



**Final Conference Grant Report to NIOSH/CDC (Award #U13OH011391)
rev. November 13, 2020**

Grant/Cooperative Agreement Project Period: 9/30/2018 – 9/29/2019

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ACKNOWLEDGEMENTS

We would like to thank everyone for attending the 2019 Western Ag Safety and Health Conference. Our conference reached 170 attendees, and we could not have done it without you and our presenters, partners, and sponsors. We would like to thank the following committee members and their respective organizations for their dedicated work and time commitment:

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Pacific Northwest Agricultural Safety and Health Center (host)

Ellen Duysen, Risto Rautiainen, Aaron Yoder
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NIOSH Western States Division & NIOSH Conference Grant #U13OH011391

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Heather Riden, Marc Schenker, Kent Pinkerton
Western Center for Agricultural Health and Safety

And our additional thanks to Scott Heiberger and the Journal of Agromedicine for the coming dedicated issue to the Western Ag Safety and Health Conference – Cultivating Collaborations.

Thank you for your partnership and thank you to the National Institute of Occupational Safety and Health/CDC (Award #U13OH011391).

TERMS AND ABBREVIATIONS

Agriculture - Includes industry sectors of farming, fishing, and forestry

One Health - One Health is an integrated, transdisciplinary approach to health problems involving humans, animals and the rapidly changing environments we share.

r2p – NIOSH's initiative of research-to-practice, an approach to collaborations with partners and stakeholders on the use, adoption, and adaptation of NIOSH knowledge, interventions, and technologies. We need to move research into practice in order to reduce and eliminate injuries, illness, and fatalities.

ABSTRACT

Introduction: The Western Agricultural Safety & Health Conference - Cultivating Collaborations, was held in Seattle, WA. August 7-9, 2019. The conference aimed to build collaborative partnerships and foster the exchange of ideas.

Background: Agricultural industries (farming, fishing, and forestry) consistently rank among the most dangerous jobs. This conference will enhance our understanding of the social and technical dimensions of agricultural worker health and move our field forward in developing systems approaches to reduce the burden of agricultural diseases, injuries and fatalities.

Study design: Used a participatory approach with co-sponsored by the five western NIOSH Agricultural Centers, the NIOSH Western States Division, and participation was invited from all partners in the implementation of science, service, and policy.

Methods: The Cultivating Collaboration Conference's core program was planned with thematic sessions and invited speakers. Thematic sessions were selected on the basis that they addressed emerging issues and areas of common interest among the NIOSH Agricultural Center partners. Partners committed to roles in hosting sessions, planning the core program, and companion meetings. Engagement with new investigators and students took place through an open call for abstracts for poster and lighting talk presentations.

Results & Outcomes: Our program addressed forward thinking research for the safety and health of the western agricultural workforce, including farming, fishing and forestry. Thematic sessions focused on hired/contract workers, climate change, animal/human one-health, injury and exposure prevention, prevention through design, and research-to-practice. The conference was a success with 170 researchers and regional partners participating in poster, lighting talks, panels, and discussion sessions on agricultural safety and health topics. Evaluation results showed consistent positive feedback with 92% responding that the conference did or might lead to collaborative in the future. Conference logistics were highly rated, with 'networking opportunities' and 'time for questions, answers and discussion' receiving the highest average scores. Participants expressed a desire for more networking time.

Discussion: The Cultivating Collaborations conference demonstrated the value of academic meetings among the NIOSH Agricultural Centers and related researchers and partners. In addition, it showcased the collaborative spirit of this research community and future research directions for western farming, fishing, and forestry safety and health.

See conference website: <https://deohs.washington.edu/pnash/west-ag-safety-conf> and the upcoming dedicated issue of the Journal of Agromedicine.

I. KEY FINDINGS & OUTCOMES

KEY FINDINGS

Western Ag Safety & Health Conference –
Cultivating Collaborations
Seattle, WA. August 7-9, 2019

In 2019 PNASH hosted Cultivating Collaborations, a conference to build collaborative partnerships and foster the exchange of ideas. The program addressed forward thinking research for the safety and health of the western agricultural workforce, including farming, fishing and forestry. Thematic sessions focused on hired/contract workers, climate change, animal/human one-health, injury and exposure prevention, prevention through design, and research-to-practice.

The conference was a success with 170 researchers and regional partners participating in poster, lighting talks, panels, and discussion sessions on agricultural safety and health topics. The conference aimed at Cultivating Collaborations was co-sponsored by the five western NIOSH Agricultural Centers, the NIOSH Western States Division, and participation was invited from all partners in the implementation of science, service, and policy. Cultivating Collaborations was supported by a NIOSH/CDC Conference Grant (Award# U13OH011391).

The Western Agriculture Safety and Health Conference was well received, with larger than anticipated participation, and highly rated presentations and sessions. The planned sessions (core program) and call for presentations (posters and lighting talks) resulted in a rich program reflecting the variety of current and future directions for research in farming, fishing, and forestry safety and health. Participant reaction evaluation results demonstrated a positive experience and high degree of relevancy and potential impact.

TRANSLATION OF FINDINGS

- The *Journal of Agromedicine* special issue is currently in-press with expected release in January 2021.
- The Western Ag Safety & Health Conference website with presentations and abstracts is located at: http://deohs.washington.edu/pnash/forest_safety.

RESEARCH OUTCOMES

Conference attendee experience and reaction was evaluated in daily email survey links. The survey was designed to capture session and presenter performance, conference process measures, and anticipated impacts/outcomes in line with our conference goals of cultivating new ideas and collaborations.



The top rated thematic sessions overall were: Occupational Health Research in the Commercial Fishing Industry, Surveillance of AgFF Injury, Illness and Economic Impacts, and Forestry & Integrating Safety in a Time of Rapid Change.

The top five lightning talks were: Tribal Bison Workers –Imminent Dangers, Surveillance and Practical Solutions, NIOSH Ag Centers Partner on “Telling the Story” Project, Academia, Extension, and Communities Use Theater to Change the Health and Safety of Farm Families, Injury and Severity in Greenhouse and Nursery Workers: Can Data Drive Prevention through Engineering Design?, and Feasibility of Heat Acclimatization in Wildland Firefighters.

35 participants wrote in ‘take home messages’, topic areas most addressed were in the categories of Hired and Contract Ag Workforce – Sustainable Solutions (“We need more mental health professions vs. safety professions”), Prevention through Design in New Technologies (“Robotic innovation is most successful in strawberries and apples/tree fruit”), and Best Practices in Engagement and Research to Practice (r2p) (“Community-Based Participatory Research is needed to improve health and safety in immigrant workers”).

From evaluation surveys conducted immediately following the conference, 92% of survey respondents agreed that the conference events did or might lead to collaborative possibilities in the future.

A follow-up evaluation of participants from the Western Agriculture Safety and Health Conference was conducted four months post-conference of 31 (20%) randomly selected participants. Outcomes shared by participants included:

- Continued exploration of new research ideas (57%)
- Post-conference communications to explore a new collaborative idea (65%)
- Planned communication with a new conference contact in the next six months (50%)

The Cultivating Collaborations conference demonstrated the value of academic meetings among the NIOSH Agricultural Centers and related researchers and partners. In addition, it showcased the collaborative spirit of this research community and future research directions for western farming, fishing, and forestry safety and health.



II. OVERALL REPORT

INTRODUCTION

The event was a rare opportunity for those engaged in injury and illness prevention research in farming, fishing, and forestry. The western US shares a common history with these vital agricultural industries, landscapes, and communities. Likewise, we share common agricultural practices, workforces, and the means to improve conditions.

Agricultural industries (farming, fishing, and forestry) consistently rank among the most dangerous jobs, with fatality rates 7-8 times that of the all-industry average for the US. Commercial fishing and forestry fatality rates exceed the national average by 32 times (US BLS, 2016). The overall impact can be seen in the cost of injuries in the US: an estimated \$7.6 billion in medical and lost productivity costs. (Leigh, 2002). This conference will enhance our understanding of the social and technical dimensions of agricultural worker health and move our field forward in developing systems approaches to reduce the burden of agricultural diseases, injuries and fatalities.

Cultivating Collaborations was co-sponsored by the five western NIOSH Agricultural Centers, the NIOSH Western States Division, and participation was invited from all partners in the implementation of science, service, and policy.

Our Theme

The Cultivating Collaborations theme reflects the conference goal to build collaborative relationships and foster the exchange of ideas. Attendees included academic researchers, students, and extension educators, and a broad range of research partners from community organizations, producers, health care providers, and government agencies.

SPECIFIC AIMS

The aims of the conference were to:

1. Convene investigators and partners in western agricultural safety and health research,
2. Facilitate networking, and the sharing and discussion of best research and practice,
3. Establish research needs and new research collaborations,
4. Develop new investigator and student research, and
5. Disseminate conference results to participants and the greater public.

METHODS

The conference was led by a steering committee that included the five western NIOSH Agricultural Centers, the NIOSH Western States Division, and in later meetings, each thematic session lead. The operations team and site host was led by the Pacific Northwest Agricultural Safety and Health (PNASH) Center.

The Cultivating Collaboration Conference's core program was planned with thematic sessions and invited speakers. These sessions were selected on the basis that they addressed emerging issues and areas of common interest among the NIOSH Agricultural Center partners. This program was originally developed during the conference grant planning process and revisited on receipt of the award. Conference advance commitments were obtained, starting one-year in advance. Partners committed to roles in hosting thematic sessions, planning the core program, and also hosted companion meetings. Engagement with new investigators took place through an open call for abstracts for posters and lightning talks.

Marketing of the event was organized through a media kit posted online and promoted through the partnership networks and placed promotions in related organizational newsletters and event calendars. Social media promotion was enhanced through a steady release of speaker profiles – highlighting keynote speakers and other featured presenters. During the conference, social media efforts were coordinated across Ag Centers and partners by promoting the use of conference hash tags in a social media plan that we developed. In addition, a selfie frame photo booth was also created to encourage people to take pictures and post them on social media to highlight the event.

Evaluation of process and outcomes indicators was conducted through participant reaction assessment and post-conference outcome assessment. The reaction assessment was administered through a daily online survey of all participants. The outcome assessment was conducted 4-months post conference through a random selection of attendees (20%) in an online survey or interview. Questions reflected our conference aims, and general goals to ensure the relevance and quality of the content and experience.

RESULTS & OUTCOMES

The conference drew 170 researchers and regional partners participating in poster, lighting talks, panels, and discussion sessions on agricultural safety and health topics. Of the 170 attendees, 24 were students, and 23 agency, community and industry partners. See Appendix A for a listing of conference participants.

Our final core thematic sessions are described below.

Thematic Sessions and Platform Presentations

Presentations are posted at <https://deohs.washington.edu/pnash/west-ag-safety-conf>. In addition, in preparation is special issue of the *Journal of Agromedicine*, featuring the Western Agriculture Safety and Health Conference with an editorial and paper for each conference thematic session.

KEYNOTE - Richard Fenske, Keynote: Beyond a Doubt: The critical role of science in workplace health and safety

KEYNOTE - Marc Schenker, Keynote: Hired and Contract Ag Workforce-Sustainable Solutions

SESSION I. Hired and Contract Ag Workforce – Sustainable Solutions

Chair: Marc Schenker, MD, MPH, University of California Davis, WCAHS

Vulnerable and underserved populations make up a substantial majority of the agricultural workforce in the West. These workers are at great risk of occupational injury and poor health outcomes. All of the NIOSH Ag Centers have considerable research and outreach activities that aim to reduce these adverse outcomes. With this in mind, the goal of the *Hired and Contract Ag Workforce* session is threefold: 1) to enhance collaborations of people working on common challenges, both research and outreach, of improving health and safety among hired and contract agricultural workers; 2) to share knowledge of unique approaches appropriate for improving the health of hired and contract agricultural workers; and 3) to learn about effective approaches to addressing sensitive health issues such as sexual harassment and mental health among vulnerable workers. In addition to presentations from Ag Center members on their research activities, a panel will discuss the translation of research to practice at the community level.

Engagement through Promotores de Salud Mary Jo Ybarra-Vega, MS, LMHC,

Outreach/Behavioral Health Coordinator, Moses Lake/Quincy Community Health Center

Mental and Physical Health of Immigrant Workers in CAFOs and Field Ag Athena Ramos, PhD, CS-CASH, University of Nebraska Medical Center

Occupational Health and Safety of U.S. Farmworkers in the High Plains Anita Pena, PhD, HICAHS, Colorado State University

Diversity within the Forestry and Logging Workforce Vanessa Casanova, PhD, SW Ag Center, University of Texas

Panel: Sustainable Models of Research and Translation to Improve Farmworker Health

Moderator: Xóchitl Castañeda, Health Initiative of the Americas, at the School of Public Health, University of California Berkeley *Panelists composed of previous speakers*

SESSION II. Prevention through Design in New Technologies

Chairs: Aaron Yoder, PhD, MS, CS-CASH, & Chandran Achutan, MS, PhD, University of Nebraska

This session will discuss the usability and feasibility of new injury prevention technologies that have been or are in the process of being developed and implemented. Presenters will provide information on current and emerging issues that may be addressed by new technologies; methods of engaging agricultural workers to use new technologies; innovative testing methods; the use of feedback protocols; and collection of quantitative and qualitative performance measures. The presentations will be followed by a panel discussion composed of the speakers.

Introduction - Brad Husberg, Director, CDC/ NIOSH

Etiquetas Bilingües de Pesticidas/Bilingual Pesticide Safety Project:

Research>> Translation>>Commercialization Kit Galvin, MS, CIH, PNASH, University of Washington

New Pesticide Application Technologies Edward Kasner, PhD, PNASH, University of Washington

Design Solutions for Prevention of Musculoskeletal Disorders in Ag Victor Duraj, WCAHS, University of California Davis

Evaluation of Foldable ROPS Universal Lift-assist Design Paul Ayers, PhD, HICAHS, Colorado State University

ATV Crush Protection Devices Farzaneh Khorsandi, PhD, WCAHS, University of California Davis

Robotics and AI in Agriculture: Innovations and Safety & Health Needs Karen Lewis, MS, Washington State University

SESSION III. Western Climate Change and Amplified AgFF Worker Health Risks

Chairs: Richard Fenske, PhD, PNASH, Univ. of Washington and Kent Pinkerton, WCAHS, Univ. of California Davis

Climate change brings with it increased risk of catastrophic wildfires, flooding, drought, and sea level rise as well as extreme heat days, which will become more frequent, resulting in increased air pollution, changes in vector-borne diseases, as well as the impact of heat itself. Climate change encompasses all aspects of agriculture from planting to harvesting, crop rotation, crop types and growing season. Near-term and long-term consequences of climate change on worker health will be explored in this session, as well as ideas for active solutions. This session will focus on the following goals: 1) examine current challenges in occupational health and safety related to extreme heat, changes in air pollution and increases in vector-borne diseases; 2) evaluate the consequences of climate projections on future occupational health hazards; outline next steps in regard to education regarding climate change in the Western United States.

Climate Impacts on Human Health and Adaptation Strategies Heidi Roop, PhD, Climate Impacts Group, University of Washington

Heat Stress in Agricultural Workers: Traumatic Injury Risk and Future Considerations June Spector, MD, PNASH, University of Washington

Heat Stress among California Farm Workers Marc Schenker, MD, WCAHS, University of California Davis

Assessing Heat Effects among Migrant and Seasonal Farmworkers: A Multi-State Study Kai

Zhang, PhD, South West Ag Center, Health Science Center at Houston, University of Texas

Health Hazards Associated with Drought Jesse Bell, PhD, CS-CASH, University of Nebraska Medical Center

Panel: Air pollution from Wildfires and its Impact on Agricultural Workers Coralynn Sack, MD, DEOHS & Department of Medicine, University of Washington June Spector, MD, PNASH, University of Washington Roger Ottmar, PhD, USDA Forest Service Pacific Northwest Research Station, Seattle WA Kent Pinkerton, PhD, WCAHS, University of California Davis

SESSION IV. Surveillance of AgFF Injury, Illness and Economic Impacts

Chair: Risto Rautiainen, PhD, MS, CS-CASH, University of Nebraska

Surveillance involves ongoing systematic collection, analysis, and interpretation of health data and timely dissemination of the findings to those who need to know. Understanding the changing nature of farming, populations at risk, exposures, risk factors, and characteristics of injuries is essential for successful prevention. Surveillance of farm-related injuries and illnesses is challenging, however. There is no single system that identifies these incidents comprehensively. The large number, small size, and geographic dispersal of farm operations, and the diversity of the populations at risk pose challenges. The goal of this panel is to discuss strategies to develop sustainable, cost-effective systems for the surveillance of injuries and illnesses in agriculture. The panelists will discuss innovative methods including analyses of 'big and small data' from existing administrative databases, automated online surveys, and media tracking services.

Monitoring Agricultural Injuries from Media Reports Bryan Weichelt, PhD, National Children's Center for Rural and Agricultural Health and Safety

Analyses of Agricultural Injury Data from Administrative Databases Erika Scott, PhD, Northeast Center for Occupational Health and Safety

Injury and Illness Surveys to Self-employed Farmers and Ranchers Risto Rautiainen, PhD, University of Nebraska Medical Center

Improving Fatality Surveillance for the US Fishing Industry Samantha Case, MPH, NIOSH Western States Division

Bureau of Labor Statistics Injury Surveillance Marika Litras, PhD, US Bureau of Labor Statistics

Migrant and Seasonal Farmworker Enumeration Methodology

Alice Larson, PhD, Larson Assistance Services

Panel: Smart Surveillance – Developing Sustainable, Cost-effective Systems for the Surveillance of Injury and Illness in Agriculture. *Panelists composed of previous speakers*

SESSION V. Animal Agriculture and the One Health Approach

Chair: David Douphrate, PhD, MPT, MBA, CPE, CSP, SW Ag Center, University of Texas

One Health is the integrative effort of multiple disciplines to attain optimal health for people, animals, and the environment. The One Health concept recognizes that human health is connected to the health of both animals and the environment. Within the One Health framework, livestock operation productivity and efficiency involves a triad of interactions between the animal, equipment and environment, and worker. To date, research emphasis has been placed on the animal or production practices, with very little research attention placed on the worker, and his/her interaction with the animal or environment. This session will address how worker health research is implemented within a One Health framework.

A One Health Model for Dairy Farming- Feasible and Scalable? Peter Rabinowitz, MD, PNASH, University of Washington

The One Health Paradigm: Challenges and Opportunities for Developing Successful Interventions to Improve Poultry and Human Health

Matthew W. Nonnenmann, PhD, CIH, Great Plains Center for Agricultural Health, University of Iowa,
One Health: Why We Care® in the Swine Industry

Heather Fowler, VMD, PhD, National Pork Board

Panel: Worker Health in a One Health Framework *Panelists composed of previous speakers (and Bison representative)*

Panel: Addressing Worker and Livestock Safety during Livestock Handling Activities Elena Austin, PhD, PNASH University of Washington, Robert Hagevoort, PhD, SW Center for Ag Health, Injury Prevention and Education, New Mexico State University

SESSION VI. Forestry – Integrating Safety in a Time of Rapid Change

Chair: Marcy Harrington, MPA, PNASH, University of Washington

There is an upswing in demand for forest products and land management that occupational health and forest management professionals need to be prepared to address. These trends are driven by the threat of wildfire and expanded demand for US timber. The forestry sector relies on a small and largely unskilled workforce in need for training, technology, and management solutions, especially in a time of rapid change. Currently transforming the West is a new logging technology - winch-assisted steep slope logging. This is opening up the West's steep slopes to harvesting and presents new safety challenges. In forestry services (forest maintenance), immigrant Latino workers conduct high hazard, intense manual labor tasks. This industry of small subcontractors is underserved and hidden from the regulatory eye and the workforce at high risk for injury and work abuses.

New Technologies Transforming Logging:

Winch-assisted Machine Logging on Steep Slopes John Garland, PhD, PNASH, University of Washington

Mechanized Planting in the Southwest Vanessa Cassanova, PhD, SW Ag Center, Univer. of Texas at Tyler

GPS and Location Services for Situational Awareness Rob Keefe, PhD, University of Idaho
Workforce Development Needs in the Forestry Sector:

NW Logger Needs Assessment and Coming Industry Initiatives John Garland, PhD, PNASH, University of Washington

Mixed-methods Analysis of Logging Injuries in MT and ID John Rosecrance, PhD, HICAH, Colorado State University

Logging Machine Operators, Health and Safety Training Anabel Rodriguez, PhDc, SW Center for Ag Health, Injury Prevention and Education, University of Texas at Tyler

Panel: Immigrant Latino Workforces in Forestry Services

Carl Wilmsen, PhD, Executive Director, Norwest Forest Worker Center, Vanessa Casanova, PhD, SW Center for Ag Health, Injury Prevention and Education, University of Texas at Tyler Butch de Castro, PhD, PNASH, University of Washington

SESSION VII. Best Practices in Engagement and Research to Practice (r2p)

Chair: Amanda Wickman, MBA, South West Ag Center, University of Texas at Tyler,

This session will feature proven techniques for research and outreach that not only reach but also engage AgFF populations. Presenters from the western United States will share best practices for engaging partners and workers in agriculture, forestry and fishing sectors through safety and health outreach and research. Successful research to practice approaches will be described. A panel of experts will conclude the session by discussing what they 'like' and 'dislike' about social media as an engagement tool.

Latino Farmworker Health Outcomes: Engaging Youth and Families in Research and Prevention Michael Merten, PhD, South West Ag Center, Oklahoma State University

Partnering with AgriBusiness Leaders to Raise the National Agri-Safety Culture Barb Lee, PhD, National Children's Center for Rural and Agricultural Health and Safety

Research to Practice – CHIPS Project: Incorporating results into education Teresa Andrews, MS, Western Center for Agricultural Health and Safety, University of California Davis

Community-Engaged Research Methods with the Yakima Farmworker Community:

Elizabeth Torrez, BS, El Proyecto Bienestar (The Well Being Project), University of Washington, Ester Min, PhD(c), Asthma Research and the Home Air Pediatric Intervention (HAPI), University of Wash.

Orly Stampfer, Reducing Woodsmoke in a Highly Impacted, Multicultural Rural Setting, University of Wash.

Kori VanDerGeest, MS, Water Quality, Nitrates and Community Messaging, University of Washington

Panel: Best Practices for Using Social Media to Connect with AgFF Stakeholders. Whitney Pennington, MPH, HICAHS, Colorado State University, Shelbie Powell, MPH, South West Ag Center, University of Texas Health Science Center at Tyler, Ellen Duysen, MPH, Central States Center for Agricultural Safety and Health, University of Nebraska Medical Center

SESSION VIII. Occupational Health Research in the Commercial Fishing Industry

Chair: Jennifer Lincoln, PhD, NIOSH Western States Division, University of Washington

The commercial fishing industry is recognized as one of the most hazardous work settings. Many operations are characterized by strenuous labor, long work hours, harsh weather, and moving decks with hazardous machinery and equipment. To date, NIOSH scientists and others have published regional and fishery-specific analyses of fatalities and traumatic injuries, and made recommendations to prevent them. Little research has examined occupational health-related issues in the US commercial fishing industry, such as chronic and infectious disease, fatigue, musculoskeletal injuries/illnesses, and thermal load from PPE. This session will highlight researchers' recent efforts to better understand such health issues.

Occupational Health Studies in Commercial Fishing and Offshore Seafood Processing:

Industries Impact of Thermal Load on PFD Use Among Shrimp Fishermen Ann Carruth, DNP, RN, Southeastern Louisiana University

Chronic Health Risks in Commercial Fishermen: A Cross-Sectional Analysis from a Small Rural Fishing Village in Alaska - Debra Cherry, MD, MPH, PNASH, University of Washington

Fatigue and Sleep Deprivation: A Review of the Commercial Fishing Literature Jennifer M. Lincoln, PhD, CSP, NIOSH Western States Division

Linking Data Sources To Explore Chronic Health Conditions, Infectious Disease, and Musculoskeletal Injury/Illness Among Alaskan Fishermen Laura Syron, PhD, MPH, NIOSH Western States Division

Health-related Results from the Fishermen Led Injury Prevention Program Laurel Kincl, PhD, CSP, Oregon State University

Participatory Research Methods to Engage Fishing Industry Stakeholders:

Interviewing Corporate Safety and Health Managers to Understand Seafood Companies' Challenges and Successes. Laura Syron, PhD, MPH, NIOSH Western States Division

Fishermen Led Injury Prevention Program: An Example of Community-Based Participatory Research. Laurel Kincl, PhD, CSP, PNASH, Oregon State University

KEYNOTE - Jeannie Nigam, NIOSH-sponsored Keynote: Stress, Mental Health, and Total Worker Health in AgFF. Introduction by Brad Husberg, AgFF Program, NIOSH

Lightning Talks

Abstracts are posted at <https://deohs.washington.edu/pnash/west-ag-safety-conf>

Dairy Safety Kit: A Washington State Focused Dairy Training Solution

Elena Austin, ScD, University of Washington

Evaluation of Wearable-Based Activity Recognition Modeling Applications for Logging Safety

Eloise Zimbelman, Graduate Research Assistant, University of Idaho

Wearable Sensors to Assess Trunk Position in a Sample of Forestry Workers

Federica Masci, Department of Health Sciences of University of Milan and International Centre for Rural Health of the Santi Palo e Carlo ASST of Milan, Milano, Italy

Timber Faller Safety on Integrated Mechanized Operations in Steep Terrain

Francisca Belart, PhD, Oregon State University

Strategies for Building Relationships with Study Partners and Participants in Washington Agricultural Communities

Pablo Palmández, MS, University of Washington

ATV Aware: An All-Terrain Vehicle Research and Safety Program

Susan Harris-Broomfield, Educator, University of Nebraska, Lincoln

Youth and All-Terrain Vehicles in the Agricultural Industry

Guilherme de Moura Araújo, Graduate Student, University of California, Davis

Crush Protection Devices for Agricultural All-Terrain Vehicles

Farzaneh Khorsandi, PhD, University of California, Davis

National ROPS Rebate Program (NRRP)

Paul Ayers, PhD, University of Tennessee

Interactive Education and Motion Graphics to Deliver Ag Health and Safety Programs

Carolyn Sheridan, BSN, Ag Health and Safety Alliance Founder

Tribal Bison Workers –Imminent Dangers, Surveillance and Practical Solutions

Ellen Duysen, MPH, COHC, Central States Center for Agricultural Safety and Health

NIOSH Ag Centers Partner on “Telling the Story” Project

Scott Heiberger, MS, National Children’s Center for Rural and Agricultural Health and Safety

Feasibility of Heat Acclimatization in Wildland Firefighters

Evan Johnson, PhD, University of Wyoming

Gene Expression of Peripheral Blood Mononuclear Cells during Heat Acclimation in Firefighter

Emily Schmitt, PhD, University of Wyoming

Wildfire Respirator Information Project

Whitney Pennington, MPH, Colorado State University

International Agriculture Health and Safety Standardized Survey Results for Gear up for Ag College Students

David Sullivan, *Adv. Dip FBM*, Ag Health and Safety Alliance

Understanding Children Farm Safety Needs of Latino Farmworkers/Farmers in the Pacific Northwest

Maria Tchong-French, MPH, University of Washington

Injury and Severity in Greenhouse and Nursery Workers: Can Data Drive Prevention through Engineering Design? Katherine Schofield, PhD, CSP, University of Minnesota, Duluth

Contribution Analysis: Measuring Behavior and Workplace Change
Sharon Newbill, PhD, Folkstone: Evaluation Anthropology

Academia, Extension, and Communities Use Theater to Change the Health and Safety of Farm Families
Deborah B Reed, PhD, MSPH, RN, University of Kentucky

Application of a Social Network Analysis to Assess Connectedness within the Agricultural Community
Cheryl Beseler, PhD, Colorado State University

Home Grown: Rural Nurses Trained to Serve Farmers and Ranchers
Natalie Roy, MPH, AgriSafe Network

HEALWA: Authoritative Information for Washington Healthcare Providers
Patricia Devine, MLS, HEALWA Program

Preparing for Emerging Agricultural Health Threats
Natalie Roy, MPH, AgriSafe Network

Poster Presentations

The posters presentations below are grouped by issue category, as they were arranged on the conference floor. See Poster Abstracts in Appendix B, and also posted at <https://deohs.washington.edu/pnash/west-ag-safety-conf>.

* Student presenters

DAIRY

1. The Healthy Dairy Worker Study Presenter: *José Carmona, MPH, University of Washington Co-author: Peter Rabinowitz, MD
2. Dairy Safety Kit: A Washington State Focused Dairy Training Solution Presenter: Elena Austin, ScD, University of Washington Co-authors: Amber Adams-Progar, PhD, Pablo Palmáñez, MS, Scott Dilley, MATS, Michael Yost, PhD
3. Carriage of MRSA among Dairy Farm Workers in the High Plains Region Presenter: *Jessica Nuñez, Masters Candidate, Colorado State University Co-authors: Stephen Reynolds, PhD, Bledar Bisha, PhD, Joshua Schaeffer, PhD
4. Injury Prevention on Pacific Northwest Dairies: Needs Assessment and Curriculum Development Presenter: Brandy Foust, BS, Washington State University Co-authors: Elena Austin, ScD, Pablo Palmáñez, MS, Michael Yost, PhD, Amber Adams-Progar, PhD
5. Hygienic Intervention and Its Effect on Nasal Inflammation and Microbiome in Dairy Workers Presenter: *Grant Erlandson, MS, Colorado State University Co-authors: Josh Schaeffer, PhD,

Stephen Reynolds, PhD, Sheryl Magzamen, PhD, Ken Jones, PhD, Matthew Nonnenmann, PhD CIH, Julia Sharp, PhD

6. Culturally Congruent Training Program on Infectious and Zoonotic Disease Prevention for Latinx Dairy Workers Presenter: I. Noa Román-Muniz, DVM, Colorado State University Co-authors: Kayla Rink, MS, Lauren Menger, PhD, Lorann Stallones, MPH, PhD, Pablo Pinedo, John Rosecrance, PhD, Flor Amaya-Soto, MV

FISHING

7. Modern Day Alaskeros: Filipinos Working in Fish Processing at Dutch Harbor, AK Presenter: Gabriel Garcia, PhD, University of Alaska, Anchorage Co-author: Butch de Castro, PhD

8. Perceptions of Safety and What Makes a Good Crew in the Dungeness Crab Fleet Presenter: Laurel Kincl, PhD, Oregon State University Co-authors: Hayley Strenke, MPH, Kendall Dunlap, Amelia Vaughan, MLIS, Kaety Jacobson, MS

9. A Statistical Approach to Merge Varied Datasets for Comprehensive Injury Surveillance in Commercial Fishing Presenter: Jasmine Nahorniak, MS, Oregon State University Co-authors: Viktor Bovbjerg, PhD, Sabrina Pillai, MPH, Samantha Case, MPH, Laurel Kincl, PhD, CSP

10. Evaluation of PFDs by Vietnamese Commercial Fishermen in the Gulf of Mexico Presenter: Ann Carruth, RN Southeastern Louisiana University Co-authors: Jeff Levin, MD, Julie Sorensen, PhD, Jennifer Lincoln, PhD

FORESTRY

11. Dangers in the Woods/Root Causes Peligros en el Bosque: Causes raíces Presenter: Carl Wilmsen, PhD, Northwest Forest Worker Center Co-author: Butch de Castro, PhD, Diane Bush, MPH, Marcy Harrington, MPA

12. Intent to Adopt Location Sharing for Logging Safety Applications Presenter: *Ann Wempe, MSc, University of Idaho Co-authors: Rob Keefe, PhD, Soren Newman, PhD, Travis Paveglio, PhD

13. Evaluation of Wearable-Based Activity Recognition Modeling Applications for Logging Safety Presenter: *Eloise Zimbelman, Graduate Research Assistant, University of Idaho Co-author: Rob Keefe, PhD

14. Wearable Sensors to Assess Trunk Position in a Sample of Forestry Workers Presenter: Federica Masci, Department of Health Sciences of University of Milan and International Centre for Rural Health of the Santi Paolo e Carlo ASST of Milan, Milano, Italy Co-authors: Giovanna Spatari, MD, Carmelo Mario Giorgianni, PhD, John Rosecrance, PhD

15. Timber Faller Safety on Integrated Mechanized Operations in Steep Terrain Presenter: Francisca Belart, PhD, Assistant Professor, Oregon State University Co-author: Viktor Bovbjerg, PhD

16. Feasibility of Heat Acclimatization in Wildland Firefighters Presenter: Evan Johnson, PhD, Assistant Professor, University of Wyoming Co-authors: Miranda Zamora, ATC, Joshua Loseke, CSCS, Carly Hibbs, Emily Schmitt, PhD, Tucker Readdy, PhD, DereK Smith, PhD

17. Gene Expression of Peripheral Blood Mononuclear Cells during Heat Acclimation in Firefighters Presenter: Emily Schmitt, PhD, University of Wyoming Co-authors: Evan Johnson, PhD, Miranda Zamora, ATC, Carly Hibbs, Joshua Loseke, CSCS, Derek Smith, PhD

FARMING: Machinery

18. ATV Aware: An All-Terrain Vehicle Research and Safety Program Presenter: Susan Harris-Broomfield, Educator, University of Nebraska Co-authors: Erin Howard, BS, Tracy Dethlefs, RN

19. Youth and All-Terrain Vehicles in the Agricultural Industry Presenter: *Guilherme de Moura Araújo, Graduate Student, University of California, Davis Co-authors: Farzaneh Khorsandi, PhD, Fadi Fathallah, PhD

20. Crush Protection Devices for Agricultural All-Terrain Vehicles Presenter: Farzaneh Khorsandi, PhD, University of California, Davis Co-authors: Hsiao-Yang Chou, Graduate Student, Eric Fong, Undergraduate Intern, Paul Ayers, PhD, Fadi Fathallah, PhD

21. National ROPS Rebate Program (NRRP) Presenter: Paul Ayers, PhD, University of Tennessee

22. Evaluation of Mechanical and Robotic Strawberry Harvest-Aids Presenter: Fadi Fathallah, PhD, University of California, Davis Co-author: Vicente Munguia, MS, Stavros Vougioukas, PhD, Victor Duraj, BS

FARMING: Climate and Air Quality Impacts

23. Gut Microbiome Profiles for Agricultural Workers Exposed to Exertional Heat, Dehydration, and Agricultural Pesticides Presenter: Valerie Mac, PhD, Emory University Co-authors: Vicki Stover Hertzberg, PhD, Dana B. Barr, PhD, Cynthia Striley, PhD, Jennifer Mulle, PhD, Malú Tansey, PhD, Linda McCauley, PhD

24. Knowledge, Beliefs and Practices of Midwestern Women Working in Agriculture Regarding Heat Stress Presenter: *Jill Oatman, MPH Student, University of Nebraska Co-authors: Ellen Duysen, MPH, COHC, Semi Lee, MPH, Lea Pounds, PhD, MBA, Terry Stentz, PhD, MPH, CPE, CPC, Aaron Yoder, PhD

25. Smoke, Wind, Rain: Extreme Weather Events and Occupational Safety in Agriculture Presenter: Heather Riden, MA, University of California, Davis Co-authors: Gail Wadsworth, Teresa Andrews, MS, Rebeca Giacinto, PhD, Julie Rainwater, PhD, Kent Pinkerton, PhD

26. Farmworkers' Perceptions on Wildfire Smoke Presenter: *Idanis Cruz, BA Public Health-Global Health, University of Washington

27. Wildfire Respirator Information Project Presenter: Whitney Pennington, MPH, Colorado State University Co-authors: Peter Kolb, PhD, Kristin Pintauro, PhD, Joshua Scott, PhD, Joshua Schaeffer, PhD, Lorann Stallones, PhD, Stephen Reynolds, PhD, Marilee Long, PhD, John Volckens, PhD

28. Construction of a Recirculating Aerosol Wind Tunnel for Evaluating Particulate Deposition in the Nasal Airway Presenter: *Joemy Ramsay, MS, University of Utah Co-authors: Darrah Sleeth, PhD, MPH, CIH

29. Understanding Airborne Particulate Pollution in Imperial Valley, California Presenter: *Savannah Mack, PhD Candidate, University of California, Davis Co-authors: Keith Bein, PhD, Qi Zhang, PhD, Kent Pinkerton, PhD

FARMING: Safety and Injury

30. International Agriculture Health and Safety Standardized Survey Results for Gear up for Ag College Students Presenter: David Sullivan, Adv. Dip FBM, Ag Health and Safety Alliance Co-authors: Carolyn Sheridan, RN, BSN
31. International Collaboration to Improve Safety Culture and Risk Management among Vulnerable Populations in Agriculture Presenter: Athena Ramos, PhD, University of Nebraska Medical Center Co-authors: Laura Girdžiūtė, PhD, Helle Birk Domino, MSc, Claudia Cordovil, PhD, Jože Starič, DVM, Adrianus de Rooij, MD, Jarkko Leppälä, PhD
32. Leveraging Crash Data for Injury Surveillance in the Southwest Agricultural Region Presenter: Eva Shipp, PhD, Texas A&M Transportation Institute-Center for Transportation Safety Co-authors: Amber Trueblood, DrPH, Hye-Chung Kum, PhD, Tanya Garcia, PhD, Shubhangi Vasudeo, MPH, Jisung Kim, Data Scientist, Marcelina Perez, MS
33. Agricultural Injuries in the Central States Region: Summary of 2011-2015 Data Presenter: *Anthony Johnson Jr, MS, University of Nebraska Co-authors: Kelsie Musil, MS, MPH, Ellen Duysen, MPH, Risto Rautiainen, PhD
34. Adoptability of Orchard Ladders with Shorter Rung Spacing Presenter: Victor Duraj, BS, University of California, Davis Co-authors: Tyler Hunter, BS, Fadi Fathallah, PhD
35. Recognizing and Reducing Safety Hazards in Northwest Potato Production Presenter: *Rachel Phinney, Graduate Student, Boise State University Co-authors: Cynthia Curl, PhD, Karin Adams, PhD, Matthew Blua, PhD
36. Hazard Mapping: A Tool to Identify Health & Safety Hazards in Agriculture Presenter: Isabel Flores Garcia, BSHA, University of California, Davis Co-authors: Heather Riden, MA
37. Biochemical and Physiological Dynamics in Ligament Injury and Hand Healing Presenter: *Amjad Ramahi, PhD Student, University of California Davis Co-authors: Fadi Fathallah, PhD, Tom Jue, PhD
38. Injury and Severity in Greenhouse and Nursery Workers: Can Data Drive Prevention through Engineering Design? Presenter: Katherine Schofield, PhD, University of Minnesota, Duluth Co-author: Abigail Clarke-Sather, PhD
39. Personal Protective Equipment Use among Farmers in Nebraska, Latvia, Lithuania, and Slovenia Presenter: Chandran Achutan, PhD, CIH, University of Nebraska Co-authors: Kaspars Kampuss, PhD, Laura Girdžiūtė, PhD, Kaunas, Lithuania, Gediminas Vasiliauskas, PhD, Jože Starič, DVM, Risto Rautiainen, PhD,
40. Improving the Job Satisfaction of Agricultural Workers to Build a More Sustainable Workforce Presenter: Malcolm Hobbs, PhD, University of California, Davis Co-authors: Monica Cooper, PhD
41. Contribution Analysis: Measuring Behavior and Workplace Change Presenter: Sharon L. Newbill, PhD, Folkstone: Evaluation Anthropology Co-authors: Amanda Wickman, MBA
42. Sexual Harassment Prevention in Agriculture: Evaluating a Tailored and Multilevel Worksite Intervention in Washington state Presenter: *Dennise Drury, MPH Student, Pacific Northwest Agricultural Safety and Health Center Co-authors: Elizabeth Torres, BS, Michael Yost, PhD, Victoria Breckwich-Vasquez, DrPH, Jody Early, PhD

43. Interactive Education and Motion Graphics to Deliver Ag Health and Safety Programs Presenter: Carolyn Sheridan, RN, Ag Health and Safety Alliance Co-authors: David Sullivan, Adv. Dip FBM, Ag Health and Safety Alliance

44. Academia, Extension, and Communities Use Theater to Change the Health and Safety of Farm Families Presenter: Deborah Reed, PhD, MSPH, RN, University of Kentucky Co-authors: Deborah Claunch, BBA, Debra McCallum, PhD

FARMING: Education

45. Considerations for Communicating Safety Information to a Diverse Stakeholder Audience in Western Ag Presenter: Kara Schilli, University of California, Davis Co-authors: Teresa Andrews, MS, Heather Riden, MA

46. NIOSH Ag Centers Partner on “Telling the Story” Project Presenter: Scott Heiberger MS, National Children’s Center for Rural and Agricultural Health and Safety Co Authors: Melissa Ploeckelman, PhD, Aaron Yoder, PhD, Ellen Duysen, MPH, Stephanie Leonard, MS

47. Application of a Social Network Analysis to Assess Connectedness within the Agricultural Community Presenter: Cheryl Beseler, PhD, Colorado State University Co-authors: Annie Keeney, PhD, Lorann Stallones, PhD

48. Home Grown: Rural Nurses Trained to Serve Farmers and Ranchers Presenter: Natalie Roy, MPH, AgriSafe Network

49. Wyoming Good Riding Practices (WyGRiP) Project Presenter: Jeremiah Vardiman, Northwest Area Extension, University of Wyoming Co-authors: Jeff Edwards, MS, Brian Sebade, MS, Hudson Hill, MS

50. Health Effects of Exposure to Cannabis in Workers in an Indoor Growing Facility Presenter: Christopher Simpson, PhD, University of Washington Co-author: Niloufar Ghodsian, MS, Cora Sack, PhD, Karen Jansen, MS

51. Tribal Bison Workers –Imminent Dangers, Surveillance and Practical Solutions Presenter: Ellen Duysen, MPH, COHC, University of Nebraska Co-authors: Lucia Finocchiaro, MPH, Risto Rautiainen, PhD, Clayton Kelling, DVM

52. HEALWA: Authoritative Information for Washington Healthcare Providers Presenter: Patricia Devine, MLS, HEALWA Program

53. Preparing for Emerging Agricultural Health Threats Presenter: Natalie Roy, MPH, AgriSafe Network

Roundtable Discussions Topics

The roundtable session format is comprised of a brief (15 minutes) introduction to the table’s moderator, followed by 45 minutes of discussion and feedback. Roundtables are an ideal format for networking and in-depth discussion on a particular topic.

Surveillance Systems for Agricultural Injuries

Moderator: Viktor Bovbjerg, Associate Professor, Oregon State University

Total Worker Health: Interventions to Protect Ag Workers during Wildfire Smoke Events

Moderators: Tania Busch Isaksen, Senior Lecturer, University of Washington, Nicole Errett, Lecturer, University of Washington

Conducting a Comprehensive Needs Assessment in the Agricultural Community

Moderator: Ellen Duysen, Community Outreach Specialist, Central States Center for Agricultural Safety and Health

Prevention of Heat-Related Stress among Farmworkers

Moderator: Joan Flocks, Director of Emerging Issues Program, Southeastern Coastal Center for Ag Health and Safety

Health and Safety in Greenhouse Production Agriculture

Moderator: Kit Galvin, Certified Industrial Hygienist, University of Washington

The Role of Crush Protection in the Safe Operation of ATV's

Moderators: Farzaneh Khorsandi, Assistant CE Specialist in Ag Safety & Health, University of California, Davis

Agricultural Safety and Health Resources for Community Health Workers: Identifying Gaps and Training Needs

Moderator: Jennifer Krenz, Research Scientist, Pacific Northwest Agricultural Safety and Health Center, University of Washington

Supporting Migrant Workers and their Families

Moderator: Alice Larson, Principal, Larson Assistance Services

Chronic Kidney Disease of Unknown Origin among Agricultural Workers

Moderator: Linda McCauley, Dean, School of Nursing, Emory University

Rethinking Social Safety Nets

Moderator: Lorann Stallones, Professor, Colorado State University

Calculating the Economic Impacts of Safety Programming

Moderator: Erika Scott, Deputy Director, New York Center for Agricultural Medicine and Health

Infectious diseases in Agricultural and Impacts of Agricultural Workers

Moderators: Stephen Reynolds, Director and Professor, Colorado State University, Noa Roman-Muniz, Colorado State University

Agricultural Center Outreach: Making the Most of Farm Shows

Moderator: Ellen Duysen, Community Outreach Specialist, Central States Center for Agricultural Safety and Health

Forestry Sector Safety Needs- Coordinating Efforts to make an impact

Moderator: Marcy Harrington, Manager, Pacific Northwest Agricultural Safety and Health Center, University of Washington

Pesticide Exposure Prevention

Moderator: Edward Kasner, Research Scientist, Pacific Northwest Agricultural Safety and Health Center, University of Washington

Agricultural All-terrain Vehicle Safety

Moderators: Farzaneh Khursandi, Western Center for Agricultural Health and Safety, University of California, Davis

Rural Crime as an Ag Health and Safety Problem

Moderator: Peter Lundqvist, Professor, Swedish University of Agricultural Sciences

Social Media: Is it still a valuable outreach tool?

Moderator: Whitney Pennington, Program Coordinator, High Plains Intermountain Center for Agricultural Health and Safety, Colorado State University

Robotics and Safety in Crop Production

Moderator: Steve Reynolds, Director, High Plains Intermountain Center for Agricultural Health and Safety, Colorado State University

Strategic Communications: Developing Meaningful Interactions with a Diverse Stakeholder Audience. Moderator: Heather Riden, Manager, Western Center for Agricultural Health and Safety; Kara Schili, Communications Specialist, Western Center for Agricultural Health and Safety

Farm Related Stressors

Moderator: Josie Rudolphi, Research Scientist, National Children's Center for Rural and Agricultural Health and Safety

Cannabis Use and Occupational Health and Safety

Moderator: Christopher Simpson, Professor, Pacific Northwest Agricultural Safety and Health Center, University of Washington

Companion Meetings

International Dairy Research Consortium, Tuesday, August 6th

The 2019 International Dairy Research Consortium (IDRC) meeting on August 6 at the Western Agriculture Health and Safety Conference in Seattle, WA, will focus on Total Worker Health including discussion on the impacts of automation and mechanization. HICAHS organized the IDRC to collaborate with other international researchers involved in improving the health and safety of dairy workers. Dairy workers throughout the U.S. and abroad are confronted with many of the same challenging issues that dairy workers in our region face. It is advantageous for HICAHS investigators to collaborate with other agricultural research centers (nationally and internationally) regarding successful injury and illness prevention strategies, tested dissemination channels, and novel approaches used to improve the health and safety of dairy workers globally. The consortium's objective is to collaborate on research and outreach projects and identify priorities that will ultimately result in the reduction of injuries and illnesses among dairy workers internationally.

RISC Fishing Technical Advisory Board Meeting, Tuesday, August 6th

PNASH lead investigator, Dr. Laurel Kincl from Oregon State University convened the RISC (Risk Information System for Commercial) Fishing Technical Advisory Board for her 5-year project, Safety Surveillance for Pacific Northwest Fisheries. This group consists of stakeholders from commercial fishing-related organizations including commercial fishermen, the United States Coast Guard, fisheries management professionals, the Oregon Health Authority, academic institutions, and Pacific Northwest

commercial fishing extension agents. More information about the agenda and priorities of the meeting will be shared at a later time.

NIOSH AgFF Outreach Networking Lunch, Thursday, August 8

PNASH convened 20 Ag Center outreach leads to discuss the topic of mental health – sharing outreach strategies, current issues, and programs and services to support the needs of rural communities.

Reaction Evaluation

Conference attendee experience and reaction was evaluated in daily email survey links. The survey was designed to capture session and presenter performance, conference process measures, and anticipated impacts/outcomes in line with our conference goals of cultivating new ideas and collaborations.

In Day One, 32 participants responded to the survey (19% response rate), Day Two, 25 participants (15% response rate), and Day Three, 21 participants (12% response rate). Participants indicated an average one point increase in knowledge following the presentations. Overall, the presentations consistently prompted further discussion or gave participants new ideas for their research. Fishing related topics made up three of the six top rated presentations, or those that prompted the most discussion or new ideas for research.

The top rated thematic sessions overall were: Occupational Health Research in the Commercial Fishing Industry, Surveillance of AgFF Injury, Illness and Economic Impacts, and Forestry & Integrating Safety in a Time of Rapid Change.

The top ten presentations were: Chronic Health Risks in Commercial Fishermen: A Cross-sectional Analysis from a Small Rural Fishing Village in Alaska, Fatigue and Sleep Deprivation: A Review of the Commercial Fishing Literature, Linking Data Sources to Explore Chronic Health Conditions, Infectious Disease, and Musculoskeletal Injury/Illness among Alaskan Fishermen, Health-related Results from the Fishermen Led Injury Prevention Program, Interviewing Corporate Safety and Health Managers to Understand Seafood Companies' Challenges and Successes, Fishermen Led Injury Prevention Program: An Example of Community-based Participatory Research, Monitoring Agricultural Injuries from Media Reports, Bureau of Labor Statistics Injury Surveillance, Mixed-methods Analysis of Logging Injuries in MT and ID, and the panel on Immigrant Latino Workforces in Forestry Services.

The top five lightning talks were: Tribal Bison Workers –Imminent Dangers, Surveillance and Practical Solutions, NIOSH Ag Centers Partner on “Telling the Story” Project, Academia, Extension, and Communities Use Theater to Change the Health and Safety of Farm Families, Injury and Severity in Greenhouse and Nursery Workers: Can Data Drive Prevention through Engineering Design?, and Feasibility of Heat Acclimatization in Wildland Firefighters.

While only 35 participants wrote in ‘take home messages’, topic areas most addressed were in the categories of Hired and Contract Ag Workforce – Sustainable Solutions (“We need more mental health professions vs. safety professions”), Prevention through Design in New Technologies (“Robotic innovation is most successful in strawberries and apples/tree fruit”), and Best Practices in Engagement and Research to Practice (r2p) (“Community-Based Participatory Research is needed to improve health and safety in immigrant workers”).

92% of survey respondents agreed that the conference events did or might lead to collaborative possibilities in the future. Conference logistics were highly rated, with 'networking opportunities' and 'time for questions, answers and discussion' receiving the highest average scores. Participants expressed a desire for more networking time and shorter or fewer sessions overall.

Outcome Evaluation

A follow-up evaluation of participants from the Western Agriculture Safety and Health Conference was conducted in December, 2019. We randomly selected 31 (20%) of registered participants to request that they respond to a Qualtrics survey regarding collaborative activities resulting from their attendance. Fourteen attendees responded to the survey (45% response rate).

The results are as follows:

Survey question	Yes	No	Unsure
Since your attendance at the Western Agriculture Conference, have you continued to explore new research ideas?	8 (57.1)	4 (28.6)	2 (14.3)
Since your attendance, have you had any e-mail exchanges or phone conferences with anyone you met at the conference for purposes of exploring a collaborative idea?	9 (65.3)	5 (35.7)	0
If you have not had personal contact with someone you met at the conference, do you anticipate contacting anyone from the conference in the next six months?	5 (50.0)	1 (10.0)	4 (40.0)

For the nine attendees who reported that they had contact with other attendees since the conference, two reported collaborating on a manuscript, four reported seeking expertise, one reported continued research projects and one reported sharing information.

Other specific comments in response to the question “Please provide any further comments on how the Western Ag Safety and Health Conference inspired new ideas and collaborations,” Included:

I connected at the conference with several people for education and training purposes.... our team will be doing a professional development course on OHS implications of technology in the workplace, and many the speakers on the technology track were very good, and I will seek their expertise in the future so we can include an agricultural session. Nothing is planned yet but the sessions I attended provided excellent ideas for future training.

Excellent forum to meet with other investigators involved in cannabis research in other states. Hopefully will help lead to a multi-site cohort study in the future

I am now more informed about the areas of research being done with ag safety and health.

Discussions with participants confirmed importance of forestry safety and health and collaborative efforts.

We have brainstormed internally about how to engage students more after hearing the student presentations. I knew most of the people at the conference.... However, I have worked with many of the people from the conference since August..

This was a really great conference that brought some key people together

Being new to this field, it was fascinating to learn about others work. I greatly enjoyed the conference.

Learning what ag safety resources are available. It is hard to know where to look for good resources.

In response to the questing asking “For a future academic conference on Ag Safety and Health, what topics would you like to see on the program?” the following responses were received:

All the topics I follow were covered but more information on nitrates in drinking water would have been interesting.

Worker engagement in Safety and Health. Creating a Positive Safety Culture in Ag Workplaces a bilingual bicultural approach.

Forestry safety and health; Statistics for small sample sizes of SS; 3 minute open mike with sign up for invitation to collaborate.

DISCUSSION & CONCLUSION

The Western Agriculture Safety and Health Conference was well received, with larger than anticipated participation, and highly rated presentations and sessions. The planned sessions (core program) and call for presentations (posters and lighting talks) resulted in a rich program reflecting the variety of current and future directions for research in farming, fishing, and forestry safety and health.

Participant reaction evaluation results demonstrated a positive experience and high degree of relevancy and potential impact. Yet, the response rate for the daily online survey was low. In future conference we recommend paper evaluations with built in time to complete forms and incentives to submit. Our outcome evaluation with participants supported the value of the sessions and the success of the conference in fostering the exchange of ideas and building research collaborations.

The Cultivating Collaborations conference demonstrated the value of academic meetings among the NIOSH Agricultural Centers and related researchers and partners. In addition, it showcased the collaborative spirit of this research community and future research directions for western farming, fishing, and forestry safety and health.

III. PRODUCTS

The *Journal of Agromedicine* special issue is currently in-press with expected for release in January 2021.

The Western Ag Safety & Health Conference website with presentations and abstracts is located at: http://deohs.washington.edu/pnash/forest_safety. Also see [Appendix C](#).

