



High Plains Intermountain Center
for Agricultural Health and Safety

ANNUAL REPORT 2019-2020

September 15, 2019 – September 14, 2020
CDC/NIOSH Cooperative Agreement No. 5 U54 OH008085



LETTER FROM THE DIRECTOR

2020 has been an unprecedented and extraordinary year. Agricultural producers adapted to protect their employees during the ongoing COVID-19 pandemic. Wildfires in Colorado, Utah, and as far as California and the Pacific Northwest blanketed the region in heavy smoke creating unhealthy working conditions.

With so much stress on the food system, especially agricultural workers, the HICAHS team collaborated with partners nationwide to respond and provide resources during these crises. We teamed up with the other U.S. Centers for Agricultural Safety and Health to draft the CDC and Department of Labor's COVID-19 Interim Guidance for the agricultural sector. We partnered with local Extension and commodity groups to help interpret that guidance and provide actionable recommendations. We lent support to State Departments of Agriculture as they advocated for increased access to personal protective equipment. We revised our recommendations for preventing exposure to wildfire smoke to help producers protect their families and employees from a dual threat: COVID-19 and smoke.

While the pandemic brought most of our field research and in-person outreach to a halt, our team found new ways support agricultural workers and rural populations. Several HICAHS researchers are using their expertise to support new projects responding to COVID-19. The outreach core is using digital avenues to connect and build new partnerships. I'm proud of the ways our HICAHS team has adapted and stepped up to meet these new challenges.

On a positive note, this summer we welcomed a new Evaluator and Center Coordinator, Morgan Valley, PhD, to the HICAHS team. Morgan will provide center support and strategy, especially as we prepare our 5-year competitive renewal.

Finally, we want to say thank you to Cheryl Beseler, evaluator and coordinator, and Maggie Clark, Pilot/Feasibility Program director, both of whom left their HICAHS posts this year. We wish them the best of luck as they continue to expand their epidemiological research.

Wishing you safety and good health as we move forward together.



Stephen Reynolds, Director



HICAHS staff and advisory board met virtually in September 2020.



HICAHS outreach team compiled a wildfire smoke video resource.

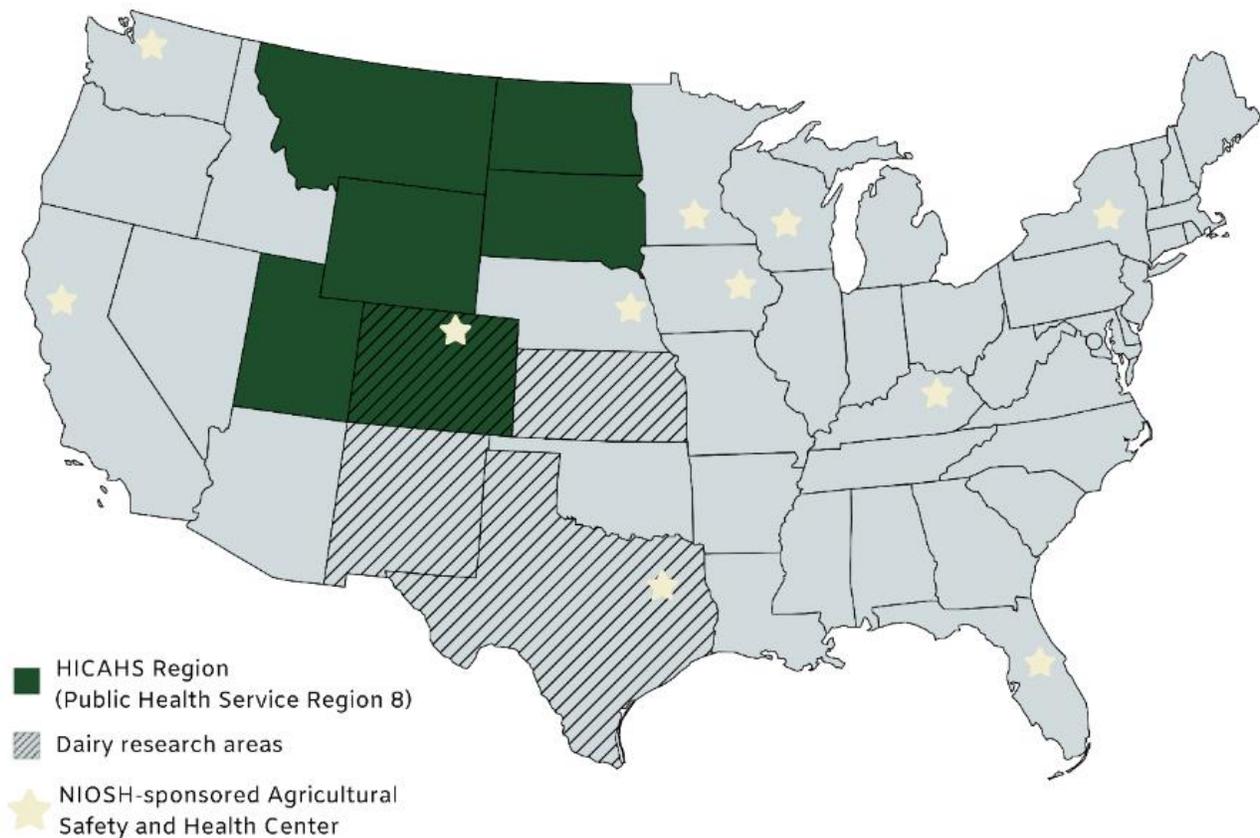


HICAHS welcomed Evaluator and Coordinator, Morgan Valley, PhD.

THE HICAHS REGION

HICAHS Vision Statement, 2016-2021 :

“To be the preeminent scientific authority, resource, and site for innovative strategies that improve the health and safety of agricultural and forestry workers and their families in the high plains intermountain region and beyond.”



The HICAHS region...

- Contains 152,620 farms and ranches.
- Employs over 300,000 workers (hired, migrant, and unpaid laborers).
- Contains 212 million acres of farmland, with the average agricultural production operation having 1,391 acres. This is 24% of the nation's farmland!
- Produces one-third of U.S. wheat cash receipts.
- Produces \$9.9 billion in cash receipts annually from the sale of cattle and calves. This is nearly 15% of all annual cattle and calf sales in the U.S. and is the largest single-commodity revenue source in the HICAHS region.

Data compiled from the United States Department of Agriculture, 2018 Census of Agriculture

ADMINISTRATIVE CORE UPDATES

The HICAHS evaluation team continues to track the center’s outputs (see page 7) and determine the worker health and safety needs in the region. The evaluation team also conducted a “social network analysis” to determine HICAHS’ connectivity and relation to other organizations and stakeholders in the region. A paper from this work, “Assessing Connections in an Agricultural Community using Social Network Analysis”, has been accepted for publication in *the Journal of Agromedicine*. This year, the evaluation team collaborated with colleagues from the other U.S. Agricultural Health and Safety Centers in two program-wide evaluation projects: one evaluating regional needs related to the COVID-19 pandemic and another developing a Contribution Analysis on cross-center activities to reduce tractor overturn fatalities through Rollover Protective Structure (ROPS) research and programs. The team also implemented an Evaluator Cultural Self-Assessment and identified priorities for growing its internal capacity, competencies, and approaches to incorporate greater cultural humility into the core.

Center Director, Stephen Reynolds, led a group of HICAHS staff and students to Washington, D.C. in February 2020. During this trip, the group visited the offices of 33 members of U.S. Congress. The trip provided an opportunity to educate representatives on the importance, value, and impact of agricultural health and safety research.

As the research projects funded for 2016-2021 time period begin to wrap up, the administrative team leads the center’s planning for the next cycle of funding. Guided by the results of last year’s needs assessment, this year the team set research priorities and recruited project investigators for the upcoming competitive grant renewal. In the next year, the evaluation team will work to identify the strengths of current HICAHS programs that can be highlighted in the next cycle of funding to increase the center’s impact.

CORE RESEARCH PROJECT UPDATES

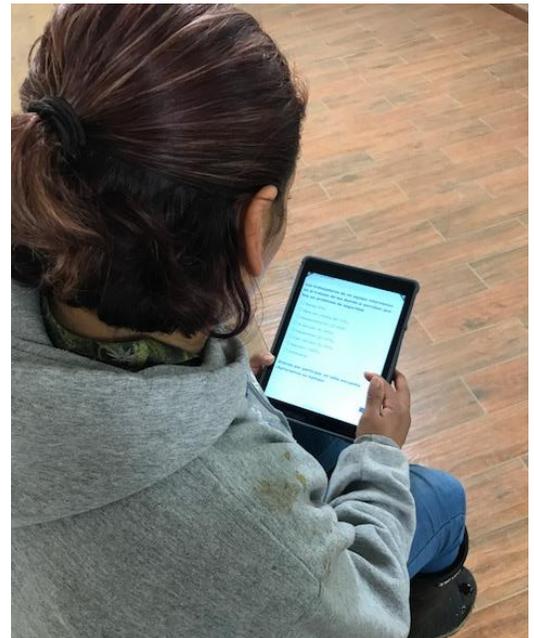
Occupational Safety Management and Leadership on Large-Herd Dairy Farms

David Douphrate – UTHealth School of Public Health

To date, 68 dairy supervisors have completed the 13-module training intervention program designed to increase their safety management and leadership skills. Over the course of three-month program, trainees complete weekly interactive digital lessons and assignments. Extension agents reinforce the management practices introduced in digital lessons during hands-on coaching sessions. Unfortunately, COVID-19 curtailed participation in the program this year; however, the research team plans to continue to recruit and train new participants in the next year.

To assess the efficacy of the program, the research team has collected nearly 650 baseline and exit surveys from workers supervised by training participants. This information will help evaluate if the training impacted safety culture experienced among workers.

Building on their experiences and collaboration in this study, Dr. Douphrate and team applied for and received a two-year grant from the U.S. Department of Agriculture to educate dairy owners, manager, and workers on COVID-19.



Dairy worker completing a supervisor evaluation.

Agricultural Safety Education Initiative

Michael Pate – Utah State University

This year the agricultural safety education initiative team led a virtual teacher training, reaching 44 teachers from South Dakota and Utah. Due to changes in the professional development schedule for Montana educators, the Montana training was postponed. Preliminary analysis suggests that repeated attendance at these trainings is associated with higher test scores on safety knowledge in teachers.

The project's Supervised Ag Experience (SAE) Award program and SAE Risk Assessment Tool are in their fourth year. The tool helps teachers and students satisfy the workplace safety objectives for experiential learning activities in agriculture. The focus of the SAE Safety Award this year was power takeoff (PTO) guarding and slow moving vehicle (SMV) emblems.

Last year the resources associated with the program's teacher trainings were made available nationwide through the Agricultural Experience Tracker (AET). This expanded availability, combined with the increased need for remote learning opportunities for students, resulted in major increases in resource use: more than 12,000 students completed the online assessment for the safety modules this year.



Utah Ag Education teachers participate in the 2019 training.

Nasal Intervention Study

Stephen Reynolds and Joshua Schaeffer – Colorado State University

Through this study, the research team is evaluating the impacts of a hypertonic and a normal (without added salts) saline rinse for preventing respiratory inflammation in dairy workers. Specifically, they are investigating if performing a nasal rinse before and after a work shift will reduce inflammatory response without significantly affecting the diversity of the microbiome of the nasal passage.

While hypertonic saline may demonstrate a more effective reduction in inflammation, it does require a prescription to acquire. By contrast, normal saline is available over the counter, making it more practical and accessible.

To date, 31 dairy workers have participated in three week-long sample campaigns. While the COVID-19 pandemic has prevented additional sampling campaigns, the team is currently analyzing previously collected samples. Analyses of nasal rinse samples (n=240) are nearly complete for characterizing inflammatory markers, Methicillin-resistant *Staphylococcus aureus*, and bacterial communities. Additionally, microbes and associated markers will be measured in 120 corresponding personal air samples.



Research team members prepare to collect nasal rinse samples at a dairy in Texas.

GRANT PROGRAM UPDATES

Emerging Issues

The Emerging Issues Grant Program provides a structure for HICAHS to identify and respond to issues of high priority for regional producers. The HICAHS Leadership Team reviews and funds project proposals under the direction of the Emerging Issues Program Lead, Joshua Schaeffer.

Two new projects were funded this year. Unfortunately, due to COVID-19 restrictions on research and gatherings, neither project could complete its objectives. We are actively working with the lead investigators to enable them to complete these projects in the upcoming year.

Table: Emerging Issues Grants funded between 9/15/2019 to 9/14/2020.

Project Title	Recipient
Supporting Resilience and Suicide Prevention in Agricultural Workers	Stacia McNeely, MSN, Affiliate Faculty, Loreto Heights School of Nursing, Regis University
Train the Trainer: Building Capacity for Respiratory Protection and Respiratory Safety Program Administrators in Utah	Michael Wierda, PhD, Extension Assistant Professor, Pesticide Safety education Program Director, Utah State University

The project “Understanding sources of farmer stress and stress reduction resources” led by Pat Sample, PhD, at Colorado State University was originally funded last year. Due to administrative issues, the research team was unable to meet its objectives last year and was allowed to continue this year.

Additionally, two investigators funded last year leveraged their Emerging Issues projects to obtain new research awards: Sheryl Magzamen, PhD (“Study of environmental mixtures and periburan respiratory outcomes”) was awarded an R21 from the National Institute of Environmental Health Sciences (NIEHS) and Dr. Noa Román-Muñiz (“Dairy worker perspectives of performing euthanasia as an essential component of their job”) was awarded funding through the Colorado State University Human-Animal Interaction program

WHAT IS AN “EMERGING” ISSUE?

Emerging issues are defined as risks to the health and safety of agricultural workers that are new or are expected to have rapidly expanding impact in the immediate or near future. HICAHS identifies specific emerging issues based on feedback from advisory board members and regional partners. This year, we identified the following:

- Cannabis and hemp production
- Connection between animal, environmental, and human health
- Distracted machinery operation
- Extreme weather and climate change
- Land-based fishing operation (aquaculture)
- Labor shortages and high worker turnover
- Mental and behavioral health
- Musculoskeletal disorders
- Robotics
- Youth safety in agriculture
- Zoonotic diseases, including COVID-19

Additional topics were considered given that applicants justified why the topic was “emerging”.

Community-Initiated Grants

Under the direction of John Rosecrance, the Community-Initiated Grants Program continues to provide funding to agricultural and forestry organizations to help them improve their health and safety programs. The program funded three projects this year. Despite some delays due to COVID-19, all three projects completed their proposed objectives.

Throughout the course of the current HICAHS grant cycle, Dr. Maristela Rovai and colleagues from the South Dakota State University Dairy Extension program have received several grants to develop health education programs for Hispanic dairy workers. This year her team published two articles on their work in relevant trade publications: dairy worker sources of stress in *Progressive Dairy* and dairy worker eating habit in *Hoard's Dairyman*. They also published a new Extension factsheet on the importance of vision tests and regular visits to the eye doctor.

Table: Community-Initiated Grants funded between 9/15/2019 to 9/14/2020.

Project Title	Recipient
Bringing the “Gear Up for Ag Health and Safety” Program to Colorado	Ag Health and Safety Alliance
“Emerging Leaders” Program	Montana Logging Association
Stress Management Skills for Hispanic Dairy Workers in the I-29 Corridor	South Dakota State University Dairy Extension

Pilot/Feasibility Grants

Two early-career investigators from Colorado State University joined the HICAHS team to lead the Pilot Program: Jessica Elf, director, and Andreas Neophytou, co-director. The program granted funding to three projects this year and solicited seven applications for next year's funding.

Additionally, previous grantee Jairo Palomares Velosa, PhD, published the article “Socio-ecological Factors of Zoonotic Diseases Exposure in Colorado Dairy Workers” in the February issue of the *Journal of Agromedicine*. The article summarized his 2016 pilot project of the same name.

Table: Pilot/Feasibility Grants funded between 9/15/2019 to 9/14/2020.

Project Title	Recipient
AI-enabled Sensing of PFAS in Agricultural Waters	Ruth Menger, Doctoral Candidate, Colorado State University
Impact of Occupational Exposures and Hazards on Brain and Cognitive Health among Aging Agricultural Workers	Michael Thomas, PhD, Assistant Professor, Colorado State University
Occupational Exposure of Dairy Farm Workers and Dairy Working Environment to Antimicrobial Resistant <i>Salmonella enterica</i>	Sangeeta Rao, PhD, Assistant Professor, Colorado State University

OUTREACH CORE

Before COVID-19 restricted travel, the outreach team attended regional farm shows and expos in Colorado, North Dakota, and Wyoming and the state Extension conference at Montana State University. By attending these events, we provided educational resources to attendees and networked with other organizations across the region that serve agricultural producers.

The outreach team also led three zoonotic disease safety trainings for the Colorado Livestock Association. Through this training more than 50 livestock producers (mostly dairy and cattle producers) identified new training resources and prevention practices for reducing zoonotic disease transmission on their operations. The outreach team presented a 10-minute version of this training as part of the Upper Midwest Agricultural Safety and Health Center’s online expo in August.

Social media and digital media are still a vital way to reach audiences across the region with information about HICAHS research and evidence-based practices. The outreach team maintains active Facebook, Instagram, and Twitter accounts and sends quarterly updates via electronic newsletter. Digital content was seen more than 120,000 times this year.

Additionally, the U.S. Centers for Agricultural Safety and Health joint YouTube channel hosts 29 videos produced by HICAHS or with HICAHS funding. These videos were viewed 41,000 times this year for a total of nearly 4,500 hours. Videos on the safe use of chainsaws are the most frequently viewed.

To further meet the needs of agricultural producers in the region, the outreach team developed and collaborated on several new resources: COVID-19 specific guidance and best practices documents, wildfire smoke exposure prevention videos, and recommendations for preventing injuries caused by repetitive motion on dairy farms.



Outreach Graduate Research Assistant, Blake Frederick, at the National Western Stock Show in January 2020.



Outreach Coordinator, Whitney Pennington, presents to members of the Colorado Livestock Association in March 2020.

Table: HICAHS Outputs for 9/15/2019 to 9/14/2020.

Output Type	Number of Outputs
Publications (Peer-Reviewed Journal Articles)	9
Trade Publications	6
Conference Papers, Presentations, and Abstracts	3
Conference Proceedings	5
Theses/Dissertations	2 Ph.D. Dissertations
Editorial and Editorial Board Service Appointments	5
Publicity for Ag Center and Awareness Events	2

HICAHS RESEARCHERS AND STAFF

Leadership and Administrative Personnel

Director: Stephen Reynolds, Colorado State University

Deputy Director, Evaluation Program & Outreach Program Lead: Lorann Stallones, Colorado State University

Associate Director: David Douphrate, UTHealth School of Public Health, San Antonio

Research Core & Emerging Issues Program Lead: Joshua Schaeffer, Colorado State University

Community Initiated Grants Program Lead: John Rosecrance, Colorado State University

Pilot/Feasibility Grants Program Lead (through December 2019): Maggie Clark, Colorado State University

Pilot/Feasibility Grants Program Director (started December 2019): Jessica Elf, Colorado State University

Pilot/Feasibility Grants Program Co-Director (started December 2019): Andreas Neophytou, Colorado State University

Outreach Program Coordinator: Whitney Pennington, Colorado State University

Evaluation & Coordinator (through July 2020): Cheryl Beseler, Colorado State University

Evaluation & Coordinator (started August 2020): Morgan Valley, Colorado State University

Evaluation Program Assistant: Annie Keeney, Colorado State University

Research Associate: Mary Bradford, Colorado State University

Research Associate: Luna Martinez, Colorado State University

Financial Manager: Kathy Petersen, Colorado State University

Students and Post-Docs

Michael Desch, Undergraduate, Colorado State University

Grant Erlandson, Doctoral Candidate, Colorado State University

Blake Frederick, Masters Candidate, Colorado School of Public Health at Colorado State University

Robyn Garratt, Masters Candidate, Colorado School of Public Health at Colorado State University

Jessica Nuñez, Masters Candidate, Colorado State University

James Seidel, Doctoral Candidate, Colorado State University

Sofia Thompson, Masters Candidate, Colorado State University

Alix Wertheimer, Masters Candidate, Colorado School of Public Health at Colorado State University

Research Core Key Personnel & Contributors:

**denotes contributor*

Occupational Safety Management and Leadership on Large-Herd Dairy Farms

David Douphrate, Principal Investigator, UTHealth School of Public Health, San Antonio
Noa Román-Muñiz, Colorado Dairy Extension, Colorado State University
Robert Hagevoort, New Mexico/Texas Dairy Extension, New Mexico State University
Luis Mendonca, Kansas Dairy Extension, Kansas State University
Stephen Reynolds, Colorado State University
David Gimeno, UTHealth School of Public Health, San Antonio
Anabel Rodriguez, UTHealth School of Public Health, San Antonio
***Lisa Pompeii**, Baylor University
***Peter Kines**, National Research Centre for the Working Environment (Denmark)
Paul Edwards, Dairy New Zealand
Rick Naerebout, Idaho Dairy Association

Agricultural Safety Education Initiative

Michael Pate, Principal Investigator, Utah State University
Dustin Perry, Montana State University
Scott Smalley, Iowa State University
Rebecca Lawver, Utah State University
***Alyx Shultz**, Montana State University (Evaluation Consultant)

Evaluation of Effectiveness of a Nasal Rinse Intervention to Reduce the Pro-Inflammatory Response in Dairy Workers Exposed to Bioaerosols

Stephen Reynolds, Principal Investigator, Colorado State University
Joshua Schaeffer, Principal Investigator, Colorado State University
Kenneth Jones, Principal Investigator, University of Oklahoma Health Sciences Center
***Jill Poole**, University of Nebraska Medical Center
***Julia Sharp**, Colorado State University
***Zachary Weller**, Colorado State University

For investigator contact information, please visit www.hicaahs.colostate.edu or email HICAHS@colostate.edu.

HICAHS ADVISORY BOARD MEMBERS

Cooperative Extension & Academia

Ragan Adams, Veterinary Extension Specialist, Clinical Science, Colorado State University

Shawn Archibeque, Associate Professor, Animal Sciences, Colorado State University

Keith Belk, Professor, Animal Sciences, Colorado State University

Jeff Edwards, Pesticide Applicator Training Coordinator & State Small Acre/Horticulture Specialist, University of Wyoming Extension

Alvaro Garcia, Professor/Agriculture & Natural Resources Program Director, Dairy and Food Science, South Dakota State University

Paul Gunderson, State University System of North Dakota, *Retired*

Robert Hagevoort, Associate Professor/Dairy Extension Specialist, Animal Sciences and Natural Resources, New Mexico State University

Peter Kolb, Associate Professor/Forestry Extension Specialist, Forest Management, Montana State University

Matt Nonnenmann, Associate Professor, Occupational and Environmental Health, Great Plains Center for Agricultural Health, University of Iowa

Agricultural Producers

Jon Slutsky, Owner, La Luna Dairy

Juan Velez, VP Farm Operations, Aurora Organic Dairy

Agriculture-Related Businesses, Non-Profit Associations, & Faith-Based Organizations

Kevin Dole, Owner, Alpha Technology USA Corp

Jessica Lemmel, Director of Communications, Colorado Livestock Association

Mike Taylor, Chief Safety, Health & Environment Officer, The Church of Jesus Christ of Latter-day Saints: Risk Management Division

Government

Herb Gibson, Area Director, Denver Area Office, Occupational Safety and Health Administration

Insurance & Workers' Compensation

Dan Hair, Senior VP/Chief Underwriting and Safety Officer, Workers Compensation Fund, *Retired*

David Knell, Safety Consultant, Pinnacol Assurance

Brian Schiller, VP/Agribusiness Department, Flood and Peterson

Thank you to Robert Ellis, Olga Reuvekamp Brouwer, and Ed Hendrikson who have concluded their service on the board. Welcome to new member, Bethany Alcauter, Manager of Information Resources, Dissemination, and Evaluation, National Center for Farmworker Health who will begin her service in the upcoming year.