



ANNUAL REPORT

2023-2024

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ANNUAL REPORT

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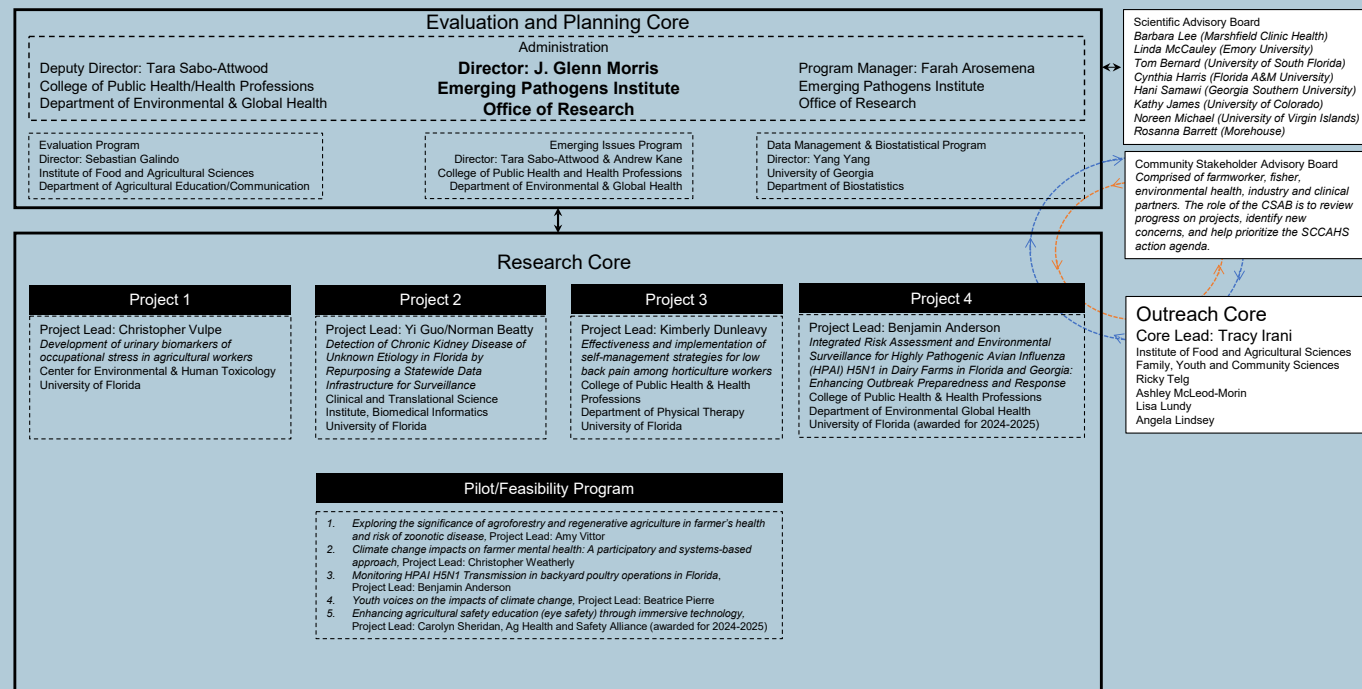
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ACKNOWLEDGMENT

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WHO WE ARE



ABOUT US

We serve our Southeast communities offering a tailored portfolio of research and outreach initiatives.

Center Summary

The Southeastern Coastal Center for Agricultural Health and Safety (SCCAHS) explores and addresses the occupational safety and health needs of people working in agriculture, fishing, and forestry in Alabama, Florida, Georgia, Mississippi, North Carolina, South Carolina, Puerto Rico, and the U.S. Virgin Islands.

The University of Florida is the lead institution of this center, partnering with the University of South Florida (USF), University of Georgia, Florida A&M University (FAMU), Georgia Southern University (GSU), Emory University, University of South Carolina, Morehouse, the University of Colorado, the University of Puerto Rico and the University of the Virgin Islands. These universities are working together on a range of interdisciplinary research and educational projects designed to promote occupational health and safety among the 240,000 farms — estimated by U.S. Department of Agriculture — to be operating in the region, their operators, families, employees, and contractors, as well as those in the forestry and fishery industries.

Our Focus Areas

- Heat stress and related illness
- Pesticide/herbicide exposure
- Musculoskeletal disorders
- Coastal fishery worker safety and health
- Disaster vulnerability of migrant and seasonal farmworkers
- Feasibility of using electronic health records to describe the health of migrant and seasonal farmworkers, inform research and measure impact of interventions.
- Geospatial Analysis of agricultural worker and fisher health: Partnering to map regional clinical indicators and neighborhood environments
- Development and implementation of training programs
- Innovative approaches to foster research to practice

Goals of the Center

1. Provide occupational safety and health education and training to the agriculture, fishing, and forestry workforce.
2. Bring evidence-based, safety and health programs, developed through the other NIOSH-funded agricultural centers into the southeastern coastal region.
3. When appropriate, translate programs into Spanish, and assist in supporting multilingual training efforts throughout the region.
4. Conduct research to practice projects focused on:
 - Evaluating whether safety and education materials produce changes in safety behaviors.
 - Documenting hazards and risks in fishery workers; testing training materials aimed at reducing injuries.
 - Utilizing remote sensing technology to map pesticide uses.
 - Looking at heat stress tolerance.
5. Forecast needed research and applied projects based on needs as they arise.

YEAR 2, 2023-2024 HIGHLIGHTS

HIGHLIGHTS

CSAB Virtual Meeting

Kick-Off Webinar Series

Building Resilience Capacity and Climate Adaptation in the U.S. Caribbean



Associate Professor
Pablo A. Mendez-Lazaro Ph.D
Environmental Health Department, University of Puerto Rico-Medical Sciences Campus



State of the Science

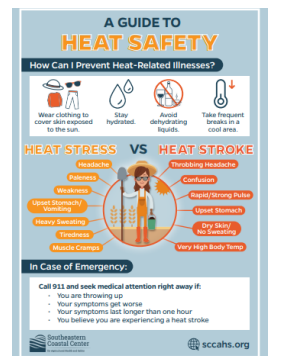
The 2024 SOS Meeting, *Rural Coastal Community Health Science, Policy and the Future*, was held March 19-20, 2024.

Emerging Issues Capstone

Two public health graduate students selected to lead a 12-week capstone project on farmworker housing and waste-water epidemiology. *Wastewater-based Epidemiology as a Tool to Identify Community Exposure to Pesticides in Florida*

Agricultural worker housing and health risk: A case study of Polk County migrant labor camps

Heat Safety Outreach and Safety Site Launched



OCT

NOV

DEC

JAN

FEB

MAR

APR

MAY

JUN

JUL

AUG

SEP

Diversity Supplement

Assessing Exposure to Inhalable Dust among Florida Crop Farmworkers and Developing a Community-Engaged Process for a Regional Air Monitoring Network

New Partner in Fisher Health & Safety

Gulf and Caribbean Fisheries Institute became a SCCAHS partner to help us address the needs of our Southeast regional fishing and aquaculture workers.



Pilot Rapid Funding: Infusion of Funding for H5N1 Research

The 2023 request for pilot applications focuses on climate change impacts on human exposure to address AgFF populations in the Southeast U.S. and Caribbean.

Research Supplement Awardee: H5N1

Benjamin Anderson PhD joins SCCAHS in Year 3 to lead the research project titled, *Integrated Risk Assessment and Environmental Surveillance for Highly Pathogenic Avian Influenza (HPAI) H5N1 in Dairy Farms in Florida and Georgia: Enhancing Outbreak Preparedness and Response.*

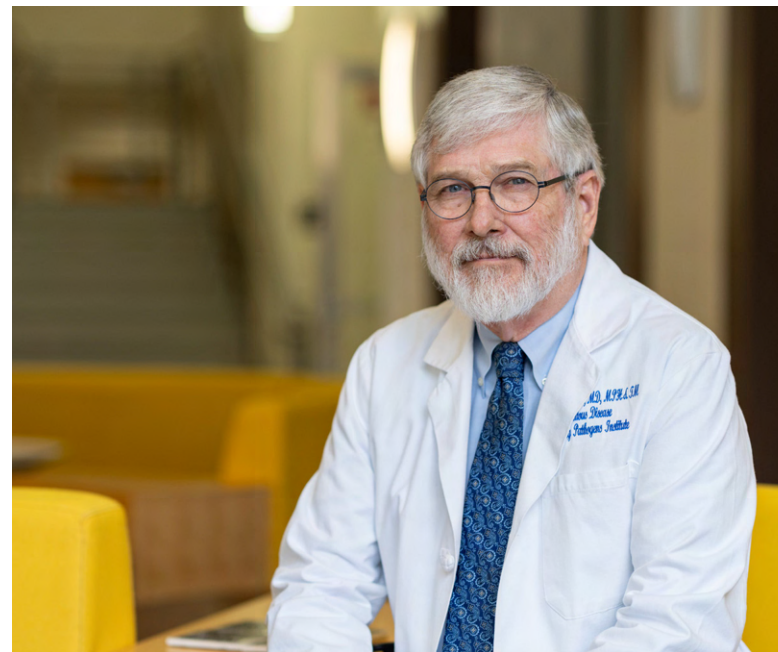


EVALUATION & PLANNING CORE (EPC)

GENERAL OVERVIEW

Led by Dr. J. Glenn Morris, Administration manages the overall activities of the Center to ensure the administrative structure works synergistically to accomplish the following,

- the coordination and integration of the Core Center grant components and activities;
- oversight of the utilization of funds, including funds for pilot and feasibility studies
- support active interaction among the Director, Core leaders, research project Principal Investigators, relevant institutional Division of Sponsored Programs personnel and the CDC/NIOSH Program Officer/Grants Management Specialist.



Dr. J. Glenn Morris, Ag Center Director

Key Accomplishments in 2022-2023

Throughout Year 2, Administration provided project coordination for faculty/staff to manage their programs and research studies – guiding decisions and allocating resources where most strategically needed. The administration component of the Planning and Evaluation Core fulfills many organizational objectives, bringing together internal collaborators, such as biostatisticians, data managers/analysts, evaluation/content area specialists, budget management and information technology, with external collaborators who include study investigators, pilot awardees, and advisory board members.

The roles of data management, analysis, and administration were reviewed during the monthly IOC meetings and bi-quarterly PI-to-PI/Program Director meetings, specifically in monitoring the quality of the data and adherence to study protocols and procedures, standard and ad hoc reporting, and working with biostatisticians to generate analysis data sets as Research Core projects

OVERALL GOALS

Our Center goals include identification of potential hazards and development of new data sources to provide a more comprehensive picture of worker safety/health issues within the southeastern coastal region; the exploration and identification of areas needing further study; and the integration of research findings, culturally-appropriate outreach and training efforts, and new technologies to improve overall worker safety and health, working within a framework that allows us to appropriately document the impact of these improvements.



WE STRIVE TO MOVE FLORIDA AND THE SOUTHEAST REGION FORWARD THROUGH A STRONG COLLABORATIVE SPIRIT AND INNOVATIVE RESOURCES

OBJECTIVES



Administration

- Provide overall Center leadership.
- Provide administrative support services for the Center.
- Coordinate and integrate Center components and activities, and facilitate communication among investigators, staff, and research partners.
- Organize and provide administrative support for the Scientific Advisory Board, Internal Operations Committee, and other committees which may be necessary for Center activities.
- In conjunction with the Evaluation program, establish a formal planning process.
- Provide biostatistics consultation on study design, data management, and data analysis for all research projects.
- Implement strategies and resources to achieve greater diversity among pilot project investigators and community-based partners.



Evaluation

- Engage stakeholders to maintain a responsive and focused evaluation program.
- Collect relevant monitoring and evaluation data from the Center as a whole, its cores, and individual research projects.
- Analyze and interpret data to establish the quality and impact of the center as a whole, its cores, and the individual research projects.
- Report and share evaluation findings and recommendations with key stakeholders.
- Maintain an open line of communication and engagement with the Evaluation Programs of other Ag Centers across the country.



EVALUATION PROGRAM MIXED-METHODS



Improving Quality

The Evaluation Program provides leadership and guidance to connect program activities and goals for strengthened PI evaluation capacity and improved quality measurement.

OBJECTIVE 01

Onboarding of new strategies, initiatives, programs, and research projects. A new planning process began in Year 1. The main tasks were to build a framework that was flexible and adaptable to collect progress data more successfully. Three types of evaluation are currently being deployed. All three evaluation types are being conducted simultaneously across projects.

OBJECTIVE 02

Performance Monitoring

- Ensures accountability for completion of program activities.
- Demonstrates that resources for the program/project/meeting, are used as intended and managed well.
- Monitors and reports on progress toward established specific aims.
- Provides early warning to Center Director of challenges.

OBJECTIVE 03

Process Evaluation

- Are the activities of a program/project/markers?
- Assesses if the program/project/SOS meeting is producing the intended outputs.
- Identifies strengths and weaknesses of the effort.
- Critical for informing revisions/modifications.

OBJECTIVE 04

Outcome Evaluation

- Investigates whether the program/project/SOS meeting achieved the desired outcomes and what made it effective or ineffective.
- Assesses if the program/project/SOS meeting is sustainable and replicable.

MONITORING, EVALUATION, AND LEARNING

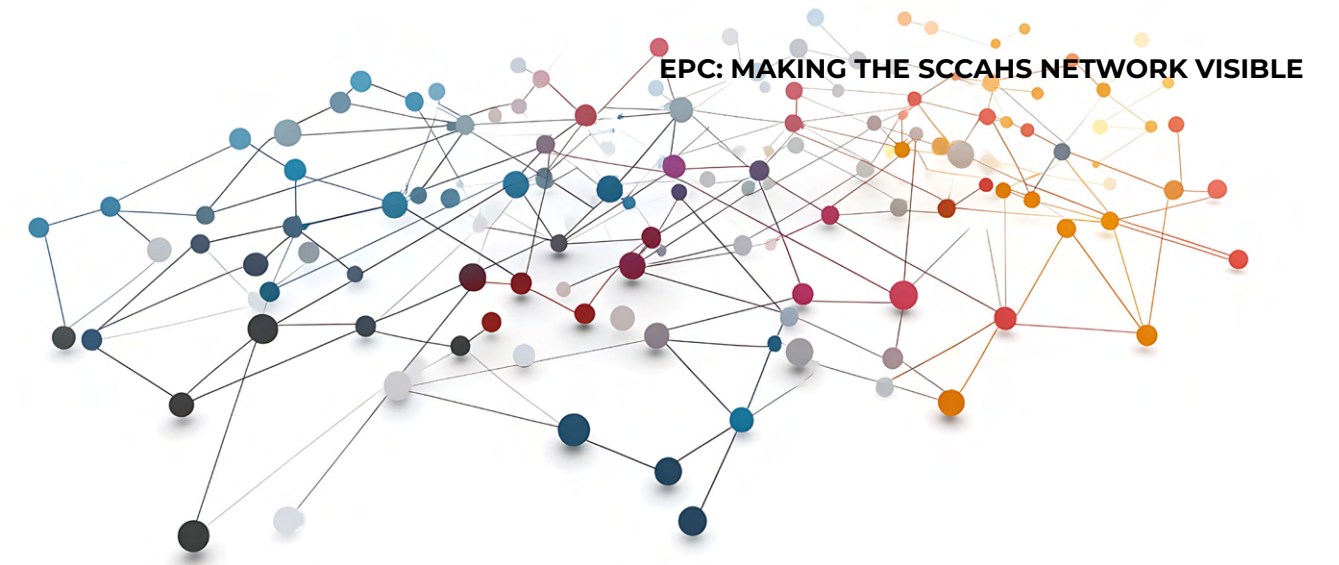
A formal monitoring, evaluation, and learning (MEL) strategy is an interwoven component of SCCAHS. The Evaluation Program provides a framework for longitudinal, center-wide evaluations to assess the processes, outcomes, and impacts of program and core activities; assists the leadership team in developing and implementing evaluation plans/logic models; and provides timely reporting as well as accountability information to the sponsoring agency.

COLLABORATION WITH EXTENSION

The evaluation team has collaborated with the UF/IFAS Program Development and Evaluation Center (PDEC) to explore the quality of the experience of Florida Cooperative Extension's clients. Best practices in culturally responsive evaluation was presented at the 2024 National Association of Extension Program and Staff Development Professionals Annual Conference.

CONTRIBUTION ANALYSIS

During Year 2, the evaluation team conducted work aimed at refining the application of the contribution analysis (CA) method to explore the impacts of projects from the center's first grant cycle (2016-2022); specifically, evaluation focused on projects that addressed heat-related illness (HRI). The preliminary findings show that for HRI, basic and applied research and outreach activities *Arati Joshi presents at ISASH 2024* contributed to the short-term outcomes of enhancing the knowledge of both internal and external stakeholders. The increased understanding of biological processes, as well as social and psychological factors affecting HRI has increased the overall knowledge about risks of occupation hazards. By sharing this knowledge and expertise through trainings, social media communications, meetings, and other channels, the center has increased the knowledge about HRI hazards among different stakeholders.



Ag Center Southeast and U.S. Caribbean Community Network: Evaluating the Strength of the SCCAHS Network

SCCAHS partnered with **Visible Network Labs** to better understand the Southeast and U.S. Caribbean network of organizations that serve the SCCAHS target population and who have worked with SCCAHS to enhance research and outreach. This project was launched to help us learn more about the quality of interactions between academic, Cooperative Extension, industry and community groups in connection with our Ag Center activities.

48 organizations were invited to participate in a social network analysis survey. The survey included a number of questions about the respondents' organizations as well as about the other organizations that the respondents may have a formal or informal relationship with. The network map shows each organization represented as a circle (node). The lines among the nodes represent all relationships that were reported by respondents. Nodes are colored by the organization sectors. The size of the node shows which organizations have the greatest number of connections.

Our next steps will be to look for opportunities to address challenges and barriers:

- Members reported high levels of competition around thought leadership and sponsorship. We will consider how competition in these areas may affect the health of the network.
- Members report that recent policies affect their relationships with others in the network. In particular, with universities, government agencies, and the populations served. These networks may become more isolated in the network overtime.

Network Composition

- **Sectors represented:**
 - Nonprofit (50%)
 - Public (33%)
- **Disciplines represented:**
 - Education (65%)
 - Research & data analytics (46%)
- **Issue Areas:**
 - Agricultural worker occupational safety and health (65%)
 - Development and implementation of training programs (62%)

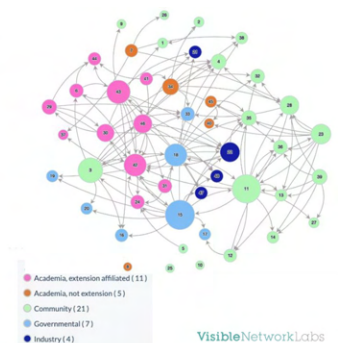


- **Network Structure:**
 - 48 members
 - 123 relationships

Network Structure by Affiliation

Three organizations emerged as key players in the network, indicated by their high number of network connections.

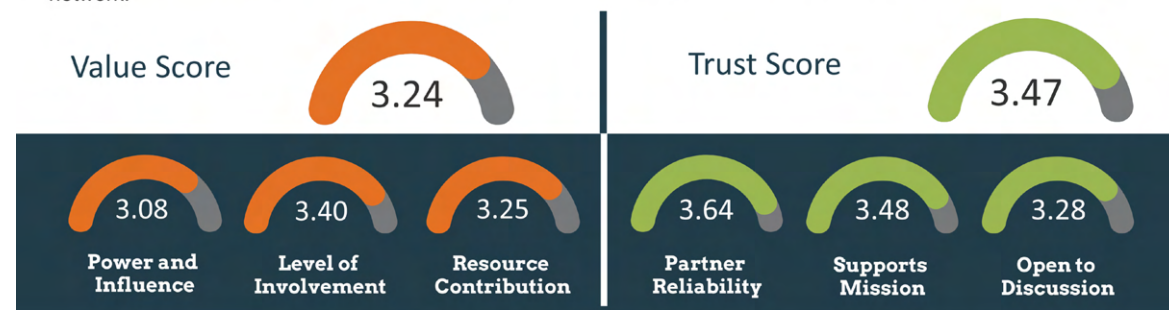
- Florida Department of Agriculture and Consumer Services (Agricultural Environmental Services) (map label 15).
- Farmworker Association of Florida, Inc. (Environmental Justice) (map label 11)
- UF/IFAS Cooperative Extension (map label 42).



Respondents reported **high levels of value** and **very high levels of trust** in their partners. In particular, network partners were perceived as **very reliable**.

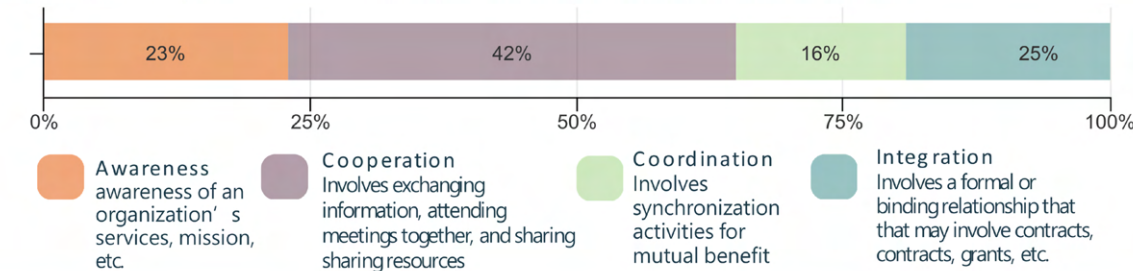
Perceptions of Value and Trust Among Partners

The following charts show the network's average perceptions of partners along three dimensions of value and three dimensions of trust. Survey participants assessed each of their reported relationships on each of the three dimensions of trust/value according to a 4-point scale, with 1 = Not at all, 2 = A small amount, 3 = A fair amount, and 4 = A great deal. Scores over 3 are considered the most positive. Overall, the network has a value score of **3.24 out of 4**. The trust score is **3.47 out of 4**, which is higher than the value score. Perceptions of value and trust are critical to building a network.



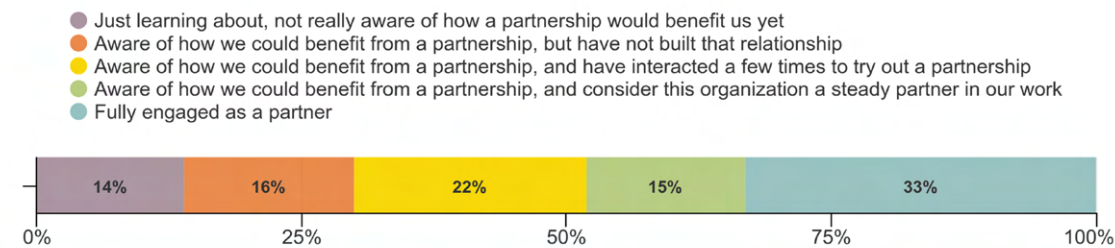
Intensity of Interaction (n=118 relationships)

It is a positive result that connections are distributed across the levels, with the greatest share described as cooperation. As the level increases, the cost of the relationship increases as well, i.e., more resources are needed to sustain the network.



Benefit of Partnerships (n=107 relationships)

When asked to describe each of their relationships, respondents reported that about 33% of their relationships were with those they consider **fully-engaged partners** and 15% were with those they consider **steady partners**.



VisibleNetworkLabs

EMERGING ISSUES PROGRAM

The Emerging Issues Program (EIP) serves to monitor AgFF health and safety issues by scanning literature and media sources, consulting with SCCAHS stakeholders, and attending relevant local, regional and national meetings and conferences.

The Capstone Experience

The Capstone Experience offers an integrative learning experience for public health graduate students to work with community-based organizations and SCCAHS key personnel to complete capstone projects. In Year 2 SCCAHS supported two graduate students to complete projects in wastewater epidemiology and to explore the nexus between health and migrant labor housing conditions.

Project 1: Agricultural worker housing and health risk: A case study of Polk County migrant labor camps, Recquel James, Epidemiology. Although the scientific evidence for the links between housing, neighborhood environment and health has gained traction in recent decades, the implications that housing and area deprivation have on the health of Florida agricultural workers is not well documented. No Florida studies have investigated the nexus between health and migrant labor housing conditions.

This analysis examined Polk County, Florida migrant labor camps and health risk factors through the lens of health disparities and Geographic Information Science (GIS). Using the Florida Department of Health migrant labor camps inspection reports and the U.S. Department of Labor H-2A employer certifications, 282 housing sites were identified. U.S. Census Bureau data and the 2021 national Area Deprivation Index percentile rankings were used to address poverty and neighborhood adversity. GIS was used to map migrant labor camps, sociodemographic variables, and objective measures of the neighborhood environment.

The findings on the associations between housing and health risk is complex. Although housing is a well-established social determinant of health, the causal pathways are poorly understood. This surveillance project is a first step to fill a gap in science and policy focused on agricultural worker housing and neighborhood contextual factors, like ADI, and their independent association with health risk. Property quality and neighborhood disadvantage were analyzed to facilitate a focus on housing as a public health emerging issue requiring intervention. Applying findings within housing policy and practice could mitigate the health risk of a valuable workforce.

Project 2: Wastewater-based epidemiology as a tool to identify community exposure to pesticides in Florida, Stacie Schulman Environmental and Global Health

A comprehensive analysis of pesticide usage in Florida, this study utilized wastewater-based epidemiology to assess potential community exposures, particularly in Immokalee within Collier County. Through investigating pesticide use across counties and their correlations with specific crops, this research explored the implications of pesticide use for environmental and human health.

Glyphosate emerged as the most utilized pesticide both statewide and in Collier County, where oranges and citrus are prominent crops. The pesticide usage analysis identified glyphosate as the most extensively used pesticide statewide, reflecting its widespread application in agricultural practices. A wastewater-based epidemiology approach was applied to analyze glyphosate and its breakdown product, aminomethylphosphonic acid (AMPA), to determine concentrations in Immokalee wastewater influent to providing insights into temporal trends and possible seasonal variations in pesticide usage.

Analysis of wastewater samples demonstrated peak concentrations of glyphosate and AMPA in the September and October of 2022, coinciding with seasonal glyphosate application to crops and seasonal rainfall patterns. These findings contribute to our understanding of glyphosate use throughout the state of Florida and the possible implications for environmental and public health, especially in regions like Immokalee where community concerns, particularly regarding agricultural workers, and pesticide exposure have been documented.



Recquel James, MPH student in Epidemiology, presents her work on a Capstone Project to address emerging issues in our region.



Stacie Schulman MPH student in Health Science in One Health

OUTREACH CORE TRACY IRANI



Dr. Irani, Outreach Core Lead

Knowledge transfer through educational and extension activities, culturally competent communication and stakeholder engagement.



SCCAHS Outreach Core Lead, Tracy Irani (left) presents Dr. Beatrice Pierre with a Distinguished Poster Award.

OVERVIEW

The work of the Outreach Core is vital to understanding the burden and addressing the needs of agricultural health and safety in the Southeast coastal region. The Outreach Core prioritizes Center-developed research projects and pilot projects to ensure that the messages tested, materials produced, and collaborations fostered are inclusive of issues unique to the Southeast coastal region and include underrepresented and vulnerable subpopulations. Effective and efficient strategies and tools are shared with project leads and stakeholders and, based on their input, science communication strategies will be evaluated and adapted where possible. The Outreach Core's ongoing work includes continued partnership with the Center's Community Stakeholder Advisory Board (CSAB), which is comprised of relevant intermediaries in agriculture and public health, and will continue to be a significant research to practice (r2p) mechanism designed to engage stakeholders, communicate research findings, and review and evaluate interventions and materials.

OUR PURPOSE

The purpose of the Outreach Core is to develop, disseminate, and evaluate evidence-based, innovative and culturally effective educational and communications approaches and materials to proactively address health and safety issues in the Southeastern coastal area's agriculture, forestry, and fishing (AgFF) sectors. The Outreach Core pushes the needle of research-to-practice (r2p) impact toward greater success in reducing workers' exposure, mortality, and morbidity caused by the work environment and associated unsafe or unhealthy practices. The plan for the Outreach Core is always comprehensive in nature, providing knowledge transfer support for the proposed research projects, integration with priority educational and extension activities, and effective and inclusive communication and information dissemination to stakeholders across the Center's six-state and two U.S. territory coverage area.

OUTREACH CORE

STATE OF THE SCIENCE MEETING

In a bid to tackle the unique challenges faced by rural communities, the Southeastern Coastal Center for Agricultural Health and Safety recently hosted its 6th annual State of the Science meeting. The event, which brought together esteemed professionals and early investigators, shed light on the pressing issues surrounding rural healthcare policy while showcasing innovative research aimed at improving the well-being of agricultural workers and rural communities.

Kicking off the agenda was Mark Holmes, Director & Professor at the Cecil G. Sheps Center for Health Services Research, University of North Carolina. Holmes delved into the intricate web of challenges and opportunities in rural healthcare, setting the stage for a series of insightful discussions.

John Diaz, Associate Professor of Agricultural Education and Communication at the University of Florida, highlighted the critical issue of rural healthcare access for agricultural workers, particularly migrant farmworkers. His presentation underscored the importance of bridging the gap between healthcare services and those working in agriculture, a vital yet often overlooked demographic.

David Buys, Associate Professor at the Department of Food Science, Nutrition, and Health Promotion, Mississippi State University, explored the synergies between Cooperative Extension and public health. Buys advocated for a collaborative approach that integrates these sectors to foster holistic solutions to rural healthcare challenges.

Hollie Cost, Vice President for University Outreach & Public Service at Auburn University, delved into the concept of reinventing rural reality as she share about Auburn University's Rural Health Initiative. Cost's presentation highlighted the transformative power of community engagement in cultivating health and vitality in rural areas and how her team is bring health solutions to rural Alabama with the help of the OnMed Care Station.

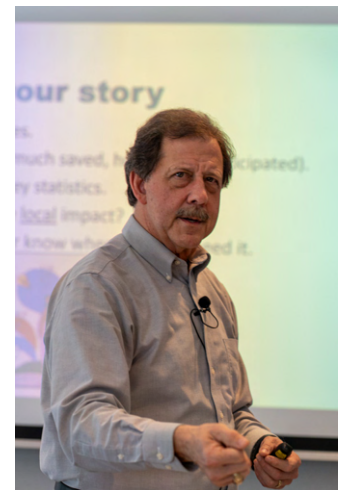
A policy communication panel discussion moderated by Lisa Lundy, Professor of Agricultural Education and Communication at the University of Florida, provided a platform for experts to exchange ideas and insights on policy implications for rural healthcare initiatives. The panel, featuring distinguished speakers including Katie Vanlandingham, Michael Dukes, and Ricky Telg, offered valuable perspectives on navigating the intersection of policy, health, and agriculture. Telg and Lundy also delivered a policy communication training where participants received a certification badge.

The State of the Science meeting also featured a poster session showcasing innovative research from early investigators from a variety of disciplines, including agricultural sciences, engineering, and public health.

Recognizing the outstanding contributions, awards were presented to the top posters.

Second runner up research poster – **Systematic Analysis for Design of Instructional Videos for Self-Management of Low Back Pain in Horticulture** | Kim Dunleavy, Jason Beneciuk, Janeen Blythe, Kelly Gurka, Boyi Hu, and Heidi Raduovich

First runner up research poster – **Exploring Perception of Socioeconomic Status (SES) among Haitian Farmworker Youths: A Qualitative Examination of Determinants and Implications** | Beatrice Fenelon Pierre, Tracy Irani, Jennifer Doty, Kate Fogarty, Sebastien Galindo, and LaToya O'Neal



Outreach Core leaders, (top to bottom) Ashley McLeod-Morin, Ricky Telg, Angie Lindsey

OUTREACH CORE

Outstanding research poster – **Bite Back: Navigating Social and Behavioral Frontiers in Tick-Bite Disease Prevention**
Cheng-Xian Yang and Lauri M. Baker

The State of the Science meeting served as a catalyst for meaningful discussions and collaborative efforts aimed at advancing rural healthcare. By harnessing the collective expertise of professionals and researchers, the event offered promising insights and solutions to address the healthcare needs of rural communities. As we look towards the future, it is imperative to continue fostering interdisciplinary collaboration and innovation to create positive change in rural health and well-being.



2024 SOS presenters

Webinar Schedule

Building resilience capacity and climate adaptation in the U.S. Caribbean, Pablo Mendez-Lazaro – October 25, 2023

The state of knowledge regarding climate change and variability impacts on adaptation options for Florida agriculture, forestry and rangelands, Steven McNulty – November 15, 2023

Images of Recovery: An interactive webinar and discussion on community recovery following Hurricanes Ian and Idalia, Angela Lindsey – February 15, 2024

Cultivating Safety and Wellbeing for Children and Youth in Agriculture, Barbara Lee – February 21, 2024

Advancing Agricultural Health and Safety: Insights from the NC Agromedicine Institute, Alyssa Spence and McKayla Robinette – April 17, 2024

Enhancing Pesticide Safety Through 360° Videos in the Gear Up for Ag! Program, OP McCubbins – May 15, 2024

Effectiveness and Implementation of Pain Self-Management for Horticulture Workers, Kim Dunleavy and Janeen Blythe – June 4, 2024

Detection of Chronic Kidney Disease of Unknown Etiology in Florida, Norman Beatty and John Diaz – July 17, 2024



Pablo Mendez-Lazaro



Angela Lindsey



Stephen McNulty



OP McCubbins



John Diaz



Alyssa Spence

OUTREACH CORE

NEXT STEPS

Next steps include publishing recommendations related to the public opinion survey, begin planning the 2024 State of the Science meeting, and develop outreach related to newly funded projects related to the Center (Dunleavy and pilot projects). The Outreach Core will also continue several initiatives including the center's membership and social media as well as completing a portfolio of educational materials on heat safety for at-risk communities.

A GUIDE TO HEAT SAFETY

How Can I Prevent Heat-Related Illnesses?

- Wear clothing to cover skin exposed to the sun.
- Stay hydrated.
- Avoid dehydrating liquids.
- Take frequent breaks in a cool area.

HEAT STRESS VS HEAT STROKE

HEAT STRESS: Headache, Paleness, Weakness, Upset Stomach/Vomiting, Heavy Sweating, Tiredness, Muscle Cramps.

HEAT STROKE: Throbbing Headache, Confusion, Rapid/Strong Pulse, Upset Stomach, Dry Skin/No Sweating, Very High Body Temp.

In Case of Emergency:

Call 911 and seek medical attention right away if:

- You are throwing up
- Your symptoms get worse
- Your symptoms last longer than one hour
- You believe you are experiencing a heat stroke

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GUÍA INFORMATIVA SOBRE EL CALOR

¿Cómo Se Puede Prevenir las Enfermedades por Calor?

- Use sombrero y ropa ligera de colores claros.
- Tome agua aunque no tenga sed.
- Evitar los líquidos deshidratantes.
- Descanse frecuentemente en la sombra.

AGOTAMIENTO O INSOLACIÓN

AGOTAMIENTO: Dolor de cabeza, Palidez, Debilidad, Náuseas y vómitos, Mucho sudor, Mareos, Calambres.

INSOLACIÓN: Dolor de cabeza intenso, Desorientación y desmayos, Pulso rápido, Náuseas y vómitos, Piel caliente y seca, Temperatura alta.

En Caso de Emergencia:

Llame al 911 de inmediato si:

- Estas vomitando
- Sus síntomas empeoran
- Sus síntomas duran más de una hora
- Cree que está experimentando una insolación

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FARMER MENTAL HEALTH NARRATIVES:

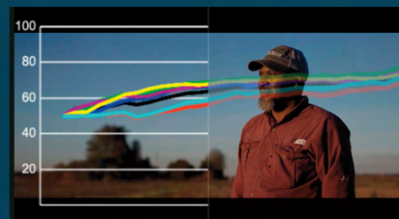
A moment-to-moment online dial testing study investigating two video approaches

Lisa K. Lundy, Ashley McLeod-Morin, David R. Buys, Tracy A. Irani, Ricky W. Telg, Angie B. Lindsey & Philip Stokes
University of Florida & Mississippi State University

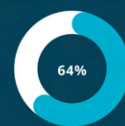


INTRODUCTION

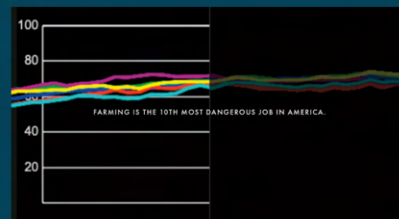
Suicide is the 10th-leading cause of death in the United States and research shows that suicide rates are higher in rural areas, as compared to urban areas, with those in the farming, fishing, and forestry occupation having the third-highest suicide rate of any occupation (Fiske, 2005; Suicide rising across the U.S., 2018; Levin, 2005). Fisher's Narrative Paradigm (Fisher, 1985) highlights the role of humans as storytellers. Mississippi State University Extension Service employed this narrative approach in developing the documentary "On the Farm," featuring growers' stories and highlighting resources and organizations that help farmers in crisis.



NARRATIVE APPROACH



PREFERRED BY WOMEN



TEXT-BASED APPROACH



PREFERRED BY MEN

METHODOLOGY

In this study, participants in a national sample (N=126) watched two documentary trailers. One trailer took a narrative/storytelling approach. The other took an informational approach. While watching the videos, they were asked to rate them on a second-by-second basis, raising their rating when they were interested in the video content and lowering their rating when they were not interested in the video content.

RESULTS/FINDINGS

Urban participants responded most positively to the message, while suburban participants responded least positively. Overall, the narrative approach was preferred to the text-based approach by rural, suburban and urban participants. Female participants also preferred the narrative approach, while slightly more male participants preferred the text-based approach.

CONCLUSION

Based on the results of this study, researchers recommend taking a narrative approach while incorporating captions and text-based elements in video messages. This will allow for a broad appeal that engages while informing audiences. Agricultural communicators should continue to be mindful of the imagery used.

Related literature

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RESEARCH CORE

KIMBERLY DUNLEAVY

EFFECTIVENESS AND IMPLEMENTATION OF SELF-MANAGEMENT STRATEGIES FOR LOW BACK PAIN IN HORTICULTURE WORKERS

OVERVIEW

Low back pain is the most frequent disabling musculoskeletal disorder among agriculture, and more specifically horticulture workers, affecting health, productivity, and workforce availability. There is very limited information on effective management and prevention interventions for musculoskeletal pain in these highly demanding occupations. Moreover, the extent of pain-related opioid use among horticulture workers in Florida identified in a SCCHAS pilot feasibility study⁵ increases the urgency to identify effective interventions to reduce high impact chronic pain and decrease use of opioids.

Given these gaps, as well as major public health implications, pragmatic interventions specifically designed to meet the unique needs of nursery and landscape small teams are needed. Self-management interventions that aim to equip workers with skills that allow them to actively take responsibility for managing persistent conditions such as back pain inherent with physically demanding work so they can function optimally and reduce overall risk are an important target consistent with Healthy People 2030 goals.⁶⁻⁸ Building from another SCCHAS pilot feasibility study where self-management interventions showed promise for similar work requirements in clam aquaculture the goal of our study is to examine the effectiveness and implementation of two variations of self-management interventions among nursery and landscape workers.

ACCOMPLISHMENTS

Aim 1: To determine if self-management combined with individualized guided participatory ergonomic choices, is more effective than self-management alone for improving LBP management among horticulture workers. We will compare changes in work-task pain and disability between intervention groups as the primary outcome. Secondary

outcomes include: 1) high impact chronic pain as defined by the National Pain Strategy, 2) medication and substance use, 3) and pain-related psychological factors.

Phase I Preparation and Video Creation

The study methods required early preparatory work to identify evidence for self-management and ergonomic strategies, in-depth interviews with stakeholders including owners, supervisors, workers, industry experts, and insurance representatives (n=15) and observations and video collection in the field. Interviews were conducted in both English and Spanish. Following a detailed assessment and instructional design planning process, scripts were developed, video clips filmed, and content reviewed for literacy, suitability, and ease of understanding with multiple rounds of iterative changes. A list of the most difficult work tasks in both nursery and landscape work and a list of possible strategies was refined from feedback. Some of the key areas of the design were content that introduced the importance of self-management and empowered workers to select non-pharmacological options along with introductory content on opioid and other medication risks. The audience characteristics were considered throughout by using less complex vocabulary, limited text in the videos, clips filmed in the workplace representing a diverse audience, and actionable information delivered in short 5-minute modules. Motivation to implement changes was centered around the need to be able to work for family and income generation for as long as possible.

The design, creation, and editing of English and Spanish videos was completed in June 2024 after comprehensive formative evaluation. The video modules were reviewed by workers, owners, and stakeholders (n=34) for both the English and Spanish versions. The English versions were adjusted first to

ACCOMPLISHMENTS (CONTINUED)

address feedback with additional video clips added for nursery tasks and different work settings, and more exercise details were added. Some terms were adjusted for ease of understanding and consistency, as well as to simplify the translation. The videos were edited for consistency and organized to help with simplifying and separating concepts.

Professional narrators were used to complete the final versions in English and Spanish. Stakeholder feedback was very positive with comments such as: "This is not your typical safety video", "I think my workers will pay attention to this", "I think people will learn something new from this", and "good pace, good info, really impressive." During the review process one of the key findings was a gap in understanding of what medications are considered opioids, why it is important to know if a medication is an opioid, and the potential for addiction. This was particularly evident in Spanish speaking workers, but also noted in English speaking workers. An infographic was created to provide additional information along with handouts to support the content for the other videos. In addition, we will use two forms of support for understanding and implementation; text-based reminders programmed using the Mosio text platform, and video reviews of the most difficult work activities to enable workers to review and select ergonomic modifications they feel would help with reducing overall work-related stress in the repetitive or high load tasks.

Phase 2 Enrollment for Intervention

We are currently enrolling companies who are prepared to allow their workers to participate with all processes implemented at the work sites. We have been very fortunate to have the support of the Florida Nursery Growers and Landscaping Association who have assisted throughout with announcements in newsletters and provided opportunities to present at chapter meetings, and state tradeshow. We will have enrolled 3 companies by the end of September and anticipate another 3 to 5 companies starting in October to December. We aim to enroll 30-40 workers in the next year with anticipated completion in 2027.

Aim 2: To identify the contextual factors that impact engagement, adoption, effectiveness, and implementation of non-opioid alternatives for LBP self-management. We will use qualitative methods to examine barriers and facilitators overall and among 1) participants with different levels of pain severity and persistence and, and 2) workers in the nursery and

landscape sectors. Understanding the external context, and individual and team characteristics will help explain results, and inform translation.

Goals and Importance of the Study

We anticipate that both self-management interventions will result in reductions in work task pain and disability and that the video + multimodal personalized support will result in greater reductions than the video modules alone. If self-management is effective, mitigating pain positively impacts quality of life, productivity, and retention, while increasing use of non-pharmacological alternatives to opioids addresses an important public health issue. Implementation aims will help inform reasons for results, barriers and facilitators, and potential for similar interventions in these and similar industries with physically challenging outdoor work.



Location: Big Trees Landscaping and Tropic Traditions Nursery companies
Media: @UFPHP IT media team

RESEARCH CORE

CHRISTOPHER VULPE

DEVELOPMENT OF URINARY BIOMARKERS OF OCCUPATIONAL STRESS IN AGRICULTURAL WORKERS

OVERVIEW

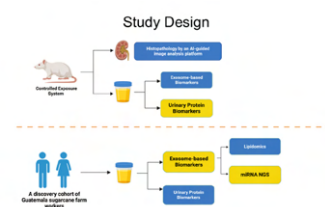
Extreme weather events across the US and the globe in 2023 – including soaring temperatures during summer and harvest seasons – represent an increasing concern for sustainable agriculture. Heat and humidity pose significant health risks to the agricultural workers that make our continued agricultural prosperity possible. Combined with other occupational stressors such as exposure to agricultural chemicals, agricultural workers are increasingly at risk of occupational related diseases.

In addition to the documented immediate effects of heat stress on worker capacity and productivity, chronic effects of recurring heat and other occupational stressors are being increasingly recognized in agricultural workers, including Southeastern US. In particular, kidney disease in young agricultural workers not attributable to the usual causes, such as diabetes, is being identified at alarming rates. Kidney disease in agricultural workers can be particularly insidious and strike down otherwise healthy men and women with little outward signs of disease until kidney failure has progressed beyond the point of return. The form of kidney disease being increasingly recognized in agricultural workers has been

designated Chronic Kidney Disease of unknown etiology, or CKDu. As the name implies, the cause or causes, remain uncertain but existing evidence suggests that recurring heat and humidity related physiological stress plays a pivotal role. As not all workers exposed to similar conditions develop the disease, other factors, as of yet clearly identified, likely play a crucial role in the development of the disease. Our project is exploring the possibility that exposure to agricultural chemicals, such as the herbicides glyphosate, paraquat and 2,4 D, could be contributing to the risk of developing kidney disease in agricultural workers. A long term goal is identify the causes of CKDu which could allow development of effective preventative interventions, early diagnosis prior to the onset of clinical symptoms, and development of therapeutics.

We are using both experimental and epidemiological studies to investigate the role of heat stress and agricultural chemicals in contributing to kidney disease in agricultural workers. Experimentally, we have developed a unique animal model for controlled studies of the role of heat/humidity and agricultural stressors in the development of kidney disease. We are using this system to systematically assess the role of each stressor alone or combination on

kidney health. Epidemiological studies in agricultural workers at risk of developing CKDu are exploring the application of new urine-based tests of kidney damage associated with exposure to heat stress and/or agricultural chemicals. Our hope is that we can identify a set of urine tests that could allow pre-symptomatic screening for CKDu in agricultural workers to detect the disease early and allow for appropriate intervention.



ACCOMPLISHMENTS

We continue our integrated efforts to help understand the causes of CKDu, enable early diagnosis, and prevent progression of the disease. We continued our use of a controlled heat and agricultural exposure in an animal model to evaluate potential causes of CKDu as well as assessing the early stages of disease. In order to evaluate the effects of these stressors on kidney function, we continue to develop two key and innovative approaches to evaluate kidney damage and disease. The first, artificial intelligence (AI) assisted kidney

ACCOMPLISHMENTS (CONTINUED)

histology (microscopic anatomy of the kidney) based approaches to look for the effects of heat and agricultural chemicals on the kidney over time. The second is the development and testing of combinations of urinary biomarkers (indicators of kidney disease measurable in urine) to enable pre-symptomatic identification of CKDu.

Aim. 1.

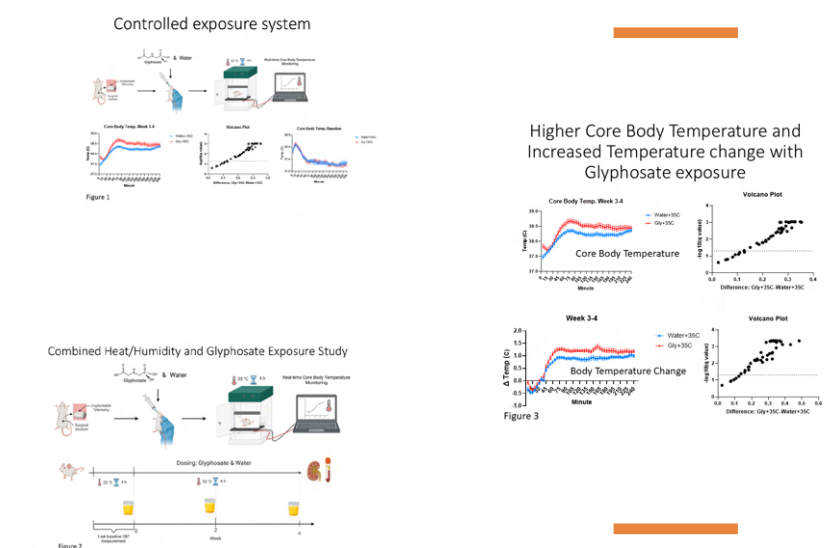
We have established a controlled exposure system to mimic the temperature, humidity and internal core body temperature changes experienced by farmworkers in the field. (Figure 1) We are using the well characterized animal model, the rat, to carry out controlled studies investigating the potential role of heat/humidity or herbicides alone, or together in development of chronic kidney disease of unknown etiology.

We previously evaluated the effects of chronic exposure to individual stressors alone, heat or pesticide exposure, on the kidney in pattern designed to be similar to that experienced by farmworkers. Chronic intermittent heat/humidity exposure (8 hrs/day for 5 days a week, for up to 8 weeks) was evaluated for adverse effects by combination of real time assessment of core body temperature during the entire exposure period, direct kidney histopathology and measurement of biomarkers of kidney damage in urine. Similarly, in chronic, intermittent exposure to glyphosate and paraquat, adverse effects were assessed, with a particular focus on effects on kidney through a combination of kidney histopathology analysis and urinary biomarkers, described below.

In this year, we began evaluation of

combinations of heat and herbicide exposures on kidney function in the controlled exposure system (Figure 2). Preliminary results found an unexpected effect of glyphosate exposure on the observed increase in body temperature associated with heat/humidity exposure. Previous work documented heat and humidity conditions that resulted in an average of 1°C increase in core body temperature. Co-exposure to glyphosate as well as heat/humidity appears to increase the core body temperature as compared to animals exposed to heat/humidity alone. In a four-week exposure trial (4 hrs/day of increased heat/humidity for 5 days a week) and glyphosate co-exposure increased core body temperature in the last two weeks by approximately 1.5°C during the 4 hr exposure period as compared to 1°C in the heat alone (Figure 3). Such

a change in core body temperature was not anticipated and chronic increased core body temperature in hot/humid conditions could contribute to increased kidney stress. Further work will need to be done to confirm these findings and assess the effects on the kidney. We have developed novel AI histopathology analysis tools for assessing the effects of heat and agricultural chemicals on the kidney. We are continuing to assess the effects on the kidney using AI assisted histopathology tools for analysis of any structural changes in kidney. One of the major challenges in histology studies of kidney disease is identifying the early signs of kidney damage. We are therefore developed custom AI guided histology approaches to automatically identify kidney regions and key structural and functional features of kidney, such



ACCOMPLISHMENTS (CONTINUED)

as the glomerulus, and assess them, qualitatively and quantitatively, for any abnormalities. These automated AI tools, trained by our histopathology team, are enabling comprehensive assessment of specific features in our kidney histopathology studies. This approach could allow for the identification of subtle histologic alterations in the kidney attributable to the individual stressors.

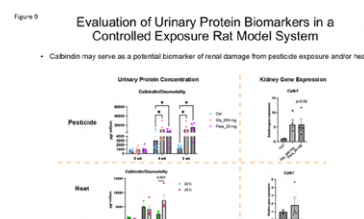
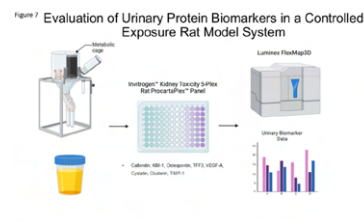
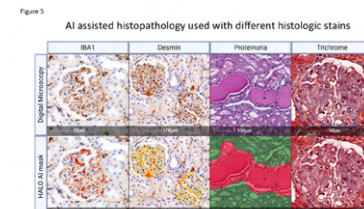
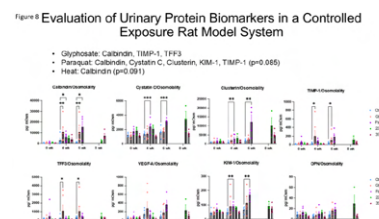
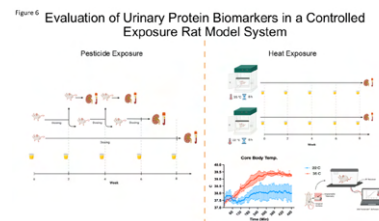
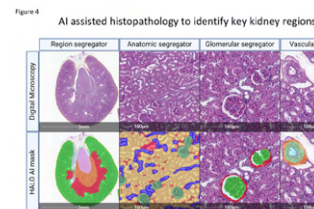
We have completed expert training of these AI tools to identify different structural features of the kidney from tissue sections stained with a set of commonly used histology stains. These AI tools demonstrate a remarkable capability to identify key kidney regions (see Figure 4) using a variety of different histologic stains (Figure 5). Similarly, specific key structural features can be automatically identified in specific regions across an entire stained tissue section, precise measurements made, and data gathered and collated on thousands of individual features. Such quantitative data is enabling more robust assessment of subtle differences between tissues samples, to identify early indications of disease, than was possible with manual assessment of tissue sections. In addition to the development of new AI tools to identify structural differences, we must also develop statistical approaches for analysis of the large data sets generated by these methods which were not previously associated with histologic data. We are working with Center Bio-statistician, Dr. Yang Yang, to evaluate the appropriate statistical tools for analysis of these data sets.

We are evaluating urine based diagnostic tests to detect early stages of CKDu.

RESEARCH CORE: VULPE

Currently available clinical tests for detection of CKDu are insensitive, they don't detect kidney damage and disease until late in the progression of the disease, non-specific, they don't distinguish between CKDu and other causes of kidney disease, and may require blood samples, which are often not readily available from agricultural workers. Diagnostic approaches based on biomarkers of kidney disease in easily accessible urine samples could overcome these limitations. These biomarkers are simply measurable components that injured or stressed kidney cells release into the urine including specific proteins and small lipid encapsulated extracellular

vesicles (EVs) which can reflect the state (stressed or not) of cell from which they came. Our goal is to identify individual biomarkers or combinations of biomarkers correlated with or predictive of kidney damage. A controlled exposure system enables the systematic analysis of measured urinary biomarkers and kidney damage as evidence by histology. We measured different potential biomarkers in the urine samples from the controlled exposure studies (Figure 6 and 7). Initial results identified several previously characterized urinary protein biomarkers which were elevated after exposure to glyphosate (Calbindin, TIMP-1, and TFF3), paraquat (Calbindin,



ACCOMPLISHMENTS (CONTINUED)

Cystatin C, Clusterin, KIM-1, and TIMP-1), or heat alone (Calbindin) (see Figure 8). Interestingly Urinary Calbindin appears to increase in all three conditions (Figure 9). Calbindin is expressed in renal tissue in the distal tubules and early portions of the collecting ducts and increased urinary levels could be reflective of damage in these regions of the kidney. We measured gene expression of Calbindin in the kidney of the exposed animals and showed a similar increase, potentially compensatory, in the kidney. Together these studies suggest that both common and unique urinary biomarkers are associated with heat, paraquat and glyphosate exposure. Similarly, they suggest potential kidney regions to focus on in our histological analysis. We will compare these biomarker results to similar urinary biomarker studies in agricultural workers to see if there are elevated protein biomarkers in common with the controlled exposure studies which could suggest similar stressors are involved.

Aim 2.

Biomarkers of renal health in Agricultural Workers. We are continuing our analysis of existing samples from two longitudinal studies of renal health in agricultural workers at risk for developing CKDu in an effort to identify indicators of early-stage disease to enable more effective occupational and therapeutic interventions. We are evaluating both existing urinary protein biomarkers as well as developing novel extracellular vesicle based biomarkers of kidney disease.

We carried out an initial study of urine samples from a longitudinal study of adult male sugarcane field workers in

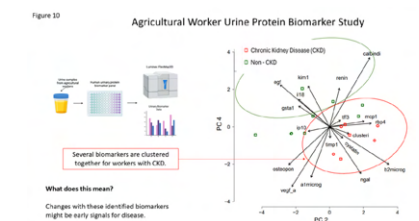
Southwest Guatemala from November 2016 to April 2017 (harvest season). 105 male workers, randomly recruited, were evaluated and biological samples gathered at three time points (Feb, Mar, Apr) during the harvest. We divided the workers into two primary categories based on existing measures of kidney function including estimated glomerular filtration rate (eGFR) into those workers with reduced kidney function (RKF) and those with no evidence of reduced kidney function (control). Previously stored urine samples collected during the last study time point in April from a subset of workers were analyzed for 21 kidney biomarkers using a custom human kidney biomarker magnetic Luminox Performance Assay. Our goal was to try and identify existing urinary protein biomarkers associated with chronic kidney disease in agricultural workers. While no one individual biomarker differentiated between chronic kidney disease (CKD) and no CKD in this population, multi-variate analysis of the biomarker data identified a clear separation between CKD and no CKD (Figure 10). These results are consistent with a specific set of protein biomarkers detected in the urine as being associated with CKD. While we are analyzing previously identified protein biomarkers that have proven useful in other forms of kidney disease, we are also attempting to identify potentially novel biomarkers based on extracellular vesicles (EVs) found in urine. EVs have been isolated from the urine samples and analysis of their unique lipid content (lipidomics) and their nucleic acid cargo (miRNA) was undertaken. Isolation and direct sequencing of miRNA from isolated EVs found dramatic changes in two miRNAs – hsa-miR-30a-5- and hsa-miR-10a-

RESEARCH CORE: VULPE

5p, post shift in individuals with RKF as compared to those individuals without RKF (Figure 11). Interestingly changes in expression of both of these miRNA have been previously associated with different forms of kidney disease and their association with post-shift changes in individuals with CKD could provide a novel non-invasive approach to detect individuals with incipient CKD. Lipidomics here (Figure 12)

These studies suggest that the combination of existing and novel biomarkers could enable more effective clinical screening tools for identification of CKDu in at risk farmworkers.

375 urine samples from 105 individuals are from pre-harvest (baseline), and pre- and post-shift samples in the last month of harvest. We will carry out protein biomarker and EV analysis of these samples to assess if the biomarkers findings noted in the previous smaller sample set are validated.



NEXT STEPS

In the controlled exposure studies, we will continue to further investigate the combined effects of heat/humidity and pesticide exposure. Additional studies will focus on further evaluating the unexpected effect of combined glyphosate and heat/humidity on core body temperature. We will continue analysis of existing kidney tissue and new tissue samples with AI assisted histopathology analysis approaches that we have developed in an effort to identify early structural changes associated with these exposures. Similarly, we will continue the urine biomarker studies to identify early biomarkers of kidney damage associated with heat and/or agricultural chemical exposures.

In the human studies, urine samples from a second, larger cohort of male agricultural workers from next harvest year (2017-2018) in the same region of Guatemala were selected for analysis.

RESEARCH CORE

YI GUO/NORMAN BEATTY
DETECTION OF CHRONIC KIDNEY DISEASE OF UNKNOWN
ETIOLOGY IN FLORIDA BY REPURPOSING A STATEWIDE DATA
INFRASTRUCTURE FOR SURVEILLANCE

OVERVIEW

This study will test the hypothesis that chronic kidney disease of undetermined etiology (CKDu), Also known as Meso-american Nephropathy or MEN, exists among migrant farmworkers in the state of Florida. There is circumstantial support for this hypothesis: prior research has detected acute kidney injury (AKI) in this population, and repetitive AKI is believed to be the etiological process behind CKDu. We will test our hypothesis using the existing, extensive data infrastructure of the OneFlorida+ Clinical Research Consortium, which is one of nine Clinical Research Networks in the National Patient Centered Clinical Research Network (PCORnet). The OneFlorida+ Data Trust comprises electronic health record (EHR) data from ten health systems that geographically cover the entire state of Florida, statewide Medicaid claims data, and a growing Medicare claims dataset. The Data Trust has been used for surveillance of both infectious and chronic diseases in the past including current uses for type 1 diabetes mellitus and COVID-19, increasing confidence that our surveillance for CKDu in this dataset will yield strong results. We will augment this dataset by selecting two community and migrant health centers (CMHCs) in collaboration and partnership with the leadership of the Southeastern Coastal Center for Agricultural Health and Safety (SCCAHS). The primary decision criterion will be proximity of the CMHC to our target population of migrant farmworkers, with also a goal of incorporating occupation data. We have verified that our current list of 10 candidate CHMCs (developed in conjunction with SCCAHS leadership) already collect structured, coded occupation data, and we have done preliminary queries demonstrating both our ability to use the occupation data and the existence of migrant farmworker populations at these CMHCs. We will then add the CMHCs and their EHRs as partners and data sources in OneFlorida+ and its Data Trust, respectively. We will harmonize the occupation data into the common data models used in the Data Trust. Our

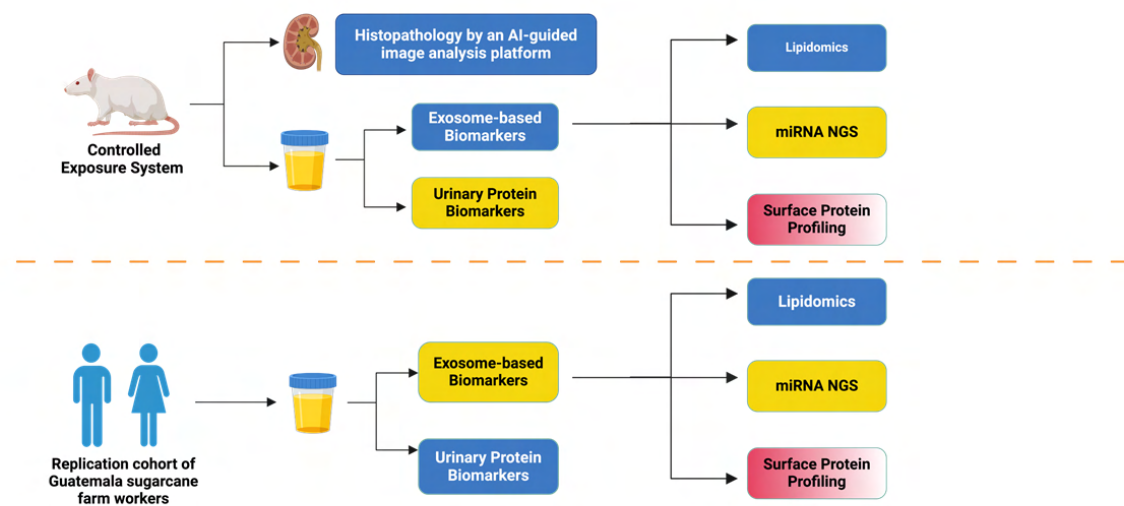
data analyses will look at all OneFlorida+ as well as the migrant farmworker population identified in the two CMHCs that join OneFlorida+. We will develop and validate a computable phenotype for CKDu, apply it to our data analyses, and generate matched control populations. We will conduct geospatial analysis to identify clusters of CKDu both generally and in patients who are known migrant farmworkers. Through chart review, we will validate the computable phenotypes as well as verify our main results in followup. We will assess the proximity of any such clusters identified to agricultural operations in Florida known to the SCCAHS. We will disseminate our results to SCCAHS stakeholders, to the broader agricultural center research community, to funding agencies, and to the relevant communities in Florida.

OUR PURPOSE

Although CKDu has not been documented in the U.S., AKI associated with heat stress among agricultural workers has in Florida and California. Initial studies of this AKI show associations with dehydration and elevated inflammatory markers. This evidence, in combination with the hypothesized role of AKI and inflammation in the development of CKDu, suggests that CKDu might be occurring in these regions. In addition, as climate warming increases global temperatures, the potential exists either for CKDu to appear in these regions (if not present already) or for the existing incidence and prevalence of CKDu to increase. Taken together, these considerations motivate an urgent need for surveillance of agricultural workers for CKDu. The study will improve a statewide infrastructure that includes EHR and administrative claims data to assess the incidence and prevalence of CKDu in Florida. The overall goals are to create a component of the data infrastructure that is focused on agricultural worker surveillance and then to use that component to study CKDu.

Figure 13

Future Directions



DIVERSITY SUPPLEMENT

ACCOMPLISHMENTS

Aim 1. This aim focuses on the development, testing, and refinement of the CKDu computable phenotype and its use to conduct geospatial hotspot analyses of CKDu incidence/prevalence rates in Florida. During Year 2 we created a first draft of our CKDu phenotype. This phenotype was run against a 10% sample of the CKD population of UF Health patients.



Dr. Norman Beaty, Live Oak, FL monthly clinic

We currently have a data request out for a dataset of the entire CKD population of UF Health (structured EHR and clinical notes) against which we will run our phenotype and perform chart review to validate and refine our phenotype. Additionally we have a data request submitted for a dataset of the entire CKD population of OneFlorida+ (structured EHR only) against which we will run our phenotype to produce the initial incidence/prevalence rates. These activities were originally planned for Year 2 of the project but were significantly delayed by back and forth with our Institutional Review Board. A final revision of our protocol is in progress to allow the release of the UF Health data set. The OneFlorida+ Front Door is currently reviewing our data request application in preparation to pull the OneFlorida+ CKD population data.

Aim 2. This aim focuses on outreach to health clinics that serve migrant worker populations in order to onboard their data into the OneFlorida+ Data Trust. In Year 2 Dr. Beaty has been able to leverage his connections with clinics to establish successful outreach to Suncoast Community Health Center. Suncoast is a FQHC that services Southern and Eastern Hillsborough County, including migrant farmworkers among their patient population. Regulatory conversations with Suncoast were delayed during Year 2 as we navigated conversations with OneFlorida+ regarding the contractual and financial requirements of onboarding sites into the Data Trust. These issues have been resolved and we have now resumed our communication with the Suncoast team, who are all eager to join the project. The Data Use Agreement is currently being drafted for review by the legal offices of both Suncoast and University of Florida.

Aim 3. This aim focuses on re-running the geospatial analyses from Aim 1 on the OneFlorida+ Data Trust after the migrant worker health clinic data has been onboarded. These activities begin in Year 3 of the project.

RESEARCH CORE: GUO/BEATTY

NEXT STEPS

Moving into Year 3 of the project the goals for Aim 1 will be to validate and refine the phenotype, run the phenotype against a full data pull from the OneFlorida+ Data Trust, and complete the prevalence/incidence rates calculation and geographical hot spot analysis. The investigative team will continue testing of the computable phenotype, now on the EHR dataset and clinical notes they will acquire for the full CKD population of UF Health patients, and validate the results via chart review. After refinement of the phenotype through this process, the team will then begin calculating the prevalence/incidence rates of CKDu in Florida and conducting the geographical hot spot analyses.

For Aim 2 the group will be focusing on completing the financial and regulatory processes for onboarding Suncoast Community Health Center as well as collaborating with their technical team and the OneFlorida+ Data Trust team to successfully ingest Suncoast's clean data into the Data Trust. Concurrently we will be continuing our onboarding discussions with CHI (our currently targeted second clinic) or engaging an alternative clinic if necessary. This work will continue through the remaining years of the project to curate ongoing quarterly data submissions from both clinics in support of Aim 3.

Given that we have only recently cleared the hurdles for onboarding clinic data to OneFlorida+, we will likely be ingesting our first batch of clean clinic data in the second half of Year 3. This will cause the examination of CKDu prevalence/incidence work for Aim 3 to start later in Year 3 than anticipated, be early preliminary findings, and likely based on OneFlorida+ data that only includes clean data for one migrant farmworker clinic.



Health fair in Sebring, Florida, in partnership with UF IFAS Hardee County, to screen agricultural workers for chronic conditions and provide education on CKDu and HRI.

The diversity supplement award has afforded Andres Manrique excellent training in environmental sciences and occupational health. Through his research, Andres has completed research and training that have contributed to his doctoral program, and he is slated to graduate in the Fall of 2024. The completed research and training accomplishments for this supplement for the 2023-24 cycle are described below:

Research

Andres Manrique has continued to engage with seasonal and migrant crop farmworker communities and H-2A temporary guest workers in Florida with the goal of advancing our ability to identify these communities and develop superior health surveillance methods that incorporate environmental factors. Two specific aims were originally identified and are near completion. For Aim 1, the goal was to identify agricultural communities and associated health outcomes in Florida using a multi-level approach to integrate electronic health records with data obtained from statewide population-based datasets. We have completed this goal.

Approach: In general, our approach involved using secondary population data (derived from the literature and knowledge of crop farmworker communities) and a data-driven approach employing Bayesian clustering statistics to spatially identify crop farmworker communities at the zip code tabulation area (ZCTA). These clusters were then matched with environmental and disease data from electronic health records (EHR) obtained through OneFlorida+, a statewide electronic health data repository. Our EHR consisted of Hispanic patients that were diagnosed with the ICD-10 code J44 (Asthma), J45 (COPD), and all forms of CKD (N18.1 -N18.9) from January 2016 through December 31st, 2020. Spatial modeling was then performed to investigate the relationship between the disease outcomes with environmental and sociodemographic variables across the state. Additionally, our modeling approach allowed us to identify cluster specific effects for each outcome.

Results

The output of 10 well defined clusters were identified and shown in Figure 1. Each cluster represents a unique set of characteristics that define a population in a geographic area. Two clusters were identified (2 & 7) that give us a strong indication that crop farmworker communities are present in a defined region (Figure 2). Cluster 7 includes ZCTA in the cities of Apopka (32703), Immokalee (34120, 34142), Plant City/Dover (33527,33563, 33566, 33567), Pierson (32180), Mulberry (33860), Wimauma (33598), and Wachula (33873). Cluster 2 captures ZCTA communities that produce crops like citrus but where the population demographics are more mixed because of other agricultural industries like livestock farming and equines husbandry. These are cities where crop farmworkers are present based on prior knowledge from previous studies conducted with these communities. Additionally, we were able to identify areas where two clusters (8 & 5) give us moderate inclinations of crop farmworker communities. Cluster 8 captures semi-rural, urbanized areas, where crop production is found at high densities and the demographics of crop farmworkers are present at high proportions but the number of individuals who reported working in agriculture is low. It is likely that this cluster includes areas that were once rural, but due to urbanization have experienced population and occupational shifts while crop harvesting still occurs. These clusters are located on the outskirts of major metropolitan areas like Orlando, Lakeland, Tampa, and Miami.

We were able to identify at-risk populations that were over 60 years of age with high poverty rate that were significant predictors of all our outcomes. These findings align with what is known literature regarding older adults being more susceptible to chronic diseases like Asthma, COPD, and CKD. Additionally, socioeconomic status is a known social determinant of health, and it has been shown that poverty, in-general, leads to worse health outcomes including the development of chronic diseases.



Awardee, Andres Manrique and Mentor, Tara Sabo-Attwood

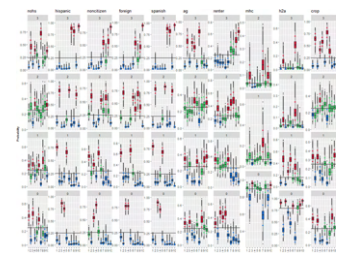


Figure 1. Boxplots depict the posterior distribution of quantile built environment and demographic factors, derived from the Bayesian Profile Regression output.

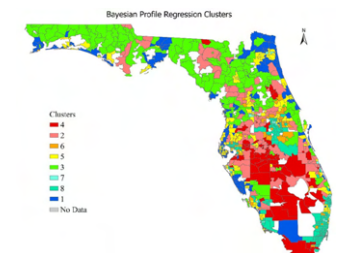


Figure 2. The spatial distribution of uniquely color-coded BPR clusters from the tertile analysis for ZCTA in Florida

DIVERSITY SUPPLEMENT

Interestingly, based on the cluster level effects, cluster 7 had elevated Incidence Rate Ratios (IRRs) for all-cause chronic respiratory disease (1.39, CI:0.93, 2.09), asthma (1.51, CI:1.04, 2.18), and COPD (1.46, CI:0.99, 2.19). Cluster 8 had even higher elevated Incidence Rate Ratios (IRRs) for all-cause chronic respiratory disease (2.44, CI:1.7, 3.50), asthma (1.55, CI:1.1, 2.18), and COPD (2.61, CI:1.85, 3.69) (Figure 3). The cluster-specific effects in the CKD models demonstrated that the IRR were all significantly elevated for all-cause CKD (1.91, CI:1.21, 3.01), late-stage CKD (N18.3 – N18.6) (2.03, CI: 1.31, 3.17), stage-3 CKD (1.66, CI:1.13, 2.44), and undetermined staged CKD (1.58, CI:1.07, 2.34) (Figure 4). These results demonstrate that Hispanic crop farmworker communities experience a higher burden of chronic respiratory disease and chronic kidney diseases compared to Hispanic non-agricultural communities. It is important to note that for each disease outcome, patients were only considered once and no repeat measures were counted with each diagnosis count being the first time they were diagnosed for a disease. Additionally, our findings also indicate that crop farmworker communities that reside near areas where sugarcane is grown experience high IRRs for late-stage and stage-3 CKD. It is important to consider that these findings are purely spatial and that we are not making any individual-level assumptions or conclusions.

The objective of Aim 2 was to develop an ambient air pollution surveillance network in vulnerable farmworker communities and use data from this network to evaluate the spatiotemporal relationship between crop harvesting and ambient PM2.5. A sub-goal was to train community members on the air monitor network with respect to maintenance and how to understand and use the data generated. The following points show how we have achieved this objective and what activities are left to complete. This aim is ~ 85% complete.

The installation of a network of low-cost air quality sensors (LCAQS) throughout central & south-central Florida was achieved in rural agricultural communities. Our sensors were strategically placed in communities where crop farming occurs, and crop farmworkers are present. Through our community partnership with the Redlands Christian Migrant Association (RCMA), we deployed 19 LCAQS developed by Purple Air, at participating locations in areas where crops are harvested. These sensors provide real-time access to air pollution data. To validate our LCAQS, we partnered with the Orlando's Ambient Air Monitoring Program to perform co-location calibrations. Here we placed one of our LCAQS next to an EPA reference grade monitor (Teledyne T640x) for a period of 4 weeks. The data is being analyzed, and a correction formula will be created to improve the prediction capabilities of the LCAQS so that it best aligns with values from high-cost regulatory monitors.

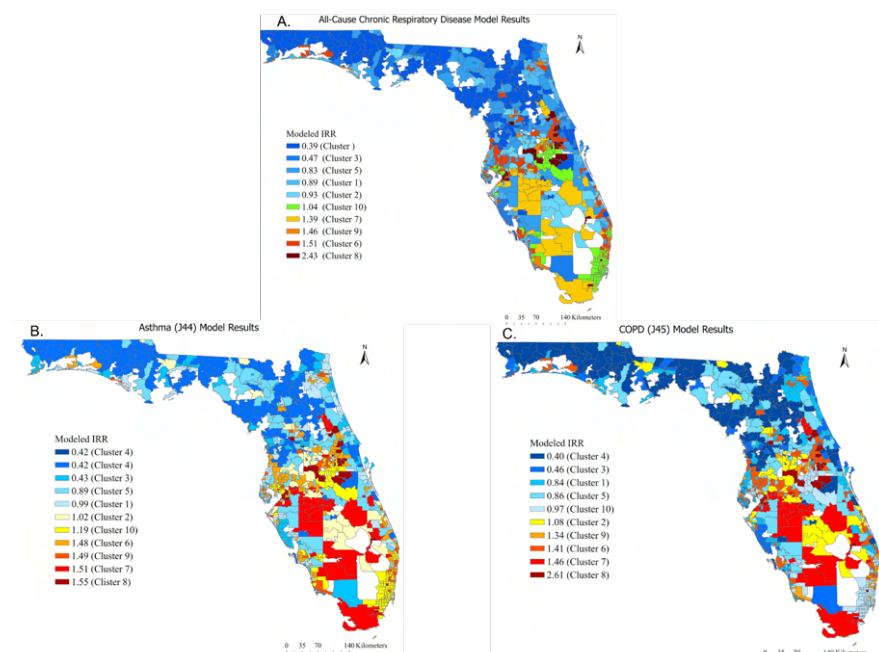


Figure 4. Incidence Rate Ratios (IRR) for (A) all-cause, (B) late-stage, (C) undetermined, and (D) stage-3 CKD across identified clusters. The clusters are color-coded using a blue-to-yellow-to-red gradient. Clusters shaded in blue represent regions with protective effects, where IRR values are lower, indicating fewer cases than expected. Clusters shaded in yellow are areas with neutral or moderate effects, while clusters in red represent regions with elevated IRR values, suggesting a higher-than-expected incidence of all-cause, late-stage, stage-3, or undetermined CKD.

The SCCAHS offers Pilot and Feasibility Grants in research areas directly related to occupational health and safety, including agriculture, forestry and fishing sectors - from basic, translational or clinical perspectives. Pilot grants are offered for up to \$30,000 per year, for a duration of one year.

PILOT FEASIBILITY PROGRAM

NEW AND EARLY STAGE INVESTIGATORS CONDUCTING PROMISING AGFF RESEARCH

The SCCAHS Research Core Pilot & Feasibility Program has been providing seed funding for new and innovative research projects for 7 years. Projects funded in past years have covered a wide range of topics in the fields of AgFF worker safety and health, including chronic low back pain among fishers, pesticide exposure monitoring, respiratory health, heat related illness, post disaster mental health and the impacts of climate change. The approaches have also been very diverse, covering wide varieties of strategies. This breadth of topics and efforts also reflects the diverse interests of SCCAHS' Research Core as a whole.

Recruiting a cadre of multidisciplinary early-stage investigators and encouraging promising new experimental strategies or methods is critical to advancing science. This program has traditionally provided support to three types of researchers:

- New and early-stage investigators who have not previously received substantial federal funding
- Experienced investigators who wish to branch out in a novel direction
- Investigators from other fields embarking on a occupational health-related project for the first time



Exploring the significance of agroforestry and regenerative agriculture in farmer's health and risk of zoonotic disease.
Amy Vittor, MD, PhD
University of Florida



Climate change impacts on farmer mental health: A participatory and systems-based approach
Christopher Weatherly, PhD
University of Georgia



Nothing about us without us: Youth voice on the impacts of climate change
Beatrice Pierre, PhD
University of Florida



Monitoring HPAI H5N1 transmission in backyard poultry operations in Florida: An integrated surveillance and risk assessment strategy
Ben Anderson, PhD
University of Florida

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Scientific advisors who are leaders in research, clinical practice and advocacy committed to furthering SCCAHS' mission

LINDA MCCAULEY, RN, PHD, FAAN FAAOHN
EMORY UNIVERSITY



Key Strengths:

- Leader at the intersection of environmental health and nursing
- Underserved populations
- Farmworkers and heat exposure

Dean
Nell Hodgson Woodruff School of Nursing
Children's Environmental Health Center
EPA's Children's Health Protection Advisory Committee

BARBARA LEE, RN, PHD
MARSHFIELD CENTER



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- Agricultural safety
- Co-founder of Agricultural Safety and Health Council of America (ASHCA)
- Children's health

Senior Research Scientist
Marshfield Clinic Research Institute
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MOREHOUSE SCHOOL OF MEDICINE



Key Strengths:

- Public health practitioner/ researcher
- Strategic leadership of community-based planning to improve the health and wellbeing of marginalized populations

Professor and Director
Prevention Research Center
Department of Community Health and Preventive Medicine

THOMAS BERNARD, PHD, CIH
UNIVERSITY OF SOUTH FLORIDA



Key Strengths:

- Exposure assessment methods
- Ergonomics surveillance
- Heat stress management
- Professional development in occupational safety and health

Professor University of South Florida
College of Public Health

CYNTHIA M. HARRIS, PHD
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Key Strengths:

- Environmental health and toxicology
- Migrant farmworker health

Associate Dean for Public Health and Director
Institute of Public Health
College of Pharmacy and Pharmaceutical Sciences
Florida Alliance for Health Professions Diversity and the Florida Health Equity Research Institute Education and Training Core

NOREEN MICHAEL, PHD
UNIVERSITY OF THE VIRGIN ISLANDS



Key Strengths:

- Community-based participatory research
- Health equity and health disparities
- Translational research

Associate Professor and Director
Caribbean Exploratory (NIMHD) Research Center of Excellence (CERC)
School of Nursing

SCIENTIFIC ADVISORY BOARD MEMBERS

HANI SAMAWI, PHD, MS
GEORGIA SOUTHERN UNIVERSITY



Key Strengths:

- Biostatistics
- Innovative statistical approaches
- Underserved populations

Professor and Chair
Jiann-Ping Hsu College of Public Health

Department of Biostatistics, Epidemiology, and Environmental Health Sciences

KATHY JAMES, PHD, MSPH, MSCE
UNIVERSITY OF COLORADO



Key Strengths:

- Epidemiology
- Environment/climate risk factors
- Kidney disease

Associate Professor

Colorado School of Public Health
Center for Health, Work & Environment
Community Epidemiology & Program Evaluation
Department of Environmental & Occupational Health
Department of Epidemiology

2023-2024 PUBLICATIONS/ PRESENTATIONS



1. Arosemena-Murfee, F.A., Sabo-Attwood, T., Guo, Y., Beatty, N. and Morris, J.G. (October 20-24, 2024). Implementing Environmental Public Health Surveillance Approaches in Agricultural Worker Communities Impacted by Florida Immigration Senate Bill 1718. International Society of Exposure Science, Montreal, Canada.
2. Dunleavy, K. (2024, January 8-12). Contextual and personal factors for participatory interventions for addressing chronic back pain in clam aquaculture workers in Florida. International Fishing Industry Safety and Health (IFISH) 6th Conference, Rome, Italy.
3. Dunleavy K, Beneciuk J, Blythe J, Gurka K, Hu B, Radunovich H. Designing videos to match characteristics and work for horticulture workers. SCCHAS State of the Science meeting 2024. Gainesville, FL.
4. Dunleavy K, Gurka K, Beneciuk J, Hu B, Radunovich H. An implementation science approach for preparing for an intervention study for low back pain in horticulture. SCCHAS State of the Science meeting 2024. Gainesville, FL.
5. Dunleavy K, Radunovich H, Beneciuk J, Hu B, Yang Y, McCormick Blythe J, Gurka K., Self-management strategies for low back pain among horticulture workers: A Type II hybrid effectiveness-implementation study protocol. JMIR Research Protocols (submitted for review). doi:10.2196/64817.
6. James, R. and Arosemena, F. (2024, March 19-20). Agricultural worker housing and health risk: A case study of Polk County migrant labor camps. State of the Science: Rural Coastal Community Health Science, Policy and the Future – Lab to Legislation, Gainesville, FL.
7. Joshi, A., Galindo, S., and Lamino, P. (2024, June 17-20). A Review of The Principles of Culturally Responsive Evaluation and Recommendations for its Application to the Evaluation Work of the NIOSH Agricultural Centers. [Oral Presentation]. 2024 International Society for Agricultural Safety and Health (ISASH). Portland, OR.
8. Joshi, A., Kalauni, D., Koundinya, V., Elgeberi, N., Spears, L., Galindo, S., & Hartmann, K. (2024, November 12-14). Best practices in culturally responsive evaluation: Recommendations for Extension. 2024 National Association of Extension Program and Staff Development Professionals Annual Conference. Virtual.
9. Kalauni, D., Joshi, A., Pasula, S., & Galindo, S. (2024, October 21-26). Determinants of Extension clients' satisfaction: Evidence from client experience survey. 2024 American Evaluation Association (AEA) Conference, Portland, OR.
10. Lundy, L. K., McLeod-Morin, A., Buys, D. R., Irani, T. A., Telg, R. W., Lindsey, A. B., & Stokes, P. (2024). Farmer Mental Health Narratives: A moment-to-moment online dial testing study investigating two video approaches. Poster presented at the National Agricultural Communications Symposium, Atlanta, GA.
11. Manrique, A.F., Milletich, S., Bautista, N., Coker, E.S., and Sabo-Attwood, T. (2024, March 10-14). A Culturally Appropriate Educational Intervention for Crop Farmworkers on Occupational Dust Exposure and Heat-Related Illnesses. Society of Toxicology 63rd Annual Meeting, Salt Lake City, UT.
12. Manrique, A., Milletich, S., Bautista, N., Coker, E.S. and Sabo-Attwood, T. (2024, March 19-20). Agri-Culture: A Culturally Appropriate Educational Intervention for Mitigating Occupational Hazards in Crop Farmworkers. State of the Science: Rural Coastal Community Health Science, Policy and the Future – Lab to Legislation, Gainesville, FL.
13. Manrique, A., Coker, E.S. and Sabo-Attwood, T. (2024, April 15-16). The Missing Link: Developing a Farmworker Identification Score to Perform Health Surveillance Studies in Florida. PPHP Research Day 2024, Gainesville, FL.
14. Manrique, A., Coker, E.S. and Sabo-Attwood, T. (2024, April 26-27). Clearing the Air: A Scoping Review on The Adverse Health Effects Associated to Sugarcane Burning. 2024 Southeast SETAC Regional Chapter Meeting, Gainesville, FL.
15. McLeod-Morin, A., Irani, T., Telg, R., Lindsey, A., & Lundy, L. (2024, June). Cultivating connections: A blueprint for hosting State of the Science meetings in your region. Abstract presented at the 2024 International Society of Agricultural Safety and Health Conference, Portland, OR.
16. Milletich, S. (2024, September 2023). AgriCULTURE: A Culturally Competent Educational Intervention to Promote Occupational Health and Safety in Crop Farmworkers. Chesapeake Annual Health and Safety Conference & Expo. Johns Hopkins University. Lauren, MD.
17. Pierre, B. F., Irani, T. L., Doty, L, Fogarty, K., Doty, J., Galindo, S., Oneal, L. (2024, April 11-13). Utilizing ego resiliency theory to assess the influence of social support and spirituality on ego resiliency of youth in Haitian farmworker communities. Southeastern Council on Family Relationship (SECFR), Orange Beach, AL.
18. Telg, R., McLeod-Morin, A., Irani, T., Lindsey, A., & Lundy, L. (2024, July). Connecting minds: A framework for regional State of the Science Conferences. Abstract presented at the 57th Annual Meeting Caribbean Food Crops Society (CFCS), Punta Cana, Dominican Republic.
19. Zhou, J., Butler-Dawson, J., Verdugo, D., Roberts, J., Fraga, M., Greenberg, K., Alli, A., Denslow, N., and Vulpe, C. (2024, March 10-14). Effects of repeated pesticides and heat exposure on the development of Chronic Kidney Disease of Unknown Etiology (CKDu). Society of Toxicology 63rd Annual Meeting, Salt Lake City, UT.
20. Zhou, J., Alli, A., Denslow, N., Butler-Dawson, J. and Vulpe, C. (2024, March 19-20). Explore Urine Exosome-based Biomarkers for Chronic Kidney Disease of Unknown Etiology (CKDu): A Pilot Study of 34 Guatemala Sugarcane Farm Workers. State of the Science: Rural Coastal Community Health Science, Policy and the Future – Lab to Legislation, Gainesville, FL.

