).



Figure 2: The data collection device developed for this study mounted on the rear of a grain cart (left) and an image from a roadway video recorded by the device during passing (right)

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

Swine workers experience an elevated rate of lung disease and decreased lung function compared to workers in other industries. Aerosols containing microorganisms in swine production contribute to disease transmission among both livestock and workers. Our previous studies have demonstrated that two technologies can improve the air quality in a small-scale swine farrowing rooms: a recirculating ventilation system with air filtration technology and a gas-fired heating system that vents to outdoors. Modifications using proven disinfection technologies (*e.g.*, ultraviolet light, c-band [UVC]) within the ducts of this system may be effective to reduce the burden of disease in both livestock and workers. Our long-term goal is to develop engineering guidelines for the swine industry that will be adopted by building contractors and swine producers to reduce occupational exposures. In Aim 1, we evaluate the effectiveness of our technology to improve air quality in swine production. In Aim 2, we use the technology to control microorganisms in the air using filtration and UVC light during commercial swine production. In Aim 3, we evaluate a bioaerosol treatment system on its ability to reduce airborne concentrations of microorganisms in a commercial swine farrowing building. This new 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 and microorganism concentrations.

In year 2, we have designed and constructed a prototype mobile air treatment technology that uses filtration and UVC. We have partnered with a local swine producer in Eastern Iowa, allowing the installation and evaluation of the air treatment technology in a commercial swine farrowing room (**Figure 3**). On 13 days from December – February, we measured 24-hour contaminant concentrations for multiple contaminants (*i.e.*, dust, carbon dioxide) in two rooms: one farrowing room with the treatment technology and a neighboring room without treatment, comparing concentrations between the two rooms. We analyzed farrowing room air samples and data collected from Year 1, including total bacteria concentration sampling. Findings were presented at the 2018 American Industrial Hygiene Conference and Exposition (available at [LINK](#)). Airborne concentrations of total bacteria were approximately 10^6 colony-forming units (CFUs) per cubic meter of air (m^3), which are above recommended exposure concentration of 1000 CFU/ m^3 .

In preparation for future field deployment, we have also designed and constructed a second air treatment prototype unit to test in the laboratory for proposed bioaerosol challenge experiments (Aim 2). Analyses of the farrowing room contaminant concentration data from years 1 and 2 in the field and the UVC dose provided by the prototype treatment unit suggest that target the airflow is sufficient to reduce dust and microorganism concentrations, which can be deployed into the field for testing.

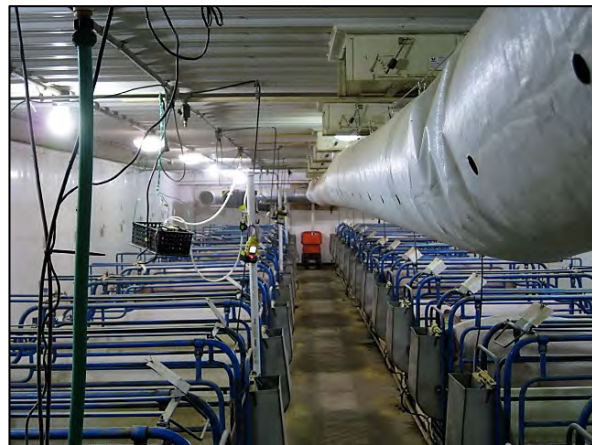


Figure 3: Air cleaning technology deployed in the swine farrowing building during testing

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 will analyze agricultural injuries captured in two overlapping datasets: Iowa’s Statewide Trauma System and Nationwide’s Iowa-based WC program. The aims of this study are to (a) estimate the incidence of agricultural injury in Iowa reported through the Iowa Trauma Registry and Nationwide Insurance’s WC program and (b) compare agricultural injuries by severity, type, mechanism, and demographics reported by farming operations. For the second study, we will evaluate a new agricultural hazard surveillance tool that was developed by the study team and experts from the GPCAH, including regional advisors. The tool will be used at regional farms to assess safety over the coming years. The aim of the second study is to evaluate the effectiveness of the Agricultural Hazard Surveillance tool in predicting agricultural injuries captured through WC data.

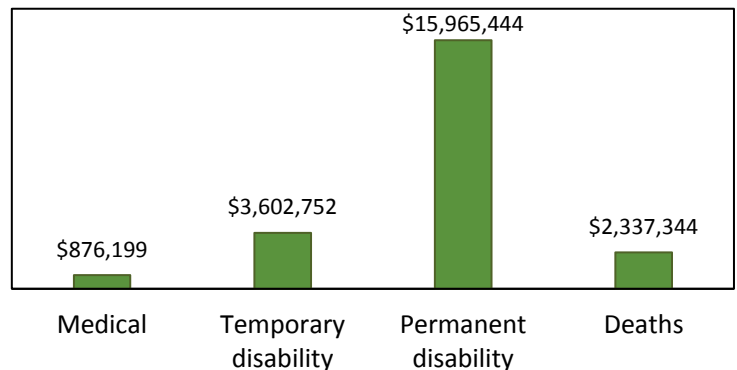


Figure 4: Total cost (\$) by workers' compensation claim type

Analysis of Nationwide Insurance claims data and Iowa Trauma Registry data are underway. A total of 1,059 claims from 662 agricultural policy holders from 21 states (AR, AZ, GA, IA, IN, KS, MD, MI, MN, MO, MS, NE, NH, NY, PA, SC, SD, TN, TX, VA, and WI) are currently being examined (Figure 4). The most frequent claim type was medical claims (66.4% of all claims filed), followed by temporary disability (21.7%), permanent disability (11.2%), and death (0.7%). Of these, 917 claims were paid by the WC system, and 65% of those paid were medical only claims. While the median costs of claims were highest for death (\$197,538) and permanent disability (\$47,777), the most costly claims were permanent disability claims (\$16 million) followed by temporary disability claims (\$3.6 million). The risk of having a death/disability claim as opposed to a medical claim was over two-folds higher when strains were the cause, and the same was over one-fold higher when the object-handling was the event. The team has also started processing Iowa Trauma data. In addition, the team recently accessed all WC claims collected across the state submitted to the Iowa Department of Labor to augment our sample of WC claims.

The team has also developed an agricultural hazard surveillance assessment tool and field guide, which will be used to collect data on exposures (Figure 5, an excerpt from the field guide). In fall 2018, the team will pilot test this tool and then enroll >70 medium to large production operations in Iowa.

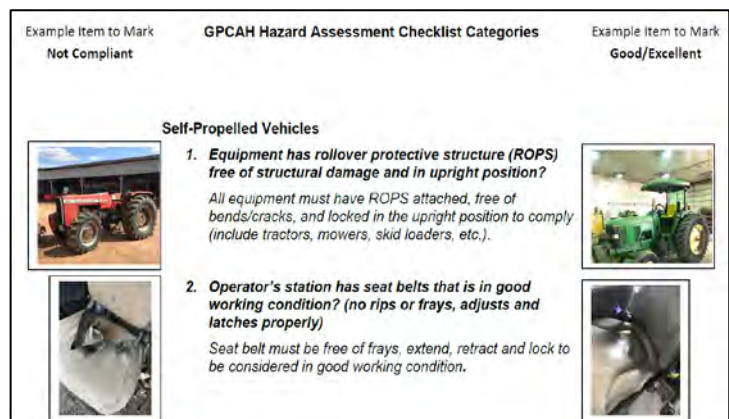


Figure 5: Example of hazard assessment field guide

Pilot/Feasibility Projects Program

(F. Gerr)

The Pilot/Feasibility Projects Program strengthens the Center's impact on agricultural safety and health by funding 3 to 4 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 assist the careers of newly trained agricultural safety and health professionals and build regional capacity to respond to emerging issues.

In 2017-18, the Center implemented new strategies to encourage submission of high quality grant applications from a broad range of applicants. The Center embraced digital technology (email list-servers, newsletters, press releases, and social media) and in-person educational activities to promote the pilot project program. In June 2018, the Center collaborated with the Central States Center for Agricultural Safety and Health in Nebraska to host a proposal-writing workshop webinar for community-based applicants. The webinar provided proposal writing guidance to organizations seeking funding for community-based projects. Thirty-eight individuals from 14 states participated in the webinar or watched it via livestream. Six of the 38 webinar participants submitted a pilot grant proposal to this Center. In August 2018, the Center Coordinator promoted the pilot project program at Rural Health Association Meetings in Missouri and Ohio. These promotional strategies appear to have resulted in an increase in the number of applications from the US Midwest: 11 applications were received in 2017, 15 applications were received in 2018.

The Center faculty and staff provided technical assistance to eight of 11 grant applicants (year 2) and to nine of 15 grant applicants (year 3). As of September 2018, the Center was in the process of making final pilot grant funding decisions for the upcoming project year.

Descriptions of the 2017-2018 pilot grant projects are provided below.

1. Hydrogen sulfide exposure and impact on swine barn dust induced lung inflammation

(C. Charavaryamath, Iowa State University, Ames, IA, 18-month project)

This laboratory-based toxicology study aims to examine the role of co-exposures to hydrogen sulfide and barn dust on lung inflammation among both mice and human tissue cultures.

2. Agritourism safety and health best practices workshops

(C. Chase, Iowa State University Extension, Ames, IA, 18-month project)

In order to prevent illness and injury at agritourism destinations, the *Visit Iowa Farms Program* proposed to coordinate three agritourism safety and health best practice workshops. Seventy-five farmers attended the first workshop and reported greater confidence dealing with issues such as farm emergency preparedness, pesticide safety, and public play area safety. Participants also stated that they planned to immediately implement an emergency preparedness plan, sign up for severe weather event notifications, and install more handwashing stations on their farm. Two more workshops have been scheduled for the Fall season. To learn more, visit the [LINK](#) through Iowa State Extension.

3. Anhydrous ammonia emergency response program

(D. Neenan, National Education Center for Agricultural Safety, Northeast Iowa Community College, Peosta, IA, 12-month project)

Study personnel proposed development of an interactive anhydrous ammonia safety-training program for EMS personnel, rural volunteer fire fighters, farmers, ranchers, and their families in North Dakota, Iowa, Missouri, Nebraska and Minnesota. The training program uses a newly developed anhydrous ammonia simulator allowing for life-like (but safe) demonstration of potential hazards, best practices, and field-based first aid. To date, four safety-training events have been delivered in the US Midwest. Evaluation is ongoing. Six additional trainings are scheduled for Fall 2018.



Figure 6: Rural firefighters, farmers, and family members receive anhydrous ammonia safety training using a simulator in Lakota, ND

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 GPCAH region. Below, 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 11-15, 2018. Twenty-six trainees participated, including veterinarians, health care providers, safety professionals, pharmacists, graduate students, and producers, who came from seven U.S. states. The course was also offered in Nebraska, North Carolina, Vermont, and Texas, training 102 additional attendees. Course materials are publicly available at www.gpcah.org/asheducation and have been provided to other AFF centers, community colleges, and agricultural education programs. In 2018, a local producer who had previously taken the *Core Course* returned as a lecturer to discuss recent safety and health-related changes she had made in her operation following her completion of the course. This producer also invited University of Iowa Graduate Students to tour her farrow-to-finish hog operation in Spring 2018. To promote the course, findings from a national meeting held in 2016, which included representatives from NIOSH Agricultural Safety and Health Centers and other partners, were shared in a poster presentation at the International Society for Agricultural Safety and Health (ISASH) conference in June 2018. The course has also been promoted at the ASCHA Safety Summit, the National FFA Meeting, the Midwest Rural Agricultural Safety and Health (MRASH) forum, and the Missouri and Ohio Rural Health Conferences.

The fifth annual Agricultural Safety and Health Networking reception was held in conjunction with the June *Core Course*. This event brings together faculty and trainees engaged in agricultural safety and health research and outreach and includes poster presentations and hands-on demonstrations. It is jointly sponsored by the Heartland Center for Occupational Health & Safety, the Great Plains Center, the Healthier Workforce Center of the Midwest, and the Iowa Injury Prevention Research Center. Demonstrations included: an ATV tilt table presented by the University of Iowa's Children Hospital to demonstrate the instability of 4-wheeler ATVs, hearing protection fit testing presented by a Heartland Center doctoral trainee, and resources for Amish communities developed by the Rural Health and Safety Clinic of Johnson County. Local producer Roger Stutsman provided farm equipment to display.

Online educational modules are being developed using existing course materials as the foundation, but with innovative technology to enhance attendee attention and engagement. Three modules are complete (*Occupational Diseases of the Lung in Agricultural Settings, Physical Agents, Skin Disease*). Completed training modules are available at: <http://agsafetyhealth.training-source.org>. The following modules are currently under development or review: *Introduction to Agricultural Safety and Health, Personal Protective Equipment, Transportation, Behavioral Health, and Livestock Handling*.

Translate

The Center translates research findings to communicate best practices to diverse audiences. In the past year, the Outreach team developed new materials related to winter hazards to present at conferences and farm shows, to incorporate into print media stories, and to incorporate into curricula for *Agricultural Safety and Health: The Core Course* (**Figure 7**, Winter Weather Hazards handout). Other translated topics include sun safety, skin cancer prevention, heat illness, and surveillance of agricultural injuries and illnesses. The Outreach team also developed new materials related to the Social-Ecological Model to share our theoretical approach with colleagues at the ISASH Conference.

Outreach specialists from the GPCAH and neighboring Midwest Agricultural Centers – the Central States Center for Agricultural Safety and Health (CS-CASH) and the Upper Midwest Agricultural Safety and Health Center (UMASH) - are collaborating on a new translation activity to convey the story of agricultural safety. *Telling the Story (TTS)* develops injury prevention messages that highlight personal stories of first-hand experiences with agricultural injuries. Recent topics include manure gas incidents, ATV crashes, falls, and an explosion resulting from foaming manure in a livestock facility. A dedicated website was launched and now houses multimedia articles that include video interviews, prevention resources, and contact and feedback information (www.tellingthestoryproject.org). The project has been covered by numerous media outlets, including Iowa Farmer Today, Ag Industry News, Brownfield Ag News, and RFD-TV (see Media Outputs, pp. 20-22). In 2018, the project was also presented in *Agricultural Safety and Health: Core Course*.

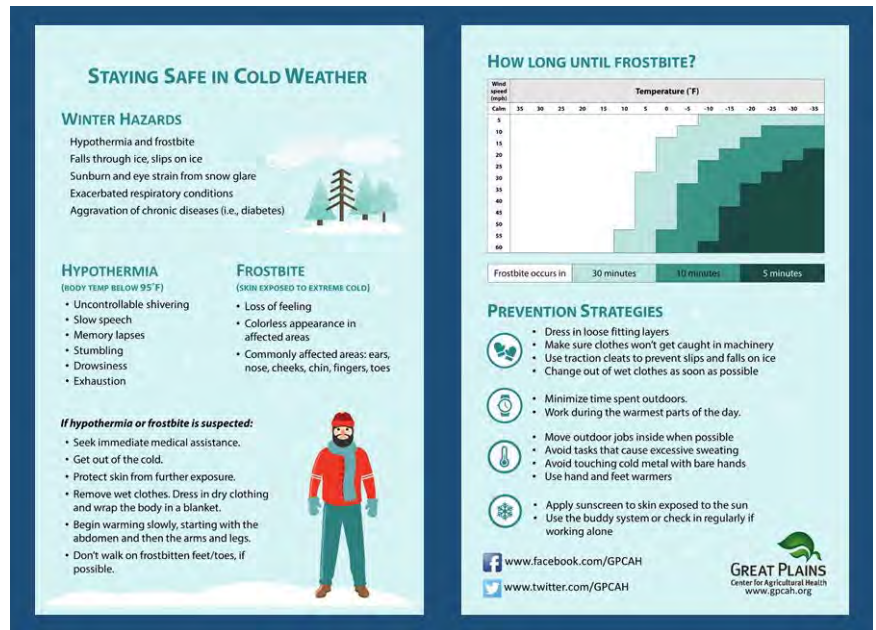


Figure 7: Winter weather hazards handout

Communicate

GPCAH outreach uses multiple formats to reach the diverse farming population across our nine-state region including traditional newspaper, in-person interactions, and online (stories, fact sheets, posters). In addition, this year the Outreach core piloted a Prevention Campaign in Missouri focusing on Rural Roadway Safety. We mailed flyers describing best lighting and marking practices for farm equipment to all Extension offices in Missouri; these were developed based on Center research findings ([Ramirez, 2011-16](#)). Extension offices were also provided with a cardboard display box to hold the flyers. 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 ATV safety and policy, eye protection, physical health, bale handling, and dairy safety. This year, a display was developed to highlight the stories at agricultural shows and conferences where printed articles can be distributed. Also in collaboration with I-CASH, four issues of [The Farm Families Alive and Well Newsletter](#) have been generated and distributed, in print and electronically, to over 3000 recipients.

Outreach personnel have attended nine 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 Farm Progress Show (Iowa), Minnesota Farm Fest, Western Farm Show (Missouri), and the International Society for Agricultural Safety and Health Conference. The GPCAH has collaborated at outreach events with Nebraska and Minnesota AFF Centers and at the Marshfield Clinic in Wisconsin, with the goal of making safety and health integral to the agricultural industry. In the past year, we have also

collaborated with Carolyn Sheridan, executive director of the Ag Safety and Health Alliance, who incorporated Center materials into her community workshops in western Iowa, Nebraska, and South Dakota. 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. The first workshop was held at a poultry farm with 25 workers in attendance. The one-hour presentation focused on respiratory hazards and included distribution of disposable respirators. Seventy-six percent of attendees indicated that the information provided was valuable and that they learned something new about respiratory protection during of the event. Additional meetings are being scheduled for the upcoming year.

The updated [GPCAH website](#) curates the considerable number of resources developed by the Center over its long history. For example, all fact sheets, handouts, posters, curricula, media, and pilot project research devoted to [Hearing Loss Prevention](#) are available to provide easy access to the full archive of GPCAH products.

Output Summary: September 2017 through August 2018

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

OUTPUTS	Year 1 (2016 –17)	Year 2 (2017-18)
Publications	5	17
Abstracts & Presentations	14	28
Lectures, Seminars, & Workshops	14	33
Consultations	9	14
Information to Policy Makers	2	2
Student Dissertations or Thesis	3	4
Press Releases & Related Media Stories	27	50

Published Manuscripts

1. Anthony TR, Cai C, Mehaffey J, Sleeth DK, Volckens J: [2017] Performance of a Prototype high-flow inhalable dust sampler in a livestock production building. *Journal of Occupational and Environmental Hygiene*, 14(5):313-322. PMC5503137. (<https://doi.org/10.1080/15459624.2016.1240872>)
2. Beswick-Honn J, Peters TM, Anthony TR: [2017] Evaluation of low-cost hydrogen sulfide monitors for use in livestock production. *Journal of Agricultural Safety and Health*. 23(4):265-279. PMC5704997. *Recognized with Superior Paper Award from ASABE, July 30, 2018. (<https://doi.org/10.13031/jash.12530>)
3. Brumby SA, Rudolphi J, Rohlman DS, Donham KJ: [2017] Translating agricultural health and medicine education across the Pacific: A United States and Australian comparison study. *Rural Remote Health*, 17(1):3931. PMID 28292189. (<https://www.rrh.org.au/journal/article/3931>)
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5. Callahan CL, Hamad LA, Olson JR, Ismail AA, Abdel-Rasoul GM, Hendy OM, Rohlman DS, Bonner MR: [2017] Longitudinal assessment of occupational determinants of chlorpyrifos exposure in adolescent pesticide workers in Egypt. *International Journal of Hygiene and Environmental Health*. 220:1256-1362. PMC5671904. (<https://doi.org/10.1016/j.ijheh.2017.09.006>)
6. Ischer S, Farnell M, Tabler T, O’Shaughnessy P, Nonnenmann MW: [2017] Evaluation of a sprinkler cooling system on inhalable dust and ammonia concentrations in broiler chicken production. *Journal of Occupational and Environmental Hygiene* 14(1): 40-48. PMID 27869548. (<https://doi.org/10.1080/15459624.2016.1211285>)
7. Ismail AA, Abdel Rasoul G, Hendy O, Bonner MR, Wang K, Olson JR, Rohlman DS: [2017] Comparison of neurological health outcomes between two adolescent cohorts exposed to pesticides in Egypt. *PLoS-One*, 12(2):e0172696. PMC5322908 (<https://doi.org/10.1371/journal.pone.0172696>)
8. Janssen B, Nonnenmann, M: [2017] New Institutional Theory and a Culture of Safety in Agriculture. *Journal of Agromedicine* 22(1): 47-55. PMC5763477. (<https://doi.org/10.1080/1059924X.2016.1249444>)
9. Ismail AA, Wang K, Olson JR, Bonner MR, Hendy O, Abdel-Rasoul G, Rohlman DS: [2017] The impact of repeated organophosphorus pesticide exposure on biomarkers and neurobehavioral outcomes among adolescent pesticide applicators. *Journal of Toxicology and Environmental Health, Part A: Current Issues*. 80(10-12): 542-555. PMC5648326. (<https://doi.org/10.1080/15287394.2017.1362612>)

10. Janssen B and Nonnenmann M: [2017] Public Health Science in Agriculture: Farmers' Perspectives on Respiratory Protection Research. *Journal of Rural Studies* 55(2017):122-130. (<https://doi.org/10.1016/j.jrurstud.2017.08.008>)
11. Janssen B: [2018] Small Farms, Big Plans: Mechanization and Specialization as Measures of "The Middle." *Culture, Agriculture, Food and Environment*, 41(2). (Accepted/In Press) Link unavailable.
12. Khan KM, Evans SS, Bielko SL, Rohlman DS: [2017] Efficacy of technology-based interventions to increase the use of hearing protections among adolescent farmworkers. *International Journal of Audiology*. 57(2):124-131. PMID 28918682. (<https://doi.org/10.1080/14992027.2017.1374568>)
13. Ringgenberg W, Peek-Asa C, Donham K & Ramirez M: [2017] Trends and Characteristics of Occupational Suicide and Homicide in Farmers and Agriculture Workers, 1992–2010. *The Journal of Rural Health*, 34(3): 246-253. PMID 28464402. (<https://doi.org/10.1111/jrh.12245>)
14. Rudolphi JM, Campo S, Gerr FE, Rohlman DS: [2018] Social and individual influences on tractor operating practices of young adult agricultural workers. *Journal of Adolescent Health*. 62: 605-611. PMID 29478719. (<https://doi.org/10.1016/j.jadohealth.2017.11.300>)
15. Shutske J, Schaefer D, Larson R, Erb K, Skjolaas C, Leonard S, Nelson J, Binversie E, Rifleman S: [2017] Investigation of a worker death while agitating manure in a non-enclosed storage. *Journal of Agromedicine*, 23(1):10-19. PMID: 29068771. (<https://doi.org/10.1080/1059924X.2017.1397076>)
16. TePoel MR, Rohlman DS, Shaw M: [2017] The impact of work demand and gender on occupational and psychosocial stress in farmworkers. *Journal of Agricultural Safety and Health*, 23(2):109-123. PMC6094363. ([10.13031/jash.11753](https://doi.org/10.13031/jash.11753))
17. Vorhees JR, Rohlman DS, Lein PJ, Pieper AA; [2017] Neurotoxicity in preclinical models of occupational exposure to organophosphorus compounds. *Frontiers in Neuroscience: Neurodegeneration*. 10(500): 1-24. PMID 28149268. (<https://doi.org/10.3389/fnins.2016.00590>)

Abstracts/Presentations Accepted for Scientific Meetings

1. Anthony TR, Peters TM: [2017] Improving air quality in swine farrowing operations: Engineering Intervention Results. American Society of Agricultural and Biological Engineers Annual Meeting; Spokane, WA, July 17, 2017.
2. Chimenti M, O'Brien K, Farnell M, Ischer S, Tabler T, Bair T, Bray J, Nonnenmann M: [2018] Metagenomic characterization of fungal communities in inhalable broiler chicken production bioaerosols. INDOOR AIR 2018, the 15th Conference of the International Society of Indoor Air Quality and Climate (ISIAQ), Philadelphia, PA, July 22-27, 2018.
3. Devito C, Gibbs J, Anthony TR: [2017] Personal attenuation ratings of farmers: How well do earplugs really fit? Midwest Rural Agricultural Safety and Health Conference, Pella, IA, November 14-15.
4. Gibbs J, Marek R, Herkert N, Ricchio J, Anthony TR, Hornbuckle KC: [2017] Monitoring for pesticide drift of herbicides 2,4-D, acetochlor, atrazine, and glyphosate at Iowa farm households. Society of Environmental Toxicology and Chemistry North America Conference, Minneapolis, MN, November 2017.
5. Gibbs J, Cheyney M: [2017] Farmers' preferences for hearing protection devices: Do educational interventions work? Society of Environmental Toxicology and Chemistry North America Conference, Minneapolis, MN, November 2017.
6. Gibbs J, Bruxvoort A, Fett W, Duysen E, Wallace G: [2017] Social media in ag panel discussion. Midwest Rural Agricultural Safety and Health Conference, Pella, IA, November 14-15.
7. Gibbs, J: [2018] Air monitoring for agricultural pesticide drift in Johnson County. Pesticides and Public Health Networking Meeting. Johnson County Extension, Iowa City, IA May 14, 2018.
8. Gibbs, J: [2018] Pesticide drift exposures to common herbicide on Iowa farms. International Society for Agricultural Safety and Health Annual Conference, Halifax, Nova Scotia, Canada, Jun 25-28, 2018.

9. Gibbs J, Cheyney M: [2018] Development of a social media strategy for agricultural safety and health messaging. International Society for Agricultural Safety and Health Annual Conference, Halifax, Nova Scotia, Canada, Jun 25-28, 2018.
10. Griffith N and Milroy G: [2018] SaferTrek. University of Iowa College of Engineering Research Open House, Iowa City, IA, April 12, 2018.
11. Heiberger S, Duysen E, Leonard S, Ploeckelman M, Yoder: [2018] Telling the Story Project. International Society for Agricultural Safety and Health Annual Conference, Halifax, Nova Scotia, Canada, Jun 25-28, 2018.
12. LaDuca L, Hartwig M, Janssen B: [2017] Determining rural health clinic data gaps in Iowa. Midwest Rural Agricultural Safety and Health Conference, Pella, IA, November 14-15.
13. Godwin K, Janssen B, Altmaier R, Mohling K, Olson G, Scott-Harp D: [2018] Community-based distribution of seasonal farm hazard education. North American Agricultural Safety Summit, Agricultural Safety and Health Council of America, Scottsdale, AZ, February 21-23, 2018.
14. Godwin K, Janssen B, Altmaier R, Mohling K, Olson G, Scott-Harp D: [2018] North American agricultural safety summit, Agricultural Safety and Health Council of America, Scottsdale, AZ, February 21-23, 2018.
15. Janssen B: [2018] Investing in Farm Safety: Agricultural lenders as public health partners. International Society for Agricultural Safety and Health Annual Conference, Halifax, Nova Scotia, Canada, Jun 25-28, 2018.
16. Janssen B: [2017] You are learning that we don't have the trust we should have: Famers' perspectives on public health research. Annual Meeting of the American Anthropological Association, Washington, D.C., Nov29-Dec3, 2017.
17. Knight K, Anthony T, Peters TM, Altmaier R, Gibbs J, Ramirez A, Nonnenmann M: [2017] Air quality in livestock production buildings: Developing a sampling strategy for measuring concentrations of CO₂ and dust in a commercial swine farrowing building. Midwest Rural Agricultural Safety and Health Conference, Pella, IA, November 14-15, 2017.
18. Knight K, Nonnenmann M, Boles C, O'Brien K, Farnell M, Tabler T, Anthony TR, Ischer SS, Altmaier R: [2018] Bioaerosols in agriculture: Quantifying total airborne bacteria concentrations using molecular biology tools. American Industrial Hygiene Conference & Exposition, Philadelphia, PA, May 21-23, 2018.
19. Peek-Asa C: [2017] Making safety happen for kids: Trends, tools, teamwork. Keynote address, 9th Annual Minnesota Child Injury Summit, University of Minnesota, St. Paul, MN. September 2017.
20. Peek-Asa C: [2018] Addressing the global burden of injury and violence. First International Public Health Symposium, Medial University of Yerevan, Yerevan, Armenia. May 15, 2018.
21. Ricchio JR: [2018] Pesticide drift in the Midwest. Pesticides and Public Health Networking Meeting. Johnson County Extension, Iowa City, IA May 14, 2018.
22. Rohlman DS: [2017] Total Worker Health in agriculture. 2017 Midwest Rural Agricultural Safety and Health Conference, Midwest Rural Agricultural Safety and Health (MRASH), Pella, Iowa. November 14-15, 2017.
23. Rohlman DS, Campo S, TePoel MR: [2017] Training supervisors to protect youth working in agriculture. 2017 Midwest Rural Agricultural Safety and Health Conference, Midwest Rural Agricultural Safety and Health (MRASH), Pella, Iowa. November 14-15, 2017.
24. Rohlman DS, Campo S, TePoel MR: [2018] Protecting and promoting the health of young agricultural workers through supervisor training. 2018 North American Agricultural Safety Summit, Agricultural Safety and Health Council of America (ASHCA), Scottsdale, Arizona, February 21-23, 2018.
25. Rohlman DS, Duysen E, Grafft L, Wickman A, McCandless J, Guin S, Sheridan C: [2018] From past to future: Education for agricultural safety and health professionals. 2018 North American Agricultural Safety Summit, Agricultural Safety and Health Council of America (ASHCA), Scottsdale, Arizona. February 21-23, 2018.

26. Rudolphi J: [2018] Comparison of three interventions to increase hearing protection use in swine facilities. International Society for Agricultural Safety and Health Annual Conference, Halifax, Nova Scotia, Canada, Jun 25-28, 2018. (GPCAH Pilot Grant)
27. Scott-Harp D, Janssen B: [2018] Barriers to the adoption of safe beef handling practices, equipment, and facilities in Iowa. International Society for Agricultural Safety and Health Annual Conference, Halifax, Nova Scotia, Canada, Jun 25-28, 2018.
28. Scott-Harp D, Janssen B, Rohlman D, Peek-Asa C: [2017] Barriers to the adoption of safe beef handling practices, equipment, and facilities in Iowa. Midwest Rural Agricultural Safety and Health Conference, November 14-15, Pella, IA.

Lectures, Seminars, or Workshops Delivered in Academic Settings

1. Cheyney M: [2017] "Agriculture Safety and Health". Lecture given to 68 undergraduate students in Fundamentals of Public Health, University of Iowa, College of Public Health, Dec 5, 2017 (75 mins).
2. Cheyney M: [2018] "Agriculture Safety and Health". Lecture given to 84 undergraduate students in Fundamentals of Public Health, University of Iowa, College of Public Health, Apr 24, 2018 (75 mins).
3. Janssen B: [2017] "Agriculture, Anthropology, and Public Health" Lecture given to 300 undergraduate students in Contemporary World Problems, University of Iowa, Nov 7, 2017 (50 min).
4. Janssen B: [2017] "What is there to eat around here: How agricultural policy affects what's in your refrigerator." Lecture given to 25 undergraduate students in Food, Drink, and Culture course, University of Iowa (50 min).
5. Janssen B: [2017] "Local Food: Sustainable Jobs and Healthy People?" Lecture given to 25 graduate students in Civil and Environmental Engineering Seminar, University of Iowa (75 min).
6. Janssen B: [2017] "Cannibalism and Kuru" Lecture given to 40 undergraduate students in Finding Patient Zero course, University of Iowa, Sept 27, 2017 (50 min).
7. Casteel C: [2017] "Introduction to Injury Epidemiology" lecture given to 8 graduate and undergraduate students in Injury and Violence Prevention course, University of Iowa (75 min).
8. Nonnenmann M: [2018] "Agricultural Safety and Health" lecture given to 21 undergraduate student in Health, Work, and the Environment course, University of Iowa (50 min).
9. Peek-Asa C: [2017] Evaluation Tools that Can Work for You and Your Program. Workshop, 9th Annual Minnesota Child Injury Summit, University of Minnesota, St. Paul, MN. September 2017.
10. Rohlman D: [2017] "Pesticides" lecture given to students in the Global Environmental Health course, University of Iowa, Fall 2017.
11. Rohlman D: [2018] "Pesticide biomarkers" lecture given to students in the Introduction to Molecular Epidemiology course, University of Iowa, Spring 2018.
12. Rohlman D: [2017] "Pesticides" lecture given to students in the Health, Work, and the Environment course, University of Iowa, Fall 2018.

Courses Taught in Agricultural Safety and Health

1. Janssen B. Fall 2017. Topics in Agriculture and Rural Health: Rural Policy and Social Movement. 5 graduate students, 15 contact hours
2. Rohlman D. Spring 2018. Rural Health and Agricultural Medicine – 12 graduate students, 45 contact hours
3. Rohlman D. Spring 2018. Topics in Agriculture and Rural Health: The Rural Mental Health Crisis – 7 graduate students, 15 contact hours

Lectures, Seminars, or Workshops Delivered to the Agricultural Community

1. Agricultural Safety and Health Core Course. The 40-hour course completed by 26 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), June 11-15, 2018.
2. Pesticides and Public Health Networking Meeting, co-hosted by GPCAH, University of Northern Iowa Center for Energy and Environmental Education, and Iowa State University Extension and Outreach. 35 attendees. Johnson County Extension Office, Iowa City, IA, May 14, 2018.
3. Chase C, Hoyle S, Meyer K: [2018] Agrotourism Destination Safety and Health Best Practices Workshop to 21 farmer participants, Polk County Iowa State Extension Office, Altoona, IA on March 22, 2018. (GPCAH Pilot Grant)
4. Cheyney M: [2018] Safety Signs. Presented to 260 students (K-6 grades) and 22 adults, at Poweshiek County Ag Safety Day, April 2018.
5. Cheyney M, Morely E: [2018] Lawnmower Safety. Presented to 76 students (K-6 grades) and 8 adults, at NECAS Ag Safety Day, July 2018.
6. Gibbs J: [2017] Social Media Strategy Webinar: Polling, Recruitment, Surveys, Hashtags. Presented to 24 participants from other U.S. AFF centers, November 8, 2017.
7. Gibbs J: [2018] Farmer's preferences for hearing protection. Do educational interventions work? To 47 attendees on an Agrisafe Webinar, January 25, 2018.
8. Gibbs J: [2018] Hearing Protection and Farmers. To 13 attendees on an American Farm Bureau Federation Webinar during Ag Safety Awareness Week, Webinar, March 5, 2018.
9. Gibbs J, Rautiainen R: [2018] Pilot Grant Writing Tips for Community-Based Organizations. GPCAH-hosted Webinar with 36 participants, on June 6, 2018.
10. Gibbs J: [2018] Agricultural Pilot Grant Writing Workshop for Community Based Organizations. Presented to 25 participants at the Missouri Rural Health Association Meeting in Camdenon, MO on August 23, 2018.
11. Gibbs J: [2018] Agricultural Pilot Grant Writing Workshop for Community Based Organizations. Presented to 46 participants at the Ohio Rural Health Conference in Mt. Sterling, OH on August 28, 2018.
12. Janssen B: [2018] Grain Handling Safety. Workers Memorial Day Observation, Iowa City, IA, Apr 27, 2018.
13. Janssen B: [2018] Iowa's Center for Agricultural Safety and Health: Leading statewide partnerships to make farming safer. Ag Update, Hills Bank, Riverside, IA, Mar 8, 2018.
14. Janssen B: [2018] Both Sides Now: Controversial Environmental Topics in Iowa. Rosenfield Symposium, Grinnell College, Grinnell, IA, Feb 8, 2018.
15. Janssen B: [2017] Local Food Goes Literary. Iowa Organic Conference, Iowa City, IA, November 19-20, 2017.
16. Janssen B: [2017] Growing Local Food: Small Scale Farming in a Big Farm State. Hancher Auditorium Science on Tap, Iowa City, IA, November 9, 2017.
17. Neenan D: [2018]: Anhydrous Ammonia Emergency Response Training Program and Workshop, given to 15 participants (included coop employees, farmers, volunteer firefighters, and EMS personnel) in Ridgeway, IA in July 2018. (GPCAH Pilot Grant)
18. Neenan D: [2018]: Anhydrous Ammonia Emergency Response Training Program and Workshop, given to 15 participants (included coop employees, farmers, volunteer firefighters, and EMS personnel) in Monticello, IA in July 2018. (GPCAH Pilot Grant)
19. Neenan D: [2018]: Anhydrous Ammonia Emergency Response Training Program and Workshop, given to 25 participants (included coop employees, farmers, volunteer firefighters, and EMS personnel) in Lakota, ND on June 22, 2018. (GPCAH Pilot Grant)

20. Neenan D: [2018]: Anhydrous Ammonia Emergency Response Training Program and Workshop, given to 25 participants (included coop employees, farmers, volunteer firefighters, and EMS personnel) in McVillie, ND on June 26, 2018. (GPCAH Pilot Grant)
21. Rohlman DS, Rudolphi JM: [2017] Youth at Work: What Parents and Supervisors Need to Know. 2017 World Dairy Expo, Madison, Wisconsin. October 6, 2017. (GPCAH Pilot Grant)

Consultation or Information Exchange

1. Anthony R: [2018] Responded to request for information on prevention strategies to ensure roadway safety around agricultural equipment from the WSO Collaborating Center for Injury Prevention and Safety Promotion at James Cook University, Australia. (Jan 2018).
2. Anthony R: [2018] Responded to Johnson County farmer request for information regarding handheld wind meters and prevention of pesticide drift, pesticide drift exposure. (Nov 2017).
3. Cheyney M: [2018] Responded to request for Hearing Conservation posters and four different handouts (in English and Spanish) by audiologist in Indiana. (March 2018).
4. Gibbs J: [2017] Provided technical assistance and presented pesticide air sampling method development to the Minnesota Department of Public Health in Minneapolis, MN (Nov 2017).
5. Gibbs J, Ricchio J: [2017] Provided technical assistance and presented pesticide drift analysis results to the Executive Director of the Ag Health Study (NIH/CDC) in Iowa City, IA (Oct 2017).
6. Gibbs J: [2018] Request for Hearing Conservation information in Spanish by local health and safety manager of a pork production facility in Eastern Iowa (Jan 2018)
7. Gibbs J: [2018] provided technical assistance and consultation about pesticide drift monitoring to A. Casey from the Midwest Center for Investigative Journalism, who is developing a citizen science program to examine levels of pesticide drift in rural communities. (February 2018)
8. Gibbs J: [2018] Provided GPCAH Hearing Conservation information in English and Spanish to the Southeastern Coastal Center for Agricultural Health and Safety and the Pacific Northwest Center for Agricultural Safety and Health. (March 2018)
9. Gibbs J: [2018] Request for assistance with promotional materials and marketing of the Agrotourism Safety Workshops, hosted by Iowa State University. (March 2018).
10. Gibbs J: [2018] Request for assistance with promotional materials and marketing of the Agricultural Medicine: Occupational and Environmental Health for Rural Health and Safety Professionals Course, hosted by the Vermont Farm Health and Safety Coalition and the University of Vermont. (March 2018).
11. Gibbs J: [2018] Provided Pilot Grant Writing Workshop webinar materials to the National Farm Medicine Center in Marshfield, WI to be used during their Children's Safety Workshop. (Aug 13, 2018).
12. Gibbs J: [2018] Provided Pilot Grant Writing Workshop webinar materials and additional pilot grant writing guidance regarding agricultural safety and health outreach to a rural health care provider in Southeastern Missouri (Aug 23 2018).
13. Janssen B: [2017] Request for grain bin entrapment surveillance from a person who had developed a prevention device. (Dec 6, 2017).
14. Ramirez M: [2018]: Request for recent surveillance data on roadway crashes and incidents involving farm equipment and tips/recommendations for farmers and rural drivers to avoid incidents from Communications manager at John Deere and Company.

Information Provided to Policy Makers

1. Anthony TR: [2017] Discussions with Floyd County, IA supervisor on recommendations to change the county Master Matrix (scoring system for approval for livestock confinement operation siting); provided

letter of support with documentation on health and safety impact of including three manure management practices. (April 3, 2017)

2. NIOSH Research Rounds: [2081] Outside NIOSH: Routine testing of hydrogen-sulfide gas monitors critical to safety. NIOSH Research Rounds 3(9). (March 2018) [LINK](#)

Student Thesis/Dissertation

1. Knight K: [2017] Bioaerosols in Agriculture: Quantifying Total Airborne Bacteria Concentrations using Molecular Biology Tools. MS Thesis, University of Iowa. (<https://ir.uiowa.edu/etd/6161/>)
2. Ricchio J: [2018] Pesticide Drift in the Midwest. MS Thesis, University of Iowa. (<https://ir.uiowa.edu/etd/6256/>)
3. Scott-Harp D: [2017] Barriers to the Adoption of Safe Beef Cattle Handling Practices, Equipment, and Facilities in Iowa, MS Thesis, University of Iowa. (<https://ir.uiowa.edu/etd/6276/>)
4. Vose R: [2018] Say what? A guide developed for grain and livestock producers to develop healthy hearing habits. Clinical Audiology Program (Au. D.), University of Iowa. (link unavailable)

Press Releases and Media Stories

Safety Watch News Column in Lee Agrimedia Publications

1. ATVs Not Made for Roadway, Even When State Law Allows, Brandi Janssen, Iowa Farmer Today, August 2018. [LINK](#)
2. Telling the Story, Stephanie Leonard, Iowa Farmer Today, July 2018. [LINK](#)
3. Dairy Promotes Safety from Farm to Table, Brandi Janssen, Iowa Farmer Today, June 2018. [LINK](#)
4. Safe Handling Could Prevent Hardship Caused by Hay Bales, Stephanie Leonard, Iowa Farmer Today, May 2018. [LINK](#)
5. Think About Spring Training Before Spring Planting Begins Brandi Janssen, Iowa Farmer Today, April 2018. [LINK](#)
6. Elders Show Importance of Eye Protection Stephanie Leonard, Iowa Farmer Today, March 2018. [LINK](#)
7. Farm Safety Doesn't Happen by Accident, Brandi Janssen, Iowa Farmer Today, February 2018. [LINK](#)
8. Story of Survival Sparks Changes on Hog Operation, Stephanie Leonard, Iowa Farmer Today, January 2018. [LINK](#)
9. Farm Couple Honored for Safety Work after Experiencing Tragedy, Brandi Janssen, Iowa Farmer Today, December 2017. [LINK](#)
10. Farm Film Reaches Rural Classrooms, Urban Theaters, Stephanie Leonard, Iowa Farmer Today, November 2017. [LINK](#)
11. Youth Groups Encourage Farmer Safety, Brandi Janssen, Iowa Farmer Today, October 2017. [LINK](#)
12. Farmer's Ordeal Began with ATV Rollover, Stephanie Leonard, Iowa Farmer Today, September 2017. [LINK](#)

Media Stories following Telling the Story Project Press Release

1. Heiberger S, Duysen E, Leonard S, Ploeckelman M, Yoder A (2018). Tell a story, save a life. Telling the Story Project. June, July, August, 2018.
2. Branch R: [2018] 'Tell a story, save a life': Farmers encouraged to share their farm accident stories. Brownfield Ag News for America. (Radio) July 3, 2018. [LINK](#)

3. Branch R: [2018] Iowa farmer shares his farm accident story. Brownfield Ag News for America. (Radio) July 13, 2018. [LINK](#)
4. Farm and Livestock Staff: [2018] Raising Farm Safety Awareness through Personal Stories. Industry Insider, Farm and Livestock Directory. July 11, 2018. [LINK](#)
5. Flammini D: [2018] The Telling the Story Project is raising awareness about farm safety. Farms.com, June 28, 2018. [LINK](#)
6. Heiberger S, et al.: [2018] New project helps farmers share stories, safety messages. Wisconsin State Farmer, June 27, 2018. [LINK](#)
7. Heiberger S, et al.: [2018] New Project Helps Farmers Share Safety Messages. Angus Beef Bulletin July 23rd, 2018. [LINK](#)
8. Heiberger S, Duysen E, Leonard S, Ploeckelman M, Yoder A: [2018] Tell a story, save a life. Storm Lake Tribune. August 27, 2018. [LINK](#)
9. Heiberger S, et al.: [2018] Things can happen in a blink of an eye. Farm Report with Pam Jahnke (Radio), Madison, WI. August 30, 2018. [LINK](#)
10. Leonard S: [2018] Telling the story project interview with Stephanie Leonard. RFD-TV (Stephanie Leonard Video Interview) July 21, 2018. [LINK](#)
11. Todd B: [2018] Website aims to share stories of injury on the farm. Post-Bulletin Agrinews, August 2, 2018. [LINK](#)

Media Stories following Alcohol and Farm Vehicle Roadway Crashes Press Release

Farmers operating equipment on roads should be cautious of alcohol-impaired drivers, especially during nighttime work. Dec 14, 2017. Covered by 9 media outlets:

1. AgWeb, Farm Journal: Drunk Driving and Farming Don't Mix. S. Brown Farm Journal. [LINK](#)
2. AgDay Daily Recap December 18th (national radio): Drunk Driving and Farmers. [LINK](#)
3. AgDay Daily Recap, RFD-TV December 18th (national radio): Drunk Driving and Farmers. [LINK](#)
4. Drunk drivers put farmers at risk. Agriview. Jan 24, 2018. [LINK](#)
5. Growing America, Newsletter: December 18th, 2017. Farmers operating equipment on roads should be cautious of alcohol-impaired drivers. [LINK](#)
6. V Miller. The Gazette. Dec 20th, 2017. University of Iowa researcher finds alcohol involvement lead to more devastating farm-equipment crashes. [LINK](#)
7. J Gibbs. Feedstuffs Magazine. Dec 22nd, 2017. Farm equipment-related crashes often involve alcohol. [LINK](#)
8. D Eller. Des Moines Register. Dec 21st, 2017. UI Study: 75 percent of drunk-driving car-tractor crashes end up in injury, death. [LINK](#)
9. Crashes involving farm equipment and cars are deadlier with booze. Dec 29th 2017. (Radio). Gibbs, JL. Nebraska Radio Network. [LINK](#)
10. Iowa study shows farm equipment operators should be cautious of alcohol-impaired drivers. Dec 27th, 2018. JL Gibbs. ASPPH Connect Member Research and Reports Newsletter. [LINK](#)

Media Stories following the American Farm Bureau Ag Safety Awareness Program Press Release

'No one can take your place' is theme of Ag Safety Awareness Program Week, March 4-10. Covered by 3 media outlets:

1. Farm Safety Week: No One Can Take Your Place. S. Brown. Drivers and Ag Web, March 6, 2018. [LINK](#)
2. J Gibbs. 'No one can take your place' is theme of agricultural safety awareness program week. High Plains Journal, March 6, 2018. *Link unavailable.*
3. J Gibbs. 'No one can take your place', theme of agricultural safety awareness program week. Wisconsin State Farmer, March 4, 2018. [LINK](#)

Media Stories following Hydrogen Sulfide Monitors Press Release

In livestock production, not all gas monitors are the same. Nov 21, 2017. Covered by 2 media outlets:

1. J Gibbs, TR Anthony. In livestock production, not all gas monitors are equal. Feedstuffs Magazine, Nov 22, 2017. [LINK](#)
2. J Gibbs, TR Anthony. Low-cost hydrogen sulfide monitors are needed to save lives. High Plains Journal, Nov 23, 2018. [LINK](#)

Additional Media Stories with GPCAH Collaboration

1. Beck M: [2018] Wind-blown pesticides an issue in courtrooms, communities across U.S. Harvest Public Media (NPR), Aug 13, 2018 (J Gibbs, Interview). [LINK](#)
2. Casey A: [2018] Pesticide buffer zones crop up in other states but none in Midwest. Midwest Center for Investigative Journalism, Champaign, IL. Jan 17, 2018. (J Gibbs, Interview) [LINK](#)
3. Casey A: [2018]. Pesticide buffer zones crop up in other states but none in Midwest. St. Louis Post-Dispatch. Jan 19th, 2018. (J Gibbs, Interview) [LINK](#)
4. Casteel C and Techau K: [2017] UI Leads Project to Address Prescription Opioid, Heroin Epidemic. USAgNet, Iowa Ag Connection. October 3, 2017. [LINK](#)
5. Gibbs J, Janssen, B, Rohlman, D: [2018] Op-Ed: Slow down during Farm Safety Week. Published in 4 newspapers in March 2018: Charles City Press, Charles City, IA; Tama News-Herald, Tama, IA; Mount Vernon Sun, Mt. Vernon, IA; Sigourney News Review, Sigourney, IA. *Link unavailable.*
6. Gibbs J: [2018] Agricultural safety and health course generates partnership between state extension and public health. Ag News Today, Iowa State University Extension, March 2018. *Link unavailable.*
7. Janssen B: [2017] Spring Planting Safety, Farm Bureau Spokesman. Mar 13, 2018
8. Janssen B: [2017] Agritourism Safety, John Deere magazine. Sept 6, 2017. *Link unavailable.*
9. Janssen B: [2017] Livestock Safety, North American Veterinary Community magazine. Oct 18, 2017, *Link unavailable.*
10. Neenan D: [2018] Anhydrous ammonia trainings held for local firemen and EMS. Griggs County Courier, McVillage, ND. June 11, 2018. *Link unavailable.* (GPCAH Pilot Grant)
11. Neenan D: [2018] Anhydrous ammonia trainings held. Lakota American, Lakota, ND, June 12, 2018. *Link unavailable.* (GPCAH Pilot Grant)
12. Neenan D: [2018] Anhydrous ammonia trainings held for locals. McVillage Messenger McVillage, ND, June 18, 2018. *Link unavailable.* (GPCAH Pilot Grant)
13. Schmid R, Schillinger S, Martin S: [2018] Large number of Iowa public schools in range of potential pesticide spray drift. (This article included discussions of the Pesticides in Public Health Meeting, held at Johnson County Extension in May 2018). IowaWatch.org, June 1, 2018. [LINK](#)