## 2025 Annual UA MEZCOPH

# Public Health
# Poster Forum

## Building Resilient Communities:
## Public Health Strategies
## for the Future

🎙 **Keynote Speaker:**

# Del Yazzie

**Director & Senior Epidemiologist, Navajo Tribal Epidemiology Center**

**Title:**

# Tribal Public Health: Data to Action

**Presentation Topics:**
Junk food tax health policy
Cancer surveillance & data dashboard
Infectious disease modeling
Tribal IRB and data sovereignty

# Event Details

📅 Friday, April 4, 2025   🕐 1:00P PM – 5:00 PM MST   📍 Drachman Hall, University of Arizona

THE UNIVERSITY OF ARIZONA
Mel & Enid Zuckerman
College of Public Health

**Presents**

# The Public Health Poster Forum

**The Public Health Poster Forum serves as a platform to:**

- Showcase and provide constructive feedback on student research.

- Foster connections and encourage collaborative efforts among participants.

- Enhance professional development through skill-building opportunities.

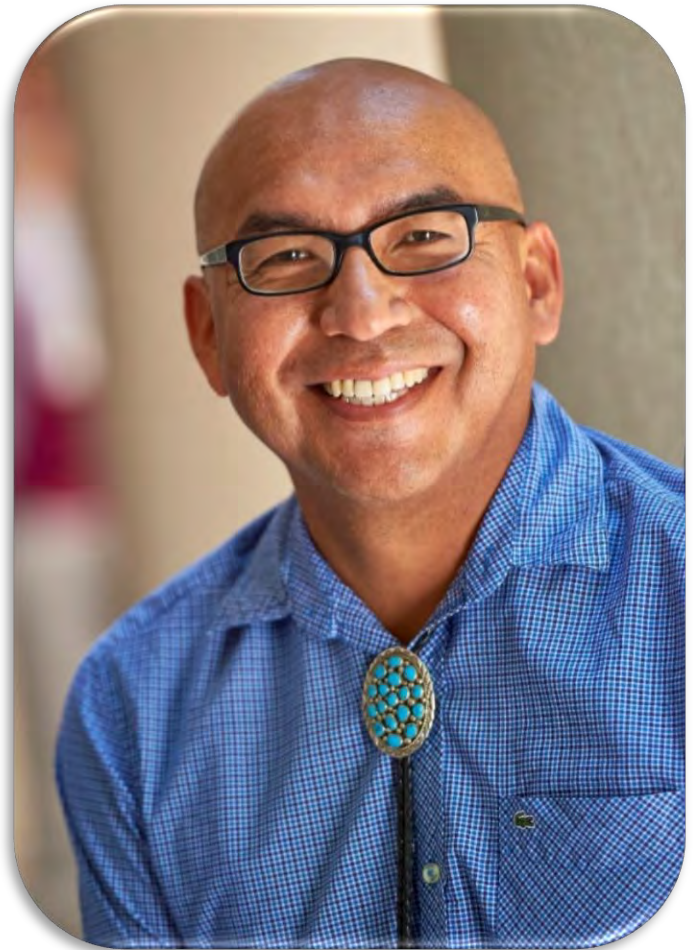- Introduce students to public health research and community engagement initiatives.

# Agenda

❖ **1.00 - 3:15 pm**     **Poster Presentations and Judging**

❖ **3:30 - 4:30 pm**     **Keynote Presentation**

❖ **4:30 - 4:45 pm**     **Presentation of Awards**

❖ **4:45 - 5:00 pm**     **Closing Remarks & Networking**

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## Del Yazzie

Del works as the director and senior epidemiologist for the Navajo Tribal Epidemiology Center. He received his MPH degree from Johns Hopkins Bloomberg School of Public Health. He was born and raised in Cove, AZ (Navajo Nation). His maternal clan is Red House, paternal clan is Red Running into Water Clan, maternal grandfather clan is Yucca Fruit Strung Out in a Line, and paternal grandfather clan is Coyote Pass. His work focuses on leading the Navajo Nation's disease surveillance efforts, putting science and data into action to help Navajo communities stay healthy. He also serves on the Navajo Tribal Institutional Review Board and CDC and NIH Tribal Advisory Committees.

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Podium

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# PUBLIC HEALTH POSTER FORUM COMMITTEE MEMBERS

**Lyn Duran**

Assistant Dean, Student Affairs,

MEZCOPH

**Michael J. Tearne, MEd**

Manager, MS and Doctoral Programs, MEZCOPH

**Refugio Sepulveda**

**DrPH, MPH, MPA**

Assistant Research Professor

MEZCOPH

**Courtney Faryab**

Senior Coordinator, Admissions & Recruitment

Office of Student Affairs, MEZCOPH

**Sheila Soto, DrPH, MPH**
Assistant Research Professor
Director of the Community
Engagement and Outreach Programs
(CEO) MEZCOPH

# Public Health Poster Forum Committee

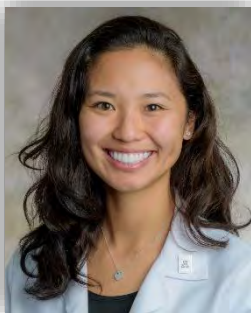**Committee Co-Chair**
Oluchi Kanma-Okafor
PhD Student in HBHP

**Committee Co-Chair**
Dulce Jimenez
PhD Student in HBHP

**Abstract & Poster Coordinator**
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**Keynote Speaker Coordinator**
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MD Student &
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Health Services
Administration

# PUBLIC HEALTH POSTER FORUM JUDGES

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# Chris Lim, PhD

Dr. Lim's research examines how the environment impacts human health applying epidemiologic, statistical, and data science methods. Specifically, he is interested in the health effects of air pollution and climate change, and whether there are disparities in the exposures and associated health outcomes. He also explores the potential application of low-cost sensor technologies for personal-level exposure assessment, urban air pollution modeling, and community-based environmental justice projects. Lim currently leads a study examining the health and academic impact of green playground renovations in New York City public schools, and another study that will look at the impact of air pollution on pediatric asthma in Tucson schools. He completed his postdoctoral training at the Yale School of the Environment and obtained his PhD from NYU School of Medicine.

# Priscilla Magrath, PhD

Priscilla A. Magrath, MS, PhD, is Senior Lecturer in the Department of Health Promotion Sciences, Mel and Enid Zuckerman College of Public Health at the University of Arizona, US. Her teaching and research focus on global health, health policy and systems, and maternal and child health. She also provides training and mentoring in qualitative research methods to students and faculty. Dr Magrath has more than 25 years' experience as an engaged anthropologist working on programs including the Title V Maternal and Child Health Needs Assessment for Arizona for Arizona Department of Health Services; IUWASH PLUS, Indonesia for USAID; Provincial Health Project, Indonesia for the World Bank; and Livelihoods Recovery through Agriculture Program for CARE Lesotho-South Africa. Dr Magrath gained her PhD in Medical Anthropology from the University of Arizona, US, her MS in Agricultural Economics from the School of Development Studies at the University of East Anglia in the UK, and her BA in Social Anthropology from Cambridge University in the UK

# David O. Garcia, PhD, FACSM



Dr. Garcia is an Associate Professor in the Mel and Enid Zuckerman College of Public Health at the University of Arizona. He has extensive experience in short and long-term intervention trials in the areas of physical activity, diet, and weight management. He received his training from leading institutions and mentors in the field. Dr. Garcia has designed and implemented trials as a lead investigator focused on reducing obesity-related health disparities among Mexican-origin adults. More recently, he has focused on examining the prevalence of metabolic dysfunction-associated steatotic liver disease (MASLD) and associated risk factors in the U.S.-Mexico border region. He is also the Director and Founder of "Nosotros Comprometidos a Su Salud-Committed to Your Health", a program developed to foster community-engaged research collaborations, service, and education to advance health equity in Southern Arizona

# Bridget S. Murphy, DBH, M.Ed.



Dr. Bridget Murphy is an assistant research professor in the Mel & Enid Zuckerman College of Public Health in the Department of Health Promotion Sciences at the University of Arizona (U of A). Dr. Murphy also works with the U of A's Arizona Center for Rural Health and Comprehensive Center for Pain and Addiction. She has more than three decades of education and experience in public and behavioral health. Her principal expertise is in substance use and related issues (e.g., pain/trauma, infectious diseases) prevention, harm reduction, treatment and recovery for culturally and linguistically diverse populations in various settings. She uses her personal experience as an evidence-based strategy to reduce stigma, communicate science through storytelling, and increase access to education, services, and support for diverse populations.

# Maiya Grace B. Ngaybe, PhD

Maiya G. Block Ngaybe is a passionate public health professional dedicated to advancing health equity and improving health outcomes globally. With a background in health education, global health research, and social psychology, she currently works at the Pima County Health Department, applying evidence-based strategies to support communities in achieving better health as a Public Health Educator. As a former NIH Fogarty Fellow and PhD graduate in Health Behavior Health Promotion, Maiya has experience in mixed methods sociobehavioral research focusing on understanding health behaviors and designing effective interventions. Whether through research, teaching, or community outreach, Maiya is committed to bridging the gap between science and practice to create meaningful change in public health.

# Shannon Newton, MPH, CIH

Ms. Newton is a Senior Lecturer at the Mel and Enid Zuckerman College of Public Health, Department of Community, Environment and Policy teaching both core Environmental and Occupational Health and Industrial Hygiene courses. Ms. Newton coordinates the NIOSH Training Project Grant in industrial hygiene mentoring students who aspire to professional practice in Occupational, Safety and Health. Ms. Newton graduated from the United States Air Force Academy in 1995 (Environmental Engineering) and the University of Arizona in 2005 (MPH, Environmental and Occupational Health) practicing industrial hygiene throughout her career in the military and consulting fields. Ms. Newton is a member of the Delta Omega Honorary Society in Public Health and holds professional certification as a Certified Industrial Hygienist by the Board of Global Credentialing (CP 8000).

# Zaida Dedolph Piecoro, MPH

Zaida Dedolph Piecoro (she/her) is a MEZCOPH alumna. Her career started in the nonprofit sector, where she worked to advance social, economic, and political changes to promote the wellbeing of all Arizonans. In January 2023, Zaida had the honor of being appointed health policy advisor to Arizona Governor Katie Hobbs. In March 2025, she stepped into a new role as State Health Strategist at the Governor's Office, focused on promoting person-centered government and interagency collaboration in the health and human services sectors. Zaida holds a Bachelor of Science in anthropology and bioethics from Loyola University Chicago, a Master's in Public Health from the University of Arizona, and is currently pursuing certification as a Maricopa County Master Gardener.

# Ellen Santos, PhD

Dr. Ellen Santos is an Epidemiology Program Manager overseeing the One Health program at the Pima County Health Department (PCHD). Dr. Santos oversees vector-borne and zoonotic disease surveillance, environmental epidemiology, and the Healthy Companions One Health Clinic. Prior to joining PCHD, Dr. Santos was an Assistant Professor of Epidemiology at Saint Louis University where her research focused on vector-borne diseases including dengue and Chagas disease.

# Nicole P. Yuan, PhD, MPH

Nicole P. Yuan, PhD, MPH, is an Associate Professor of Public Health and Program Director of Health Behavior Health Promotion at the University of Arizona. She received her PhD in clinical psychology from Bowling Green State University and MPH from the University of Washington. Her research focuses on adverse life experiences, substance use, coping, resilience, and health promotion of older adults, with an emphasis on Indigenous and other diverse populations. Recent projects include a cultural needs assessment with Tucson Indian Center, Tai Chi interventions for older adults, and risk factors of depression among postmenopausal women. Nicole is a licensed psychologist in Arizona

# Daniel Sestiaga Jr., MPH

Daniel Sestiaga Jr. is a member of the Ft. Yuma Quechan Indian Tribe of Arizona. He is the son of Daniel Sr. and the late Rosie Sestiaga. His paternal grandparents are Carlotta and the late Julio Sestiaga. His maternal grandparents are Rosie Montoya and the late Tomas Montoya and Virgil Jack. Daniel is currently the Assistant Director for the Indigenous Resilience Center (IRes) at the University of Arizona. Within his role, he manages the operations of IRes including, supporting faculty, professional and student staff on projects and operation budgets along with various grants and initiatives.  Within his leadership role, he liaises with UArizona faculty and administrators to further IRes goals and objectives around strengthening teaching, research and outreach related to Indigenous resilience. He works closely with tribal leadership through principles of respectful tribal engagement and collaborates with other external partners to execute successful and impactful outreach.

# Amanda Lam, MD, MPH

Amanda Lam, MD, MPH, serves as the Data Modernization and Informatics Strategist with the Pima County Health Department. Prior to public health, Dr. Lam spent seven years helping healthcare organizations with the technical implementation and integration of patient portals and other digital patient engagement tools with electronic health record systems.

# Flavia Nakayima Miiro, MCS

Epidemiology PhD candidate

 Flavia Nakayima Miiro has a passion for health research as a gateway to disease prevention and treatment. She has either as a team leader or member of a team conducted research in HIV/AIDS, Malaria, Maternal and Child Health, adolescent health and health systems strengthening focusing on service provision and utilization looking at bottlenecks and how they can be overcome. Flavia has previously worked with The World Bank, UNICEF, CDC, UNFPA and other local and international NGOs in her home country Uganda. On the African continent, she has conducted evaluations in Kenya, Malawi, Nigeria, Swaziland, Liberia and Zimbabwe.

# Marcelino Flores
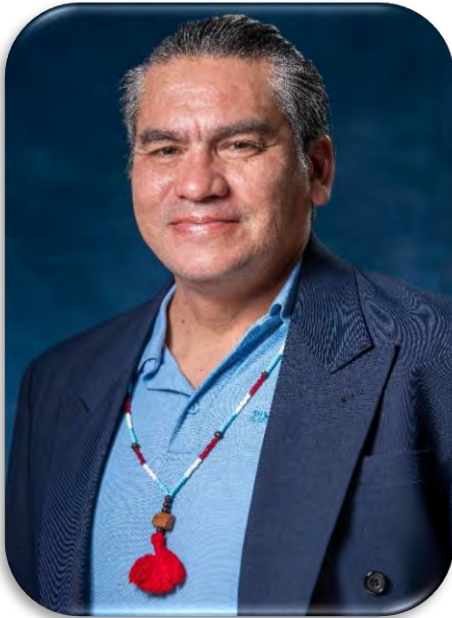
Flores has been a Pascua Yaqui Tribe council member and an employee of Pima County, and now he is working to bridge those worlds as a liaison to public health. His work has often focused on community and economic development, most recently for Pima County's Community & Workforce Development Department

# Jean McClelland

Assistant Librarian,

Jean McClelland is an Assistant Librarian at the Health Sciences Library and the "embedded" liaison librarian to the Mel and Enid Zuckerman College of Public Health (MEZCOPH). I support public health researchers from the student to the faculty level in information literacy skills, collaboration and intersection with library resources and specialists, advanced database searching, evidence synthesis consultation, and more. I have a joint appointment as the Program Director for Community-Based Health Information Resources in the Department of Health Promotion Sciences at MEZCOPH where, up until 2018 I worked as a program evaluator and community-based collaborative researcher in Arizona's rural and border communities.

# Samantha Ruth, MPH

Epidemiology PhD candidate and

Research Assistant at U of A



Epidemiology PhD candidate and Research Assistant at University of Arizona. Samantha Ruth is a PhD candidate in Epidemiology at the University of Arizona, where she is conducting her dissertation research on long COVID surveillance. She earned her Master of Public Health (MPH) in Global Environmental Health from George Washington University. Samantha has extensive experience in infectious disease surveillance and outbreak investigations through her role as a supervisor for the Student Aid for Epidemiology Response (SAFER) team. During the COVID-19 pandemic, she conducted PCR and antibody testing as a Clinical Research Scientist at the University of Arizona Genetics Core. She has also contributed to global health initiatives, including establishing a diagnostic laboratory in rural Guatemala and researching antibiotic resistance in foodborne pathogens at George Washington University.

# Erin Woods, MPH

Epidemiologist - Pima County Health Department



Erin Woods, MPH, is an Epidemiologist with the Pima County Health Department (PCHD). Prior to her current position, Erin completed two internships with PCHD while earning her Master of Public Health degree at the University of Arizona.  Erin's current work leverages data analysis and visualization to illuminate morbidity-specific health inequities and inform targeted interventions, focused on morbidities that are of particular concern in the Southwest, such as heat mortality and congenital syphilis.

# ABSTRACTS

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# Hand Hygiene Practices and Adherence Among BUMCT Healthcare Workers

**Lead presenter:** SHENEIL AGYEMANG

**Faculty advisor:** Kate Ellingson

**Partner/Setting:**

This project was conducted at Banner University Medical Center Tucson (BUMCT) in collaboration with the infection prevention team and environmental services. This initiative addressed the critical issue of healthcare-associated infections (HAIs) by improving hand hygiene practices among healthcare workers and enhancing patient safety.

**Activities**:

A comprehensive literature review on optimal dispenser placement revealed that positioning dispensers near patient beds, entrances, and high-contact areas significantly increases accessibility and compliance. The review also highlighted that optimal dispenser placement is essential for reducing HAIs. Utilizing facility CAD files, a detailed mapping of hand sanitizer dispenser locations was conducted. Hand hygiene observations were performed using the Joint Commission Resources Targeted Solutions Tool (TST) to evaluate adherence. A flagging system was also established to quickly identify and replace non-functional dispensers and reposition poorly located dispensers.

**Engagement:**

Collaboration was integral to this project. I worked closely with the infection prevention team and environmental services to review current hand hygiene practices and managed the installation of 105 new dispensers, which increased accessibility by 21.3%.

**Outcomes**

Dispenser accessibility increased by 21.3% due to the installation of new dispensers and the strategic repositioning of existing ones. Detailed mapping and documentation also provided actionable insights that supported improvements in hand hygiene compliance. Hand hygiene observations also revealed compliance of 83.2%.

**Conclusion**

This internship demonstrated that a community-engaged, data-driven approach can significantly enhance hand hygiene practices and reduce HAIs. Future steps include continuous monitoring and targeted education to ensure long-term hand hygiene compliance and improved patient safety.

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# Libraries as Hubs of Resilience in Rural Arizona

**Lead presenter:** Mona Arora

**Faculty advisor:** Mona Arora

**Other authors:** Fnu Kajal, Brianna Rooney, Laura Schweers, Lisa Lewis

## Background

The Arizona Canter for Rural Health collaborated with rural and small libraries to address community health concerns through the Library Champions Program. This project provided $4-5,000 in funding and developed a library community of practice that included technical assistance and training.

## Objectives

The AzCRH implemented a "mini-grant" program for rural libraries in December 2022 to address local community concerns around health and wellbeing..

## Methodology

Feedback forms were utilized to capture end-of-program feedback and to understand impact, lessons learned, and best practices. All responses were reviewed and coded into themes and categories in Microsoft Excel. Program details, including target audience, activities implemented, and partners engaged, were obtained from both the mini-grant application process and the evaluation survey.

## Results

Fourteen small and rural libraries from across the state participated in the 6-month program. The libraries implemented training and workshops on topics such as tai chi and healthy eating and expanded library services to include medical equipment, food pantries, and hygiene products. Library programs engaged community members from all age groups. An analysis of library feedback surveys indicated valuable outcomes, including enhanced community engagement and empowerment. Libraries collaborated with schools, health departments, parks, and recreation departments to implement programs.

## Conclusion

The Library Champions program underscores libraries' critical role in providing health and well-being education, services, and programming to communities. Our program illustrates the value of public health library partnerships in strengthening community health and resilience. However, additional research is needed to understand the network's impact on communities during and after the pandemic.

**Implementation of Student Ambassador Program for Healthy Aging**

**Lead presenter:** Elizabeth Burows

**Faculty advisor:** Tomas  Nuno

**Partner/Setting:**

The Precision Aging Network-Student Ambassador Program (PANSAP) at the University of Arizona empowers students to promote brain health awareness through community engagement in Tucson. Funded by the National Institutes of Health (NIH), Precision Aging Network is a nationwide collaboration with institutions like Johns Hopkins, Emory, University of Miami, Arizona State, and TGEN. Its mission is to sustain healthy minds for life and advance brain health solutions.

**Methods/Activities:**

Through PANSAP, participants learn to collaborate across academic and public sectors to support older adults' well-being. PANSAP offers education on aging research, precision medicine, and dementia genetics. A key function is presenting MindCrowd, a 10-minute online memory game that measures cognitive performance. At the end of the game, participants receive results comparing their brain, speed and attention to their age group.

**Engagement**

Since 2022, PANSAP has participated in community engagement events such as Tucson Meet Yourself, Feast for Your Brain (FFYB), Tamale Festival, and Festival of Books. Ambassadors translate complex scientific concepts into relatable information for the public, allowing engagement with PANs mission. Through involvement in outreach and research, ambassadors contribute to PAN's efforts to recruit diverse participants for studies, promote brain health education, and inform the development of interventions aimed at preventing age-related cognitive decline.

**Outcomes/Products**

PANSAP has enabled the enrollment of thousands of participants to MindCrowd.

**Conclusion/Discussion**

PANSAP plays an important role in advancing the goals of the PAN by acting as a bridge between cutting-edge research and the Southern Arizona community.

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## Developing engagement best practices for environmental justice:

## American Pacific Southwest

**Lead presenter:** Aurea Cunanan

**Faculty advisor:** Nathan Lothrop

**Authors:** Maia Ingram, MPH Mona Arora, PhD, Melissa Garcia, Hawai, Public Health Institute, The Larson Institute for Health Impact and Equity, and the University of Arizona, Southwest Center on Resilience for Climate Change & Health (SCORCH)

**Partner**: The WEST Environmental Justice Center (WEST EJ Center) provides free technical assistance on EJ to communities across the Pacific Southwest. The WEST EJ Center staff identified Tribal and Indigenous, rural non-Tribal, and U.S. Pacific Territories as regions with marginalized populations who require specialized attention when engaging them for technical assistance activities.

**Methods**: First, a literature review was conducted providing context and identifying current literature on the issue. Results of the literature review informed a draft recommendation report that was disseminated to partners working with these communities. Feedback from partners and WEST EJ Center staff were integrated and finetuned to provide practical recommendations for engagement. The report recognizes the value and need for taking a place-based approach that integrates local knowledge and experiences.

**Engagement**: In a collaborative writing process with Hawai Public Health Institute, The Larson Institute for Health Impact and Equity, and the University of Arizona, Southwest Center on Resilience for Climate Change & Health (SCORCH), a recommendations report was developed.

**Outcome**: Cross cutting themes identified are communities as the main authority in EJ interventions. Engaging communities who have been harmed by systemic abuse of power and extractive resource practices require respect and an understanding of their lived experiences. Community Based Participatory Research approaches should be used, where each community plays a strong role in solution planning, implementation, and evaluation of their specific issue.

**Conclusion/Discussion:** Following this report, it is important to refine these recommendations through more research, engagement, and resources for community-centered partnerships among these populations.

## Communities Partnerships & Prevention through Mobile health unit initiative

**Lead presenter:** Alicia Hernandez
**Faculty advisor:** Sheila Soto

The University of Arizona's Mobile Health Unit (MHU), in partnership with the Mexico Section of the U.S.-Mexico Border Health Commission, serves underserved and high-risk populations across Arizona. This includes Hispanic/Latino communities, low-income individuals, the uninsured, and rural/border region residents.

The initiative addresses chronic diseases like cardiovascular diseases and diabetes, which are significantly elevated in these populations due to health inequalities. The goal is to reduce reliance on emergency care by connecting individuals with primary care providers (PCPs) and local clinics. MHU provides free preventive health screenings including blood pressure, glucose, HIV tests, and body measurements delivered by bilingual, culturally competent Community Health Workers (CHWs). CHWs offer tailored health education and referrals to Federally Qualified Health Centers (FQHCs) and social services, ensuring participants establish ongoing care.

The MHU is community-driven, involving CHWs, student volunteers, faculty researchers, and the Mexican consulate for binational efforts. Community engagement drives our work. We collaborate with clinics for direct patient referrals, co-host health fairs, and partner with agencies for CHW professional development. From January 2016 to May 2024 our collaborates allowed us to serve 34,012 participants and provided 164,778 health services across Arizona, improving access to preventive care and education.

We learned CHW-led mobile units effectively address health disparities and build trust through community collaboration. Future plans focus on expanding partnerships with healthcare providers, policymakers, and funders for sustainability and enhanced access to care via expanded outreach and funding applications.

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# Mexzona: A Student Effort to Combat Healthcare Disparities in Mexico

**Lead presenter:** Noah  Linskey

**Faculty advisor:** Riemke  Brakema

**Other authors:** Mckenna Dellinger, Carlos Barraza, Emma Martinez, Alex Hitti

**Partner/Setting:**

Mexzona is a student-led non-profit organization that partners with Rocky Point Medical Clinics (RPMC) and public health centers to provide free healthcare to citizens of northwestern Mexico. South of the United States/Mexico border, healthcare resources are finite leading to poor health outcomes, particularly among low-income populations. The mission of Mexzona and its partners is to provide free healthcare to Mexican citizens with limited access to healthcare resources.

**Methods/Activities:**

Mexzona and its partners coordinate monthly clinics at three sites, serving hundreds of patients in Sonoyta and Puerto Peñasco by providing free medicine consultations, physical therapy, surgical services, and more. Through Mexzona, students volunteer as interpreters, scribes, and medical assistants to gain experience as future providers while combating health disparities.

**Engagement**:

Students volunteering with Mexzona gain experience collaborating with providers, clinic partners, and other students. Students have the opportunity to communicate with Spanish-speaking patients and practice making clinical decisions with provider assistance.

**Outcomes/Products:**

Engaging with community partners allows for the establishment of a connected care network yielding improved patient outcomes through comprehensively addressing multiple health determinants effectively.

**Conclusion/Discussion:**

Volunteering with Mexzona made apparent the healthcare disparities present in northern Mexico and how we as students and future providers can mitigate challenges related to healthcare access and chronic disease. We plan to continue recruiting volunteers and maintaining donor relationships to preserve the sustainability of this program while attempting to expand free services to those who deserve better access to quality care.

# Utilizing an academic-community partnership for a mixed methods cultural assessment

**LEAD PRESENTER:** Marlaina Maddux

**Faculty advisor :** Nicole Yuan

**Other authors:** Tucson Indian Center Nicole Yuan, Kathryn Ortiz y Pino, Georgia Weiss Elliott, Jordan Upshaw, Jennifer Begay, Kanishka Chinnaraj, RueShunda Jim, Sheryl Nelson, Veronica Boone (TIC Wellness Director), and Phoebe Cager (TIC Health Services Director).

**Partner**:

Urban Indian Organizations (UIOs) that receive funding from the Indian Health Service (IHS) are required to complete community health needs assessments to stay abreast of the health status and healthcare needs of the American Indian/Alaska Native (AI/AN) urban population. The Tucson Indian Center (TIC) fulfills this requirement by using an independent team of researchers (e.g., UA-MEZCOPH).

**Activities**:

This presentation describes a collaboration between TIC and the University of Arizona to conduct a comprehensive cultural assessment funded by IHS. The collaborative process and key results are documented. Engagement: We engaged the community via four focus groups (Elders, women, men, young adults) (n= 34), a cultural survey (n= 196), and key informant interviews (n= 2) with leaders who were familiar with the Tucson AI/AN community.

**Outcomes**:

We found that the Tucson AI/AN community exhibits strengths through engagement with native language and traditional practices, and in creating a collective sense of shared cultural identity between Tribal groups. Community resources include access to cultural programs provided by TIC, Tribal offices, and other native-serving organizations. Community members and leaders described historical trauma, racial discrimination, distance from their Tribal lands, and lack of culturally competent healthcare providers as barriers to health.

**Conclusion**:

The community-engaged cultural assessment provided a rich understanding of the complex cultural strengths and needs of this community. The synthesis of findings across multiple data sources increased the value of dissemination activities to local Tribal and community partners and improved implementation of culturally-relevant strategies to achieve optimal health among the urban AI/AN community.

**Parks for all Accessibility in Motion: Inclusivity for Deaf Communities:**

**Lead presenter:** Jillian McFarland

**Faculty advisor:** Martha Monroy

**Other authors:** Cam Juarez, Stephanie Hernandez, Audrey Zelinka

The National Park Service aims to preserve national and cultural resources for the enjoyment, education, and inspiration of all people. A key aspect of park service is the expert guidance provided by employees and volunteers through tours, trail information, and educational programs. However, Deaf and Hard of Hearing individuals have had limited access to these services.

This project seeks to investigate and improve accessibility by exploring better communication avenues for Deaf and Hard of Hearing individuals, identifying their specific needs for accessing national parks, and developing training updates to enhance ADA services. Utilizing a community assessment approach, this initiative gathered data and feedback to inform a comprehensive program proposal aimed at improving the experiences of Deaf and Hard of Hearing individuals at Saguaro National Park and creating a replicable model for other national parks.

Our project consists of a baseline community assessment, key informant interviews and surveys with Deaf individuals in Tucson, and a proposal for specific improvements and additions to the ADA services currently rendered at Saguaro National Park. These improvements include access to interpreters, video calls, and culturally relevant services for Deaf and Hard of Hearing park patrons.

In times of uncertainty, it is more necessary than ever to find ways to adapt existing programs to better fit the needs of our local community. Our project aims to bolster the resilience of underserved groups, like Deaf Americans, by increasing collaboration between Deaf communities and the parks service.

## PM 2.5 Exposure of Unhoused Individuals in Tucson

**Lead presenter:** Brooke McKalip

**Other authors:** Dr. Marc Verhougstraete, Dr. Chris Lim, Dr. Victor Braitberg

Air pollution, particularly fine particulate matter (PM 2.5), is a well-documented environmental hazard linked to severe health effects, including respiratory and cardiovascular diseases. Individuals experiencing homelessness (IEH) are disproportionately exposed to PM 2.5 due to prolonged outdoor exposure, limited access to healthcare, and preexisting health vulnerabilities. Despite the well-established risks of air pollution, there is limited research on the direct exposure levels of IEH populations.

This study aims to quantify the personal PM 2.5 exposure levels among IEH in Tucson, Arizona, using the AirBeam 3 portable air quality monitor. By collecting real-time data across different seasons and geolocating high-exposure areas, this study will compare personal exposure levels to city-reported data and assess seasonal variations.

Additionally, participant surveys will provide insight into health conditions and behavioral factors that may influence exposure risks. Findings from this study will contribute to the growing body of environmental justice research, informing public health interventions aimed at mitigating air pollution exposure among vulnerable populations.

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# Innovations in HIV Testing and Engagement Among Hispanic Population

**Lead presenter:** Lazaro Ruiz

**Other authors:** Sheila Soto

Led by the University of Arizona's Zuckerman College of Public Health, the Primary Prevention Mobile Health Unit (MHU) seeks to enhance overall health awareness, making HIV screening an integral part of comprehensive healthcare in Hispanic communities.

This program is composed of health professionals and diverse student volunteers, the MHU team delivers individualized health education to address cultural barriers, emphasizing inclusivity. By offering a comprehensive health screening experience directly within communities, the project aims to mitigate the apprehension associated with HIV testing.

Preliminary results indicate an increase in HIV testing rates, a reduction in stigma, and heightened community engagement. Implementation challenges, notably language barriers, were effectively navigated through culturally competent interventions and direct community involvement, emphasizing the importance of an interdisciplinary approach adaptable to diverse healthcare settings.

Building on the success of the status-neutral health screening approach, future endeavors should focus on implementing similar programs across various healthcare settings and communities. Recommendations include a continued emphasis on community engagement, cultural competence, and strategic marketing to further destigmatize HIV testing.

The initiative serves as a replicable project, offering valuable insights into interventions related to community engagement, cultural competence, and health equity within the context of HIV care.

# Inequalities in NO2 pollution exposure in communities near border crossings

**Lead presenter:** Mojisola Ajayi

**Faculty advisor:** Chris Lim

## Background

Exposure to nitrogen dioxide (NO2), a traffic-related air pollutant, poses a high risk to public health. Social inequalities have previously been noted in communities near border crossings, highlighting the possibility that associated health risk effects and outcomes of adverse exposure to NO2 at border crossings are borne by nearby low-income and vulnerable communities.

## Objective

The aim of this study is to identify if under-resourced and underserved communities are exposed to higher levels of NO2 along the United States-Mexico and United States-Canada borders.

## Methods

This study will utilize a three-way approach to examine sociodemographic variables, income, and pollution levels. Median income, race, and ethnicity variables from the 2022 5-year American Community Survey are mapped in second-level administrative regions containing all public border crossings. GDP data in these regions will also be analyzed. Using satellite data, annual averages of daily NO2 concentration measurements will determine exposure levels at the border crossings. Population estimates will also be made using satellite data.

## Results

The study is ongoing, and initial results suggest that areas near the United States-Canada border have lower levels of NO2 pollution than on the United States-Mexico border. Areas closer to the border also have higher levels of NO2 pollution than the rest of the region.

## Discussion

Regions near the United States border crossings are experiencing environmental pressures driven by economic and population growth, exposing nearby communities to higher levels of traffic-related air pollution. Further research will determine if there are higher levels of NO2 pollution in areas with lower income.

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# Social Communication, Satisfaction, and Loneliness in FMR1 Premutation Carriers

**Lead presenter:** Mohima Ali

**Other authors:** Mohima Ali, Nell Maltman

### Background

Individuals with the FMR1 premutation experience social communication difficulties, increasing their vulnerability to loneliness and impacting mental health. This study examines (1) gender differences in loneliness, social satisfaction, and social communication among FMR1 carriers and (2) the relationship between social communication deficits, social satisfaction, and loneliness.

### Methods

Participants included 34 females with the FMR1 premutation, 21 female controls, 11 males with the premutation, and 17 male controls, with an anticipated total of 20 males at the conference. Participants completed a virtual testing battery assessing social communication (La Trobe Communication Questionnaire, Pragmatic Rating Scale), loneliness (UCLA Loneliness Scale-3), and social satisfaction (NeuroQoL). Group differences were analyzed using one-way ANOVAs, and Pearson correlations examined relationships among variables.

### Results

Significant group differences were found in social satisfaction ($p = .010$) and marginally in self-reported social communication ($p = .060$). Females with the FMR1 premutation had lower social satisfaction than males ($p = .009$), male controls ($p = .005$), and marginally lower than female controls ($p = .053$).** Self-reported social communication difficulties correlated with lower social satisfaction and higher loneliness in females but not in males.

### Conclusions

Females with the FMR1 premutation experience lower social satisfaction and a strong link between social communication difficulties and loneliness. Findings underscore the need for gender-specific interventions to improve social communication and enhance well-being.

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# Disparities in Playground Shade: A Socioeconomic Analysis in Arizona

**Lead presenter:** Riyanshi Bohra

**Faculty advisor:** Chris Lim

### 1. Background:

Exposure to extreme heat and ultraviolet (UV) radiation is a major public health concern, particularly for children in school environments. Shade structures mitigate heat-related illnesses and long-term UV exposure risks. However, disparities in shade coverage may exist based on socioeconomic status (SES), disproportionately affecting marginalized communities. This study quantifies the relationship between playground shade coverage and SES across schools in Arizona.

### 2. Objectives:

This study examines whether playground shade coverage varies by SES and assesses if lower-income and racially diverse schools have reduced shade access.

### 3. Methods/Activities:

We utilized high-resolution satellite imagery and geospatial analysis in Google Earth Engine (GEE) to quantify playground shade coverage. School boundary shapefiles were overlaid with classified shade areas, and total shade coverage was normalized by school boundary area. Socioeconomic and demographic data were integrated from census datasets and school district reports. Schools were stratified into quartiles based on income, race/ethnicity, and urban-rural classification. Shade classifications were manually verified using ground-truth images to ensure accuracy.

### 4. Results/Outcomes/Products:

Preliminary findings indicate significant disparities in shade coverage. Schools in lower-income quartiles and those with higher racial minority populations had less shade coverage than wealthier, predominantly white schools, suggesting environmental inequities that may affect children's health.

### 5. Conclusion/Discussion/Significance:

These findings highlight the need for policy interventions and urban planning strategies to ensure equitable shade distribution and improve child health outcomes."

# HWISE as an indicator of water insecurity in Tanzania

**Lead presenter:** Thania Brinks Zuniga

**Faculty advisor:** Aminata Kilungo

**Other authors:** Noah Rios, Victor Okpanachi, Dr. Hussein Mohamed

## Background

Water insecurity is an important measure when addressing the challenges of climate change adaptation and mitigation strategies. Dar es Salaam, Tanzania, is a large city experiencing rapid urbanization, poverty, and significant water delivery challenges. Compounded by high temperatures and variable rainfall due to climate change, examining water security at the household level can illuminate the needs of vulnerable communities.

## Objectives

This study assessed the success of the Household Water Insecurity Experiences Scale (HWISE) in identifying water insecurity in low-resource areas with existing water insecurity in Dar es Salaam, Tanzania.

## Methods

In collaboration with the Muhimbili University of Health and Allied Sciences (MUHAS) and with permissions from the Tanzanian government, a 12-question HWISE survey and a household survey were administered in the districts of Kinondoni, Temeke, and Ilala. Surveys were administered in REDCap by MUHAS students in Kiswahili.

## Results

A total of 364 surveys were completed in 2023. The HWISE scale results showed that 98% of households were water secure, and only 2% were water insecure. However, the water-secure group exhibited common vulnerabilities such as inconsistent water access (21%), the need to travel over one kilometer to access water (66%), and the need to supplement their water source (23%).

## Conclusions

This study reveals a discrepancy between observed water insecurity indicators and HWISE scale results, indicating a need for revisions to HWISE. These revisions should capture factors such as time/distance to fetch water, frequency of trips to fetch water, economic burden, burden of waterborne illness/quality of water, and resilience.

# Microbial Transfer Comparison on Wet and Dry Laundry

**Lead presenter:** Abigail Cassius

**Faculty advisor:** Jonathan Sexton

**Other authors:** Jonathan Sexton, Royani Saha, Jack Picton, Kelly Reynolds

**Background**:

Although hospital laundering regulations protect employees from pathogens, these rules may not protect households.

**Objectives**:

This laundry study evaluates the transfer of organisms from dry and wet fabric to hands and assesses the number of organisms left on the hand.

**Methods**:

Laundry materials were seeded with 107 cfu/ml of Escherichia coli ATCC-25922, Staphylococcus aureus ATCC-43300, and 107 pfu/ml of Phi-X174 ATCC-13706B1 organisms. Participants handled fabric for five seconds to imitate dry, soiled laundry transfer into a washing machine and wet laundry to the dryer. Afterwards, the transfer was measured and evaluated from 30 participant trials per organism at the dry phase and repeated with deionized water (wet phase).

**Results**:

Experimental results demonstrate the concentrations of organisms on fabric after hand-cloth contact. Phi-X174‚Äôs concentration increased from 4.79 (SD 4.98) in dry trials to 5.92 (SD 5.90) in wet. Staphylococcus aureus and Escherichia coli's concentrations increased from 4.78 (SD 4.69) and 4.68 (SD 4.84) in dry trials to 5.45 (SD 5.56) and 5.53 (SD 5.64) in wet. This provides evidence that wet clothing poses a higher transfer risk compared to dry.

**Conclusion/Discussion:**

For medical professionals that launder their scrubs at home, there is an increased risk of exposure to the household, especially if clothing is wet. To ensure household safety, those that launder clothing at home are recommended to wash their hands and disinfect surfaces to prevent further microbial contamination. Finally, this study brings awareness to the dangers of handling soiled garments and serves as a baseline for future risk models.

# Air Pollution Exposure and Socioeconomic Deprivation across Mexican Municipalities

**Lead presenter:** Yifan Chao

**Faculty advisor:** Chris Lim

**Background**: Air pollution inequities have been extensively studied in developed countries. However, there is a research gap on such disparities in low- and middle-income countries.

**Objectives**: This study aims to evaluate the disparity in air pollution exposure in Mexico, given its large population size and distinct sociodemographic patterns.

**Methods**: We extracted PM2.5 and NO2 data from satellite-constrained atmospheric models and satellite re-estimated models. We generated population-weighted air pollution levels to capture actual exposure experienced at the municipality level. Air pollution data were linked to socioeconomic indicators obtained from the 2020 Mexico Census. The indicators include language use, education level, access to basic utilities, indigenous population, Afro-Mexican population, and Gross Domestic Product (GDP). We performed data visualization to explore temporal and geospatial patterns and conducted both correlation analysis and t-tests to investigate the relationship between air pollution levels and socioeconomic indicators.

**Results**: Municipalities with larger Afro-Mexican populations, a higher proportion of post-secondary education attainment, and greater GDP growth tend to experience higher PM2.5 and NO2 levels. Conversely, those with higher illiteracy rates, lower education levels, and more pronounced infrastructure deprivation generally face lower exposure levels.

**Discussion**: The analysis reveals that elevated air pollution disproportionately affects urbanized, economically developed municipalities and areas with higher concentration of Afro-Mexicans, who comprise less than 2% of Mexico total population. These findings raise significant environmental justice concerns and may further inform public health officials and policymakers in identifying disadvantaged municipalities and prioritizing resources for mitigation and regulations.

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## A Cry Unheard: Gaps in Tanzania Mental Health Care

**Lead presenter:** McKenna Dellinger

**Faculty advisor:** Sommer Aldulaimi, MD

**Other authors:** Noah, Linskey; Bryce, McWhorter

**Background**:

The World Health Organization (WHO) reports that in 2019 the suicide rate was 4.27 per 100,000 people in Tanzania. Specifically, the rate for females was 1.6 per 100,000 while the rate for males is 6.6 per 100,000. In 2020, there were only 1.3 mental health workers for every 100,000 Tanzanian citizens.

**Objectives**:

To draw attention to the potential relationship between access to mental health services and suicide rates in Tanzania, and to investigate why Tanzanian men have a significantly higher risk of suicide as compared to women. Lastly, to recognize potential barriers to the implementation of mental health initiatives in Tanzania.

**Methods/Activity:**

We examined the case of a 20-year-old male who presented to the emergency department of Songambele Hospital in Tanzania with intentional ingestion of organophosphate pesticides. Despite this patient's active suicide attempt, no mental health services were provided upon discharge. This case report motivated us to research the prevalence of suicide and the availability of mental health resources in Tanzania to develop a thorough understanding of the current research landscape.

**Results/Outcomes/Products:**

Our externship experiences and research investigation suggest a potential relationship between access to mental health services and suicide rates in Tanzania, in conjunction with certain cultural perspectives and other possible factors.

**Discussion**:

This submission aims to highlight the mental health disparities among different populations in Tanzania. A lack of mental health initiatives likely contributes to higher suicide rates, especially among men. The relationship between Tanzanian suicide rates and access to mental health services demands further investigation.

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# Tuberculosis Stigma and Healthcare Burdens in Indonesia: A Qualitative Analysis

**Lead presenter:** Lady Dorothy Elli

**Faculty advisor:** Priscilla Magrath

**Other authors:** Siwi Wijayanti, Priscilla Magrath

Tuberculosis (TB) stigma remains a critical barrier to achieving TB elimination in Indonesia, impacting treatment adherence, healthcare delivery, and patient well-being. This study examines the experiences and perceptions of TB stigma among TB patients and healthcare workers in Purwokerto, Indonesia, and its broader implications for healthcare service provision.

Using a qualitative research design, we conducted semi-structured interviews with 15 participants, including TB patients, community health advocates (MSI kader), and TB programmers from five puskesmas (community health centers).

Participants were selected through purposive sampling to ensure diverse representation of stigma-related experiences. Data were analyzed using qualitative thematic analysis, involving an iterative coding process to identify patterns across stigma, healthcare experiences, and systemic challenges. TB patients reported minimal direct discrimination but expressed self-stigma, shame (malu), and fear (takut), leading to reluctance in disclosing diagnoses due to concerns about social exclusion.

Healthcare workers, particularly TB programmers and MSI kader, described emotional exhaustion, frustration, and burnout, compounded by resource limitations and a lack of financial support. Many MSI kader expressed interest in retirement, with fewer individuals entering the field.

Beyond stigma, findings highlight occupational stress, healthcare worker shortages, and systemic constraints that hinder effective TB care. These insights contribute to ongoing TB stigma research, reinforcing the need for culturally relevant interventions and sustainable healthcare models. Aligning with global TB elimination goals for 2030, addressing stigma, burnout, and systemic barriers is essential for improving treatment adherence and long-term public health outcomes in Indonesia.

## Assessing Healthcare Accessibility in Rural Areas of Pima County

**Lead presenter:** Nasrin Fatima

**Faculty advisor:** Chris Lim

### Background

Healthcare accessibility remains a critical challenge in rural and low population density areas, where residents often travel long distances to medical facilities.

### Objectives

This study evaluates disparities in healthcare access across Pima County, Arizona, by analyzing the spatial distribution of hospitals and residential buildings within census tracts classified by population density.

### Methods

We utilized US Structure Data to identify the residential and building locations in Pima County. We analyzed 2010 census tract data for Pima County, categorizing tracts by population density using the Rural-Urban Commuting Area (RUCA) data. The distance to the nearest hospital was calculated for each residential building, and travel times were compared between census tract centroids and individual residences in low-density areas. A two-sample t-test was conducted to assess statistical differences of travel times.

### Results

Findings indicate that high-density urban areas have an average hospital distance of 2.21 miles, while low-density rural areas experience significantly longer distances, averaging 10.82 miles. The overall mean travel time from census tract centroids was 48.08 minutes, whereas individual residences had a shorter mean travel time of 27.36 minutes. Statistical analysis ($p<0.01$) confirmed a significant difference, with census tract centroids overestimating travel time by approximately 20 minutes.

### Conclusion

Significant disparities in healthcare accessibility exist between urban and rural areas of Pima County. While using census tract centroids may overestimate travel times, our findings highlight substantial challenges in accessing healthcare for residents in low-density areas. These results underscore the need for targeted interventions to improve healthcare access in rural Pima County.

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# Investigating G3BP1 in the cGAS-STING Signaling Pathway

**Lead presenter:** Gabriela Fragozo

**Faculty advisor:** Haining Zhu

ALS is a neurodegenerative disease characterized by its effects on the nervous system as a result of directly impacting motor neurons. Degenerative progression varies per individual, often this progression is reflected through levels of neuroinflammation. In an effort to better comprehend the role of neuroinflammation, the cGAS/STING pathway has become of great interest.

We recently found that G3BP1 (an RNA binding protein implicated in ALS) facilitates the activation of cGAS/STING upon exposure to cytosolic DNA. In addition, we have also found a heavy decrease in STING expression in human lung G3BP1-KO cells. We plan to further investigate how G3BP1 effects cGAS/STING activation in neurons.

To develop a model regarding the G3BP1-cGAS/STING pathway In neurons, we generated G3BP1 knockout line using the mouse neuroblastoma N2a cells. We are currently investigating how G3BP1 mediates the G3BP1-cGAS/STING inflammation response pathway in the context of familial ALS model.

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# Stated Preference Studies on Global HIV Care & Prevention (2018-2022)

**Lead presenter:** Kai Glahn

**Faculty advisor:** Maiya Block Ngaybe

**Other authors:** Maiya G Block Ngaybe, MPH, Priyanka Ravi, MDS, Kai Glahn, MA, Arturo Rosales, MPH, Josv© L Camarena, PSM, Flavia Miiro, MS5, Maia Ingram, MPH, John Ehiri, PhD, MPH, Gabriela Valdez, PhD, Purnima Madhivanan, MBBS, MPH, PhD

### Background

Globally, over 39.0 million individuals live with HIV/AIDS, and diverse HIV prevention and care services are emerging. Understanding the willingness to engage in such services is essential. Stated preference research methods help predict factors influencing health behaviors.

### Objectives

This systematic review summarizes findings of stated preference studies on adults choices to engage in HIV prevention/care and examines heterogeneity in findings.

### Methods

We searched PubMed, PsycINFO, Embase, Scopus, CINAHL, and gray literature for studies published from January 1st, 2018, until October 28th, 2022, with no restrictions on language or location of studies. An information specialist developed a search strategy based on a previous scoping review (Humphrey et al., 2019). Covidence was used for screening and extracting data. Two researchers independently reviewed and compiled the final set of articles. PRISMA guidelines were followed, and PREFS and AMSTAR checklists assessed risk of bias.

### Results

Of 2,970 screened studies, 71 were included, covering 34,558 participants. Most used discrete choice experiments, were published in 2022, and conducted in Africa. Attributes most reported were location (55%) and cost (39%). Among HIV care-related studies, participants valued respectful providers (20%) and health improvement (16%). Among HIV prevention-related studies, participants valued cost (28%), confidentiality (23%), and product type (21%).

### Conclusion

Location and cost significantly influence decision-making across HIV services. Future reviews should conduct meta-analyses on specific attributes and stated preference studies should examine upcoming products like the HIV vaccine and broadly neutralizing antibodies, while more systematically collecting and reporting sociodemographic information."

# Stigma and Discrimination Among Veterans with PTSD with Service Animals

**Lead presenter:** Molly Hofer

**Faculty advisor:** Maggie O'Haire

**Other authors:** Sarah C. Leighton, Clare L. Jensen, Zane R. Burrows, Molly E. Hofer, Marguerite E. O'Haire

**Background**: Individuals with disabilities experience valuable benefits from service dog partnerships but may also experience challenges. For example, individuals with invisible disabilities, such as posttraumatic stress disorder (PTSD), may face stigma about needing a service animal. There are inconsistencies among laws that interfere with service dog teams access to public spaces. These experiences may deter service dog partners from taking their dogs into public.

**Objective**: Our objective was to investigate the impact of service dog partnerships on experiences of stigma and discrimination among veterans with PTSD.

**Methods**: Participants were recruited from non-profit service dog provider databases as part of a larger randomized clinical trial. Fifty-two veterans with PTSD contributed perceived stigma and discrimination data for this secondary analysis. Assessments were conducted at 0 months (before partnership) and 6-months follow-up. Linear regression analyses controlled for demographic characteristics (age, gender identity, etc.) and baseline scores.

**Results**: Regression analyses showed that at 6 months, service dog partnership was not associated with significant differences in perceived stigma (b = -1.16, SE = 1.38, p = 0.405) or discrimination (b = -0.79, se = 1.19, p = 0.507).

**Discussion**: Service dog partnership did not increase perceived stigma or discrimination in this sample. Research with larger samples and longer follow-up periods is needed to confirm these findings. These findings have the potential to contribute to the optimization of the integrative health intervention of service animal partnerships by shedding light on this critical area of inclusion for individuals with disabilities.

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# Antenatal Depressive Symptoms Predict Cesarean Birth

**Lead  presenter:** RueShunda  Jim

**Other authors:** Erin George Ph.D., CNM; Elise Erickson Ph.D., CNM

**Background**: In 2023, the Cesarean Delivery (CD) rate in the United States rose to 32.4%, with a notable increase in nulliparous patients. Concurrently, maternal depression remains a significant concern, with 1 in 5 women not being screened for depression during prenatal visits. Previous studies have not established a clear association between antenatal depression and CD, although women of color experience higher rates of complications, including CD.

**Objectives**: This study aims to examine the relationship between antenatal depressive symptoms and the mode of delivery, utilizing data from the Nulliparous Pregnancy Outcomes Study: Monitoring Mothers-to-Be (NuMoM2b), which enrolled first-time mothers and assessed depression using the Edinburgh Postnatal Depression Scale (EPDS) given during the patients, third trimester.

**Methods**: Statistical analyses, including chi-square tests and logistic regression, were performed to explore the impact of depressive symptoms, maternal characteristics, and comorbidities on CD. The study included 2,273 participants, after inclusion criteria were applied with significant findings across racial groups.

**Results**: Results indicated that a 1-point increase in EPDS score was associated with a 2.6% increase in the odds of CD (p=0.024). Furthermore, increased BMI and age were also linked to higher CD rates. The treatment of depression was associated with a 27% reduction in CD odds.

**Discussion**: This study highlights the potential influence of untreated depressive symptoms on delivery outcomes, suggesting that maternal mental health interventions may reduce CD rates. Further research is needed to understand the direct and indirect impacts of depressive symptoms on pregnancy outcomes within pregnant populations.

# Chronic Kidney Disease of Unknown Etiology in Nepali Migrant Workers

**Lead presenter:** Ika Lin

**Faculty advisor:** Mary Fox

**Other authors:** Aishwarya Dabholkar, Mary Fox

### Introduction

Characterized by declining renal function, chronic kidney disease of unknown etiology (CKDu) is a growing global health concern. While CKDu rates have increased among manual laborers in low- and middle-income countries exposed to heat stress, definitive risk factors and underlying etiologies are not yet identified. One population of concern is Nepali migrant workers (NMW). Gulf Cooperation Council countries and Malaysia - the destinations of 88% of NMW - routinely experience extreme heat events. Compounded by long working hours and limited access to drinking water, heat-related illnesses, including kidney disease, are increasingly reported.

### Objectives

This umbrella review summarized existing CKDu literature, identified exposures, synthesized knowledge deficits, and reported research, policy, and practice recommendations.

### Methods

PubMed, Embase, and Scopus were searched for results from 2013 to 2023. After assessing for inclusion, thirteen (13) reviews were included for full-text screening.

### Results

Risk factors fell under two categories: occupational hazards and environmental exposures. Substantial heterogeneity in associations point to research limitations, the most prominent being single time point study designs and variable methods in CKDu definition and exposure assessment. Notably, migrant populations were not included in the 13 reviews.

### Conclusion

Findings from this study will inform the Enhanced Network for Safety and Occupational Health Utilisation and Risk Evaluation (ENSURE) project. Spearheaded by La Isla Network, ENSURE-Nepal is a four-year project to assess the socioeconomic and health exposures that prompt migration. Ultimately, this project will aid in designing and implementing scalable interventions to protect workers health.

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# Contextual Predictors of Sleep Coaching Acceptability among Fire Service Workers

**Lead presenter:** Matthew Lujan

**Faculty advisor:** Patricia Haynes

**Other authors:** Siyuan Huang, Erin Rael, Dana R. Epstein, Matthew Buman, Daniel J. Taylor, Michael A. Grandner, Edward Bedrick, David A. Glickenstein

**BACKGROUND**: Sleep disorders are common in the fire service, yet few agencies have adopted evidence-based sleep health workplace wellness programs.

**OBJECTIVES**: As part of a pre-implementation assessment, this project examined contextual factors that predict the acceptability of a new sleep health coaching program among workers in 20 Arizona fire agencies.

**METHODS**: Cross-sectional survey data were analyzed from non-manager fire service personnel (n=145). Program acceptability was measured using the Acceptability of Intervention Measure. Contextual factors were assessed via the Organizational Readiness for Change Assessment (ORCA) subscales, including culture among captains, culture among senior leadership, leadership, measurement, readiness for change among opinion leaders, and resources. The ORCA instrument aligns with the integrated Promoting Action on Research Implementation in Health Services (i-PARIHS) framework. Linear regression examined contextual predictors of program acceptability.

**RESULTS**: Participants (M age = 38.89, SD = 9.35) had an average tenure of 10.17 years (SD = 9.35). Greater readiness for change among opinion leaders was associated with higher program acceptability ($\beta$ = 0.05, SE = 0.02, p < 0.001). Leadership factors generally did not predict acceptability, except for senior leadership culture. Worse evaluations of senior leadership culture were associated with higher program acceptability ($\beta$ = -0.06, SE = 0.03, p < 0.05).

**CONCLUSION**: Opinion leaders, including union members, are key champions for implementing sleep health coaching in the fire service. These findings underscore the importance of using measures like ORCA, that align with theory-informed implementation frameworks such as i-PARIHS, to identify facilitators and barriers to successful adoption in occupational settings.

# Association Between Heat Exposure and Low Birth Weight in Newborns

**Lead presenter:** Paulina Luna Ramirez

**Faculty advisor:** Melissa Furlong

**Background**:
Extreme heat events have increased throughout the years due to climate change, threatening human health. Exposure to such events during pregnancy causes alterations in the metabolism and physiology of the fetus leading to preterm birth, low birth weight, and stillbirth.

**Objective**:
In this review, we aimed to synthesize and evaluate current literature about the association between extreme heat exposure and low birth weight.

**Methods**:
To achieve this, we analyzed the data obtained from epidemiological studies performed to find an association. Databases used included PubMed, Scopus, Web of Science and Embase. Studies done in animals, thesis dissertations, reviews, and work published in languages other than English were excluded from this search. Data extracted from each article included author, year, study design, characterization of heat and low birth weight, sample size, exposure window, effect estimate, and statistical model. To compare the articles, a table was constructed with the data extracted.

**Results**:
A total of 23 articles were selected for this literature review based on the exclusion and inclusion criteria. The studies varied in geographical location, study design and methodologies for assessing the relationship between heat exposure and low birth weight. However, throughout the individual study results it is clear that exposure to a hot environment during pregnancy can lead to low birth weight in newborns.

**Conclusions**:
The implementation of more studies is essential to understand the mechanisms behind it and prevention measures for mothers that live in a hot climate.

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# Mapping Rabies Exposure Risk Using Bite Records in Blantyre, Malawi

**Lead presenter:** Precious Mastala

**Faculty advisor:** Janelisa Musaya

**Other authors:** Patrick Ken Kalonde, Ernest Chikhola, Jordana Burdon Bailey, Joseph Nkhoma, Frederic Lohr, Thoko Kapalamula, Dagmar Mayer, Catherine Wood, Stella Mazeri Precious Innocent Mastala, Janelisa Musaya

**Background**

Rabies remains a major public health challenge in low- and middle-income countries (LMICs), with dogs as the primary reservoir. Limited surveillance funding hampers data collection, making it difficult to identify transmission hotspots.

**Objective**

This study set out to explore the potential of using veterinary clinical records on animal bites to map out active hotspots of potential rabies exposure through bites.

**Methods**

We digitized veterinary clinical records from January 2015 to May 2023 and geolocated bite incidents using Google Maps. We calculated cumulative incidence rates, mapped case distributions, and conducted prospective spatiotemporal scan analysis using SatScan. Finally, we visualized the results in QGIS.

**Results**

Of the 15,191 recorded bite cases, 15,178 were mapped to known communities, with an overall incidence of 163 cases/100,000 people/year. Blantyre City had the highest incidence (165/100,000 people/year), while Blantyre Rural recorded 20/100,000 people/year. We identified two significant hotspots: one spanning seven areas (RR = 5.36, $p \leq 0.001$) and another covering a single area (RR = 3.81, $p \leq 0.001$). Additionally, two cold spots were detected one spanning six areas in rural Blantyre (RR = 0.05, $p \leq 0.001$) and another covering three areas in Blantyre City (RR < 0.01, p ,â§ 0.001). Bite incidence and relative risk were highest in commercial areas compared to residential areas. Hotspots exhibited a significantly higher mean rabies exposure incidence (6.59 vs. 1.98 per 100,000 people per year, $p = 0.0013$).

**Conclusion**

Veterinary clinical bite records can be used to identify rabies exposure hotspots, enabling targeted interventions for rabies control.

# Human Rabies Incidence and Post-Exposure Access in Southern Malawi

**Lead presenter:**  Precious Mastala

**Faculty advisor:**  Janelisa Musaya

**Other authors:**  Tamanda Hiwa, Stella Mazeri

## Introduction

Rabies, a fatal public health threat, remains a significant burden in Low- and Middle-Income Countries (LMICs) due to high mortality and challenges in accessing post-exposure prophylaxis (PEP). Limited data on disease burden, risks, and vulnerabilities hinder effective control strategies.

## Objectives

This study assessed human rabies incidence, PEP access, barriers, issuance patterns, and vaccine availability in Blantyre, Zomba, Machinga, and Chiradzulu districts.

## Methods

A mixed-methods study was conducted in public hospitals and District Health Offices across Blantyre, Zomba, Machinga, and Chiradzulu districts. Retrospective data (2008‚Äì2023) on human rabies cases, anti-rabies vaccination and vaccine stocks were analyzed, alongside interviews with 8 District Health Officers and 16 patients. Data analysis was performed using R and NVivo.

## Results

A total of 94 rabies deaths were recorded: 19 in Chiradzulu, 8 in Machinga, 38 in Zomba, and 29 in Blantyre. Anti-rabies vaccines were available in all districts, but human rabies immunoglobulins (HRIG) were not stored. Monthly vaccine consumption varied significantly: 91.4 ($p<0.0001$) in Blantyre, 32.5 ($p<0.0001$) in Chiradzulu, 149 ($p<0.0001$) in Machinga, and 570 ($p<0.0001$) in Zomba. The mean annual stock-out days were 18.55 ($p=0.00001$), with no significant differences between districts ($p=0.0663$). PEP access was hindered by stockouts, distance, and financial constraints. Vaccination schedules and injection techniques also varied across districts.

## Conclusion

The study highlights persistent rabies-related deaths, exacerbated by HRIG absence and frequent vaccine shortages. Addressing stockouts and adopting intradermal administration as recommended by the World Health Organization could reduce vaccine use per case by up to 80%, significantly lowering the stockouts.

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# Effectiveness of Low-Sodium Diets in Hypertension Management

**Lead presenter:** Mohammed Najeeb Naabo

**Faculty advisor:** Nicole P. Yuan

**Other authors:** Burris Duncan Loveryn Margaret Naa Densua Dodu

**Background**:

Hypertension, often called ""the silent killer,"" affects over 1.28 billion people globally and is a leading cause of cardiovascular disease, stroke, and kidney failure. Yet, only 21% of affected individuals have their condition under control. Excessive sodium intake is a major risk factor, contributing to increased blood pressure and related complications. This systematized review evaluates the effectiveness of low-sodium diet interventions in managing hypertension and reducing cardiovascular risk.

**Methods**:

A systematized review of PubMed identified relevant studies published in the past five years. Inclusion criteria focused on community-based interventions targeting hypertensive adults aged 40 and older. Studies assessing blood pressure reduction through dietary sodium restrictions or salt substitutes were analyzed.

**Results**:

Five studies, including randomized controlled trials and observational studies, met the inclusion criteria. Findings demonstrated that sodium reduction strategies significantly lowered systolic blood pressure (by 4.6 –16 mmHg) and moderately reduced diastolic blood pressure. While all studies reported benefits, adherence challenges, cultural dietary habits, and limited access to low-sodium alternatives were key barriers.

**Conclusion**:

Low-sodium diet interventions effectively reduce blood pressure and serve as a viable non-pharmacological strategy for hypertension management. Public health efforts should focus on increasing awareness, improving access to low-sodium food options, and advocating for industry regulations. Future research should explore long-term sustainability and personalized approaches to sodium reduction across diverse populations.

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# Asymptomatic malaria infection and pregnancy outcome in Delta State Nigeria

**Lead presenter:** Sadiatu Sally Obi

**Faculty advisor:** Davis W Sumner

**Other authors:** Obi, Sadiatu Sally; Adebe Gabriel; Adjekuko Collins; Nze Francis Ikechukwu; Odili-Igba Ann; Ogirisen Felix; Ajani Dele; Tiana Garrett-Cherry; W. Sumner Davies

Pregnant women are vulnerable due to the pregnancy-induced suppressed immunity in malaria-endemic areas. Asymptomatic malaria in pregnancy (MiP) threatens both the mother, fetus, and neonate via chronic placental malaria which impacts maternal-neonatal exchange. Some studies reported that MiP risk factors vary across locations, however, there are few studies on MiP and pregnancy outcome in Nigeria.

The purpose of this study was to investigate the association between asymptomatic placental malaria infection and pregnancy outcome among parturients in Asaba, Delta State, Nigeria.

This study was developed with a quantitative methodology that utilized primary and secondary healthcare data from 483 subjects aged 18–49 years from four healthcare facilities between May and July 2021. The Socio-Ecological Model framework was used to explain how parturients can achieve improved pregnancy outcome via the mobilization of multi-levels supports to enhance the compliance of parturients to malaria interventions. Three research questions with three sets of hypotheses were tested with the binomial logistic regression and Chi-square tests. The findings showed a statistically significant association between placental malaria parasitemia by microscopy, intermittent preventive treatment in pregnancy with sulfadoxine-pyrimethamine, use of complementary and alternative medicine, and pregnancy outcome in the study population.

The findings of this study could inform malaria control policymaking in Asaba and Delta State on tracking and treating asymptomatic malaria among underserved parturients accessing antenatal services.

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# Utilizing NLP to Analyze Veteran Surveys on Service Dog Impact

**Lead presenter:** Mercedes Ortiz

**Faculty advisor:** Maggie O'Haire

**Other authors:** Maggie O'Haire

## Background

Veteran mental health is a critical public health concern. For veterans with PTSD, psychiatric service dog partnership has been linked to improved mental health. Qualitative research provides valuable insight on the lived experiences of veteran families participating in service dog programs. However, traditional qualitative analysis manually coding responses time-intensive and limits the scale of analysis. Natural language processing (NLP) uses machine learning to analyze human language data and may offer an innovative approach to analyzing qualitative data in veterans' healthcare research.

## Objective

This project explores the conceptual feasibility and applicability of NLP in streamlining and enhancing qualitative analysis of veteran families survey responses.

## Methods

Nationwide surveys were administered to veterans with PTSD partnered with psychiatric service dogs, and their spouses. Qualitative items asked about helpful aspects, trained behaviors, and drawbacks of service dog partnership. Responses were manually coded using conventional content analysis. This study assessed (1) feasibility of training an NLP model with prior data and (2) applicability of specific NLP approaches to the dataset.

## Results

A total of 618 responses (206 per item) were eligible for NLP training. Manual coding produced 214 codes, 45 categories, and three themes. The most applicable NLP approaches were Topic Modeling and Word2Vec.

## Conclusion

Results indicate sufficient data and manual codes to train and validate an NLP model for replicable use. This contributes to discussions on NLP feasibility for qualitative analysis in public health research and its potential to enhance understanding of service dog effects on veteran mental health.

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# Sex-Based Differences in Vehicle Seating Position and Safety Outcomes

**Lead presenter:** Juliana Panhorst

**Other authors:** Alyssa Ryan

**Other authors:** Saquib M Haroon, Juliana Panhorst, Saquib Mohammed Haroon, Alyssa Ryan.

## Background

Understanding seating position is vital to creating designs that lead to safe outcomes for diverse vehicle occupants. Current vehicle designs hold a significant role in health outcomes, but often fail to account for demographic and anthropometric driver differences. Male dimensions had been the standard for vehicle testing until the early 2000s in the U.S., until 2006, when testing for the 5th percentile female dummy was introduced. However, this 5th percentile dummy, which is still used today, is based on scaled male data and is only ever tested in passenger positions. Furthermore, research has shown that a 17.2% gap persists between male and female injury severity in comparable crash conditions.

## Objectives

This study investigates how seating distance from the steering wheel varies between male and female sexes across sociodemographic, vehicle, and individual characteristics to analyze existing disparities. Specifically, this study identified sex differences in seat positioning considering age, education, income, height, and vehicle make/model, as well as driving history and safety awareness.

## Methods

Data were collected using a questionnaire administered via the Prolific platform. To address potential biases, propensity score matching (PSM) was employed.

## Results

The analysis revealed that female drivers consistently sit closer to the steering wheel than male drivers even when accounting for driver height to a significant degree. This finding was confirmed through a Welch Two Sample t-test, underscoring a sex-based disparity in seating positions.

## Conclusion

The results suggest that vehicle design should consider sex-based ergonomic differences to enhance health and safety.

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# Metal Binding Mechanism by Substrate Binding Proteins (PiA and PiU)

**Lead presenter:** Sakshi Parate

**Faculty advisor:** Dr Michael Johnson

**Other authors:** Yamil Sanchez-Rosario, Meredythe M. Durckel, Dr. Michael D.L Johnson, Mahi Rohilla

**Introduction:**
Metal ion homeostasis is crucial for bacterial survival and virulence, balancing essential metal acquisition and toxicity avoidance. Streptococcus pneumoniae lacks a dedicated copper import system but accumulates copper through iron uptake pathways. Previous studies showed that iron uptake promotes copper accumulation in S. pneumoniae, suggesting an indirect mechanism for copper entry. Bacterial infections, including those caused by S. pneumoniae, remain a significant public health burden, contributing to respiratory infections, meningitis, and other diseases. Understanding bacterial metal transport systems could lead to the development of novel antimicrobial strategies.

**Methods:**
This study investigates the molecular mechanism underlying iron-dependent copper uptake in S. pneumoniae, focusing on the substrate-binding proteins PiA (SP_1032) and PiU (SP_1872). The proteins were expressed in Escherichia coli, purified using an AKTA system, and tested for binding with $Cu^{2+}$, $Fe^{2+}$, and $Fe^{3+}$. Metal binding was quantified using Inductively Coupled Plasma Optical Emission Spectrometry (ICP-OES).

**Results:**
Both PiA and PiU were found to bind copper and iron ions, highlighting their potential role in the iron-dependent copper uptake mechanism. The metal-binding assays revealed distinct binding patterns, suggesting that these proteins play a key role in copper accumulation when iron uptake is active.

**Conclusion:**
These findings provide insights into bacterial metal homeostasis and the mechanisms by which S. pneumoniae acquires copper and iron. Understanding these processes may inform the development of novel antimicrobial therapies targeting bacterial metal transport systems, ultimately contributing to the prevention and treatment of bacterial infections.

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# Understanding Trauma Patient Health Literacy and Patient Discharge

**Lead presenter:** Vivek Patil

**Faculty advisor:** Dr. Tawab Saljuqi

**Other authors:** Dr. Bellal Joseph Annabelle, Roldan; James, Rozelle; Dr. Bellal, Joseph; Dr. Tawab, Saljuqi

## Background

Discharge summaries (DS) are a tool widely used across healthcare environments to convey important information - essential for facilitating patient recovery and continuation of care beyond the hospital visit. Despite this, little research exists exploring DS retention and utilization, or factors that contribute to these behaviors.

## Objectives

We aim to better understand how patients view and use their DS and to identify the impact of factors such as low health literacy, socioeconomic status, and educational background on DS use.

## Methods

This study takes place through a Level I trauma center and ED. Research coordinators gather demographics and assess health literacy using SAHL (Short Assessment of Health Literacy). A phone interview is conducted post discharge, aimed at evaluating patients' discharge experiences and their interaction with discharge documents.

## Results

To date, we have completed 22 interviews. Data reveals two prevalent patient attitudes towards the DS: discharge documents are seen as either beneficial for the patients themselves, or as serving the hospital's administrative functions. We also observe significant variability in satisfaction with DS. Dissatisfaction tends to be grounded in insufficient DS detail.

## Conclusion

Discharge summaries are a nearly universal element of the discharge process, yet patient utility of DS is highly variable. This appears to stem from a high degree of variability in the content and thoroughness of DS, and from patient expectations. More work is needed to identify the contributions of health literacy, patient complexity, and other variables on the utility of DS.

# Falls Free City: Outdoor Built Environment Factors for Fall Prevention

**Lead presenter:** Elaina Richards

**Faculty advisor:** Dan Derksen

**Other authors:** Dr. Tawab Saljuqi

**Background**: Falls are a leading cause of death for older adults. Physical activity is the primary recommendation for fall prevention, yet prior research on fall risk lacks consideration of the effect of the neighborhood built environment on physical activity behaviors.

**Objectives**: Review existing fall prevention literature for measurement of the effect of the neighborhood environment on physical activity behaviors. Assess the behaviors of community members engaged in outdoor physical activity and perceptions of their neighborhood infrastructure for physical activity.

**Methods:** Mixed-methods were used to develop a community survey. Literature review keywords fall prevention, older adults, and built environment, identified gaps used to develop survey questions. Questions assessed demographic characteristics; rate and type of physical activity; perception of safety in neighborhood environment; and selection of infrastructure to increase neighborhood mobility. Adults of all ages were randomly recruited during six visits to a community outdoor recreation area in Tucson.

**Results**: The safety of the outdoor environment was identified as the greatest barrier to mobility for daily life activities, and to mobility without an automobile. More, safer, and shaded sidewalks and benches were the leading infrastructure selections to increase outdoor mobility.

**Conclusion**: This is a preliminary assessment of the overlooked context of the neighborhood and built environment in fall prevention. Overall, adults who exercise outdoors do not primarily do so in their own neighborhoods. The safety and lack of pedestrian neighborhood infrastructure are the primary reasons. Adaptation and application of these methods should be used in future evaluation of factors for fall risk.

# Arizona Falls Prevention Integrative Network Capacity Assessment

**Lead presenter:** Elaina Richards

**Faculty advisor:** Tawab Saljuqi

**Other authors:** Dr. Tawab Saljuqi, Veev Lovato, Mon Lacea, Kayla Silva Maravilla

**Background**: Preventable falls among people aged 65 years and older are the primary cause of unintentional injury-related deaths among people in this age group. There continue to be gaps in interventions across the continuum of care. Greater understanding is needed from stakeholders across Arizona involved in fall prevention efforts to achieve policy goals to make Arizona a fall free state.

**Objectives**: Identify and assess involvement, perception, and barriers to stakeholders in the public and private sectors to establish the Arizona Falls Prevention Integrative Network (AFPIN) for collaboration on fall prevention.

**Methods**: The capacity assessment tool is a qualitative semi-structured interview questionnaire and focus group discussions. Interviews elicit individual perceptions and involvement with fall prevention efforts. The focus group discussions bring stakeholders together to discuss the collaborative capacity and goals for a stronger network of care.

**Results**: Analysis revealed high interest in a collaborative system to address fall risk and prevention. Barriers include the need for funding, high turnover rates in current collaborative leadership, a lack of shared data among providers to identify patients at risk, and a need for increased Spanish language prevention education tools.

**Conclusion**: To the best of our knowledge this is the first time this methodology has been used to assess the capacity of stakeholders in fall prevention in the United States. The assessment tool will continue to be used to assess a larger range of organizational, programming, informational, and contextual needs for fall prevention.

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# Cohort Study on Trauma Patient Enrollment in Fall Prevention Programs

**Lead presenter:** Elaina Richards

**Faculty advisor:** Tawab Saljuqi

**Other authors:** cMon Lacea, Veev Lovato, Charity Moparthy, Jessica Kendricks, Taylor Liddle, Maddie Schaffrath

**Background**: Preventable falls among people aged 65 years and older are the primary cause of unintentional injury-related deaths among people in this age group. There continue to be gaps in hospital service provider referrals to fall prevention programs. Data is needed on whether patients admitted to the hospital for fall-related trauma receive information about services to prevent future falls.

**Objectives**: Assess in-hospital patient experience, concern, and history of primary care provider education about fall risk. Assess patient referral to fall prevention programs after discharge from the hospital. Quantify the rate at which hospital service providers discuss fall prevention with patients.

**Methods**: Trauma patients are screened upon arrival to the emergency department for ground-level falls, over 65, with GCS 15. In-hospital recruitment and surveys about the conditions of the fall are conducted. Follow-up surveys are conducted a week after discharge, assessing hospital referral to fall prevention programs, as well as potential barriers to participation.

**Results**: Of 165 patients enrolled, none were referred to fall prevention programs by medical providers. Study participants revealed a range of understanding of fall risk and prevention, from belief of personal clumsiness, to experience with physical therapy that reduced their risk of falling.

**Conclusion**: There are major gaps in the continuum of care for patients who are at high risk for fall related-injury and death. Future research into provider referral to fall prevention programs should focus on provider perception and awareness of fall prevention programs.

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## The Hygienic Scholar: The Science of Keeping Study Spaces Clean

**Lead presenter:** Royani Saha

**Faculty advisor:** Kelly Reynolds

**Other authors:** Jonathan Sexton, Jack L. Picton, Alexia Vance

**Background**:

Fomite-mediated microbial transmission contributes to disease spread, especially in shared study spaces. Libraries and university workspaces serve as contamination hotspots. This study assesses hygiene interventions to mitigate microbial transmission in these environments.

**Objectives**:

This study evaluates the effectiveness of cleaning strategies in reducing fomite contamination. We hypothesize that structured hygiene interventions, particularly those promoting personal responsibility, will significantly decrease contamination.

**Methods**:

Bacteriophage Phi X174, a non-pathogenic microbial tracer, was used to assess six intervention scenarios: a baseline (no intervention), two cleaning strategies (basic and targeted hygiene), and three personal responsibility initiatives encouraging student-led cleaning with visual reminders. Fifteen high-touch fomites were sampled, including staplers, armrests, and keyboards. The double-agar overlay technique quantified contamination levels. A paired t-test ($p < 0.05$) assessed the intervention efficacy.

**Results**:

Staplers (570.0 ± 828.0 PFUs/cm$^2$), armrests (255.0 ± 394.0 PFUs/cm$^2$), and keyboards (48.3 ± 32.5 PFUs/cm$^2$) were the most contaminated. Personal responsibility with disinfecting wipes reduced contamination by 70%, followed by targeted hygiene (61%). Paired t-tests confirmed targeted cleaning was significantly more effective than basic cleaning ($p < 0.05$). Hand hygiene alone was insufficient.

**Discussion**:

Structured hygiene interventions effectively reduce fomite-mediated transmission. Personal responsibility further enhances outcomes, emphasizing an integrated approach combining surface disinfection and hand hygiene. Findings support behavioral nudges in hygiene promotion. Implementing accessible hygiene resources fosters safer study environments.

# Smartphone-Based Health Monitoring: Using Machine Learning to Detect Behavioral Changes

**Lead presenter:** Hannah Ngoc Vu

**Faculty advisor:** Eung-Joo Lee

**Other authors:** Kim, SeongHyun; Torous, John; Eung-Joo Lee,

**Background**: Digital phenotyping involves using devices such as smartphones to measure and quantify behavioral activity and can be an accessible and cost-effective means of collecting moment-to-moment data. Detecting abnormalities, baselines, and trajectories within individuals patterns can potentially help identify changes in symptomatology, as well as measure treatment efficacy.

**Objectives**: In collaboration with the Accelerating Medicines Partnership (AMP®) SCZ non-interventional longitudinal cohort study, we are replicating a computational model that can detect changes in routine. Our objective is to help contribute to the prediction of conversion to psychosis for patients with clinical high risk for schizophrenia.

**Methods**: Using collected GPS, accelerometer, and screen state data across 110 at-risk participants, we wrote a machine learning code that is able to detect behavioral routine anomalies. This method utilizes similarity matrices, hierarchical clustering, and the isolation forest algorithm to flag anomalies at specific time points for each participant.

**Outcomes**: At present, our algorithm is able to produce anomaly timestamps (date, time) given a designated time frame of interest (i.e., Mondays 9am-5pm). These timestamps would then be compared with mood score surveys to evaluate the validity and reliability of the algorithm.

**Discussion**: Further applications of this method could involve developing tools that can help detect behavioral risk factors for other diseases of interest as well as monitor and analyze patient behavior in clinical and research settings. Having a machine learning method that can statistically categorize behavioral data can help expand our understanding of how mental illness symptoms can manifest respective to each individual.

# The relationship between maternal oxytocin levels and childhood adversity

**Lead presenter:** Paige Wagstaff

**Faculty advisor:** Stacey Tecot

**Other authors:** Katie King, Allison Hays, Alicia Allen, Linnea Linde-Krieger, Lela Rankin, Stacey Tecot

## Background

Expecting parents undergo physiological changes critical for bonding with their infant, but childhood adversity can affect physiological responses throughout an individual's life. Therefore, it important to determine the effects of childhood adversity on the physiological response in new parents.

## Objectives

We hypothesized that mothers with early life adversity would have a smaller average and increase in oxytocin (OT), a hormone known for its role in bonding, during the peri-partum period due to dysregulation of physiological responses.

## Methods

To understand how adversity may influence parenting we explored the relationship between childhood adversity and concentrations of OT. We analyzed data from 29 participants enrolled in Observing Relationships between Caregiving and Hormones after Infant Delivery (ORCHID) study. Participants identified as Hispanic (55.2%), White (41.4%), and Native American (3.4%), average age of 29.55, and live in Phoenix and Tucson. Pre-partum, participants completed the Adverse Childhood Events (ACEs) questionnaire and provided a baseline saliva sample. Postpartum, participants provided weekly saliva samples for 12 weeks, and in months 4 and 5.

## Results

ACE scores ranged from 0-10 with an average of 5.207. Using a regression model, ACE score significantly predicted mean early postpartum OT concentrations (β= 0.44, p= 0.016) and the average change in OT across postpartum weeks one through five (β= 0.41, p= 0.028).

## Conclusion

Contrary to our prediction, there was a positive correlation between OT and ACE score. This result may reflect resilience in parents with childhood adversity if higher OT levels act as a compensatory mechanism to overcome lower OT receptor function.

# Impact of Dry Contaminants on Slipping: Implications for Public Health

**Lead presenter:** Lila Wayman

**Faculty advisor:** Jonathan Lee-Confer

**Other authors:** Lila Wayman & Jonathan Lee-Confer

**Background**: Slips and falls are a public health concern, with research focusing on wet contaminants like water and oil. As such, pedestrian floor standards mandate that accessible floors remain slip resistant, however, dry contaminants such as salt may also contribute to slip hazards.

**Objective**: This study aimed to determine the effects of dry contaminants on the coefficient of friction (COF).

**Methods**: A porcelain tile was tested under three levels of particle thickness (127µm, 254µm, and 508µm), leveled using a comb. A Mark IIIb tribometer measured COF in four orthogonal directions, with two trials per direction. A one-way ANOVA assessed whether COF was influenced by particle thickness ($\alpha$ = 0.05).

**Results**: The COF was 0.208 ± 0.01 for the uncontaminated tile, and 0.148 ± 0.008, 0.159 ± 0.009, and 0.163 ± 0.01 for the 127µm, 254µm, and 508µm levels, respectively. A significant main effect of contaminant thickness on COF was found ($F_{(3,28)}$ = 56.916, $p < 0.001$, partial $\eta^2$ = 0.859), indicating that particle thickness significantly influenced slip risk.

**Discussion**: This study demonstrates that dry contaminants reduce COF to unsafe levels, posing risks in residential and occupational settings.

**Significance**: The findings highlight the need for safety protocols addressing dry contaminants in slip prevention strategies. These results may inform floor surface maintenance standards (ASTM, OSHA, ADA) to enhance pedestrian safety and reduce fall-related injuries. Future research will examine additional flooring materials and various particle sizes (e.g., flour, sawdust, talcum) and present findings to organizations that establish flooring safety standards.

# Association of Pre-Conception and Pregnancy Pesticide Exposures with Apgar Scores

**Lead presenter:** Audrey R. Yang

**Faculty advisor:** Melissa Furlong

**Other authors:** Kimberly L. Parra, Kimberly Paul, Edward J. Bedrick, Beate Ritz, Paloma I. Beamer, Melissa A. Furlong

## Background

Studies suggest that pesticide exposures may contribute to neurodevelopmental delays in children. However, research on the effects of ambient pesticide exposures during preconception and gestation on newborn health is limited.

## Objectives

We aimed to assess the relationship between preconception and prenatal pesticide exposures and fetal neurological health using Apgar scores.

## Methods/Activities

We analyzed Arizona pesticide use registries and birth certificates (2006-2020), focusing on ingredients in the carbamate, organophosphate, and pyrethroid pesticide classes. Exposure was defined as living within 500m of a pesticide application, and preconception was defined as the 90-day period before conception. Newborn Apgar scores (<8 considered low) were obtained from the Arizona Pregnant Women Environmental and Reproductive Outcomes Study. We performed a logistic regression to evaluate the association of pesticide exposures at any point during preconception and/or pregnancy with low Apgar scores.

## Results/Outcomes/Products

Exposure to the carbamates class, carbaryl, and diazinon at any point during preconception and/or pregnancy was positively associated with low Apgar scores, while permethrin was negatively associated. During preconception, the ingredients diazinon, phorate, and esfenvalerate were positively associated. Our trimester-specific analysis found that exposure to the carbamate class, carbaryl, diazinon, and methomyl was positively associated. However, exposure to lambda-cyhalothrin, permethrin, and the pyrethroid class was negatively associated.

## Conclusion/Discussion/Significance of this research

We identified the preconception period as a sensitive exposure window. The observed inverse associations could be due to survival bias or chance finding. Prenatal exposure to certain organophosphates and carbamates increased the risk of a low Apgar score, which aligns with preexisting literature.

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# Associations between air pollution and cancer survivorship in the U.S

**Lead presenter:** Jeonggyo Yoon

**Faculty advisor:** Chris Lim
**Other authors:** Rena Jones, George Thurston

**Background**:

Emerging evidence suggests that exposure to ambient particulate matter (PM2.5) increases the risk of developing and dying from cancer. Studies examining cancer survival are limited to date. Furthermore, most research has focused on lung cancer, with limited studies on other types, including breast, prostate, and colorectal cancer.

**Objectives**: This study investigates the long-term effects of air pollution exposure on post-diagnosis cancer survival, utilizing data from the NIH-AARP Diet and Health Study.

**Methods**: Annual average concentrations of PM2.5, NO2, and O3 were derived from published models based on individual residential addresses. Cancer types analyzed include all cancers, lung, colon, prostate, and breast cancer. Cox proportional hazards models with time-dependent covariates were used to account for the time-varying exposures while adjusting for demographic, socioeconomic, and behavioral factors (age, sex, race/ethnicity, education level, and smoking history). Different lag structures (1 to 10 years) were examined to assess cumulative and delayed effects on survival outcomes.

**Results**: Nitrogen dioxide (NO2) exposure was associated with decreased overall survival (OS) in prostate cancer patients (Hazard ratio [HR]=1.010 [1.000–1.019]) in the 5-year lag model, whereas lung cancer patients showed increased OS with PM2.5 (HR=0.988 [0.980–0.996]), and NO2 (HR=0.994 [0.990–0.997]) in 5-year lag model. No significant associations were observed for other cancers.

**Conclusions**: This study provides robust evidence on the impact of air pollution on cancer survivorship, highlighting the need for environmental health policies and targeted interventions to enhance long-term outcomes for cancer patients.

## (44) Art in Public Health Exhibitor

**"The Face of American Sickle Cell Anemia"**

**(HPS 387 Final project, May 2024)**

**Faculty Advisor:** Dr. Monroy

**By Benjamin "Ben" Ryan Johnson**

**Undergraduate student in Biology**

My artwork focuses primarily on the elements of the sickle cell condition. The background of the piece is an American flag made up of small circles, these circles represent the normal blood cell shape, some of the cells are a lighter shade of red, white, or blue, and exactly 10% of the cells are a lighter shade. This number represents the 90% of sickle cell patients that are African American (CDC, 2023).

The black and white portrait of the man is made up of small, black, sickle cell-shaped pieces that are a stark contrast to the normal blood cells behind the man. There are exactly 375 sickle cell shapes that make up the man's portrait, this number represents that 1 out of every 375 African Americans have sickle cell anemia (Lonergan et al., 2001).

The man's face and hairstyle are shaped like a tree and the man's Dashiki shirt appears like roots, this symbolizes the disease's African origin (Solovieff et al. 2016). This piece, along with the symbolism in the abstract shapes, conveys a powerful message about the prevalence of sickle cell disease in the African American community.

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## Statement

We extend our heartfelt gratitude to all participants, presenters, and organizers of the 2025 Public Health Poster Forum. Your dedication, innovation, and shared passion for advancing public health have made this event a resounding success. Together, we continue to inspire and drive meaningful change in our communities.

**Thank you for being a part of this journey.**