



Southwest Center for Agricultural Health, Injury Prevention and Education

Summary Annual Report

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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 Science Center at Tyler. The SW Ag Center serves Public Health Region VI that 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". The Center brings together an experienced leadership team, Internal and External Advisors in an organizational structure that facilitates a cohesive, coordinated and synergistic operation. Four research projects were funded in year 1; an additional project received funding for years two through five. 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; (4) respirator use among poultry house workers; and (5) safety practices among OK farmers and ranchers. The Center's impact is expanded by a feasibility program that augments the proposed scope of work and is responsive to emerging issues within AFF in the region. Outreach activities include the creation and dissemination of safety products and messages to partners and focused initiatives within high risk areas including tractors, machinery, livestock, and heat related illnesses.

Relevance

The SW Ag Center is uniquely positioned to address farming, ranching, commercial fishing, and 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 the appropriate personal protective equipment. Research projects also 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. The most recently funded project aims to educate farmers and ranchers in Oklahoma about occupational safety and assistive technology for workers with disabilities.



Feasibility studies allow the Center to investigate gaps in research or data. Currently funded feasibility studies are exploring secondary data sources for logging worker injuries and fatalities and gathering primary data on logging worker risks. Outreach activities serve occupational safety and health across the broad industry through monthly safety messages delivered to 1200-2000 producers, educators and scientists; heat illness prevention education; livestock safety resource development; and an agricultural safety internship. Emerging issues, including a rise in new landowners, are addressed through collaborative outreach activities and feasibility studies. The outreach program regularly hosts tractor and machinery safety workshops. The tractor and machinery safety curriculum will be adapted in the near future to address new farmers and ranchers. Evaluation data for research projects, feasibility studies and outreach initiatives are collected through a database (process data) and social network analysis (outcome data) to record current work and lead future action.

Key Personnel

Name	Role	Phone	Email
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TBN	Applied Research Manager		
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Deborah Helitzer, ScD	Co-PI-Evaluation Core	505-272-1887	helitzer@salud.unm.edu
Jan Johnston, PhD	PI-Education Project	405-744-5057	jan.johnston@okstate.edu
Matthew Nonnenmann, PhD, CIH	PI-Education Project	319-335-4207	matthew-nonnenmann@uiowa.edu
Eva Shipp, PhD	PI-Research Project	979-458-2151	eshipp@tamhsc.edu

Changes in Key Personnel: Karen Gilmore, MPH, who served as the Program Director for the SW Ag Center accepted another position within the University of Texas Health Science Center at Tyler. Notification of this change in key personnel was made to the Program Official, W. Allen Robison, on July 3, 2012. The SW Ag Center is currently recruiting an Assistant Professor for Occupational Health Sciences to assume many of Ms. Gilmore's duties within the Center. In addition, Amanda Wickman, MBA, has assumed greater responsibility for various Center management functions including coordinating weekly staff meetings and monthly IAC calls, budgeting, and reporting.



Ag Center web link: www.swagcenter.org

SECTION II

Center Cores

Administrative and Planning Core

Highlights

Given the newly funded projects, dynamic AFF industry, and continued threats to NIOSH funding, the SW Ag Center launched a substantial revision to its original strategic plan. PIs, IAC and EAC members, and Center staff participated in a preliminary focus group discussion at the bi-annual board meeting to review the original goals and offer suggestions for changes. The same group prepared a SWOT analysis for the Center via Survey Monkey. Additional guidance was provided from a dedicated committee comprised of an Internal Advisor, three External Advisors, and the Center Evaluation Program Coordinator through conference calls and a webinar. The new strategic plan will be unveiled in March 2013 at an in-person meeting of the EAC and PIs.

At the September 2012 board meeting, PIs, Center staff, and the Evaluation team participated in a training for specialized network analysis software. Upon discussing the training with advisory committee members, a desire for future professional development emerged. As a result, the Center will include training in research methods, mentoring, communication approaches, or other relevant topics during at least one board meeting per year.

Presentations

- Symposium Panel: The Role of Trusted Leaders in Influencing Vulnerable Workers – r2p from the SW Ag Center presented June 7, 2012, First Annual Workshop on Research Translation among Vulnerable Workers, Ft. Collins, CO.
- Social Network Analysis and Social Media presented on October 24, 2012 at the Ag Center Evaluators Meeting, Minneapolis, MN.
- Farmworker Clinical Care Website presented at the Midwest Stream Farmworker Health Forum on November 9, 2012, San Antonio, TX.



Feasibility/Pilot Studies Program and Emerging Issues Core

Highlights

Members of the SW Ag Center regional logging advisory group identified several safety and health risk factors (strains/sprains, fatigue, slips/falls) that contribute to injuries and fatalities. Industry leaders asked the Center to help develop interventions to help workers reduce risks. Two scientists have been recruited to conduct feasibility studies to guide the development of effective interventions by collecting observational, survey, and secondary data to inform proposed solutions. A mentor was identified for each principal investigator to foster team science and provide guidance for the scientific process.

Products

- Considering Human and Animal Safety Part II, a DVD for dairy worker safety

Publications

- Feasibility project data collected in the 2012 NAAA (National Agricultural Aviators Association) Aerial Application Industry Survey was published in *Agricultural Aviation*, May/June 2012, pp 24-27.

Outreach Program Core

Highlights

In order to build interest for and capacity within the agricultural occupational safety and health field, the SW Ag Center partnered with the well-respected Noble Foundation in Ardmore, OK to launch an annual safety-focused agricultural internship. The 2012 summer intern, A. Williams, engaged in scientific research, curriculum development, interviewing, production safety, conference exhibits, and public speaking. Ms. Williams said that "...joint internships provide students with a variety of experiences as they are able to work under different people, interact with more employees, gain a better understanding for how two organizations work, become familiar with different places to live, etc." As a result of her internship, Ms. Williams stated that she was strongly considering additional training in agricultural safety after her bachelor's degree.

Through support from the Houston Livestock Show and Rodeo, the SW Ag Center created supplemental materials for the popular educational video, *Right from the Start: Safety Awareness for the Next Generation of Livestock Producers* (over 1300 videos disseminated & over 25,000 hits on YouTube for the year). Based on guidance from agriculture science teachers and extension educators, PowerPoints, notes pages, outlines, quizzes, a



comprehensive exam, and best practices were created for each chapter of the video to facilitate classroom and 4-H meeting use. All chapters for the video and all supplemental materials are available at <http://www.swagcenter.org/resourcesvideos.asp>.

Presentations

- Right from the Start Supplemental Materials, Vocational Agricultural Teachers Association of Texas, Chad Baskin on behalf of the SW Ag Center, Lubbock, TX
- Heat Stress Risks and Prevention, MAFO Conference, San Antonio, TX
- SW Ag Center r2p Materials, National Farm Bureau Health and Safety Workshop, Oklahoma City, OK

Products

- Supplemental Materials for Right from the Start
 - PowerPoints
 - Notes pages
 - Outlines
 - Quizzes
 - Exam
 - Best Practices
- 12 Monthly Blasts
- 4 Cultivation Newsletters
- 1 Health Advisory (West Nile virus)

Evaluation Program Core

Highlights

The Evaluation Team crafted a guide to strategic partnerships based on the CDC Strategic Planning Conceptual Framework. In order to evaluate the Center's strategic partnerships, Social Network Analysis (SNA) software was identified and training was offered to PIs, staff and evaluators. During the training, participants not only learned how to use the software, but also gained a greater appreciation for the importance and influence of social networks. SNA will serve as an integral piece of the evaluation program in order to capture and record the growth of the Center's sphere of influence.

Products

- Strategic Partnership Framework
- SNA Survey



Research Projects

Poultry Dust Exposure and Lung Inflammation

PI: Vijay Boggaram, PhD

Host Institution: UT Health Science Center at Tyler

Highlights

Poultry dust is a complex mixture of organic and inorganic components and contains bacteria and fungi. Lung epithelial cells play major roles in the propagation and amplification of inflammatory responses. To date we have studied the effects of aqueous extracts of settled broiler dust on the regulation of expression of interleukin-8 (IL-8), a key proinflammatory chemotactic cytokine, in A549 alveolar and Beas2B bronchial epithelial cells. We found that broiler extracts induced IL-8 levels by transcriptional mechanisms via increased binding of AP-1 and NFκB transcription factors to IL-8 promoter. Dust extracts contained high levels of endotoxin (LPS) (~ 600 EU/mg), low levels of muramic acid (~ 4.5 ng/mg), a marker of peptidoglycan, but no ergosterol. Additionally, it contained trypsin- and elastase-like protease activities. Treatment of dust extracts with polymixin B, an inhibitor of endotoxin, had no effect on IL-8 induction indicating that endotoxin in dust extracts may not be important for IL-8 induction. However, heat and protease inhibitors reduced induction of IL-8 indicating that protease activities may be important. Exposure of A549 cells to dust extract resulted in oxidant stress, as indicated by dihydroethidium labeling of cells and increased levels of oxidized glutathione (GSSG), and activations of protein kinase C (PKC) and mitogen activated protein kinases (MAPK). Oxidants and protein kinases may serve as signaling agents for IL-8 induction by dust extract.

Products

- Shiva K. Bandari. Regulation of interleukin-8 (IL-8) gene expression in THP-1 cells by organic dust. Master's Thesis (Biotechnology), Joint Program of Stephen F. Austin State University, Nacogdoches, TX & University of Texas Health Science Center at Tyler, August 2012.



Neuromotor Function and Work Injury Risk Among Hispanic Adolescent Farmworkers

PI: Eva Shipp, PhD

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

Highlights

Although adolescent farmworkers play a major role in the agricultural economy, little to no data exists regarding their health status. From April 16-20, 2012, the PI and project staff piloted data collection procedures and collected pilot data (for the pre-migration assessment) from a convenience sample of 40 students at one of the high schools in Starr Co., TX. The pilot data collection provided the opportunity to assess the acceptability of collecting blood samples from the participants. Of the 40 pilot study participants, 97.5% (n=39) agreed to submit a fingerstick sample. This was a higher participation proportion than expected. The invasive nature of this procedure was expected to be a challenge to research with this adolescent population. Participants expressed that they would have been less willing to submit a venous blood sample, which is important information in terms of planning future research.

The Project PI and a staff member traveled to the University of Cincinnati to be trained in the assessment of postural sway using the portable force plate system. Postural sway analysis provides a unique insight into the function of the central (CNS) and peripheral (PNS) nervous systems. This method is especially valuable because it can detect subclinical changes after exposure to neurotoxins. The value of early detection from a public and occupational health perspective is large as intervention strategies can be implemented before overt health problems develop. There are only a few individuals who are qualified to conduct in-depth neuropsychological exams using this method. By learning how to conduct postural sway analysis, Dr. Shipp not only expanded her own research competency, but she will also be able to serve as a regional authority on the subject.

Products

- Training Product – Staff training manual for teaching study procedures
- Education Product – Community-focused flyer explaining study in lay terms

Publications

- Shipp EM, Cooper SP, del Junco DJ, Cooper CJ, Whitworth RE. Acute occupational injury among adolescent farmworkers from South Texas. *Inj Prev* 2012 Nov 9 [Epub ahead of print]



Intervention Project

Marketing Safety and Health Among Vietnamese Commercial Fishermen

PI: Ann Carruth, DSN, RN

Host Institution: Southeastern Louisiana University

Highlights

Social marketing views consumers as making choices about action based on benefits and costs of present and proposed actions. Thus, to understand how to motivate shrimp fishermen to engage in risk mitigation behaviors, social marketers will develop campaigns which balance benefits over costs associated with unsafe behaviors. Strategic partners helped recruit shrimp fishermen for a community group meeting held in Belle Chasse, LA. During this meeting, 25 key community opinion leaders discussed and prioritized their safety and health concerns and the behaviors they believed contributed to unsafe practices. A consensus was established that falls overboard are a significant concern. This meeting provided essential direction for the project since social marketing campaigns target the ideas, needs and desires of the affected audience.

Dr. Carruth introduced agricultural occupational health and safety research to a graduate nurse practitioner (NP) student by engaging her in the project. In order to facilitate future locations for data collection and health fairs, the NP student produced a comprehensive map of all the fish houses in the New Orleans and Abbeville areas.

Presentations

- The Role of Trusted Leaders in Influencing Vulnerable Workers, presented June 7th, 2012, First Annual Workshop on Research Translation among Vulnerable Workers, Fort Collins, CO.

Education Projects

Education Approach to Increase Respirator Use Among Broiler Chicken Workers

PI: Matt Nonnenmann, PhD, CIH

Host Institution: The University of Iowa

Highlights

A task-based exposure assessment at Stephen F. Austin State University broiler research center was completed in June 2012. A total of 72 personal exposure samples were collected and analyzed to determine airborne dust concentration. A potential intervention (task modification) was also tested to decrease dust exposure. Preliminary analyses



suggest that dust exposure was reduced while performing the modified task compared to how the task has been traditionally performed.

Stakeholders identified postal questionnaires as the best method to assess growers' perceptions of potential health hazards and respirator usage. Developing a comprehensive mailing list of broiler chicken growers has been challenging and taken longer than expected as little information is publically available; however, the project PI recently partnered with a large contractor to gain access to broiler chicken growers. The partnership with the contractor represents an essential step in the success of the project.

Partners to Improve Safety Practices among Oklahoma Farmers and Ranchers (2012-2016)

PI: Jan Johnston, PhD

Host Institution: Oklahoma State University

Highlights

The SW Ag Center received funding for a fifth project, Partners to Improve Safety Practices among Oklahoma Farmers and Ranchers, for years two through five of the current Center cycle. The rationale for this project is that increased knowledge related to safety and assistive technology will improve safety practices and reduce the injuries and fatalities in this population of agricultural workers. The research team aims to improve safety practices through a participatory approach with descriptive and qualitative research methods to develop translated safety and assistive technology education programs.