



Southwest Center for Agricultural Health, Injury Prevention and Education

Summary Annual Report

September 30, 2014-September 29, 2015

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SECTION 1

Center Summary

The Southwest Center for Agricultural Health, Injury Prevention and Education (SW Ag Center) is a well-established center based at the University of Texas Health Northeast in Tyler, Texas. The SW Ag Center serves Public Health Region 6 which includes Arkansas, Louisiana, New Mexico, Oklahoma and Texas. The mission of the SW Ag Center is to *improve the safety and health of agricultural, forestry and fishing (AFF) workers*. This is accomplished through an integrated program of research, intervention, education and outreach activities that engage and leverage a network of strategic partners who represent the interests of a diverse worker population and a wide range of agricultural production in the region. Similarly, the Center's scope of work is organized around the theme "Building Strategic Partnerships to Improve Agricultural, Forestry and Fishing Worker Safety and Health". Four research projects are funded through the Center. Projects address (1) organic dust induced inflammatory responses in the lung; (2) neuromotor function and acute injury among adolescent Hispanic farmworkers; (3) social marketing to promote adoption of safe work practices among Vietnamese commercial fishermen in the Gulf of Mexico; and (4) respirator use among poultry house workers. The Center's feasibility program augments the research projects, supports mentorship relationships between senior and junior researchers and is responsive to emerging issues within AFF in the region. Three diverse, regionally representative feasibility studies were active in year four of this funding cycle. Outreach activities for year four include the development of logging/forestry tailgate trainings; production of testimonial videos; update and translation of the Bites, Stings and Venomous Things tip booklet; health screenings; numerous presentations; and an agricultural safety and health internship. The Center evaluation program uses logic models, bi-annual progress charts and social network data to assess goal attainment and network growth. In year four, a new website for evaluation data entry was finalized and piloted with staff and PIs.

Relevance

The SW Ag Center is uniquely positioned to address farming, ranching, commercial fishing, forestry and logging occupational safety and health within its service region through research projects, feasibility studies and outreach activities. The SW Ag Center has two funded projects related to poultry production, a substantial operation within the region. One project will help us understand how the lungs respond to organic dust and the other will educate poultry workers on use of appropriate personal protective equipment. The latter project has experienced significant challenges due to industry culture and management structure. In light of these barriers, the PI partnered with an anthropologist to describe barriers and resistance to research among broiler chicken workers so that other scientists can benefit from his experience.



Research projects specifically address diverse regional worker groups, including Vietnamese fishermen and adolescent Hispanic farmworkers. The Center has a record of success working with special populations and producing culturally appropriate interventions in the language of the audience. Read more about the currently funded projects at <http://www.swagcenter.org/projectscurrent.asp>.

Feasibility studies allow the Center to investigate emerging issues or gaps in research or data, while also fostering mentoring relationships with scientists new to the field. Studies active in year four address a wide variety of topics including: pesticide exposure biomonitoring using sweat patches; forces experienced by the body during grain entrapment and rescue; and reaching south Texas agricultural workers through health clinics. Principal investigators from these studies are located in Oklahoma and Texas. Information about past and current feasibility studies is available at <http://www.swagcenter.org/projectsfeasibility.asp>.

Outreach activities address occupational safety and health across the broad industry through monthly safety messages delivered to 1200-2000 producers, educators and scientists; <http://www.swagcenter.org/resourcesmonthlyblasts.asp>. Monthly safety blasts are regularly reprinted in trade publications like the Texas Logger, sent to industry list serves (Arkansas Ag Science Teachers, Louisiana Extension) and shared on Facebook. The SW Ag Center builds the capacity for future professionals in agricultural safety and health through a collaborative internship. Educational resources are adapted and created to address current occupational issues. Agromedicine, logging/forestry, and bites and stings were specifically addressed in year four. Additionally, the SW Ag Center collaborated with the other nine Ag Centers to maintain a joint YouTube channel in order to respond to the growing popularity of social media among AFF producers and educators (<http://www.youtube.com/user/USagCenters>). Outreach staff also actively participates with other Ag Centers to promote National Farm Safety and Health Week and National Agriculture Day through social media campaigns, presentations, and email blasts.

Evaluation data for research projects, feasibility studies and outreach initiatives are collected to record current work and lead future action. A new, time-efficient method for gathering data is currently in use by PIs and Core staff. The new web-based database is mobile friendly and allows PIs and staff to capture the details of their research or outreach activities while on the go.



Key Personnel

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Learn more about the SW Ag Center faculty, staff, principal investigators and advisors at <http://www.swagcenter.org/aboutpeople.asp>.

Ag Center web link: www.swagcenter.org

- Facebook: www.facebook.com/swagcenter
- Twitter: <https://twitter.com/SouthwestAg95>
- SW Ag Center YouTube Channel:
<https://www.youtube.com/channel/UCpjY-4XqieAKHwSioeBH-nQ>
- Ag Centers' Joint YouTube Channel:
https://www.youtube.com/channel/UCRgk3ryTcY8Wcvvv_ulZgmA

SECTION II

Center Cores

Administrative and Planning Core

Center staff, principal investigators (PIs) and advisors convened twice in year 4 to discuss progress on research projects and cores and to consider emerging issues in agricultural occupational safety and health.

A virtual Board Meeting was held in October 2014 and an in-person Board Meeting was held in Dallas/Fort Worth in March 2015. During the Dallas meeting, the Center engaged in two field trips in order

to learn more about Texas agriculture. The group visited a family operated apple orchard and a dairy specializing in raw milk products. Worker safety and health issues were explored and observed at both locations. The in-person meeting wrapped up with a presentation from NIOSH Health Communications Specialist, David Caruso, who provided professional development on the effective, prudent use of social media for safety and health messaging.

Staff, advisors and PIs also undertook a multi-step process to revise the Center's strategic plan in order to stay aligned with NIOSH priorities, emerging issues and regional expertise.

Feasibility/Pilot Studies Program and Emerging Issues Core



Kevin Moore applying pressure mapping measurement devices to dummy.

In year four, three projects were in process. Two applications were submitted for the 2014-2015 feasibility studies announcement. One project received favorable scores from reviewers. Joseph Grzywacz, PhD from Oklahoma State University was funded to conduct pesticide exposure biomonitoring using sweat patches. This is a translational study that builds upon a previous feasibility study led by Michael Merten, PhD. Two past projects submitted carryover requests to complete or expand on their original scope of work. Kevin Moore,



Center staff, PIs and advisors visit Henrietta Orchards near Dallas/ Fort Worth.

ChE, MBA was previously funded to study the forces of grain. Fortunately, Kevin used strategic partnerships to acquire the grain at no cost; freeing up funds to test and compare multiple grain types. Finally, Dr. Sharon Huff's project designed to capture work-life characteristics of South Texas agricultural workers through a clinic-based database was delayed due to staffing issues. Dr. Huff will adjust her project aims and move forward with data collection.

For more information, visit <http://www.swagcenter.org/opportunitiesfeasibilities.asp> or contact Vanessa Casanova, PhD at 903-877-5896 or by email to Vanessa.Casanova@uthct.edu.

Read more about past and current feasibility studies at <http://www.swagcenter.org/projectsfeasibility.asp>.

Outreach Program Core

In September 2014, Center staff met with representatives from logging associations in Arkansas, Louisiana and Texas, along with faculty from LSU Ag Center, to update, adapt and create new safety and health materials for logging continuing education. A series of 21 tailgate trainings were developed and distributed to association leadership for distribution to logging crews; <http://www.swagcenter.org/resourcesforestryfactsheets.asp>. These tailgate trainings have also been given a spotlight on NIOSH's AFF page; <http://www.cdc.gov/niosh/agforfish/>.

The SW Ag Center partnered with the [Samuel Roberts Noble Foundation](#) to offer an Agricultural Safety Internship to help a budding professional gain knowledge and skills for a successful career in safety and health. In 2015, Chelsea Connel, BS, was selected as the intern. Chelsea recently completed her bachelor's degree in occupational safety and health from Southeastern Oklahoma University. During the summer, Chelsea lived in Ardmore, Oklahoma, and worked with Robert Williams, Safety and Risk Manager for the Noble Foundation. At Noble, Chelsea got hands-on experience creating pesticide safety protocols, conducting farm audits and delivering job



Intern, Chelsea Connel, prepares to conduct an interview with Kalyn McKibben about an agricultural work-related incident.



site safety presentations. Chelsea collaborated with the Center to develop an educational presentation with enduring posters related to bites and stings. The SW Ag Center also engaged Chelsea in the production of testimonial videos with the McKibben family in northern Oklahoma.

In November 2014, the SW Ag Center partnered with the Great Plains Ag Center, Texas Rural Health Association and the University of North Texas Health Science Center to conduct a 2 day Agricultural Medicine Course tailored to the Southwest United States. Over 50 medical students, residents and health and safety professionals attended the course. The second half of the course will be offered in October 2015 in Fort Worth, TX.

Other resources available through the Center include:

- Educational Materials, <http://www.swagcenter.org/resourcesvideos.asp>
- Monthly Safety Blasts, <http://www.swagcenter.org/resourcesmonthlyblasts.asp>
- Cultivation Newsletters, <http://www.swagcenter.org/resourcesnewsletters.asp>

Contact Nykole Vance at 903-877-7935 or by email to Nykole.Vance@uthct.edu for more information on outreach activities and resources.

Evaluation Program Core

During the Advisory Board Meeting in March, 2015, a comprehensive report of the first 4 years of evaluation activities was presented with the intent to initiate planning for the 5th year of work under the current funding cycle. The goal of the summative evaluation is to assess the overall impact of the SW Ag Center on the goals as set forth in the Center's logic model. The focus of data collection and analysis for year 5 summative evaluation, as outlined in the original logic model, links activities to intermediate outcomes. Evaluation activities have been reported at previous Advisory Board Meetings.

Members of the External Advisory Committee (EAC) provided guidance to the SW Ag Center to help it achieve its desired outcomes. Similarly, we requested guidance to ensure that we are collecting the right data and asking the right questions. The EAC recommended that we discontinue social network analysis and concentrate on expanding stakeholder groups to obtain perceptions of the impact of the SW Ag Center on the various topics. We are developing an on-line survey in response to the EAC suggestions and the intermediate outcomes in the evaluation logic model. The survey will be deployed through the SW Ag Center website in early 2016.



Research Projects

Poultry Dust Exposure and Lung Inflammation

PI: Vijay Boggaram, PhD

Host Institution: University of Texas Health Northeast

The intensification and concentration of animal production operations expose workers to high levels of organic dusts in the work environment. Exposure to organic dusts is a risk factor for the development of acute and chronic respiratory symptoms and diseases. Lung epithelium plays important roles in the control of immune and inflammatory responses to environmental agents to maintain lung health. To better understand the effects of organic dust on lung inflammatory responses, we characterized the gene expression profiles of lung epithelial and THP-1 monocytic cells influenced by exposure to poultry dust extract by DNA microarray analysis using Illumina Human HT-12 v4 Expression BeadChip. We found that lung epithelial and THP-1 cells respond with unique changes in the expression profiles with induction of genes encoding inflammatory cytokines, chemokines, and other inflammatory proteins being common to all the three cells. Induced genes included IL-8, IL-6, IL-1 β , ICAM-1, CCL2, CCL5, TLR4, and PTGS2. Validation by real time qRT-PCR, ELISA, Western immunoblotting, and immunohistochemical staining in cells and in mice exposed to dust extract confirmed DNA microarray results. Pathway analysis indicated that dust extract induced changes in gene expression influenced functions related to cellular growth and proliferation, cell death and survival, and cellular development. These data show that a broad range of inflammatory mediators produced in response to poultry dust exposure can modulate lung immune and inflammatory responses.

Neuromotor Function and Work Injury Risk Among Hispanic Adolescent Farmworkers

PI: Eva Shipp, PhD

Host Institution: Texas A&M School of Rural Public Health

Participants in this combined cross-sectional/cohort study are adolescents from the Texas-Mexico border who participate in migrant farm work at locations across the United States and a comparison group of their peers. The data collection schedule covers three migration seasons with pre- and post-migration assessments during each season (project years 2-5). During the current reporting period (project year 4), data collection continued successfully as planned with community support. The post-migration data for season 2 was collected during the fall of 2014 and the pre-migration data for season 3 was collected in the spring of 2015. Assessments involved questionnaires to solicit information on demographics, migration and agricultural work patterns, work safety including a focus on pesticides/chemicals, injury, general health status, and health behaviors. Nurses measured height, weight, foot size, and blood pressure. Trained staff and nurses measured motor control primarily using postural sway assessment. All staff completed training/re-training in study procedures. For the season 2 post-migration data collection, 154 adolescents in grades 9-12 participated (response proportion=74%). For the season 3 pre-migration data collection, 93 adolescents in grades 8-11 participated (overall response proportion= 73%). To date, 534 adolescents have been enrolled in the study. Approximately half of participants are female and 100% are Hispanic/Latino. Collaborators at the University of Cincinnati continue to monitor the postural sway assessment protocol (including an on-site visit) and to verify the accuracy of data processing. Preliminary analysis of questionnaire and postural sway data is underway.



Data collection team



Portable postural sway assessment set-up in a high school setting



Intervention Project

Marketing Safety and Health Among Vietnamese Commercial Fishermen

PI: Ann Carruth, DSN, RN

Host Institution: Southeastern Louisiana University

This project establishes awareness and adoption of safety and health behaviors among Vietnamese commercial fishermen in the design and implementation of a socially marketed intervention campaign. Data from 339 Vietnamese shrimp fishermen indicate significant barriers to wearing personal flotation devices (PFDs) while working. As part of the design of prototype social marketing messaging, a pilot study is underway asking crews from 11 fishing vessels to wear three types of PFDs to examine work environment while wearing PFDs. Information regarding motivators will inform the development of campaign messaging. We conducted an evaluation with commercial fishermen to rate the comfort and acceptability of three modern personal flotation devices (PFDs). Twenty-nine fishermen were asked to evaluate three PFDs over a course of one month while working on deck. The PFDs evaluated include; ski belt, suspender type PFD, and inflatable belt PFD. Each fisherman wore each PFD for a minimum of 2 hours. The majority of fishermen rated the suspender type PFD as overall best. Reasons cited included comfort, lightweight and does not interfere with work tasks.

Currently, the project is working with Louisiana Public Health Institute and U.S. Coast Guard, and VIET to develop social marketing messaging for deckhands and captains to increase the use of suspender type PFDs. A social marketing campaign and evaluation will follow.

Education Project

Education Approach to Increase Respirator Use Among Broiler Chicken Workers

PI: Matt Nonnenmann, PhD, CIH

Host Institution: The University of Iowa

During the past year, we had two opportunities to interact with broiler chicken farmers. In September 2014, we had an exhibit at the Titus County fair (Mt. Pleasant, TX) to recruit broiler chicken farmers to fill out the survey. In September 2015, we hosted a grower appreciation day at Stephen F Austin State University (Nacogdoches, TX) to present the latest research in poultry science and to teach farmers how to properly choose and wear a respirator for protection against inhalation exposure of dust and ammonia. The event was held with the cooperation of Pilgrims, a major chicken meat production company.



Titus County Fair



Grower Appreciation Day at Stephen F Austin State University

Also, we extracted genomic DNA from personal inhalation exposure poultry dust samples from farms throughout the state of Mississippi. We sequenced the genomic DNA on an Illumina 2500 Next-Generation Sequencer. Presently, we are summarizing the data from those samples. Lastly, we evaluated the ability of a sprinkler system to reduce dust and ammonia concentration in the chicken house located at Mississippi State University (Starkville, MS). Variability in dust concentration was decreased; however, there was no statistically significant difference between the sprinkler and control house in both ammonia and dust concentration.

The emerging H5N2 Highly Pathogenic Avian Influenza (HPAI) outbreak in the United States was devastating to the poultry industry, particularly, in Iowa and Minnesota. We measured area gas concentrations during composting work at a turkey farm infected by H5N2 HPAI virus in northwest Iowa. Our results demonstrated that ammonia concentrations placed workers at risk during composting, as concentrations reached over 100 ppm. Other gases such as hydrogen sulfide, carbon monoxide, and carbon dioxide did not reach the short term exposure limit (35 ppm) recommended by the American Conference of Governmental Industrial Hygienists. In collaboration with Agrisafe Network, The Great Plains Center for Agricultural Health, Upper Midwest Agricultural Safety and Health Center, and Central States Center for Agricultural Safety and Health, we made respirator recommendations for poultry farmers handling infected bird carcasses.