

The Maui Wildfire Exposure Cohort Study (MauiWES.info)

Principal Investigators:

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Expected Collaborating Partners: University of Hawaii Economic Research Organization, John A. Burns School of Medicine, UH Cancer Center, Social Science Research Institute, Papa Ola Lokahi, Hui No Ke Ola Pono, Maui Medic, Roots Reborn, Hawaii Integrated Analytics, Hispanic Chamber of Commerce Hawaii, Hawaii Community Foundation, Kaiser Permanente Hawaii, American Lung Association of Hawaii, Malama Kula, Hawaii Health and Safety Alliance

Summary: On August 8, 2023, the unparalleled devastation wrought by the Maui wildfires, the deadliest in the US in over a century and the worst natural disaster in the state of Hawaii, triggered a domino effect exacerbating the pre-existing adverse socioeconomic and health conditions in Maui's multiethnic population including Native Hawaiians, Asian Americans (mostly Filipino), and Hispanics/Latinos. With over 100 lives lost, 8,000 individuals displaced, 2,200 buildings decimated, and \$10 billion worth of damages altogether threaten the overall well-being of communities in Maui, with significant implications to public health. The region's scant healthcare resources accentuate the pre-existing long-standing health disparities in these populations, signaling a dire need for comprehensive exposure, socioeconomic, and health data to inform recovery and resilience initiatives.

Prior to the wildfires, Hawaii's multiethnic population harbor long-standing health and social inequities that are likely to be exacerbated by the disaster. Compared to Asian Americans or Non-Hispanic Whites, Native Hawaiians and Pacific Islanders, Filipino Americans, and Latinos have a higher prevalence of chronic disease risk factors and conditions including higher smoking (and of lower smoking cessation rates), binge drinking, sedentary lifestyles, poor-quality diet, obesity, diabetes and cancer rates. The prevalences of these conditions vary across sex, race/ethnicity, generationally, and by socioeconomic status. Compounded by these pre-existing conditions, the aftermath of the wildfires leaves behind various environmental hazards that residents returning to the disaster areas may be exposed to as contaminants in ground water, food sources, in the air, or direct contact. These include smoke and particulate matter, volatile organic compounds, polycyclic aromatic hydrocarbons, and heavy metals. Short-term exposures to these hazards can contribute to adverse long-term health outcomes, particularly impacting respiratory and cardiovascular health. To better understand and address the complexity of these adversities on the health of minority populations affected, our multidisciplinary team endeavors to undertake a holistic examination of the wildfires' impacts using a cohort study design, employing a blend of robust survey instruments and biospecimen analyses. Insights from data collected are poised to steer the state of Hawaii, local organizations, and policy makers in resource optimization and intervention blueprinting, that altogether addresses imminent community needs, informs recovery, and supports the foundation for future disaster preparedness. To this end, we propose the following specific aims:

Aim 1: Recruit and evaluate the socioeconomic and health conditions of those exposed to the Maui wildfires for a cohort study on community health and resilience. Using established survey tools that include critical domains such as mental and physical health, healthcare needs, job and housing stability, and trust in public institutions, we plan to partner with community-based organizations to gather detailed information on the socioeconomic and health status of 1,000 residents exposed to the Maui wildfires. We will also collect anthropometric data (BMI, blood pressure, spirometry, etc), as well as saliva/buccal cells, blood and urine samples from

participants to measure biomarkers of stress and exposures to toxicants resulting from the wildfire.

Aim 2: Monitor the health and well-being of the wildfire-exposed cohort participants over the course of recovery. The data gathered in Aim 1 will serve as a baseline for our longitudinal analysis that will examine changes to participant's socioeconomic and health conditions over time. We will re-administer the survey described in Aim 1 annually for up to five years, which will provide data on any emergent changes to these conditions during recovery. At these intervals, biospecimens will be collected to measure any shifts in stress and exposures levels, enabling a comprehensive understanding of ongoing impacts on the exposed, analyzed at the individual level. We will also compare these results to that collected from our unexposed cohorts.

Aim 3: Develop and execute a data-informed dissemination strategy and toolkit to support current recovery efforts and build resilience against adverse impacts of future disasters. Findings from this study will be disseminated broadly via bi-annual reports on our website, traditional and social media channels, and showcased to stakeholders, community organizations, and Hawaii public forums. These include bi-annual meetings with scientific, community advisory boards and stakeholders to assess interventions to improve the health and wellbeing of Maui populations. In addition, bi-annual reports on the UHERO website, publicize our findings through traditional and social media, and present research findings to stakeholders, community organizations, and in general public forums statewide. Data collected in this study will inform a toolkit that includes recommendations to the Department of Health, the Governor's office and policy makers for immediate resource allocation, advising government action plans over the estimated 10-year recovery, and augmenting current disaster guidelines.

This is the most comprehensive study to evaluate short- and long-term health to date following a natural disaster in Hawaii, integrating social and biological data from individuals exposed to the Maui wildfires. It will fill important gap in knowledge and inform an evidence-based approach to disaster recovery and resilience building, which could be a model to mitigate the adverse impacts of climate change disasters on the health/well-being of Hawaii's populations.

About the Investigators:

Dr. Ruben Juarez is the HMSA Distinguished Endowed Professor in Health Economics at the University of Hawaii Economic Research Organization (UHERO) and the Economics Department at UH Manoa. As Director of the Pacific Alliance Against COVID-19 and Director of the UHERO RAPID Survey Project, he has successfully built a long-term study involving over 2,000 Hawaii residents. This project has resulted in the most comprehensive reports on COVID-19 and mental health in Hawaii. Dr. Juarez will be responsible for spearheading participant recruitment, shaping behavioral metrics, and overseeing all aspects of data collection and analysis, especially focusing on minorities, immigrants and underserved populations.

Dr. Alike Maunakea is a Native Hawaiian Professor and Director at UH Manoa's John A. Burns School of Medicine, specializing in health disparities and epigenetics. He is the driving force behind numerous NIH-funded research projects focused on health issues prevalent in Hawaii, such as diabetes and cancer, many of which are cohort studies comprising over 30,000 residents throughout Hawaii. Dr. Maunakea will manage the collection and analysis of biomedical samples for the study and support the recruitment, engagement with participants and dissemination strategies.