



PILOT PROJECT EXECUTIVE SUMMARIES

The Pilot and Feasibility Program has been an essential component of the Central States Center for Agricultural Safety and Health (CS-CASH) since the Center was established in 2011. This program supports projects with funding up to \$20,000 over 18 months. The program goal is to enable investigators to collect preliminary data to support the submission of grant applications for independent, longer-term, larger projects related to agricultural safety and health. The central hypothesis of this program is that pilot and feasibility projects funded from this Center will result in subsequent grant submissions that advance agricultural health and safety research or will result in development of new safety technologies, products, or enduring resources. The projects selected for support by this program must address a critical issue in agricultural safety and health. In addition to NIOSH AFF (Agriculture, Forestry and Fishing) funding (\$720,000), generous funding from the University of Nebraska Medical Center's Vice Chancellor for Research (\$540,000), the University of Nebraska Lincoln (UNL) College of Agricultural Engineering (\$20,000), and the UNL Institute of Agriculture and Natural Resources (\$40,000) has allowed **CS-CASH to fund 71 pilot projects over 12 years**. Additional funding received by Pilot Program investigators due to data generated through their pilot research amounts to \$21,782,827.



Occupational Health Hazards posed by Airborne Neonicotinoid Dust from Seed Treatments **Primary Investigator: Darrin Thompson**

Affiliation: University of Iowa's Center for Health Effects of Environmental Contaminants

Neonicotinoids are a widely used insecticide classes globally. Most neonicotinoid applications are applied as seed treatments for common crops like corn and soybeans. During planting abrasion of seeds can create neonicotinoid containing dust that can become airborne, resulting in an occupational exposure pathway for agricultural workers. While a few studies have begun to investigate the negative health outcomes of such exposure, none have been conducted in the heavily agricultural areas of the USA. Researchers at the Center for Health Effects of Environmental Contamination aim to deploy stationary air samplers that can be placed at key agricultural locations across Iowa, and silicone wristbands worn by agricultural workers to measure and analyze neonicotinoid containing dust exposure. Combined with drinking water and urine measurements, researchers aim to develop a more comprehensive approach to assessing neonicotinoid exposure and use these results to evaluate potential health impacts in future studies.

An assessment of formal and non-formal safety education in secondary and post-secondary agricultural education

Primary Investigator: Jonathan Ulmer, PhD

Affiliation: Department of Agricultural Education and Communications, Kansas State University

Instruction in safety in the agriculture industry needs to be improved. The current state of instruction and knowledge at the college and high school levels has yet to be discovered. Two projects will be conducted to assess the current state of agriculture safety instruction. A survey will be conducted with current Kansas agriculture teachers on their knowledge of and about safety. An assessment of current safety classes, programs, and offerings at Kansas State University will be conducted to improve opportunities.

Creating a generation of agriculture safety and health influencers: Youth peer-to-peer engagement strategies to foster positive change

Primary Investigators:¹Laura Rice, PhD, & ²Jana Davidson

Affiliations: ¹University of Minnesota, Teaching Assistant Professor; ²Progressive Agriculture Foundation

The mission of the Progressive Agriculture Safety Days is *"to provide education, training and resources to make farm and ranch life safer and healthier for all children and their communities."* Since 1995, more than two million youth and adult participants have been reached through our traditional, one-day events that offer age-appropriate, engaging hands-on activities and demonstrations on relevant topics. While we take great pride in our program's past success, we remain driven by the sobering statistics reveal that a child dies about every three days due to agriculture-related incidents, while every day at least 33 children are injured. Our project, *"Creating a Generation of Agriculture Safety and Health Influencers: Youth peer-to-peer engagement strategies to foster positive change,"* will focus on gaining a better understanding of what influences youth to make safer and healthier decisions; developing new resources to assist teens to teach their peers and younger children about agricultural safety and health; and identifying ways to recognize success through capturing and sharing feedback from evaluations, contests, and storytelling.

Adverse health outcomes from pesticide exposure in the female agriculture workforce

Primary Investigator: Muhammad Zahid, PhD

Affiliation: UNMC Department of Environmental, Agricultural, and Occupational Health

Pesticide exposure is associated with adverse health outcomes. Acute and chronic exposure to these agrochemicals has significant effects on human health and, depending upon doses and exposure length, may lead to cancers or neurological disorders. Agrochemicals can alter the endocrine system and the hormones they produce, like estrogens, which are essential in human development, growth, and reproduction. Agrochemicals can act as endocrine-disrupting chemicals through various mechanisms. Research studies have shown that several *contd.*

mechanisms of action involve mimicking the interaction of endogenous hormones with nuclear receptors. Homeostasis of estrogen metabolism is essential for women's health. In recent years, a pronounced increase in female farm workers, known as "the feminization of agriculture", suggests an increase in women's roles and possible increased pesticide exposure as pesticide applicators. Given all the above, there is a critical need for research investigating female pesticide applicators' exposure to these chemicals. We propose to 1) monitor urinary pesticide and their effects on estrogen metabolism before and after the application season and 2) Survey the effectiveness of training and awareness of ongoing safety programs for female applicators.

Cardiovascular Disease Risk (CVD) of Latino migrant farmworkers: A descriptive study

Primary Investigator: Maria Jose Sanchez, MD, MPH, PhD Student and Graduate Research Assistant

Affiliation: UNMC College of Public Health

Cardiovascular disease (CVD) remains a leading cause of mortality globally and nationally; however, it remains underdiagnosed among Latino migrant farmworkers. Latino migrant farmworkers may be at greater risk of CVD due to factors associated with the traveling nature of their job, having limited access to care, high job demands, health behaviors, and lower socioeconomic status. CVD risk estimates in Latino migrant farmworkers have not been reported in Nebraska and there is a lack of health promotion interventions for this population. The purpose of this cross-sectional descriptive study is to objectively measure risk factors for CVD including hypertension, diabetes, obesity/overweight, and lipids along with health behaviors and beliefs among Latino migrant farmworkers (n=100) to estimate CVD risk. Findings from the study will inform future research and interventions aiming to educate Latino migrant farmworkers on CVD prevention in a culturally tailored manner and improve health outcomes.

Surveillance of Ticks and their Pathogens in Bison populations

Primary Investigator: Shaun Cross, PhD

Affiliation: UNMC College of Public Health, Department of Environmental, Agricultural, and Occupational Health

Tick-borne diseases (TBD) pose significant risks and challenges for public health within the United States. With climate change, the expansion of tick vectors and their pathogens is occurring (including the Central States region). This causes increased risks and economic burdens for agriculture and their workers. These risks are especially pronounced in underserved populations like the Indigenous communities. Here we propose to mitigate the risk of TBD to bison and their handlers through two distinct, yet synergistic efforts. In Aim 1, we will survey ticks collected from bison for known pathogens using a cost-effective qPCR approach. This will inform us of the risks of various TBD to both bison and the handlers. In Aim 2, we will disseminate educational material regarding TBD and preventative actions against them in these communities. Altogether, completion of this pilot project will allow us to accurately assess the risks of TBD in bison and their workers.