The Pacific Northwest Agricultural Safety and Health (PNASH) Center, established in 1996 through the NIOSH/CDC Agricultural Initiative, is dedicated to the prevention of illness and injury among agricultural producers, workers, and their families. We work toward this goal through partnerships in the Northwest (Alaska, Idaho, Oregon, and Washington).

For more information on our research, visit deohs.washington.edu/pnash/research.

RESEARCH

Heat Exposure, Injury Risk, and Productivity in Agricultural Workers (Spector, PI, NIOSH 2014-2017). This project examines the association between heat exposure and traumatic injury risk in agricultural workers, the relationship between heat stress and productivity, and the feasibility of using a biomarker of heat acclimation to detect workers at risk for heat-related illness and injury.

Prevention of Occupational Exposure to Pesticide Drift (Fenske, PI, NIOSH 2016-2021)
Beginning with linking data from the WA Department of Health and WSU Ag WeatherNet, this project will determine the probability of drift events due to environmental conditions during spraying and develop a predictive model. We will then conduct field studies to validate our model. Study findings will be used to provide new user-friendly tools and trainings to predict drift event-prone weather conditions.

The Healthy Dairy Worker Study (Rabinowitz, PI, NIOSH 2016-2021)
This partnership study with WSU will enroll new workers in the dairy industry and evaluate microbiome changes over time. We will characterize worker exposures to microbes and allergens and evaluate whether these exposures impart immune benefits (the 'hygiene hypothesis'), and/or increase risk of disease, including infection and airway inflammation. This study will help identify priorities for preventive interventions and healthy host adaptation to the dairy environment.

Pilot: Smoke Monitoring for Agricultural Safety and Health (SMASH) (Kasner, PI, PNASH 2019-2020)
This pilot seeks to develop wildfire decision aid tools driven by data collected from a high-density network of air quality monitoring sensors. During the 2020 wildfire season, smoke sensors will be added to an existing network of weather stations in agriculturally productive regions to explore applications such as worker safety and health, crop protection, and plume tracking. If successful, this pilot study will demonstrate proof-of-concept for air quality monitoring based on the AgWeatherNet platform.

Pilot: Use of Unexpected Events and Management Requiring Conditions in the Training and Management of Loggers (Lyons, PI, Oregon State University, PNASH 2019-2020) This pilot will work with loggers during the high-risk task of choke setting to test a method for collecting: 1) unexpected events, and 2) conditions required for managing tasks. The inventory of incidents will be used to inform worker safety training and hazard management in the logging sector.

PREVENTION AND INTERVENTION

A Multi-level Approach to Heat Related Illness Prevention in Agricultural Workers (Spector, PI, NIOSH 2016-2021)
Building on our previous heat-related illness (HRI) studies, we will develop and evaluate a multi-level approach to address HRI for farmworkers in the tree fruit industry. The project will assess a proposed work-based intervention program as well as whether off-hour environmental conditions contribute to risk for HRI during work. To accomplish study aims, an Expert Working Group (EWG) that includes workers, farm managers, and other stakeholders will guide the development, testing, and dissemination of the intervention.

Injury and Illness Prevention in the Pacific Northwest for the Dairy Industry (Yost, PI, NIOSH 2016-2021)
Dairy workers in Washington have an injury claim rate 72% higher than the state average. The hazards of animal-related injuries, slips, trips, and falls are exacerbated by a growing hired workforce that has little previous experience in this industry. This project delivers and tests new worker safety training programs, and will include newly hired workers. The project, conducted in partnership with WSU, is guided by the ongoing participation of a Technical Advisory Group and on-the-ground dairy managers and workers.

Pilot: Evaluation of Wearable-Based Activity Recognition Modeling Applications for Logging Safety (Keefe, PI, Univ. of Idaho, PNASH 2018-2020) This pilot project will integrate geospatial technology and activity recognition modeling into a Garmin smartwatch and smartphone application for rigging crew workers in the logging industry. This application aims to prevent injuries by improving loggers' situational awareness by providing real-time updates of their coworkers' work activity status and location.

Pilot: Evaluation of Exoskeletons in Reducing Musculoskeletal Disorders in Manual Timber Felling (Kim, PI, Oregon State University, PNASH 2019-2020) This small project will evaluate stakeholders' awareness and acceptance of exoskeletons, and identify potential barriers/risks to implementation of exoskeletons in forestry.

SURVEILLANCE

Safety Surveillance for Pacific Northwest Fisheries (Kincl, PI, Oregon State University NIOSH 2016-2021)
This OSU research team will develop a system to address severe non-fatal injuries in NW commercial fishing by assessing vessel disaster and casualty data collected by NIOSH and the USCG. The project will also include casualty and safety data from insurance claims and primary data collection. The combination of these data will form the foundation for ongoing, scalable, practical surveillance systems for hazard assessment and for evaluation of programs for interventions in the commercial fishing industry.

EDUCATION

Practical Solutions for Pesticide Safety (Galvin, PI, NIOSH 2016-2021)
This project will identify and evaluate solutions that farm managers, forest service managers, and pesticide handlers can implement to minimize pesticide exposures. The new resources will be applicable to the revised EPA Worker Protection Standard and recent food safety requirements. We will engage workers and managers in walk-through evaluations and field testing to identify key safety issues and novel solutions, and share solutions through an online platform.

Washington State Dairy Safety Network (Austin, PI, WA SHIP 2019-2020)
The goal of this project is to improve workplace training on WA State dairies through an approach that provides in-person seminars, an online community of professionals where curated materials and user feedback can be found, and hands-on training that participants can bring back to their home dairy.

Etiquetas Bilingües de Pesticidas/Bilingual Pesticide Safety (Galvin, PI, Multiple Sponsors 2017-2021) This service project has successfully demonstrated proof-of-concept for the PestiSeguro/PestiSafe mobile app. Demand is high among growers for pesticide label safety information in Spanish. This year's activities are developing the product for the tree fruit industry.

COMMUNITY-BASED PARTICIPATORY RESEARCH

El Proyecto Bienestar (or, The Wellbeing Project), is a long-standing community health intervention effort guided by a Yakima Valley community advisory board and partnership between: University of Washington, Northwest Communities Education Center/Radio KDNA, Heritage University, and Yakima Valley Farm Workers Clinic. Our current Proyecto Bienestar projects:

> **Home Air in Agriculture - Pediatric Intervention (HAPI) Trial** (Karr, PI, NIEHS 2014-2019) This study aims to reduce child exposure to inflammatory agents and allergens in the home through the use of high efficiency particulate air cleaners and a home-based education program. The study addresses the health of children with asthma living in communities with industrial scale agricultural operations, asthma in a vulnerable subpopulation (Latino farm worker children), and evidence based intervention strategies.

> **Health & Safety of Women Ag Workers** (Breckwich Vasquez and Jody Early, PIs, Multiple Sponsors 2014-2020) El Proyecto Bienestar is addressing sexual harassment of women working in agriculture. In partnership with our advisory board, we are developing resources to farm employers and communities. Current activities are to conduct training sessions and evaluate effectiveness of the curriculum, **Basta! Prevent Sexual Harassment in Ag (ENG/SP). See** https://deohs.washington.edu/pnash/sexual-harassment

Safety and Health of Latino Immigrant Forestry Services Workers in the Pacific Northwest (de Castro, PI, NIOSH 2014-2017)
This research-to-practice project based in the community of Medford, Oregon is identifying and assessing injury and health risks for Latino immigrant forestry services workers in order to develop injury prevention solutions and provide safety education.

PNASH EDUCATIONAL RESOURCES

Video and Audio Libraries ➥ https://www.youtube.com/user/USagCenters and http://depts.washington.edu/pnash/audio_library

Hazard Self-Assessment Tool (HSAT) ➥ https://sites.google.com/boisestate.edu/potential-hazards/hsat-forms

Basta! Prevent Sexual Harassment in Ag (ENG/SP) ➥ https://deohs.washington.edu/pnash/sexual-harassment

Reducing Safety Hazards in NW Potato Production ➥ https://sites.google.com/boisestate.edu/potential-hazards/home

Practical Solutions for Pesticide Safety (ENG/SP) ➥ http://depts.washington.edu/pnash/practical_solutions

Fluorescent Tracer Training Hands on Learning for Pesticides (ENG/SP) ➥ http://depts.washington.edu/pnash/fluorescent_tracer

Forestry Services Safety Resources (ENG/SP) ➥ http://deohs.washington.edu/pnash/forestry-services

Fishermen Led Injury Prevention Program (FLIPP) ➥ https://health.oregonstate.edu/labs/osh/resources/flipp

Other resource pages: **Heat Related Illness, Orchard Injuries, Nitrates & well water, etc.** ➥ http://depts.washington.edu/pnash

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