

2011-2016 Projects and Contact Information

NIOSH-Sponsored U.S. Agricultural Safety and Health Centers



WESTERN CENTER FOR AGRICULTURAL HEALTH & SAFETY (WCAHS)

HIGH PLAINS INTERMOUNTAIN CENTER FOR AGRICULTURAL HEALTH AND SAFETY (HICAHS)

GREAT PLAINS CENTER FOR AGRICULTURAL HEALTH (GPCAH)

SOUTHEAST CENTER FOR AGRICULTURAL HEALTH AND INJURY PREVENTION (SCAHIP)

UPPER MIDWEST AGRICULTURAL SAFETY AND HEALTH CENTER (UMASH)

CENTRAL STATES CENTER FOR AGRICULTURAL SAFETY AND HEALTH (CS-CASH)

NORTHEAST CENTER FOR OCCUPATIONAL HEALTH AND SAFETY (NEC)

SOUTHWEST CENTER FOR AGRICULTURAL HEALTH, INJURY PREVENTION & EDUCATION (SWAG)

PACIFIC NORTHWEST AGRICULTURAL SAFETY AND HEALTH CENTER (PNASH)

NATIONAL CHILDREN'S CENTER FOR RURAL AND AGRICULTURAL HEALTH AND SAFETY (NCCRAHS)

Website: www.cdc.gov/niosh/oep/agctrhom.html

YouTube: www.youtube.com/usagcenters

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CDC/NIOSH Cooperative Agreement 2 U54 OH007550

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The WCAHS Administrative Core provides the infrastructure, outreach/relationship building, and support for the Center's day-to-day functions (including convening the Administrative Committee, Steering Committee, External Advisory Board, and Strategic Planning retreat). Administrative Core management provides leadership input for NIOSH and NORA/AFF collaborative efforts, and guides WCAHS' three Administrative Core programs: outreach, pilot grants/feasibility, and evaluation.

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Dr. Julie Rainwater and her evaluation team assess the impact of WCAHS research, interventions and outreach.

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The WCAHS outreach and education program strengthens relationships with stakeholders and works closely with the evaluation team to identify key outputs that can be translated for use by different stakeholders.

Pilot/Feasibility Projects and Emerging Issues Program

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WCAHS supports graduate student education and training and assists in connecting students to agricultural health and safety careers. The Seed grant program seeks to encourage the development of creative research and translational, prevention/intervention training and outreach projects particularly by early-stage researchers interested in agricultural health and safety. The program is open to researchers in the WCAHS four-state region: Arizona, California, Hawaii, and Nevada.

Research Core

1. Effects of California agricultural particulate matter in a murine intranasal sensitization model of allergic airway inflammation

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Using a murine intranasal sensitization model of allergic airway inflammation and PM collected from various agricultural, rural and urban sites in the Sacramento and San Joaquin regions of California, the goal of the proposed research is to enhance knowledge of the relationship between agricultural PM, alone and relative to other PM sources and source mixtures, and adverse health effects; thereby, better approaches to managing exposure risks and regulating

air quality will be established. A novel approach to collecting ambient, size-segregated PM will be employed to provide both single pollutant (e.g., single source) and multi-pollutant (e.g., source mixture) PM samples for subsequent toxicological studies.

2. Using large national datasets and econometrics in agricultural injury research

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The overall goal is to demonstrate how large, reliable, national data sets, combined with econometric techniques, can be used to address significant questions facing agricultural stakeholders including health professionals, researchers, farmers, policy makers, unions and trade groups. These data sets are specifically designed to provide information on the safety and health of farm owners, their children, farm managers, contractors and workers.

3. Impacts of new caging laws in California on worker health and safety in layer hen facilities

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California voters passed Proposition 2, which requires egg-laying hens be confined only in ways that allow these animals to lie down, stand up, fully extend their limbs, and turn around freely. Project 3 proposes to use a before and after testing strategy to determine the impact of changes in animal housing on the workers in otherwise similar egg production facilities. We have put together a new research team with expertise in indoor air quality monitoring, whole animal toxicology, and human subjects research to perform field studies that examine the chemistry and toxicology of indoor air and the potential for allergic sensitization of workers in the egg production industry during the period of transition from conventional battery cages to Proposition 2–compliant animal housing. The new information generated by this anticipatory research will be disseminated to managers and workers in the egg production facilities to encourage the adoption of best occupational health and safety practices in this rapidly changing industry.

Prevention/Intervention Projects

4. Rapid assays for human and environmental exposure assessment

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The translational goal of this project is to develop improved tools for the detection of pesticides in farmworkers and landscape workers, and apply these tools to determine exposure levels. Development of new immunoassays for pesticides used heavily in western states will be generated, particularly for the herbicides 2,4-dichlorophenoxybenzoic acid (2,4-D), glyphosate, and paraquat and the insecticides chlorantraniloprole and the class of pyrethroids.

5. Reducing the risk of heat-related illness in western agricultural workers

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Missing from occupational studies on factors contributing to HRI are considerations of the metabolic heat load from working in diverse agricultural environments, and the socio-cultural factors affecting the mostly immigrant workers' work practices/behaviors. Without thorough understanding of these aspects, effective strategies to reduce agricultural HRI are diminished. This multidisciplinary effort brings together investigators from medicine, epidemiology, public health, physiology, anthropology and community outreach/education who are uniquely positioned to address HRI in agricultural populations. The goal is to obtain novel data on internal body temperature as it relates to crop type and geography, external heat and internal metabolic loading, including accounting for work type, personal factors, and obtain critical information on knowledge, work practices and social-cultural issues that impact a worker's decisions with regard to HRI prevention.

6. Effects of Orchard Ladder Rung Spacing on Agricultural Workers

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The main goal of the proposed research is to reduce the number of falls from ladders in orchards, through an alternative ladder or set of ladders designed to better suit the anthropometry of specific worker populations. With a research design focused on optimum rung spacing, the improved orchard ladder is expected to reduce worker force exertions, fatigue, and self-reported pain, as well as a potential increase in worker stability during climbing activities or unexpected ladder movement or foot slippage.

Colorado

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The Goal of the Administrative and Planning Core is to provide overall vision, administration, and management of the Center. This includes ensuring the coordination of the HICAHS Advisory Boards

(Internal Advisory Board, External Advisory Board, Dairy Advisory Board, and International Dairy Research Consortium); coordinating an active outreach program; administering and providing funding for Pilot/Feasibility Projects; conducting evaluation and feedback based on the Systems Theoretical Model and a RE-AIM Framework; and establishing a HICAHS Dairy Health and Safety Network.

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The Evaluation Program evaluates the internal and external components of the Center system and the way they work together to create a synergistic approach to occupational health and safety research, intervention, education and outreach. The evaluation team has conducted preformative evaluation on all proposed projects, meeting with each of the PIs to accomplish an evaluability assessment and plan. The specific aim of the Evaluation Program is to enact and evaluate the evaluation plans of each of HICAHS' projects and Cores.

Outreach Program

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The HICAHS Outreach Program provides technical assistance, consultation, educational materials, and training activities to promote a safer and healthier work environment in agriculture and forestry. For the current HICAHS funding cycle, the Outreach Program will focus on dairy farm workers' health needs by utilizing its Dairy Health and Safety Network (in progress) and HICAHS Dairy Board. The Outreach Program will focus on providing information about the National Agricultural Safety Database (NASD) to all regional and international partners, plus provide the means for HICAHS staff to participate and create conferences and workshops on agricultural and forestry safety and health issues.

Pilot/Feasibility Projects and Emerging Issues Program

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The Pilot Program funds scientific projects that (1) develop new and creative research, prevention, intervention, outreach, education, evaluation or translation findings and outcomes related to agricultural and forestry safety and health at institutions in federal Region VIII (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming); (2) foster the development of new, collaborative partnerships between HICAHS members, private industry, and regional State and Federal agencies with stakeholder interests in agricultural and forestry health and safety; and (3) build research capacity related to health and safety in agriculture and forestry in the HICAHS region. Eligible pilot research project investigators are academic faculty junior investigators, graduate research trainees, occupational medicine residents, postdoctoral fellows, and/or staff from health departments and non-academic public health institutions who wish to conduct research in the field of agricultural health and safety.

The request for applications (RFA) and other information can be found at:
www.hicaHS.colostate.edu/pilot-grants.html

Research Core

1. Bioaerosol Exposures and Models of Human Responses in Dairies and Cattle Feedlots

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This study will explore new techniques for sampling bioaerosols on dairies and cattle feedlots, classifying bioaerosol constituents, and examining the health responses to workplace exposures to bioaerosols. Bioaerosol analysis will focus on gram positive bacteria which may be causing unexplained reactions in lung function and immune system response in agricultural workers. This project will also evaluate the application of a novel sampler incorporating human lung cells to measure inflammatory markers.

2. Exploring Shed Antimicrobial Exposures within High Plains Livestock Operations

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For more than four decades, agricultural producers within the U.S. have administered sub-therapeutic doses of antibiotics to feedlot beef cattle, fish, poultry, swine, and selected oil crops such as sunflowers and canola. This study is the first to specifically assess U.S. agricultural worker exposure to antimicrobials through handling and applying liquid livestock manure slurry, which may be modified from its original form after metabolization by the animals and farm storage of the fecal matter. Shed tetracyclines and tetracycline resistant determinants will be quantitated and characterized, the microbiomes of fresh animal feces vs. manure slurry will be compared, and the movement of these compounds will be evaluated within soil zones.

Prevention/Intervention Core

3. Enhancing Safety Training Effectiveness in Large-Herd Dairy Production

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The purpose of this project is to develop safety workshops for dairy managers and workers that address critical training issues not often considered in traditional safety education. We will pursue an innovative approach that addresses facilitators and barriers of safe work practices as well as the facilitators and barriers involved in the transfer of training knowledge to actual work environments. Based on the strategies tested during these safety workshops a dairy communication campaign will be enacted.

4. Exposure Assessment and Intervention Analysis in Large-Herd Dairy Parlors

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This study will compare physical exposures associated with different milking parlor configurations and develop recommendations for dairy producers which address parlor design,

milking tools and worker productivity. This study will also determine an optimum parlor pit height and evaluate the ergonomic effectiveness of a lightweight milking cluster and teat stripping/sanitization tool. The rationale that underlies the investigation is that identification of targeted ergonomic interventions will reduce physical exposures during the performance of milking tasks, which, in turn will translate into a reduction of musculoskeletal symptoms and disorders.

Education/Translation Core

5. Development and Evaluation of a Computer-based ROPS Design Program (CRDP)

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Roll-Over Protective Structures (ROPS) retrofit programs have been implemented to increase the number of ROPS on tractors and reduce tractor rollover fatalities, but for some tractors a commercial ROPS (nor a ROPS design) are available. The major aim of this project is to develop and evaluate a computer-based ROPS design program that will assist in quickly developing ROPS designs based on tractor weights and dimensions. The final product from the model will be ROPS design drawings with specifications that can be used to construct the ROPS.

6. Enhancing Translation and Dissemination through Agricultural Partnership

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The Translation Program, also known as the “Community-Initiated Small Grants Program” funds community organizations to conduct projects in agricultural safety and health. Grants are made available to organizations that are most closely aligned with the current HICAHS focus area, which is to reduce or eliminate accidents and injuries, disease and death resulting from agricultural operations.

www.hicahs.colostate.edu/community-initiated-grants.html

Leveraged Projects

These projects in agricultural health and safety have been funded through sources other than CDC/NIOSH Cooperative Agreement 2 U54 OH008085.

7. Design and evaluation of interventions to improve dairy worker respiratory health

(U01 NIOSH Grant, September 2014 – September 2017)

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The dairy industry workforce is at risk for adverse respiratory health effects including hypersensitivity pneumonitis, decreased lung function, chronic bronchitis, and occupational asthma. Bioaerosol exposure (i.e., organic dust) is of particular concern for respiratory health among dairy workers. The objective of this research is to characterize microbial exposures among dairy workers to inform the design and evaluation of best practice interventions to reduce worksite inhalation hazards. The specific aims include, Aim 1: Determine respiratory response to three bioaerosols constituents based on task among dairy workers, Aim 2: Design and assess interventions that address bioaerosol exposures associated with respiratory health in dairy settings, Aim 3: Evaluate the feasibility and acceptability of intervention strategies to dairy industry partners and employees.

Iowa

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CDC/NIOSH Cooperative Agreement 2 U54 OH007548

Administration & Planning Core

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The nine states of the Great Plains Center for Agricultural Health (GPCAH) region are major contributors to the nation's agricultural output, qualifying it as America's most agriculturally intensive region. The GPCAH region accounted for approximately 28% of all agriculturally-related injuries and 30% of all fatalities in agriculture, forestry and fishing in the United States. In response to this public health challenge, the GPCAH serves to advance knowledge about agricultural illness and injury through its education, outreach, and intervention efforts. The Administrative and Planning Core provides the programmatic and financial infrastructure needs for efficient and effective Center operation.

Evaluation Program

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The Center Evaluation team has developed a set of indicators and data sources for center outcomes and documents the impacts of GPCAHS activities on the injury and illness experience of agricultural workers.

Pilot/Feasibility Projects and Emerging Issues Program

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The GPCAH is an incubator for new research, prevention, intervention, outreach, education, evaluation, and translation activities. During the current grant cycle, we have separated the announcement and award mechanisms for academic pilot grant applicants and community-based pilot grant applicants. We believe this approach will facilitate applications from both groups. We typically fund three or four projects per year with each project limited to a \$20,000 maximum budget. This program is administered by Center Director Fred Gerr and staff.

Surveillance Program

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The Surveillance program integrates and coordinates regional agricultural injury surveillance activities. It provides local, state, and federal agencies, researchers, and community stakeholders with information about trends and characteristics of agricultural traumatic fatalities and injuries and provide an infrastructure to assist GPCAH collaborators to integrate surveillance data in their research. Through ongoing efforts, the GPCAH describes the incidence of fatal and severe agricultural injuries and the prevalence and characteristics of less severe non-fatal injuries. Resources available to GPCAH include data from the NIOSH-funded Fatality Assessment and Control Evaluation (FACE) program and the Iowa Statewide Trauma System Registry.

Research Core

These two projects represent important new directions for GPCAH research.

1. Farm Equipment Roadway Crashes: Identification of Risk Factors and Evaluation of Policies

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This project examines the extent to which farm equipment/vehicle crashes vary across nine states, identifies risk factors for these crashes, determines if involved operators with citations for marking and lighting have increased risk for crashes and injuries, and use GIS to identify and determine which roadway factors are associated with crashes.

2. Musculoskeletal Symptoms among Agricultural Workers

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This project is examining seasonal trends in the occurrence of work-related low back, neck/shoulder, and distal upper extremity, characterizing exposure to physical risk factors for musculoskeletal symptoms during common agricultural activities, and is providing estimates of associations between exposure to physical risk factors and musculoskeletal symptoms among approximately 500 farmers in the nine state GPCAH region.

Prevention/Intervention Core

For decades investigators at the University of Iowa have studied risk factors for respiratory illness among agricultural workers. In an effort to move from etiological research to prevention of these disorders, the following study draws on modern and innovative computational fluid dynamics methods to identify optimal ventilation designs for subsequent empirical testing.

3. Intervention to Reduce Exposures in CAFOs

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Dr. Anthony and her colleagues are quantifying the effects of ventilation design and operation on contaminant concentrations within swine CAFOs. The long-term goal is to develop engineering guidelines that will be adopted by builders and swine producers to reduce occupational exposures, thereby reducing adverse health outcomes in the working population. After extensive computational modeling, the project is now testing ventilation interventions in a swine barn affiliated with a local community college.

Education/Translation Core

The GPCAH continues to offer its considerable resources to the agricultural community by delivering a multi-level education program. The Community Partnership program is designed to facilitate the transfer of expertise and information on “best practices” directly to community agricultural safety and health leaders. The Building Capacity program is an internationally recognized intensive educational activity designed to strength the professional agricultural safety and health workforce.

4. Advancing Research to Practice Through Community Partnerships

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The project has engaged in direct dissemination of agricultural safety and health information by administration of an annual regional safety and health conference, the Midwest Regional Agricultural Safety and Health (MRASH) conference. In addition to this annual event, the center produces a quarterly newsletter designed to bring agricultural safety and health messaging to producers, safety professionals, industry specialists, and health care providers (“Farm Families: Alive and Well”). In addition, the Center’s Regional Advisory Committee is administered by the Community Partner project. A new addition to this project is the monthly contribution of a safety and health article to a widely publicized agricultural publication, *Iowa Farmer Today*.

5. Building Capacity in Agricultural Safety and Health

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The Building Capacity program was developed and funded by the GPCAH. The goal is to provide intensive training to impart knowledge and skills to trainees necessary to prevent agricultural injury and illness. Since 2007 (the inception of the program), the course has been offered 26 times in eight states, as well as in Australia and Turkey. More than 600 students have completed the course, primarily health care providers (physicians, nurses/nurse practitioners, physician assistants), veterinarians, medical students and public health graduate students, and health and safety professionals including Extension, safety managers, producers, and county public health workers. We are actively disseminating the course nationally and are planning on developing course options to widen its appeal to a diverse group of trainees.

Kentucky

Southeast Center for Agricultural Health and Injury Prevention (SCAHIP)

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The mission of the Southeast Center is to develop and sustain an innovative program of research, education, and health promotion to prevent work-related illness and injury and improve the safety and health of agricultural workers and their families in the southeastern United States. The Center aims specifically to (1) Conduct research on the prevention of occupational disease and injury among agricultural workers and their families; (2) Develop, implement, and evaluate education and outreach programs to promote the health and safety of agricultural workers and their families; (3) Develop, implement, and evaluate model programs to prevent illness and injury among agricultural workers and their families; and (4) Develop linkages with other governmental and non-governmental bodies involved in public health and safety, especially other agricultural health and safety research centers.

Evaluation Program

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This program will provide systematic quality monitoring and outcomes assessment for Southeast Center projects and activities in order to document the Center's immediate and long-term impacts on agricultural occupational safety and health in its 10-state service region: KY, TN, AL, GA, MS, VA, WV, NC, SC, and FL. The Southeast Center's evaluation team will also collaborate with other NIOSH-funded Agricultural Centers toward development of a uniform, scientifically rigorous evaluation framework across the Agriculture, Forestry, and Fishing Initiative.

Outreach Program

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The purpose of Southeast Center outreach is to (1) obtain continuous input on agricultural occupational safety and health concerns in the region; (2) identify priority topics for research and intervention, be they persistent and/or emerging problems; (3) cultivate improved access to Hispanic farm workers and other vulnerable populations; (4) ensure that farm safety instruction, guidelines, and other prevention activities are culturally, linguistically, and educationally appropriate; (5) achieve the widest possible diffusion of Center knowledge and research findings, including evidence-based "Simple Solutions", work organization strategies, and best practices for farm safety and health; (6) develop cross-center outreach strategies; (7) utilize state-of-the-art technology to package, market, and distribute field-tested agricultural occupational safety and health materials and tools; and (8) collaborate with the High Plains Intermountain Center (Colorado State University) and Conceptual Arts, Inc. (Gainesville, FL) on expansion of the National Agricultural Safety Database as the top online source for stakeholder access to resources and tools identified, developed, and evaluated by the NIOSH Agricultural Centers.

Pilot/Feasibility Studies and Emerging Issues Program

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The purpose of this program is to support timely, relevant research, prevention, and education/translation projects that focus on preventing work-related injuries and improving the occupational safety and health of agricultural workers in the Southeast. It aims specifically to (1) provide initial funding to develop innovative methods of investigation and prevention/intervention in agricultural occupational safety and health; (2) stimulate investigators in diverse disciplines to apply their expertise to agricultural safety and health issues; (3) enhance external partnerships and cross-center collaboration; (4) provide seminal support for activities designed to move the results of research into practice; and (5) provide sufficient pilot data to pursue R-01 type funding.

Projects

1. Latino Farmworkers, Work Organization, Safety and Health

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The purpose of this 5-year, R01 research project is to improve the occupational safety and health of Latino horse breeding workers by reducing exposure to (1) job-level hazards and (2) work organization factors that may increase exposure to job hazards. Specifically, this study will identify the job hazards and work organization factors inherent in horse production; determine the types of illness, injuries and near miss incidents experienced by Latino horse workers; and analyze the direct relationship of work organization variables to occupational health outcomes, and the indirect relationship through increased exposure to job-level hazards.

2. Economics of Prevention II: Extending Impact, Reducing Risk

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The long-term goal of EOP2 is to reduce exposure to four types of injury events that are prevalent among adolescents and adults who live and/or work on farms: (1) crush injuries to operators when tractors without ROPS overturn, (2) deadly collisions between farm tractors and other motor vehicles on public roadways, (3) traumatic brain injuries to horseback and ATV riders without helmets and (4) hearing loss from exposure to loud noises. The intermediate goal is to provide greater online access to effective, field-tested educational materials that are

delivered in Web-based, interactive formats; to train agricultural educators to use these materials in public school classrooms; and to modify data collection instruments to provide more sensitive measures of the materials' effectiveness in influencing participant use of safety interventions to prevent injury.

3. Nurses Utilizing Research, Service, Education, and Practice (NURSE-AP)

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The long-term goal of NURSE-AP is to provide farm communities with tailored evidence-based health care and health promotion delivered by transdisciplinary teams. The intermediate goal is to advance agricultural health and safety nursing practice through emerging education and communication strategies, new clinical interventions, service learning, and community collaborations. This project will test new e-learning platforms for nurses; serve as a catalyst for developing a national nurse network focused on agricultural health through research, service, practice, and education; and support innovative strategies to bring state-of-the-art agricultural health and safety clinical practice within reach of farm constituents. Five schools of nursing in Kentucky, Tennessee, Alabama, and Louisiana will serve as the initial sites.

Minnesota

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Administrative and Planning Core, Evaluation Program, & Pilot/Feasibility Studies and Emerging Issues Program

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UMASH brings together a unique combination of multidisciplinary expertise and resources of public health, medicine, and veterinary medicine in academic, government, and health care environments. The current focus of the UMASH center is animal agriculture, with specific attention to dairy and pork

production. A central theme is the interrelationship between the production practices, which are primarily driven by social, economic and animal health considerations, and the health and safety conditions in the workplace. UMASH embraces a One Health model philosophy that recognizes the connections between human, animal and environmental health when addressing occupational health and safety issues in agriculture. Understanding the impact of the UMASH center through evaluation and monitoring activities are key to ensuring the effective and impactful use of the Center's resources. The UMASH pilot projects program provides resources to explore new opportunities and address emerging issues. A call for proposals is announced annually in early spring.

Outreach Program

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The priority of the UMASH outreach and engagement program is to create a two-way flow of information between the Center and people affected by and involved in agriculture. This includes producers, processors, agri-businesses, public health and health care practitioners, farm family members, and many others. UMASH hosts an annual forum to engage stakeholders on topics such as: *Improving Animal and Worker Health and Welfare, The changing agriculture workforce, Challenges and opportunities for the worker, the employer and the community, and the Occupational Health of Immigrant Workers: Reducing Disparities*. The upcoming annual forum will focus on *Integrating agricultural safety and health into education*. UMASH engages directly with stakeholders at a variety of professional and agriculture events and also communicates information through the UMASH website, quarterly newsletters, and social media channels.

All cores are administered by Center Director Bruce Alexander with the help of Center staff.

1. Occupational Hazards in Pork Production Associated With Production Practices

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The overall objective of this project is to determine how differences in pork production practices in facilities, often determined by animal health, economic and/or social concerns, impact the working environment and exposure to workers. We will evaluate how production practice affects concentration of airborne contaminants, including respirable dust, biogases, and

endotoxin, and modifies the frequency of exposure to known injury hazards and affects injury rate.

2. MRSA Colonization and Infection in Swine Veterinarians

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This project will prospectively evaluate MRSA and MSSA colonization, incidence of skin infections, and use of personal protective equipment in swine veterinarians. Risk of colonization/infection with MRSA will be evaluated with respect to exposure to pigs and personal protective practices.

3. Surveillance of Disease and Injury in Wisconsin Dairy Farmers and Workers

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This project will conduct surveillance of illnesses and injuries in Wisconsin dairy farmers through the Wisconsin Department of Agriculture (USDA NASS), the Marshfield Epidemiologic Study Area (MESA) and Marshfield Clinic Electronic Medical Records (MCEMR). These surveillance resources will be used to further develop a surveillance system and identify high risk production practices related to injury and illness in dairy producers.

4. Surveillance for Zoonotic Diseases in Agricultural Workers In Minnesota

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This project will utilize the Minnesota Department of Health infectious disease surveillance system to characterize the incidence of zoonotic infections in agriculture workers in Minnesota. This system will be utilized to identify emerging zoonoses related to agriculture exposures, identify risk factors for acquiring agriculture-related zoonoses, and develop preventive measures.

5. Seguridad en Las Lecherias: Immigrant Dairy Worker Health and Safety

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The goal of this translation project is to plan, implement and evaluate a culturally appropriate, occupational safety and health intervention to reduce worksite hazards and to improve knowledge and practices among immigrant dairy workers in the Marshfield Clinic service area of Clark, Marathon, and Wood counties in Wisconsin. The project will apply evidence-based research findings as well as incorporate and test the feasibility of culturally appropriate popular education (CAPE) approaches to address the health and safety immigrant workers in the dairy industry.

6. Facilitating Return to Work for Injured and Ill Animal Agriculture Workers

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This translational project will develop a compendium of agricultural tasks in dairy and pork production and develop and pilot an interactive clinically guided software application designed for clinicians to facilitate early return to work planning for injured workers in the dairy and pork industries. Concepts for developing transitional work plans commonly used in non-agricultural industries will be applied to this project.

7. Multidisciplinary Network to Address Agriculture Worker Health and Safety Issues

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The goal of this project is to develop a functional multidisciplinary network of diverse stakeholders to address occupational health and safety issues among livestock workers. The network will be utilized as a surveillance mechanism for identifying emerging occupational health and safety issues among livestock production workers, and will provide a platform to integrate knowledge gained from all Upper Midwest Agricultural Safety and Health Center (UMASH) projects to create potential solutions to identified health and safety hazards.

Nebraska

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The Administrative and Planning (AP) Core provides leadership, governance, and central services to all Cores, projects, programs, and investigators in the Center. It facilitates participation of the Internal Advisory Committee and External Advisory Committee in the Center's governance. The Core provides the administrative structure for day-to-day management, and for planning, budgeting, IRB compliance,

evaluation, and other essential Center functions. The AP Core leads the Center's public relations and community engagement efforts in the Center's region. The Core manages the collaboration with regional institutions participating in the Center. With the strong leadership established by the AP Core, the Center has a clear vision, mission, and goals, aiming to contribute to the reduction of injuries and illnesses in the agricultural community in the Centers' designated eight-state region.

Evaluation Program

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Evaluation is a critical function of the Center. The evaluation program will assess the effectiveness of the Center's leadership and governance using the Internal Coalition Effectiveness model and the Internal Coalition Effectiveness (ICE©) instrument. Process evaluation includes tracking progress of all projects using the Targeting Outcomes of Programs model and the Center's online evaluation database. The evaluation of outcomes and overall impact includes reviewing progress towards proving research hypotheses, evidence from systematic reviews of intervention studies, and evidence from the Center's injury surveillance in region states. With the proposed evaluation plan, CS-CASH will have a mechanism to ensure that (a) the Center has effective leadership, (b) all projects make progress towards reaching their stated goals, (c) the Center becomes a valuable resource to the agricultural community in its region, (d) the Center makes an impact moving the field forward scientifically, and (e) the Center ultimately contributes to positive development, reducing the burden of injury and illness in the agricultural community in the region. The Evaluation Program is conducted by UNMC with input from all programs and projects.

Outreach Program

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The Outreach Program coordinates for the Center's information dissemination efforts. It employs a systematic approach to identifying agricultural health and safety information that is relevant to producers in the CS-CASH region, translating it into focused educational messages, and disseminating messages to specific target audiences through the Center's Community Contact Network (CCN) and a mix of dissemination channels. To reach the large number of farmers and ranchers in the region, the Outreach Program has an emphasis on use of mass media and internet-based communication.

Pilot/Feasibility Projects and Emerging Issues Program

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The Pilot/Feasibility Projects and Emerging Issues Program (Eleanor Rogan, PI) aims to support pilot and feasibility projects that lead to independent research projects concerning agricultural safety and health, with particular attention to emerging issues. The objective of this program is to support a series of well-constructed pilot and/or feasibility studies concerned with important issues in agricultural safety and health, particularly those identified in NIOSH National Occupational Research Agenda (NORA) Agriculture, Forestry, and Fishing (AFF) and related guiding documents.

Research Core

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1. ADMA: A Novel Mediator in Organic Dust-mediated Allergic and Non-allergic Asthma

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The goal of this project is to uncover novel pathways important in allergic and non-allergic inflammation induced by organic dust, enabling the identification of new strategies for the prevention and management of airway disease in at-risk workers. This project is supported by a strong agricultural lung disease interest group, and an established lung research program at UNMC which includes over 30 researchers conducting lung research using cellular and molecular biology, epidemiology, enzymology, animal models, pharmacology, toxicology, pathology, and clinical studies.

2. Surveillance of Agricultural Injuries in the Central States Region

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The objective of this project is to develop an innovative, cost-effective system for the surveillance of injuries in agriculture. We will conduct an annual survey of injuries in the Central States region, linked with existing data on farm production and operator characteristics from the Census of Agriculture. We will use the data from the surveillance system to describe injuries and injured persons, estimate rates of injury and identify risk factors for injury. With this project we will demonstrate the feasibility of a model for injury surveillance that is capable of identifying high priority populations and injury risk factors and following risk trends over time. This project is a collaboration of UNMC and the National Agricultural Statistics Service (NASS) of the US Department of Agriculture.

Education/Translation Core

3. Addressing Safety and Health Education Needs of Non-traditional Family Farms

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The long-term goal of this project is to reduce injuries and illnesses in agriculture, particularly on non-traditional family farms, which now represent over 60% of US farms. We aim to identify the most important health and safety issues and preferred communication channels among retirement, residential/lifestyle, organic, and traditional family farms through a survey, focus groups, and interviews. We will then select, develop, and pilot-test educational resources designed for the specific non-traditional farm audiences. This project provides a better understanding of the changing health and safety needs and ways to reach diverse farm audiences effectively. This project is conducted by Farm Safety 4 Just Kids, National Agricultural Statistics Service and UNMC.

4. National Ag Safety Database

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The National Ag Safety Database (NASD) is the most widely recognized and used Internet based assemblage of educational resources related to human health and safety in production agriculture. The goal of this project is to make audience targeted educational resources from NIOSH centers, researchers, educators, and standards accessible to end users in the agriculture, forestry, fishing, and hunting industry. To accomplish our goal, researchers identify, solicit and add new safety and health print materials; review materials on an ongoing basis for accuracy and usefulness; identify, solicit and add more on-line safety and health non-print materials; develop new original on-line training units for the NASD website; solicit and develop more multilingual resources and promote NASD and NIOSH safety and health efforts.

Prevention Core

5. Preventing Hearing Loss Among Farmers by Point-Source Hearing Protection Strategy

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The overall objective of this study is to develop, implement and evaluate a novel point-source hearing protection strategy to increase the use of hearing protection. This randomized controlled trial will test the effectiveness of this highly participatory intervention. To date forty three farms are participating in this study. Preliminary findings show that there is a need to educate farmers on the proper use and disposal of HPDs, hazards associated with noise, importance of noise control and use of hearing protection devices. Interviews with farmers reveal a strong interest in protecting their hearing. Younger participants observed the hearing difficulties of their fathers and grandfathers and appeared motivated to use hearing protection. Participants acknowledged that having hearing protectors close to loud noise sources would give them the access to these protective devices when they are most needed.

New York

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1. A New Surveillance Strategy for Farming & Forestry Injury

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The overall goal of this project is to establish a fatal and non-fatal farm injury surveillance system using ambulance reports, hospital data, death certificates and fatality data set from newspaper reports in six states.

2. Musculoskeletal Disorder Rates in Northeast Lobstermen

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The main objective of this study is to compile the necessary data for the descriptive and analytic epidemiology of occupationally-related mortality and injury associated with lobstering in the Northeast.

3. Social Marketing of Machinery Safety Shields

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The proposed research uses social marketing to address the longstanding problem of farm machinery entanglements. The study will develop a machinery shielding promotion program using the following steps; a) identifying a subset of the NY farm population to serve as the target audience; b) identifying the target's current shielding behavior, barriers to machinery shield use, and potential motivators; b) developing a social marketing campaign based on identified barriers and motivators; c) bringing industry into the development process (this is a new component in the model); and d) evaluating effectiveness with a randomized-controlled-trial.

4. On-Line Tool for Designing Ventilation Systems to Reduce Manure Pit Entry Risk

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Penn State will conduct manure storage pit safety research through development of an on-line, web-based, computer-aided-design tool to simulate the performance of ventilation systems for removing noxious gases and to replenish oxygen prior to entry.

5. Northeast Fisheries Winch Safety Improvement Project

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This research-to-practice application aims to reduce the number of drum winch related injuries and fatalities on fishing vessels in the Northeast through the application of winch technology and usage policy and protocols.

6. Tractor Stability Monitoring

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The objective of this research is to reduce the number of deaths and injuries caused by farm tractor overturn through the development of technology-assisted training and tilt alerting tools for tractor operators, and through mechanical tractor overturn intervention.

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The SW Center serves AR, LA, NM, OK, and TX by building strategic partnerships to improve the safety and health of agricultural, forestry and fishing workers. The AP Core will 1) provide the infrastructure to promote cross-discipline interactions among all cores, programs, and projects, and support translation of research findings; 2) provide the infrastructure for internal and external advisors and investigators to address the Center's theme; 3) implement a program of effective fiscal and resource management and growth; 4) contribute to and utilize Center-wide evaluation results to identify and respond to opportunities, gaps, and emerging issues; and 5) assure compliance with all Human Subjects approvals, reports and other funding agency requirements.

Evaluation Program

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The Evaluation Program will determine whether the objectives of the SW Center have been met, provide information to see if NIOSH funds have been well spent and if the Center initiatives are helping to achieve NIOSH goals and objectives. The formative evaluation is designed to enhance programmatic efforts and provide opportunities for improvement and the summative evaluation will allow the EAC, IAC, staff, and NIOSH to determine the extent to which their constituents are helping achieve AFF occupational safety and health outcomes.

Outreach Program

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The Outreach Program will engage and expand its network of partners to design, deliver, and evaluate educational programs to reduce exposure risk and improve best safety practices. The outreach program aims to: 1) develop a communication network to identify regional safety and health needs and to disseminate prevention/intervention findings, best practices, tools, approaches, technologies, guidelines and policies; 2) enhance the capacity of agricultural educators, producers, and stakeholders to sustain SW Center initiated outreach projects; 3) identify outreach and education interventions through initiatives that will serve as models for the promotion of safe and healthy work behaviors; and 4) increase awareness of AFF safety and health careers.

Pilot/Feasibility Projects and Emerging Issues Program

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The Pilot/Feasibility Projects and Emerging Issues Program aims to: 1) identify junior researchers to conduct small, innovative research, education, translation and intervention projects; 2) support small

research projects that provide data to support innovative approaches and that lead to further research; 3) establish mentoring relationships between new and established scientists to build capacity; 4) identify opportunities and support new researchers in conducting small projects that augment larger projects conducted by the SW Center; and 5) engage members of the IAC, EAC, and stakeholders to identify changing trends and emerging issues.

Research Core

1. Poultry Dust Exposure and Lung Inflammation

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Although the prevalence and severity of respiratory illness is higher among poultry workers, compared to other animal farm workers, there is insufficient information on the effects of poultry dust on lung inflammatory responses and lung disease. Considering the rapid growth of poultry production and the risk for exposed workers to develop lung diseases, it is very important to understand mechanisms mediating poultry dust induced lung inflammation and lung disease in order to develop new preventive measures and treatments. The proposed studies use in vitro cell culture and mouse model systems to elucidate molecular mechanisms mediating inflammatory responses of alveolar and airway epithelial cells to poultry dust.

2. Neuromotor Function & Work Injury Risk among Hispanic Adolescent Farmworkers

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This project will examine whether chronic, low-level exposure to pesticides is a major contributor to injury among adolescent farmworkers. The scope of work seeks to (1) build research capacity with strategic partnerships, (2) collect study variables before and after the migration season when exposure occurs, and (3) use study findings to carry out research to practice activities. The long term goal is this project is to reduce the high rates of injury among adolescent farmworkers by intervening on main contributing causes.

Education / Translation Core

3. Educational Approach to Increase Respirator Use among Broiler Chicken Workers

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Broiler chicken workers in confined animal feeding operations are exposed to inhalation hazards that include dust, bacteria, fungi, endotoxin and ammonia. Broiler workers or "growers" may not be aware of the inhalation hazards present in broiler buildings or adequately trained to select and correctly use respiratory protection. Therefore, the proposed studies are aimed to determine the awareness of inhalation hazards, tasks performed, respirator usage and barriers to respirator use in the broiler production environment among two geographically isolated groups of broiler growers in Texas.

Prevention / Intervention Core

4. Marketing Safety and Health among Vietnamese Commercial Fishermen

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Commercial fishing injury and mortality rates are among the highest in the world. The goal of this project is to expand current NIOSH research related to Worker Health Protection among Shrimp Fishermen of the Gulf Coast, with a long term goal to effectively reduce illness and injuries through a social marketing campaign. This project aims to (1) establish a baseline of Vietnamese fishermen knowledge, behaviors, cultural norms, and unmet needs, and (2) design and test a social marketing intervention campaign to increase vessel safety and health mitigation behaviors among Vietnamese shrimp fishermen.

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The Administrative and Planning and Outreach Core will provide the administrative infrastructure for the entire Center program and will assist in the implementation of individual project and program objectives. It will also ensure that project activities are well coordinated and integrated within the

center, of high scientific quality, and work in coordination with community partners to meet research-to-practice objectives. The Administrative and Planning Core's specific aims and programs are:

- A. Management, Operations, Facilities and Communications
- B. Internal and External Advisory Committees
- C. Data and Statistical Service
- D. NIOSH and NIOSH Agricultural Center Collaboration
- E. Pilot/Feasibility Project Program and Emerging Issues Fund
- F. Outreach Program
- G. Evaluation Program

Evaluation Program

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This program's goal is to ensure that our efforts are relevant, feasible, sustainable, the best science and practice, and demonstrate efforts consistent with the ultimate goal of reducing injuries and illness. As a result of NIOSH's investment in evaluation, PNASH's 2011-16 Center proposal has developed an evaluation plan that is rigorous and focused on what is both appropriate and measurable. We will provide oversight to ensure each funded project has an adequate level of evaluation as well as evaluate how well we as a Center reach our objectives.

Outreach Program

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The PNASH Center is part of a vital national infrastructure dedicated to agricultural safety and health. We work to achieve this goal by partnering with key stakeholders in the Northwest region and collaborating with other regional centers to formulate national programs. Areas of emphasis include new production technologies and the needs of under-served and vulnerable populations. PNASH faculty provide regional and national expertise in chemical hazard exposure assessment.

Pilot/Feasibility Projects and Emerging Issues Program

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The PNASH Center will continue to administer a Feasibility/Pilot Project Program and establish a new Emerging Issues Fund to support new initiatives in research, prevention/intervention, and education/translation that may arise each year. The Pilot/Feasibility Project Program will fund up to 3 projects each year through a competitive process for a maximum total annual direct cost allocation of up to \$25,000. The Emerging Issues Fund will be used to respond to pressing issues that arise in the Northwest region where a small, timely investment could make a big difference to the health and safety of agricultural workers in the region.

Research Core

1. Farmworker OP Exposure through Protein Adducts

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In Washington State, cholinesterase activity is measured in farmworkers who are expected to have high exposures to Organophosphorus (OP) pesticides. To improve assessment of worker exposures to OP pesticides we have developed an assay that provides greater sensitivity and specificity as compared to traditional ChE monitoring, and it eliminates the need for collection of a baseline pre-exposure blood sample from each worker. In the current application we propose to expand the OP-adduct assay to include other protein targets in addition to cholinesterase. This will provide a more complete understanding of worker exposures to a wide range of OP pesticides. In addition, we will develop a lateral flow assay for use in field and clinic settings, providing rapid feedback to workers and clinicians, permitting physicians and industrial hygienists to rapidly implement appropriate interventions to treat overexposed workers, to remove them from the source of exposure, and to identify and remediate risk factors responsible for the workers' overexposure.

2. Using IPM to Reduce Pyrethroid Pesticide Exposures in Dairy Workers

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Pyrethroid pesticides are widely used in agriculture and are applied on livestock, in the form of sprays, dips, and tags to control flies and other insects, particularly in dairy operations. This study proposes to evaluate the potential for reducing pesticide use in dairy operations by conducting a targeted intervention to introduce IPM practices in these workplaces. We believe that our approach in working with a strong network of participants and evaluating treatment effectiveness will result in a robust and practical IPM intervention program and provides evidence for a cost-effective intervention that can reduce pesticide usage in these farm operations.

3. Pilot Study of Risk Factors for Heat-Related Illness in Agricultural Workers

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The overall goal of this two year study is to identify potential risk factors for heat-related illness (HRI) and to quantify the physiological effects of heat exposure (heat strain) in agricultural workers. During the course of the study, findings will be incorporated into HRI education materials, and HRI training using updated materials will be provided to workers and employers. The results of this feasibility study will generate valuable baseline data, setting the stage for future larger studies of the association between potential HRI risk factors and heat effects and studies of interventions to reduce HRI.

Prevention Core

4. Reducing Agricultural Worker Risks through New and Emerging Technologies

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The overall objectives of this project are to 1) evaluate interventions designed to reduce agricultural worker exposure and risk during pesticide applications in tree fruit, and 2) effectively communicate project findings to workers, supervisors, orchardists, scientists and public health policymakers. We will work directly with industry, producers, and workers to ensure that the decision matrix used for adopting new pesticide products and new spray technologies includes explicit recognition of worker health and safety concerns.

5. Pilot Study Assessing Agricultural Safety and Health among Hmong Farmers

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The goal of this two year pilot project is to identify agricultural safety and health issues among Hmong refugee farmers in Washington State. Using novel community-based participatory approaches along with conventional industrial hygiene methods, a systematic assessment of the working conditions and practices of Hmong refugee farmers will be conducted.

6. Pilot Study on Ergonomic Evaluation of Emerging Technologies in the Tree Fruit Industry

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The primary aim of this one year project is to develop methods to evaluate the ergonomic and productivity impacts of existing, new and emerging assistive agricultural tools and technologies. If our long-term goals are achieved, ergonomic, economic and safety principles will become an integral part of the process of designing, changing, and conducting orchard work. At the

conclusion of the project, study findings will be widely disseminated to the agricultural community through the PNASH website and best practices documents.

7. Impact of Workplace Stress on Health in Farmworker Families (2014-2016)

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This project addresses stress experienced by agriculture workers and their families. Findings will lead to the development of practical workplace intervention strategies designed to reduce stress. Plans for this project include administering a stress-factor screening questionnaire to 100 farmworkers who have worked in agriculture for the past three years. An intervention program aimed at employees, as well as one aimed at supervisors, will be developed using existing intervention study research.

8. Safety and Health of Latino Immigrant Forestry Services Workers in the Pacific Northwest (U01 NIOSH 2014-2017)

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This research-to-practice project identifies and assesses injury and health risks for Latino immigrant forestry services workers in order to create story (case)-based education and prevention materials aimed to reduce risks for workers. The project partnerships include the Northwest Forest Worker Center, Berkeley Labor Center and UW PNASH.

Education Core

9. Pesticide Safety in Tree Fruit: Translating Research, Overcoming Barriers

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The overall goal of this project is to minimize agricultural worker and family pesticide exposure in the tree fruit industry by translating and disseminating research results and overcoming barriers to pesticide safety practices, particularly those that affect the large Hispanic workforce in the Pacific Northwest. By providing access to information and solutions, orchard owners, managers, and handlers will be better equipped to protect workers from potential pesticide exposure and illness

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National Farm Medicine Center Social Media Accounts

Facebook: www.facebook.com/farmmedicine
Twitter: twitter.com/farmmedicine
YouTube: www.youtube.com/nationalfarmmedicine

Cultivate Safety Social Media Accounts

Facebook: www.facebook.com/CultivateSafety
Twitter: twitter.com/cultivatesafety
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Research Core

1. Filling the Gaps in Child Agricultural Injury Data

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This project is exploring the most promising, existing public health data systems to determine their utility for adding to the limited data currently available via the NIOSH/NASS surveillance process. Preliminary work by Dr. Marlenga's team has provided insights into potentially valuable agriculture-related data embedded within child death reviews, trauma registries, and emergency medical services data. Recommendations will guide future policies for national data collection.

2. Enhancing Supervisors' Skills and Employer Policies to Promote and Protect the Health of Youth Agricultural Workers

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This project will conduct a randomized controlled trial blending elements of Total Worker Health with agricultural safety. Content on substance abuse, fatigue and cell-phone use will augment existing safety resources and policies for employers. Results will inform its impact on both English- and Spanish-speaking supervisors.

Prevention, Intervention and Translation Core

3. Understanding Beginning Farmers and Ranchers

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This project strives to understand the attitudes of millennial generation, non-traditional family farmers whose livelihood has been launched by USDA-funded support. As an anthropologist, Dr. Bendixsen will compare and contrast demographics and practices of African Americans, Native Americans, Hispanics and other unique groups in order to guide future culturally relevant interventions addressing children and farm safety.

4. Developing a Sustainable Infrastructure for the SAY National Clearinghouse

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In 2013, responding to the agricultural community's rejection of proposed updates to child labor laws, the USDA awarded funds to establish a clearinghouse for educational resources. The Safety in Agricultural Youth (SAY) clearinghouse is now under construction. This project will evaluate the roll-out of SAY at a regional level, then, based upon results, generate recommendations for SAY's modification, termination or long-term sustainability.

Outreach, Education and Translation Core

5. Advanced Knowledge Mobilization and E-communication

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The health communications, marketing, and technology specialists of AKME facilitate messaging, packaging and dissemination of information across all projects. This team collaborates with center-wide and external partners. AKME facilitates timely and culturally-appropriate communication strategies, including social media, virtual meetings, and mobile applications. Considered the centerpiece project of the National Children's Center.

6. Strengthening Organizational Capacity

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This project leverages current relationships with organization executives to reach into networks of leaders across domains of youth serving organizations, insurance companies, agricultural media, and agricultural bankers. The project uses marketing approaches and principles of corporate social responsibility to increase the number and spectrum of groups that incorporate a focus on childhood farm safety into their ongoing systems, policies and communications with constituents and members.

7. Protecting Children While Parents Work

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This project aims to increase the engagement of agribusiness leaders in facilitating availability of, and access to, off-farm child care services for migrant and immigrant agricultural workers with children younger than 12 years. It is based upon the successful RCMA model in Florida.

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