

## WASSP Committee

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**From:** Ruben Juarez <rubenj@hawaii.edu>  
**Sent:** Wednesday, August 7, 2024 9:42 AM  
**To:** WASSP Committee  
**Cc:** Clarissa L. MacDonald; Alike Maunakea; Veronica Mendoza Jachowski  
**Subject:** MauiWES Presentation - Juarez, Maunakea, Mendoza  
**Attachments:** MauiExposureStudy (4).pdf; MauiWESgenericflyer.pdf; Makawao -Whole Body Wellness (1135 Makawao Ave) Sábado 3 de agosto, 10am a 4pm Kihei -Island Health (2439 South Kihei) Domingo 4 de agosto, 10am a 4pm Sábado 17 de agosto, 10am a 4pm Domingo 18 de agosto.pdf

You don't often get email from rubenj@hawaii.edu. [Learn why this is important](#)

Aloha,

thank you for having us this Monday. Please see attached:

- 1) Presentation to the committee
- 2) Report release in May
- 3) Website and dashboards are available here, and you are welcome to share them widely for the community to learn more:  
  
<https://www.mauiwes.info/results>  
  
<https://analytics.uhero.hawaii.edu/maui-wes/community-support/family-friends>
- 4) Poster for August dates (and without dates)
- 5) Poster of Registry and newly established registry is MauiRegistry.com
- 6) The MauiWES website for people to sign up and with any new dates is MauiWES.info for people to sign-up

**MauiRegistry.com**

**Sign Up Today**

Share Stories, Rebuild  
with Maui Registry



**Requirements:**

- **Anyone** who has been affected by the 2023 Maui Wildfires
- Residents, workers and first responders

**How to sign up:**

Complete a brief online form that takes about **10 minutes**

**Questions ask about:**

- **Name and contact info**
- **Address during the fires**
- How did the fires **affect you**?
- What are your **needs right now**?



**Sign Up Now**

**MauiRegistry.com**

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**Sign Up Now**



MauiWES\_Talk\_August2024\_WASSP.pdf

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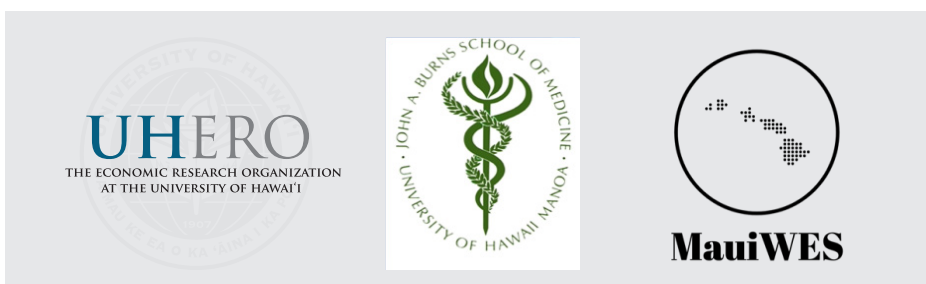




PUBLIC HEALTH REPORT

# MAUI WILDFIRE EXPOSURE STUDY: COMMUNITY HEALTH, WELLBEING, AND RESILIENCE

MAY 15, 2024







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**UHERO Public Health Report**  
**Maui Wildfire Exposure Study: Community Health, Wellbeing, and Resilience**

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**Funded by the Hawaii Community Foundation's Maui Strong Fund and Kaiser Permanente**

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**See the ACKNOWLEDGMENTS AND SUPPORT section for  
additional contributors**

# Executive Summary

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The Maui Wildfire Exposure Study, or MauiWES, is the most comprehensive cohort study dedicated to understanding and mitigating the health and social impacts of the Maui wildfires. By joining this study, participants gain insight into their personal exposure risks and contribute essential data to support community resilience throughout the recovery phase. Led by the University of Hawai'i Economic Research Organization and the John A. Burns School of Medicine in partnership with numerous community and health organizations, MauiWES addresses a critical gap in knowledge about the effects of environmental hazards and socioeconomic challenges on the health of those affected by wildfires. Over a span of at least ten years, the study will monitor, analyze, and address the fire's impacts on acute and chronic health and social conditions. Participants will play a pivotal role by providing valuable data through detailed questionnaires, health assessments, and biospecimen collection, enabling researchers to evaluate the short- and long-term health outcomes resulting from potential hazardous substance exposures.

The sample collected largely in February 2024 consisted of 679 participants, two-thirds of whom resided in Lahaina at the time of the fires. It represented a fairly even sampling of adults and one of the most diverse cohorts in the state, including white, Latino, Native Hawai'ian, Pacific Islander, Asian, and Filipino participants.

## **Key findings:**

**Access to Medical Care, Medications, and Health Insurance Disparities:** More than four in ten people reported difficulties accessing medical care and medications, compared to about one in ten before the fires. Significant disparities in health insurance coverage were also found, with over 13% of participants lacking insurance. Notably, nearly 38% of Hispanic respondents reported having no insurance coverage. This is contrasted with broader statewide data indicating lower uninsured rates, suggesting heightened accessibility and affordability challenges for the MauiWES respondents, especially post-wildfire.

**Community Resiliency:** MauiWES participants trust and depend on community organizations more than FEMA or local government in the aftermath of the wildfires, underscoring the vital role of grassroots groups in Hawai'i's disaster response. This preference reflects community resilience, with high levels of perceived social support correlating with better mental health and fewer medical access challenges.

**Health Outcomes:** Nearly half of the participants (46%) reported a decline in health compared to one year ago. These health outcomes could deteriorate further if difficulties in accessing care and lack of health insurance are not addressed.

**Physical Health:** Exposure to smoke, ash, and debris is strongly associated with worse physical health outcomes and reported symptoms. Approximately 74% of participants face a heightened risk of cardiovascular disease due to elevated or prehypertension levels. Kidney function may be compromised in 8-20% of participants, and up to 60% may suffer from poor respiratory health.

**Mental Health:** The survey found a notable increase in depression compared to before the fires, with more than half showing symptoms, significantly higher than state and local averages. About 30% of participants reported symptoms of moderate or severe anxiety. Elevated levels of low self-esteem (35%) and suicidal thoughts (4.4%) highlight severe mental health challenges for survivors. Notably, exposure to smoke, ash, and debris is not associated with mental health outcomes, suggesting that mental health effects are affecting a broader population of survivors beyond people who have been physically exposed.

**Residential Impact:** Only 34% of participants report living in pre-wildfire (their original) homes, while 56% are in temporary housing, and 10% have settled into new permanent residences.

**Employment and Income:** The wildfires caused almost half of the participants to lose their jobs; however, 80% have since secured employment, leaving 20% still unemployed at the time of collection. Additionally, 74% have experienced a reduction in household income.

**Food Security:** 47% of households report experiencing low food security, which is higher than previous rates observed locally and statewide.

With the report, our research team is introducing the [MauiWES interactive dashboard](#). The dashboard contains all the data from the report as well as additional indicators. All health and social impact metrics can be broken down by age, race and income groups. These tools let users delve deeper into the data from the report, giving everyone a clearer picture of how the fires have affected people in Maui.

## Initial Recommendations from Key Findings

Based on the initial findings these are key recommendations to aid those affected by the Maui wildfires in their recovery:

1. Medical Care and Accessibility: Focus on expanding access to healthcare and insurance coverage for individuals affected by the wildfires, particularly in light of urgent health needs in pulmonary, cardiovascular, and behavioral health. Enhance medical capacity and accessible interventions while reducing patient costs where possible.
2. Housing Stability: Ensure stable, long-term housing solutions for displaced individuals through policies supporting housing supply, financial aid, and access to affordable options.
3. Environmental Safety: Reduce post-wildfire environmental hazards by cleaning up affected areas, monitoring air and water quality during clean-up, and educating residents about protective measures.
4. Community Support: Strengthen community networks and engage local organizations to provide culturally sensitive support and enhance resilience.
5. Develop strategies for targeted support for the most vulnerable individuals, including low-income households, food insecure households, immigrants, people with pre-existing physical and mental health conditions and people with disabilities, in terms of healthcare access and socioeconomic needs.

## Lay Summary:

### English:

The Maui Wildfire Exposure Study (MauiWES) is a long-term project looking at how the wildfires in Maui affect people's health and communities. It's coordinated by the University of Hawai'i Economic Research Organization and the John A. Burns School of Medicine. The study aims to understand how wildfires impact things like health problems, access to healthcare, and the community. The data is used to inform and support survivors.

The study includes 679 people from Lahaina and Kula, who come from different backgrounds. Here's what they found:

1. Healthcare Differences: After the wildfires, many people had trouble getting medical help and medicines. Some groups, like Hispanic people, had more problems getting health insurance.
2. Community Support: After the wildfires, local community groups were really important in helping people. This shows how crucial community support is during tough times.
3. Fire Exposure and Health: Being close to the wildfires made people's health worse. Survivors were also more likely to have heart problems, kidney issues, and trouble breathing.

4. Mental Health: Many people felt more worried or depressed after the wildfires. Some also felt bad about themselves and had thoughts of hurting themselves. This suggests that mental health issues are a big concern after the disaster.

5. Housing and Money: Many people had to leave their homes because of the wildfires, and many lost their jobs. While some found new jobs, many still struggle to make ends meet and find stable housing.

All this information and more is available [online](#). This helps everyone understand how wildfires affect health, communities, and people's lives. With this data, we can make better decisions and policies to help the community recover.

#### Spanish:

El Estudio de Exposición al Incendio Forestal de Maui (MauiWES) es un proyecto a largo plazo que analiza cómo los incendios forestales en Maui afectan la salud y las comunidades. Está coordinado por la Organización de Investigación Económica de la Universidad de Hawái y la Escuela de Medicina John A. Burns. El estudio tiene como objetivo comprender cómo los incendios afectan aspectos como los problemas de salud, el acceso a la atención médica y la comunidad. Los datos se utilizan para informar y apoyar a los sobrevivientes.

El estudio incluye a 679 personas de Lahaina y Kula, provenientes de diversos orígenes. Esto es lo que encontraron:

1. Diferencias en la atención médica: después de los incendios forestales, muchas personas tuvieron problemas para obtener ayuda médica y medicamentos. Algunos grupos, como los hispanos, tuvieron más dificultades para conseguir seguro médico.
2. Apoyo comunitario: después de los incendios forestales, los grupos comunitarios locales fueron cruciales para ayudar a las personas. Esto muestra lo importante que es el apoyo de la comunidad en momentos difíciles.
3. Exposición al incendio y salud: estar cerca de los incendios forestales empeoró la salud de las personas. Los sobrevivientes también fueron más propensos a tener problemas cardíacos, renales y dificultades para respirar.
4. Salud mental: muchas personas se sintieron más preocupadas o deprimidas después de los incendios forestales. Algunas también tenían una baja autoestima y pensamientos de hacerse daño. Esto sugiere que los problemas de salud mental son una gran preocupación después del desastre.
5. Vivienda y dinero: muchas personas tuvieron que dejar sus hogares a causa de los incendios forestales, y muchas perdieron sus trabajos. Si bien algunas encontraron nuevos empleos, muchas siguen teniendo dificultades para llegar a fin de mes y encontrar una vivienda estable.

Toda esta información y más está disponible [en línea](#). Esto ayuda a todos a comprender cómo los incendios forestales afectan la salud, las comunidades y las vidas de las personas. Con estos datos, podemos tomar mejores decisiones y políticas para ayudar a la comunidad a recuperarse.

#### Tagalog:

Ang Maui Wildfire Exposure Study (MauiWES) ay isang pangmatagalang proyekto na nagsusuri kung paano naaapektuhan ng mga wildfire sa Maui ang kalusugan ng mga tao at komunidad. Pinangangasiwaan ito ng University of Hawai'i Economic Research Organization at John A. Burns School of Medicine. Layunin ng pag-aaral na maunawaan kung paano naaapektuhan ng mga

wildfire ang mga problema sa kalusugan, access sa pangangalagang pangkalusugan, at komunidad. Ginagamit ang mga datos upang magbigay ng impormasyon at suporta sa mga nakaligtas.

Kasama sa pag-aaral ang 679 katao mula sa Lahaina at Kula na mula sa iba't ibang pinagmulan. Narito ang kanilang natuklasan:

1. Pagkakaiba sa Pangangalagang Pangkalusugan: Pagkatapos ng mga wildfire, maraming tao ang nahirapan sa pagkuha ng tulong medikal at gamot. Ang ilang grupo, tulad ng mga Hispanic, ay nahirapan sa pagkuha ng seguro sa kalusugan.
2. Suporta ng Komunidad: Pagkatapos ng mga wildfire, naging mahalaga ang mga lokal na grupo ng komunidad sa pagtulong sa mga tao. Ipinapakita nito kung gaano kahalaga ang suporta ng komunidad sa mahihirap na panahon.
3. Pagkalantad sa Sunog at Kalusugan: Ang pagiging malapit sa mga wildfire ay nagpalala sa kalusugan ng mga tao. Mas malamang din na magkaroon ng mga problema sa puso, bato, at paghinga ang mga nakaligtas.
4. Kalusugang Pangkaisipan: Maraming tao ang nakaramdam ng higit na pag-aalala o depresyon pagkatapos ng mga wildfire. Ang ilan ay nawalan ng tiwala sa sarili at nagkaroon ng pag-iisip na saktan ang kanilang sarili. Ipinapahiwatig nito na ang mga isyu sa kalusugang pangkaisipan ay isang malaking alalahanin pagkatapos ng sakuna.
5. Pabahay at Pananalapi: Maraming tao ang kailangang umalis sa kanilang mga tahanan dahil sa mga wildfire, at marami ang nawalan ng trabaho. Bagama't ang ilan ay nakahanap ng bagong trabaho, marami pa rin ang nahihirapang makaraos at makahanap ng matatag na tirahan.

Lahat ng impormasyong ito at marami pang iba ay makukuha [online](#). Nakatutulong ito sa lahat na maunawaan kung paano naaapektuhan ng mga wildfire ang kalusugan, mga komunidad, at buhay ng mga tao. Sa mga datos na ito, makakagawa tayo ng mas mahusay na mga desisyon at patakaran upang matulungan ang komunidad na makabangon.

#### Tongan:

Ko e Ako ki he Maumau 'a e Mo'ui 'i he Afi Maui (MauiWES) ko ha polokalama taimi lōloa 'oku siofi ai pehē te ne uesia 'e he afi lahi 'i Maui 'a e mo'ui 'a e kakai mo e ngaahi komiuniti. 'Oku fakahoko ia 'e he Sosaieti Sivi'i 'o e 'Ikonomika 'a e 'Univēsi 'o Hawai'i mo e Ako'anga Fakafaito'o 'a John A. Burns. Ko e taumu'a 'o e ako ko 'eni ke ma'u ha mahino fekau'aki mo e uesia 'e he afi lahi 'a e ngaahi palopalema mo'ui, e 'ataki ki he ngaahi tokoni mo'ui, mo e komiuniti. 'Oku ngaue'aki e ngaahi fakamatala ke fakamālōlō'i mo tokoni'i 'a e kau puke.

'Oku kau he ako ko 'eni e kakai 'e 679 mei Lahaina mo Kula, 'oku nau mei ha ngaahi tupu'anga kehekehe. Ko e ngaahi ola 'eni na'e ma'u:

1. Ngaahi Kehekehe 'i he Tokoni Mo'ui: Hili e afi lahi, na'e tokolahi na'a nau faingata'a'ia 'o kumi ha tokoni fakafaito'o mo e ngaahi faito'o. Na'e 'i ai e ngaahi kulupu, pehē ki he kakai Hispaniki, na'a nau faingata'a'ia lahi ange ke ma'u ha inisiua mo'ui.
2. Tokoni Komiuniti: Hili e afi lahi, na'e mahu'inga lahi e ngaahi kulupu komiuniti fakalokolo ki hono tokoni'i 'o e kakai. 'Oku hā mai 'eni 'a e mahu'inga 'o e tokoni komiuniti 'i he ngaahi taimi faingata'a.
3. Maumau 'a e Mo'ui mo e Afi: 'Oku ne fakavavevave'i e kehekehe 'o e mo'ui 'a e kakai ko e 'i he vaha'a vāofi mo e afi lahi. Na'e toe lahi ange mo e kakai na'a nau puke ke 'i ai ha ngaahi palopalema 'i honau loto, ngaahi palopalema 'i he kili, mo e faingata'a'ia ke ma'u ha manava lelei.
4. Mo'ui Fakalaumālie: Tokolahi na'a nau siofi loto hoha'a pe faingata'a'ia hili e afi lahi. Na'e 'i ai mo



e ni'ihī na'a nau 'ikai ke fiefia ki he'enua ngaahi 'ulungaanga pe mo'oni 'i he'enua manatu ke nau fa'a ta'ofi 'enua mo'ui. 'Oku 'uhinga 'eni 'oku mahu'inga lahi e ngaahi palopalema fakalaumālie hili e mala'ia.

5. Ngaahi 'Api mo e Pa'anga: Tokolahi na'a nau toki hiki mei 'enua ngaahi 'api koe'uhi ko e afi lahi, pea tokolahi mo 'enua ngaahi ngāue na'e mole. 'I he taimi tataua, na'e 'i ai e ni'ihī na'a nau ma'u ha ngāue fo'ou, ka tokolahi pe 'oku kei faingata'a'ia ke nau ma'u e pa'anga ke nau mo'ui mo e ma'u ha nofo'anga tu'uma'u.

'Oku 'i ai e ngaahi fakamatala ko 'eni mo e lahi ange 'i he ['initaneti](#). 'Oku tokoni 'eni ki he to'utupu ke nau ma'u ha 'ilo fekau'aki mo e uesia 'e he afi lahi 'a e mo'ui, e ngaahi komiuniti, mo

e mo'ui 'a e kakai. 'Oku mahu'inga 'a e ngaahi fakamatala ko 'eni ke tau fai ha ngaahi fili mo ngaahi tu'utu'uni lelei ange ke tokoni ki he komiuniti ke nau toe fakalelei'i.

#### Vietnamese:

Nghiên cứu Về Phơi Nhiễm Cháy Rừng Maui (MauiWES) là một dự án dài hạn xem xét cách các vụ cháy rừng ở Maui ảnh hưởng đến sức khỏe và cộng đồng. Dự án được phối hợp bởi Tổ Chức Nghiên Cứu Kinh Tế của Đại học Hawai'i và Trường Y John A. Burns. Nghiên cứu nhằm tìm hiểu cách các vụ cháy rừng tác động đến các vấn đề như vấn đề sức khỏe, khả năng tiếp cận chăm sóc sức khỏe và cộng đồng. Dữ liệu được sử dụng để cung cấp thông tin và hỗ trợ những người sống sót.

Nghiên cứu bao gồm 679 người từ Lahaina và Kula, có xuất thân khác nhau. Đây là những gì họ phát hiện:

1. Khác biệt Trong Chăm Sóc Sức Khỏe: Sau các vụ cháy rừng, nhiều người gặp khó khăn khi tiếp cận sự trợ giúp y tế và thuốc men. Một số nhóm, chẳng hạn như người gốc Tây Ban Nha, gặp nhiều khó khăn hơn khi có bảo hiểm y tế.
2. Hỗ Trợ Cộng Đồng: Sau các vụ cháy rừng, các nhóm cộng đồng địa phương thực sự quan trọng trong việc giúp đỡ mọi người. Điều này cho thấy sự hỗ trợ của cộng đồng rất quan trọng trong những lúc khó khăn.
3. Phơi Nhiễm Lửa và Sức Khỏe: Ở gần các vụ cháy rừng khiến sức khỏe của con người tồi tệ hơn. Những người sống sót cũng có khả năng mắc các vấn đề về tim mạch, thận và khó thở cao hơn.
4. Sức Khỏe Tinh Thần: Nhiều người cảm thấy lo lắng hoặc trầm cảm hơn sau các vụ cháy rừng. Một số cũng cảm thấy tồi tệ về bản thân và có suy nghĩ tự làm hại mình. Điều này cho thấy các vấn đề về sức khỏe tinh thần là một mối quan tâm lớn sau thảm họa.
5. Nhà Ở và Tiền Bạc: Nhiều người phải rời khỏi nhà của họ vì cháy rừng, và nhiều người mất việc làm. Mặc dù một số đã tìm được việc làm mới, nhưng nhiều người vẫn gặp khó khăn trong việc kiếm sống và tìm được chỗ ở ổn định.

Tất cả thông tin này và hơn thế nữa có sẵn [trực tuyến](#). Điều này giúp mọi người hiểu được cách các vụ cháy rừng ảnh hưởng đến sức khỏe, cộng đồng và cuộc sống của mọi người. Với những dữ liệu này, chúng ta có thể đưa ra các quyết định và chính sách tốt hơn để giúp cộng đồng phục hồi.

#### Hawaiian:

Ke Kālai'aina No Ke Aho Pōmaika'i O Nā Kūlana Pōmaika'i o Maui (MauiWES) he papahana lō'ihī e nānā ana i ka hopena o nā ahi hihīu ma Maui i ke olakino o nā kānaka a me nā kaiāulu. Ho'ohui 'ia kēia papahana e ka University of Hawai'i Economic Research Organization a me ke Kula Olakino

o John A. Burns. ‘O ka pahuhopu o ke kālai‘aina ka ho‘omaopopo ‘ana i ka hopena o nā ahi hihui i nā mea e like me nā pilikia olakino, ka loa‘a ‘ana o ke ola lapa‘au, a me ke kaiāulu. Ho‘ohana ‘ia ka ‘ikepili no ka hā‘awi ‘ana i ke kākō‘o a me ke kōkua i ka po‘e i ho‘opilikia ‘ia.

Aia i loko o ke kālai‘aina he 679 kânaka mai Lahaina a me Kula, mai nā ‘ano kahua like ‘ole mai. Eia nā mea i loa‘a:

1. Nā Kūlana Ola Lapa‘au: Ma hope o nā ahi hihui, he nui nā kânaka i loa‘a nā pilikia i ka loa‘a ‘ana o ke kōkua olakino a me nā lā‘au lapa‘au. Ua loa‘a nā pilikia hou aku i kekahi mau hui kanaka, e like me nā kânaka Hispanic, i ka loa‘a ‘ana o ka inikua olakino.
2. Kākō‘o Kaiāulu: Ma hope o nā ahi hihui, ua lilo nā hui kaiāulu kūloko i mea nui loa i ka hā‘awi ‘ana i ke kōkua i nā kânaka. Hō‘ike kēia i ka nui loa o ke kākō‘o kaiāulu i nā wā pa‘akikī.
3. Ke Aho Pōmaika‘i a me ke Olakino: Ua ‘oi aku ka ‘ino o ke olakino o nā kânaka i kokoke i nā ahi hihui. Ua loa‘a iā lākou nā pilikia ma ka pu‘uwai, nā pilikia ma nā akemāmā, a me nā pilikia hanu.
4. Ka No‘ono‘o Olakino: Ua nui ka po‘e i lo‘ohia i ka hopohopo a me ka ho‘oha‘aha‘a ma hope o nā ahi hihui. Ua ‘ike kekahi i ka mana‘o ‘ino iā lākou iho a me ka mana‘o e hō‘ino iā lākou iho. Hō‘ike kēia i ka nui o nā pilikia olakino no‘ono‘o ma hope o ka pō‘ino.
5. Ke Kūkulu Hale a me ke Kālā: He nui nā kânaka i hele aku mai ko lākou mau hale aku no nā ahi hihui, a he nui ho‘i ka po‘e i lilo i kā lākou mau hana. ‘Oiai ua loa‘a kekahi i nā hana hou, he nui ka po‘e e hakakā nei e loa‘a ke kālā kūpono a me ka hale pa‘a.

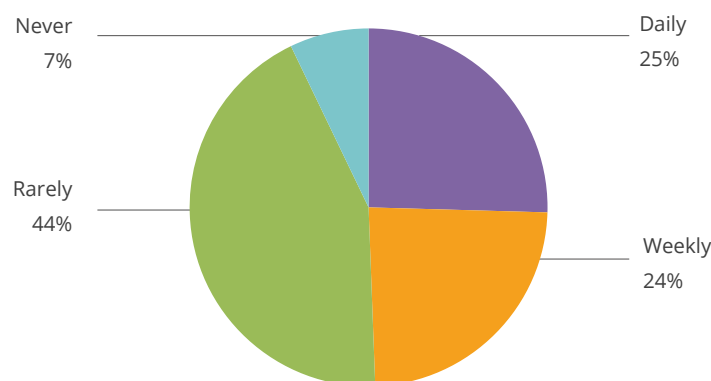
Aia kēia ‘ike a me nā mea hou aku ma ka [pūnaewele](#). Kōkua kēia i ka ho‘omaopopo ‘ana i ka hopena o nā ahi hihui i ke olakino, nā kaiāulu, a me nā ola o nā kânaka. Me kēia ‘ikepili, hiki iā kākou ke hana i nā ho‘oholo a me nā kulekele ‘oi aku ka maika‘i no ka ho‘ōla hou ‘ana i ke kaiāulu.

# Introduction

Since the wildfires in August 2023, Maui has been dealing with emotional, mental, and physical health challenges. The fires left behind air pollution, toxic substances, and heavy metals, which can continue to harm people's health. Similarly, the days of the fires and the loss of loved ones, homes and land have been traumatic for many survivors. Without a proper investigation, we might not fully understand how the wildfires have affected the health of our community, including possible future illnesses from exposure and trauma.

To address this, we started the Maui Wildfire Exposure Study (MauiWES). This cohort study aims to involve over 1,000 residents impacted by the wildfires. Participants self-selected into the study cohort based on their own assessment of impact. They were not required to have resided in the burn area or to have been physically exposed to smoke, ash or debris. The current cohort involves 679 participants. 55% of them resided in the fire perimeter area at the time of the wildfires and about half of the participants report daily or weekly exposure to smoke, ash or debris.

**How frequently have you been exposed to wildfire ash, debris, or smoke?**



We collect data on participants' health and social situation to understand the short- and long-term effects. Participants answer questions about their demographics, social support, and how the wildfires affected their health. They also provide measurements like height, weight, and blood pressure, and give samples of urine, saliva, cheek swabs, and blood. We give participants some initial results and show them how to access their health information online. They also receive \$100 for participating. We plan to repeat this study yearly for at least ten years to monitor health changes and provide help if needed.

Our first preliminary [Public Health Report: Initial Findings from the Maui Wildfire Exposure Study](#) based on a sample of 224 participants showed the notably higher prevalence of potential physical and mental health problems among the affected population. This report largely validates those preliminary findings with a larger sample of almost 700 people who joined the study. The data was collected in January and February 2024. In addition, this new report provides a new set of findings related to exposure to ash and debris, health access and mental health to offer a more thorough understanding of the complex ways in which the wildfires have affected the health of Maui residents.

In addition to reporting data from the MauiWES cohort, when the same metric was available, we compared it to data from the American Community Survey by the Census Bureau and/or to a subsample from the UHERO Rapid Survey (data collected in June 2023). The UHERO Rapid Survey data represents a broad sample. But it includes relatively more people with higher levels of education and higher incomes than the overall Maui population. This sample composition may explain some of the observed differences when we use it for comparisons to the MauiWES cohort, in addition to the true effects of the wildfires. A detailed description of UHERO Rapid Survey data is available in the [UHERO Public Health Report: Shaping Health in Hawai'i – The Influences of Poverty, Housing, and Food Insecurity](#). This allowed us to compare data of the MauiWES cohort with an unaffected "control" sample of 120 Maui residents before the wildfires. When making this comparison, we labeled it *All of Maui* in graphs.

Crucially, in conjunction with this report, we are launching the companion [MauiWES interactive dashboards](#). The dashboard is designed to provide additional insights and allow users to further explore the data presented in the report. It features additional charts not included in the report and all the charts can be broken down by age, race and income groups.

# General Health Impacts

*Nearly half of the participants reported worsened health since the wildfires, with decreased rates of excellent or very good health compared to before the fires, particularly among those with higher exposure to wildfire ash, debris, and smoke.*

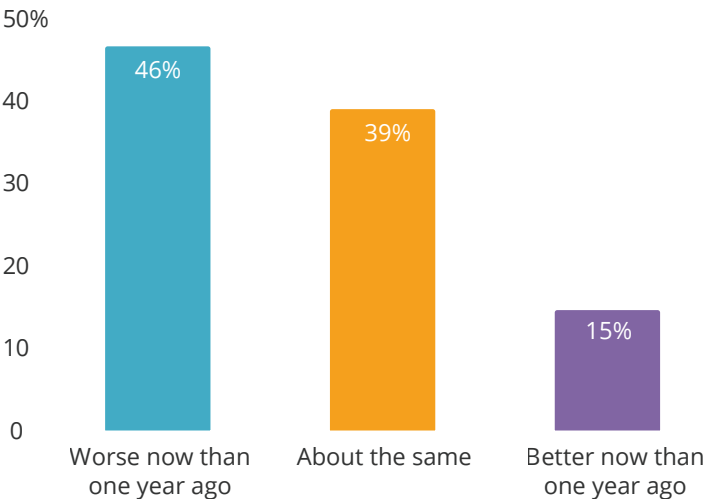
## Self-reported Health Assessment Pre- and Post-wildfires

We also asked participants to rate their overall current health from “Poor” to “Excellent.” Compared to the UHERO Rapid Survey for Maui residents which was done before the wildfires, the post-wildfire MauiWES cohort tended to rate their health lower. Only 6% said their health was excellent. Also, 22% said their health was very good and also 3 out of ten rated their health as “fair” or “poor”.

In general, would you say your health is:



We also examined how participants’ health had changed over the past year and asked them to compare their current health to that of one year ago. Alarminglly, nearly half of the respondents reported a decline in their health, suggesting a significant negative change possibly linked to the environmental and psychological aftermath of the wildfires.

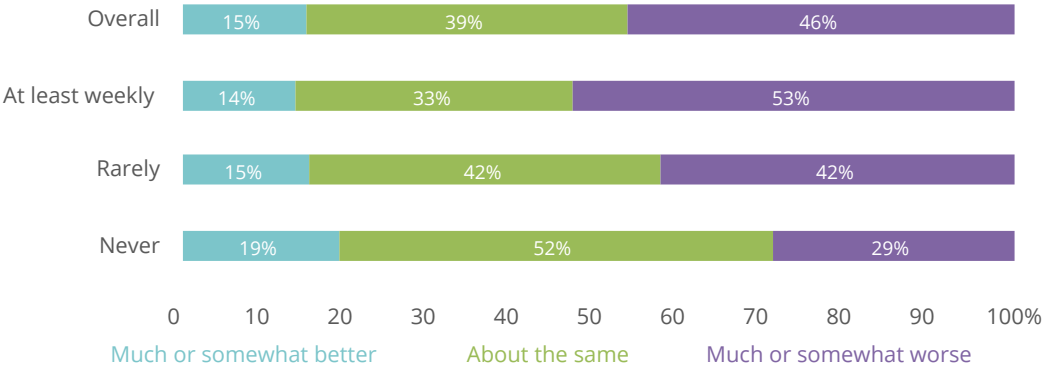




Slightly over one-third of participants noted no change in their health, remaining at the same level as the previous year. This could indicate either resilience to the effects of the wildfires or a delay in symptom onset.

A minority of respondents reported improvements in their health since the wildfires, with about 15% stating they are much better off health-wise than the previous year. These improvements might stem from recovery from initial wildfire-related health issues, positive lifestyle changes, better access to health services, or the psychological boost of overcoming a crisis.

**Compared to one year ago, how would you rate your health in general now? By exposure to wildfire ash, debris, and smoke**



People who have been exposed to smoke, ash or debris more frequently report worse health than a year ago at a much higher rate. More than half of the people who have had weekly exposure report worse health compared to 3 out of ten people who have never been exposed.

These findings illustrate the diverse health paths following a significant environmental disaster and emphasize the importance of ongoing health monitoring and support for affected communities. Understanding the factors contributing to health declines and those fostering resilience or recovery can help tailor public health interventions and support systems for future incidents more effectively.

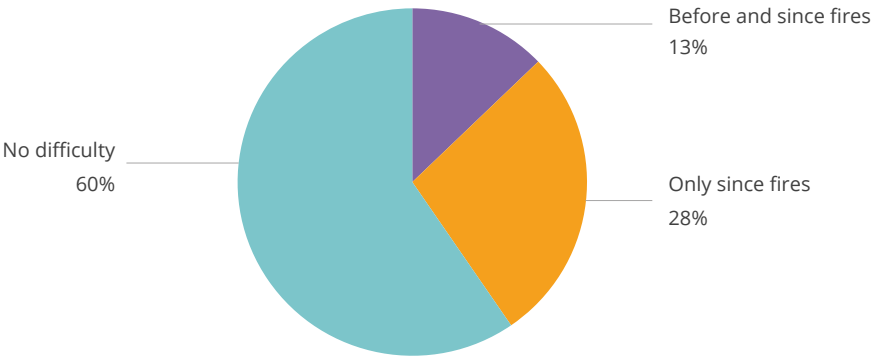
# Access to Health Care and Health Insurance

*More than four in ten people in the MauiWES cohort are having trouble getting medical care and medications, compared to about one in ten before the fires. Significant disparities in health insurance coverage were also found, with over 10% of participants lacking insurance, notably nearly 30% among Hispanics. This is contrasted with broader statewide data indicating lower uninsured rates, suggesting heightened access and affordability challenges for the MauiWES respondents, especially post-wildfire.*

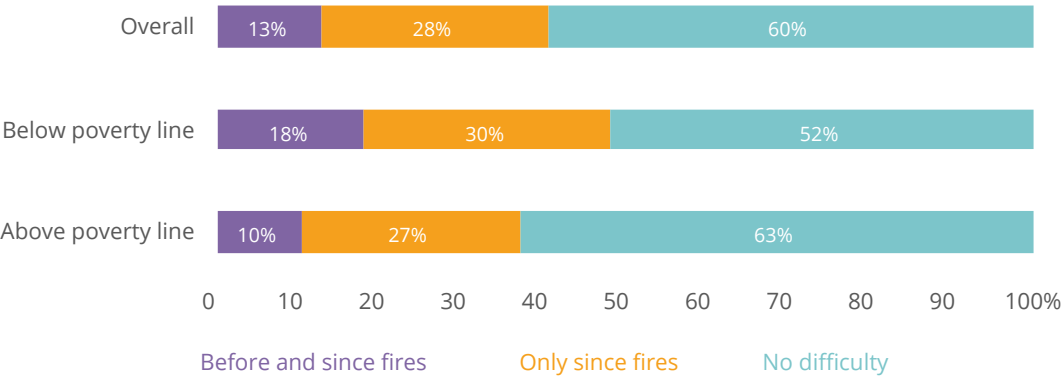
Accessing medical care and medications poses a challenge for individuals in the MauiWES cohort. While 13% of the cohort faced these issues before the fires, an additional 28% reported difficulties since the fires. More than four in ten individuals are experiencing such challenges, and this underscores a pressing concern for this underserved community. Understanding and addressing barriers, such as financial constraints, lack of insurance, limited healthcare facilities, or socioeconomic factors, is crucial. We find that people living in households below the poverty line report substantially lower access to healthcare, both in terms of pre-existing disparities and additional barriers since the fires.

Difficulties in accessing healthcare also disproportionately affects people who may need it most. Only 15% of people who have had difficulties with accessing healthcare before and since the fires report excellent or very good health, compared to a third of people for whom healthcare access is not a problem.

Did you have any difficulties accessing medical care or medications?



Did you have any difficulties accessing medical care or medications? - by poverty line



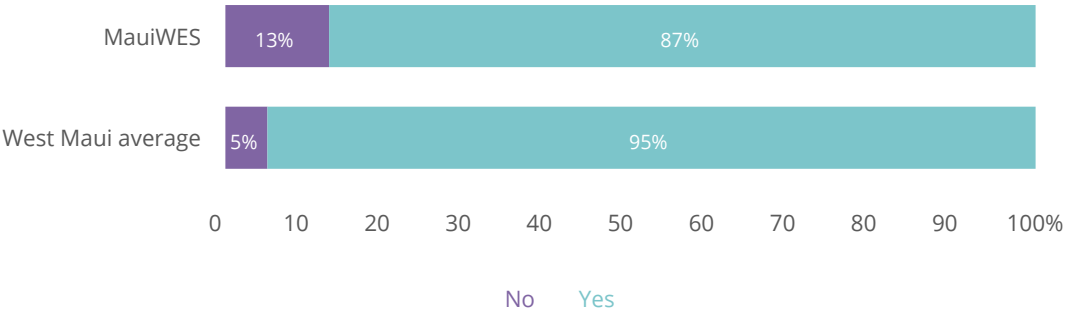
Did you have any difficulties accessing medical care or medications? - by self-reported health



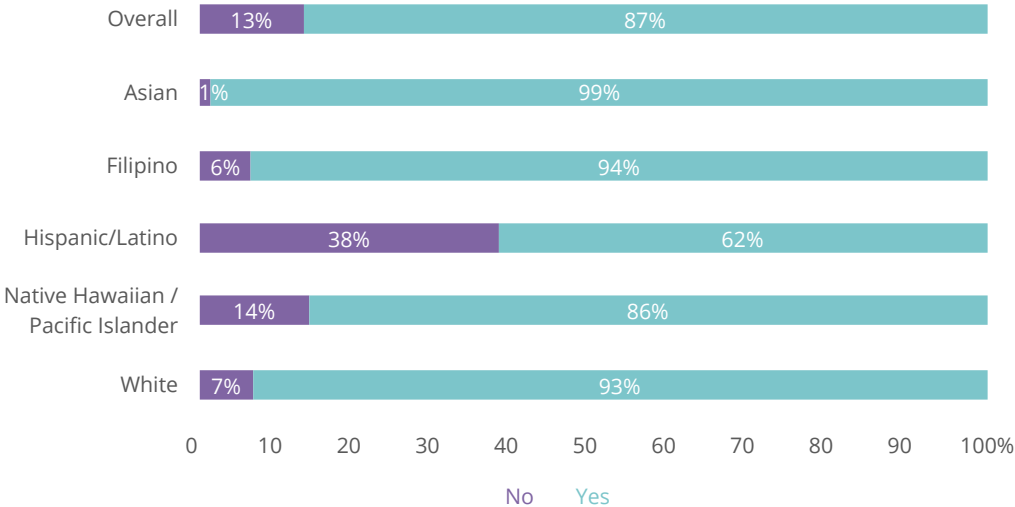
## Health Insurance Coverage

Health insurance is a key factor affecting access to medical care and medications. In comparison to a broader statewide survey, participants in the MauiWES study reported much lower rates of health insurance coverage. One in ten MauiWES respondents currently do not have health insurance, which is a significant difference from pre-fire data for West Maui from the American Community Survey, where only one in twenty of the West Maui population reported being uninsured. This striking difference highlights a considerable gap in health insurance coverage among MauiWES study participants compared to before the wildfires, suggesting potential challenges in accessing and affording health insurance within this group. This is particularly evident among Hispanics, with almost one in four Hispanics reporting no health insurance.

### Do you currently have health insurance?



### Do you currently have health insurance?



## Access to Services and Trust

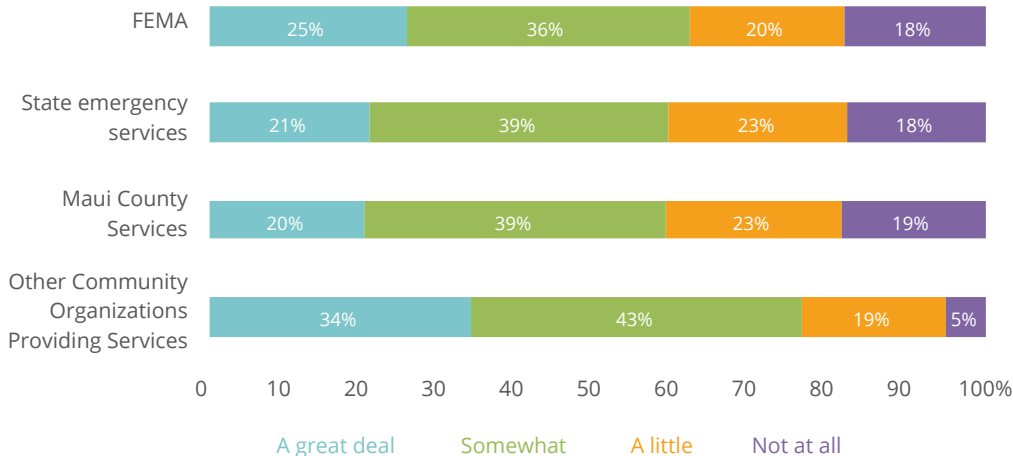
*MauiWES participants trust and use community organizations more than FEMA or local government services for wildfire aid, underscoring the key roles that grassroots organizations play in Hawai'i's disaster response.*

The MauiWES cohort shows that participants trust and use services provided by community organizations such as Roots Reborn, Tagnawa for Maui or Maui Medic Healers more than those offered by FEMA, State Emergency Services, and Maui County services. This highlights the crucial role local community groups play in disaster response, especially in wildfires. The consistent trust and engagement with these community-based services, compared to state and federal emergency

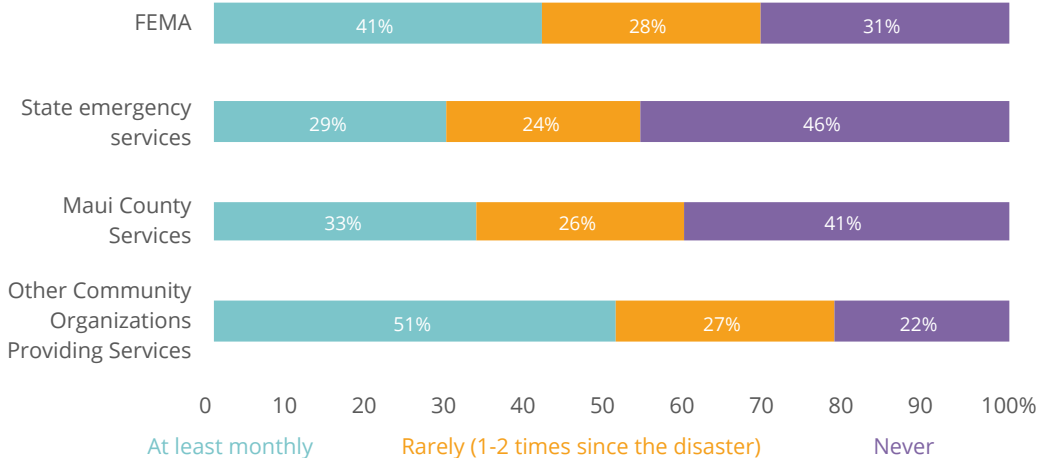
services, suggest that community organizations may provide a more effective and trusted way to support those affected by wildfires.

Filipinos and non-Filipino Asians use community organizations at the highest rates. Hispanics have the lowest rates of use of services by any provider.

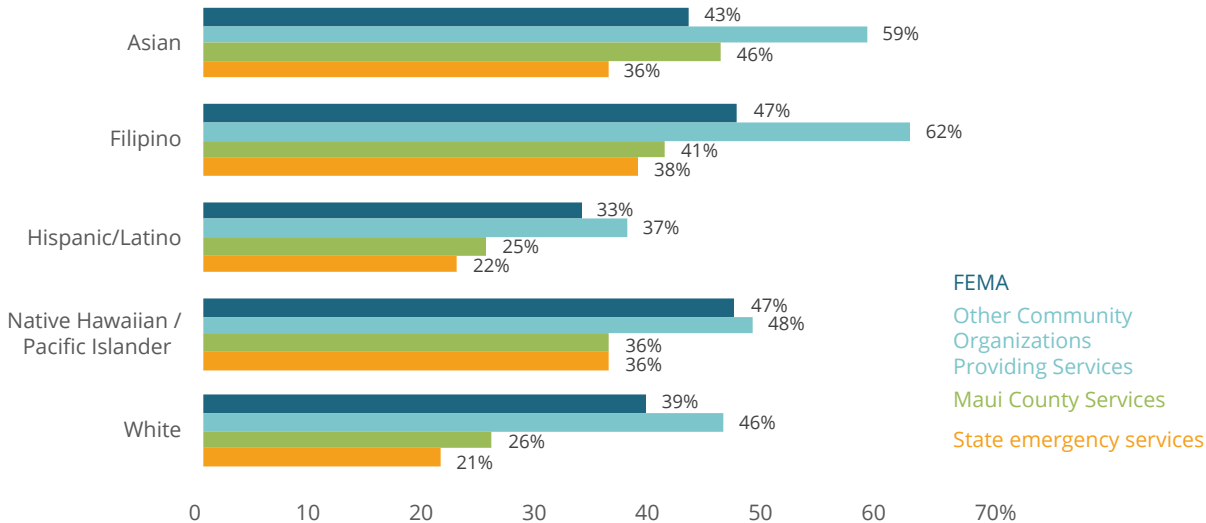
How much do you trust the following agencies in their disaster response?



How often have you used the services provided by these agencies in the aftermath of a disaster?



Percentage of "Always" or "Often" use the services provided by the agencies in the aftermath of a disaster by race/ethnicity





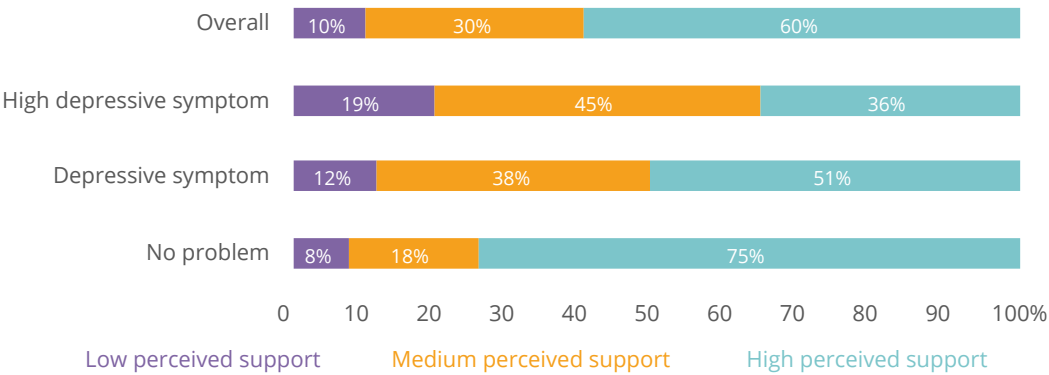
# Community resilience and community support

*Responses highlight the resilience of the community and importance of community support, with most participants reporting high levels of perceived social support across age and ethnicity. However, those who perceive low support tend to experience worse mental health and face difficulties accessing medical care and medications.*

The West and Upcountry Maui communities have shown exceptional strength and resilience in the face of the devastating wildfires. Community values are deeply ingrained in Hawaiian culture and shape the social paradigm of the islands. This community spirit has provided much support and comfort for fire survivors.

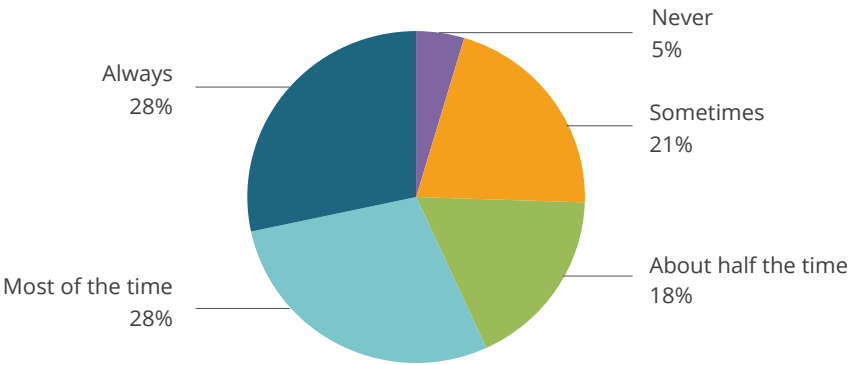
The data from the MauiWES survey underscores the importance of community support. Respondents were asked 12 questions as part of the Multidimensional Scale of Perceived Social Support (“MSPSS”). This is a short questionnaire designed to measure an individual’s perception of support from three sources: family, friends and a significant other. The majority of respondents had high levels of perceived social support. Only about 1 in 10 participants had low perceived support. This may have important health consequences. MauiWES participants who report low levels of social support experience worse mental health outcomes (e.g., depressive symptoms).

### Multidimensional Scale of Perceived Social Support by depression



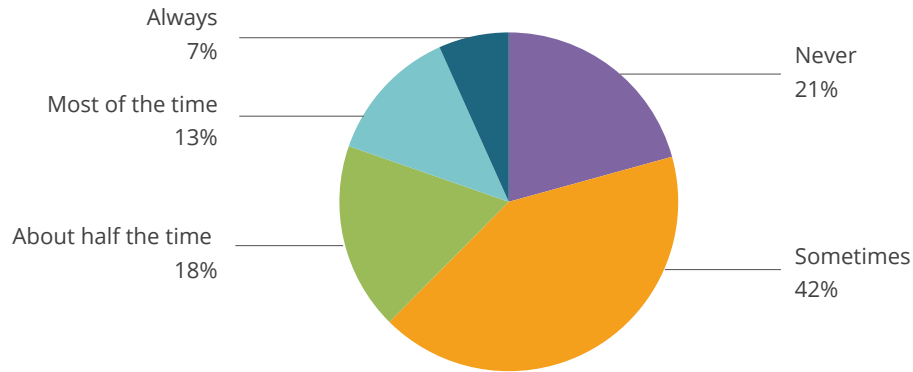
Most respondents reported feeling supported by their friends and family in their recovery efforts. Fewer than 5% reported that they do not have support from family and friends.

### How often do you feel supported by friends or family in your recovery efforts?



The vast majority of respondents have used community resources in the aftermath of the wildfires at least sometimes. Around one-fifth report that they have never relied on community resources to help them cope. This data underscores the critical importance of community relationships and community-based resources in the recovery process.

How frequently do you utilize community resources to help cope with the aftermath of the wildfires?



## General Social Impacts

*At the time of data collection (January-March 2024), about one-third of participants remained in their pre-wildfire homes. More than half were in temporary homes, and 10% have moved to new permanent homes. The wildfires caused half of the participants to lose their jobs. By January/February 2024, over half have found employment, but 20% were still unemployed and searching for work. Additionally, 75% reported a drop in their household income.*

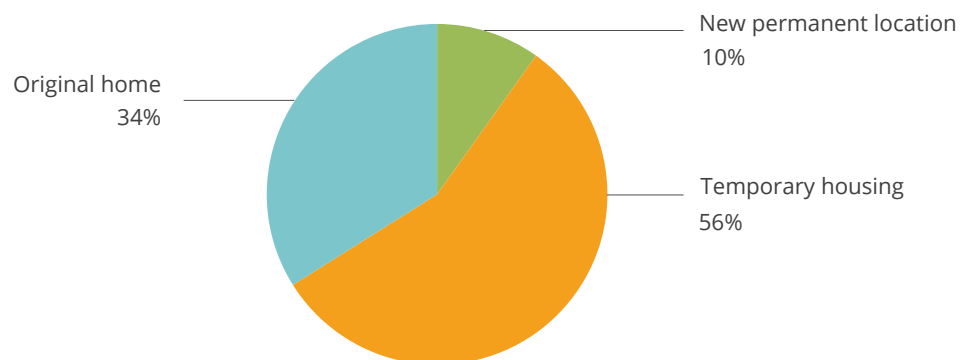
### Housing

Our results show that a lot of people are dealing with temporary housing, like staying in shelters, hotels, or with friends. This situation adds stress because it is uncertain and unstable.

Some participants have moved into new permanent homes since the wildfires, which could provide more stability for some, but it also shows how much their lives have been changed by the fires. Moving can be tough emotionally and financially, especially if it means leaving behind familiar places and struggling to find affordable housing.

Overall, our findings show that the wildfires have had a big impact on where people live, and there is a need for support and policies to help them find stable housing.

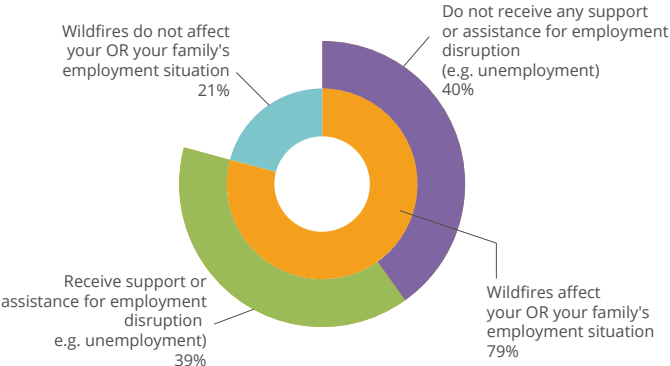
Are you currently living in your original home, temporary housing, or a new permanent location?



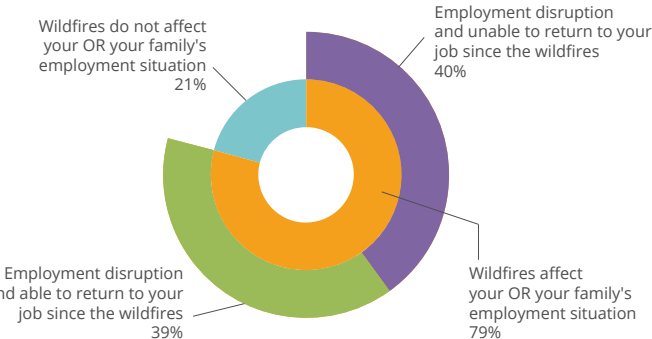
Employment

The wildfires have significantly affected many households, with job loss being a major socioeconomic consequence. In the MauiWES cohort, three quarters of households had at least one person who either lost their job or had a family member lose their job due to the wildfires. Notably, more than half of the people who reported employment disruption do not receive any support or assistance for their employment disruption. Similarly, more than half of people who reported employment disruption are unable to return to their job since the wildfires. At the time of data collection in January/February 2024, only about 55% of the people in our study are employed, while 20% are actively seeking employment. Furthermore, around three quarters of individuals report a reduction in household income following the wildfires.

Did the wildfires affect your OR your family's employment situation? Did you receive support or assistance for employment disruption (e.g., unemployment)?

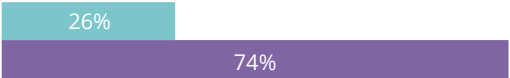


Did the wildfires affect your OR your family's employment situation? Have you been able to return to your job since the wildfires?

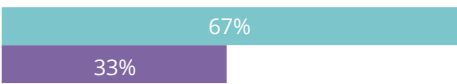


Employment effect of wildfires

Have you or your household experienced a decrease in income following the wildfires?

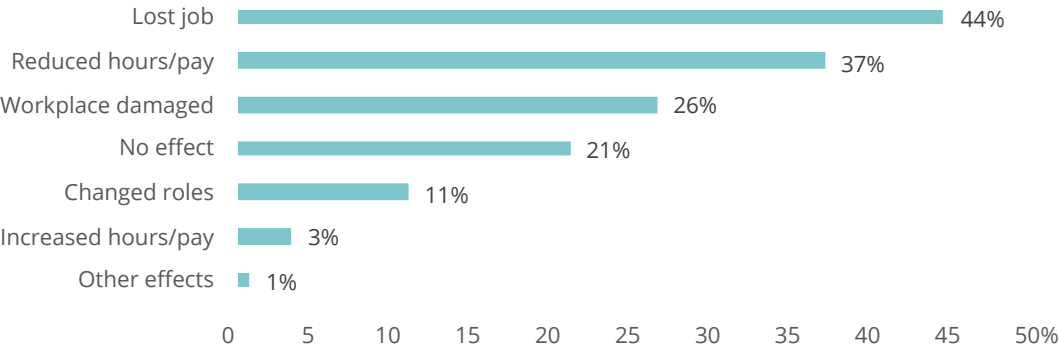


Are you currently looking for work due to changes in your employment caused by the wildfires?

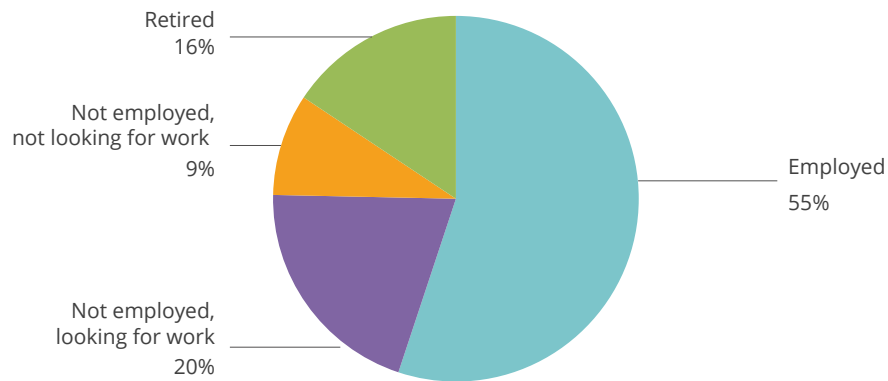


0 10 20 30 40 50 60 70 80%  
No Yes

In what way has your job OR your family's job been affected?



### What is your current employment status?



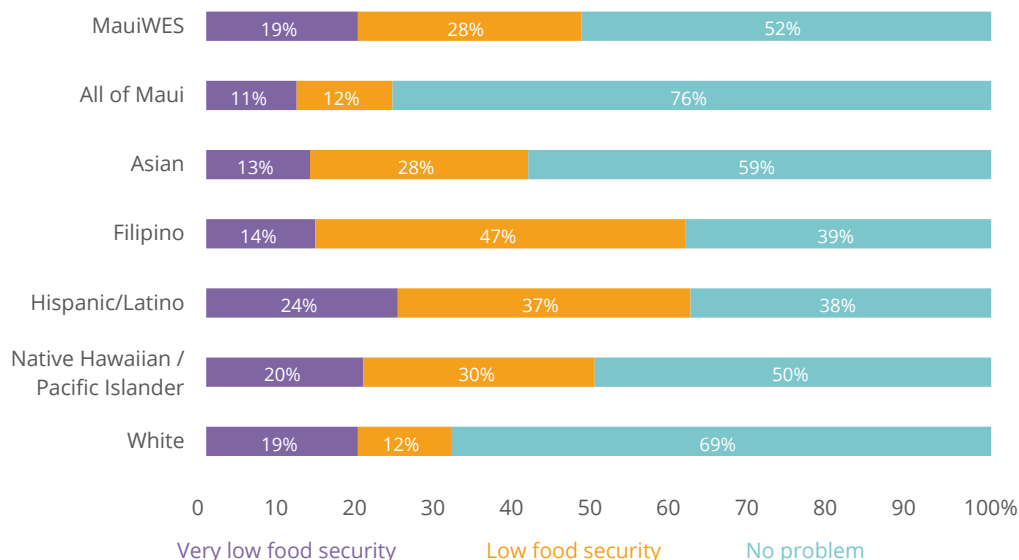
## Food security

*Almost half of surveyed people experienced very low or low food security. This is substantially higher than in the pre-fire UHERO Rapid Survey cohort for all of Maui where less than a quarter of participants were found insecure.*

Almost half of people in the MauiWES cohort fall into the categories of very low or low food security. This compares to less than a quarter of households identified as having low food security in the UHERO Rapid Survey pre-fire cohort for Maui.

White and Asian people are less likely to report food insecurity. In contrast, more than 60% of Filipinos and Hispanic/Latinos reported very low and low food security.

### Food Insecurity by race





# Physical Health

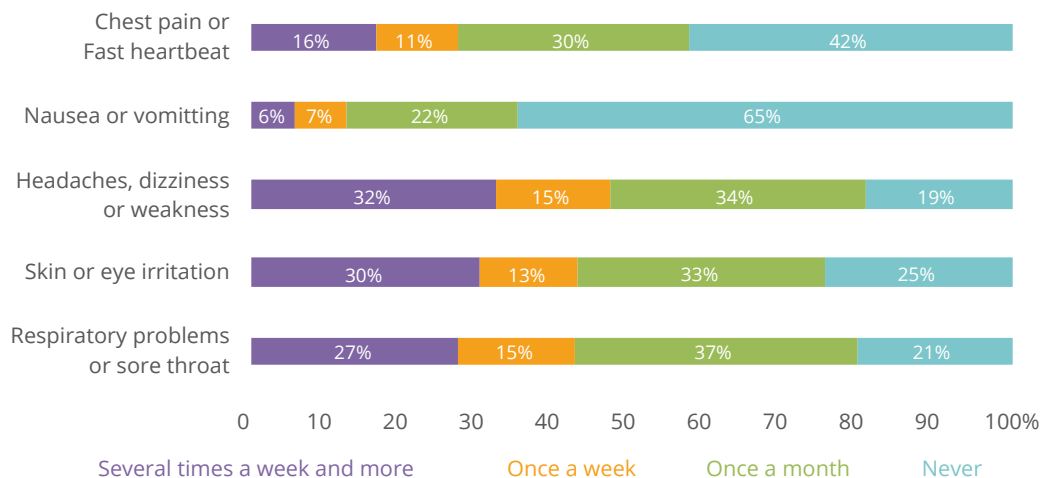
*Almost 20% of the cohort participants showed high blood pressure at the level of stage 1 and 2 hypertension, with 54% at prehypertension levels, indicating an overall proportion (~74%) of individuals at elevated risk for cardiovascular disease. Initial blood biomarker tests also indicated that 10-18% of participants may have compromised kidney function. Additionally, up to 74% of participants may be experiencing poor respiratory health, with 48% exhibiting signs of mild to severe lung obstruction, and 39% with compromised lung function linked to impaired tissue oxygenation.*

A multi-component health assessment was performed on-site for each participant, including cardiovascular, kidney, and lung function. The primary biometric tests included height/weight measurements, readings of blood pressure and pulse, spirometry measurements, and blood tests for specific biomarkers and chemistries. In this report, we summarize the initial frequencies of healthy and unhealthy readings from each of these tests within the MauiWES cohort. Note that indeterminate values listed indicated those with incomplete or failed tests Breakdowns by age, race and income are in the companion MauiWES dashboards.

## Symptoms

The individuals were asked the frequency and type of health issues since the wildfires. Respiratory issues (coughing, wheezing, difficulty breathing) and fatigue or weakness are the most common among respondents. About a third of individuals answered that they experienced fatigue or weakness daily or at least several times a week. About one in four individuals answered that they experienced respiratory issues several times a week or more. Skin or eye irritation (redness, itchiness, watering) was similarly common. Around 35% of the individuals reported that they experienced nausea or vomiting.

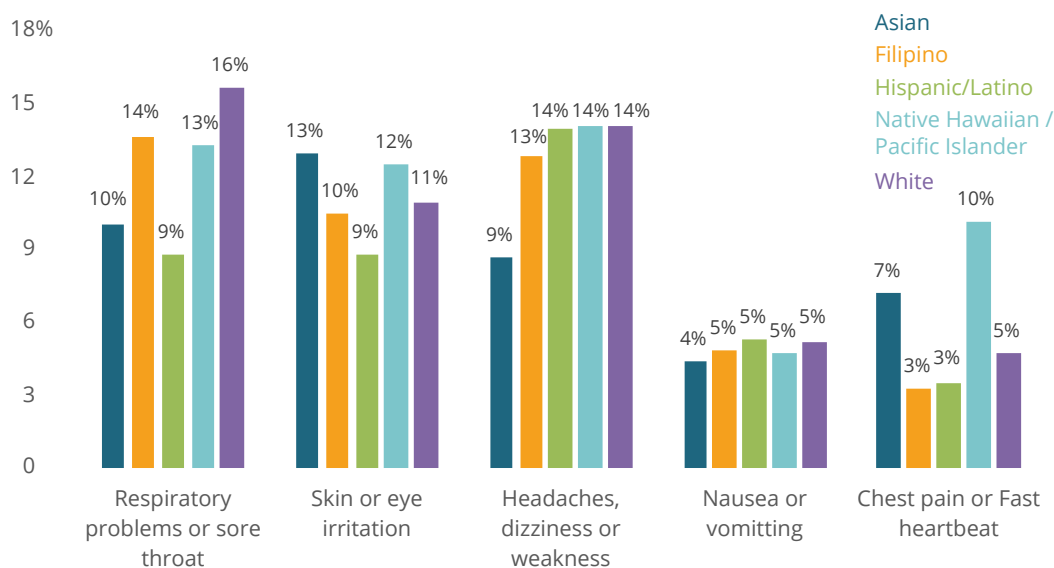
**How often have you experience the following symptoms since the wildfires?**



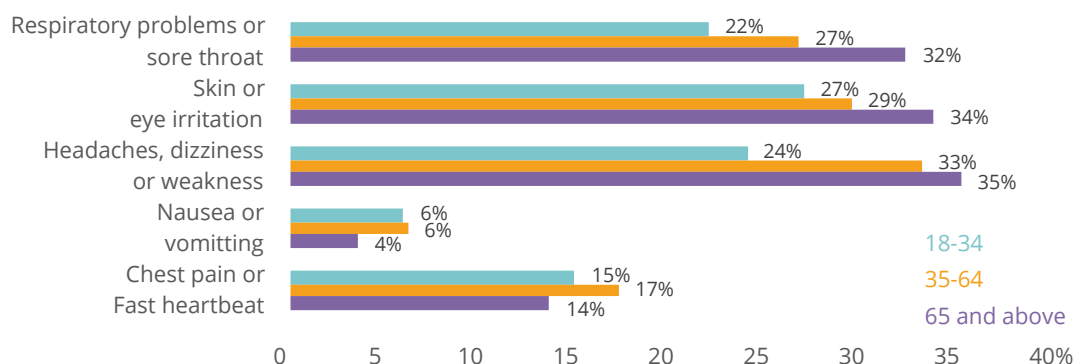
We looked at these symptoms by race and age groups. Compared to other race groups, Native Hawaiian/Pacific Islander and White people are more likely to report that they experienced symptoms several times a week or more. One in four Native Hawaiian/Pacific Islander and White people reported that they always or frequently had respiratory issues (coughing, wheezing, difficulty breathing) and eye irritation (redness, itchiness, watering). Around 10% of Native Hawaiians/ Pacific Islanders also experienced chest pain or fast heartbeat.

People aged 35 and above are more likely to report experiencing health symptoms several times a week and more. One in five of these individuals experienced respiratory issues (coughing, wheezing, difficulty breathing) and one third of the individuals reported fatigue or weakness. One in five of the individuals aged 35 and above reported headaches, dizziness or weakness. 15% of the individuals aged between 35 and 64 reported chest pain or fast heartbeat. Around 8% of the individuals aged between 18 and 34 reported skin or eye irritation.

**Percentage of responses of “Several times a week and more” experiencing the symptoms since wildfires by race**

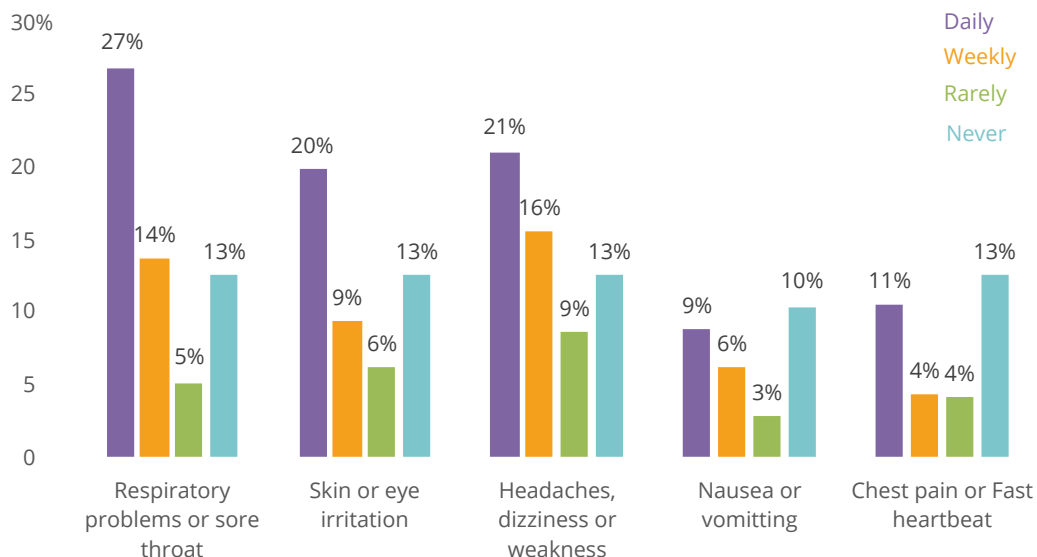


**Percentage of responses of “Several times a week and more” experiencing the symptoms since wildfires by age**



People who report daily exposure to the wildfire debris, smoke or ash experience symptoms more often than others. Almost three in ten individuals who had daily exposure to the wildfires debris, smoke or ash report experienced respiratory problems or a sore throat several times a week or more, while one in five of these individuals reported headaches, dizziness or weakness.

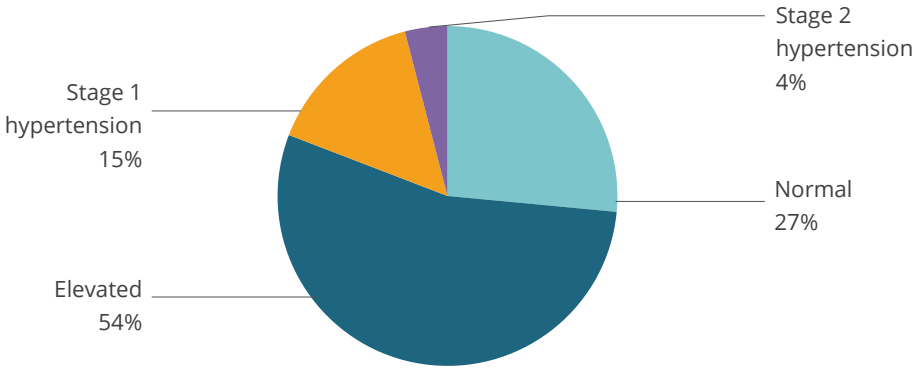
**Percentage of responses of “Always/ Frequently” experiencing the symptoms since wildfires by the exposure to wildfire debris, smoke or ash**



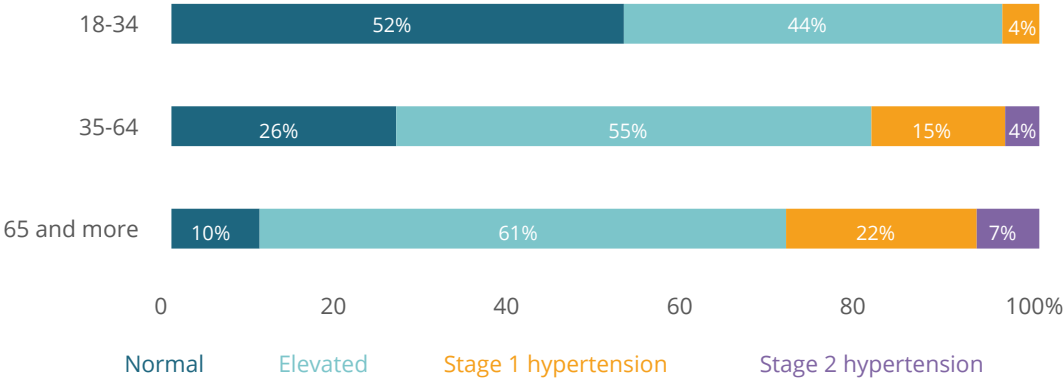
Cardiovascular Health Assessment

From each participant, blood pressure readings to examine hypertension status were meticulously measured as a key indicator of cardiovascular disease risk. These readings were then classified into one of four categories, from normal to stage 2 hypertension based on standard American Heart Association (AHA) cutpoints, providing a general assessment of cardiovascular health. Over half (54%) of participants had elevated blood pressure, with an additional 19% experiencing stage 1 or 2 hypertension. Just over a quarter (27%) of participants had normal blood pressure.

Blood Pressure Categories



Blood Pressure Category by age



Kidney and Lung Health Assessment

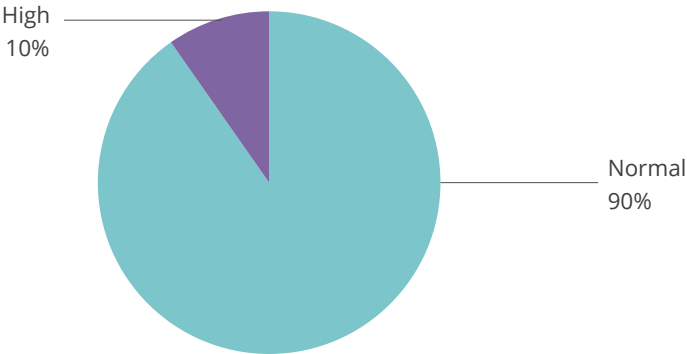
In addition to cardiovascular health, preliminary health metrics were obtained using the iStat system by Abbott, which involved a simple blood collection from participants from venipuncture. The blood samples were then analyzed on-site using two specific cartridges: CG4+ for blood gasses and electrolytes, and CHEM8+ for a comprehensive blood chemistry and biomarker profile. Pulmonary function was assessed using spirometry with the EasyOne® Air spirometer. We list a few salient metrics relevant to renal and pulmonary function.

**Creatinine:** Creatinine is a waste product produced by muscles from the breakdown of a compound called creatine. It is primarily filtered out of the blood by the kidneys and excreted from the body through urine. Creatinine levels in the blood can serve as a reliable indicator of kidney function. The importance of creatinine as an indicator of kidney health lies in its relationship with glomerular filtration rate (GFR), which is a measure of how well the kidneys are filtering waste from the blood (Stevens, Coresh et al. 2006). When kidney function is impaired, the clearance of creatinine from the blood is reduced, leading to an increase in blood creatinine levels. Thus, elevated levels of creatinine in the blood can signify decreased kidney function or kidney damage (Levey and Coresh 2012). Elevated creatinine levels among participants post-wildfire could indicate acute kidney injury or exacerbation of pre-existing kidney conditions due to factors such as smoke exposure, dehydration, or stress, among others. Although the majority (90%) of MauiWES participants exhibited normal levels of creatinine, 10% had abnormally high

levels potentially indicative of kidney disease. Those with high levels were encouraged to seek follow up care.

We found a much larger share of Native Hawaiians and Pacific Islanders who had high creatinine levels compared to the overall population, while Hispanics/Latinos had lower rates of high creatinine.

**Creatinine Range Categories**

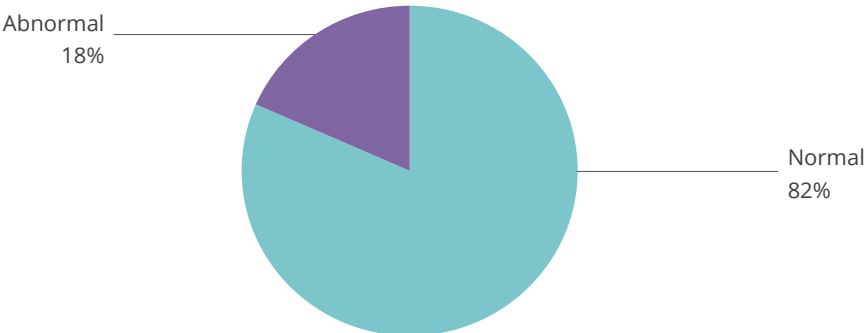


**Blood Urea Nitrogen (BUN):** Blood urea nitrogen (BUN) is a measure of the amount of nitrogen in the blood that comes from the waste product urea. Urea is formed in the liver as a result of protein metabolism and is normally excreted by the kidneys. Elevated levels of BUN in the blood can indicate impaired kidney function, dehydration, or other medical conditions affecting the kidneys.

BUN levels are influenced by factors such as dietary protein intake, liver function, and hydration status. When kidney function declines, BUN levels tend to rise because the kidneys are less efficient at filtering urea from the blood and excreting it in the urine. Therefore, elevated BUN levels can be a sign of decreased kidney function or kidney damage. BUN is often measured alongside creatinine, previously described in this report. While both BUN and creatinine can provide valuable information about kidney health, they have different sensitivities and specificities. BUN levels can be affected by factors such as diet and hydration status, while creatinine levels are more specific indicators of kidney function.

Abnormal BUN levels were observed in 18% of MauiWES cohort participants, potentially indicating kidney issues or dehydration.

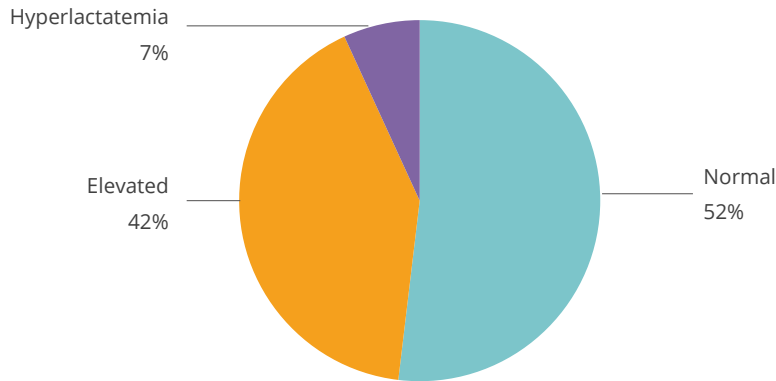
**BUN categories**





**Lactate:** Lactate, also known as lactic acid, is a byproduct of anaerobic metabolism, meaning it is produced when the body breaks down glucose for energy in the absence of oxygen (Brooks 2007). An increase in lactate production is typically caused by impaired tissue oxygenation, either from decreased oxygen delivery or a disorder in oxygen use. High levels can be an indicator of severe lung disease, respiratory failure, or pulmonary edema (Garcia-Alvarez, Marik et al. 2014). A significant proportion of the initial MauiWES cohort (41%) exhibited high levels of blood lactate, or were already at hyperlactatemia levels (7%), with 52% within the normal range. Those with high levels were encouraged to seek follow up care.

**Lactate Range Categories**

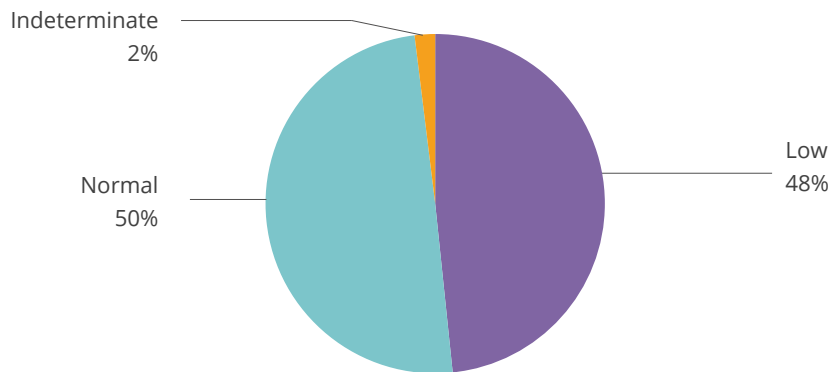


**Spirometry Measurements:** Pulmonary function tests are breathing tests to understand how well an individual is able to move air in and out of their lungs. Spirometry is the most common test and measures how much and how fast one can move air into their lungs. Spirometry can be used to indicate potential respiratory conditions like asthma or chronic obstructive pulmonary disease (COPD). Wildfire smoke has high concentrations of particulate matter and irritants and can lead to compromised lung function and exacerbate pre-existing respiratory conditions. Spirometry provides a number of pulmonary function measurements including forced vital capacity (FVC) and forced expiratory volume (FEV), which we report here.

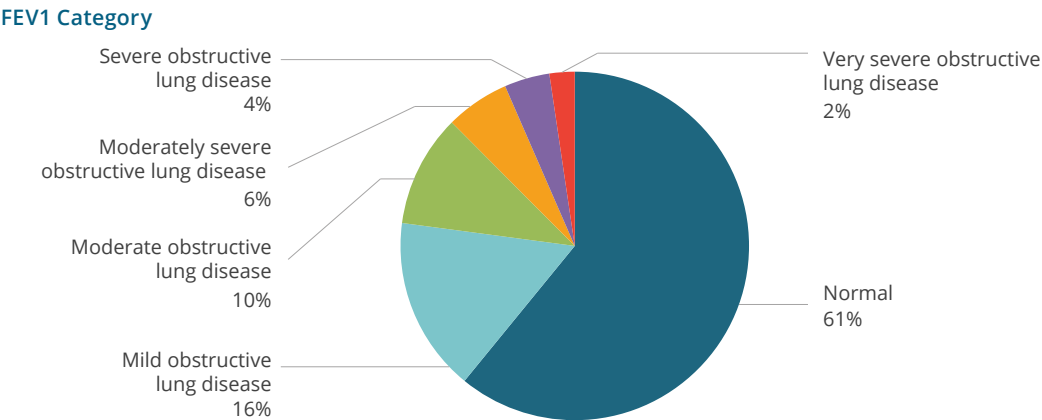
**Forced Vital Capacity (FVC):** FVC corresponds to the total amount of air an individual can forcefully exhale after taking a deep breath. It is an important measure of how well an individual's lungs work. FVC readings outside the normal range may indicate compromised lung function. Almost half of MauiWES cohort participants exhibited low FVC levels outside the normal range. Those with these abnormally low FVC levels were encouraged to seek follow up care and confirm these readings.

Filipinos and other Asians had higher rates of low FVC readings compared to other race groups.

**Spirometer Reading: Forced Vital Capacity**



**Forced Expiratory Volume in 1 Second (FEV1):** FEV1 quantifies the volume of air expelled in the first second of a forced exhale during the spirometry reading. This metric is crucial for assessing potential airflow obstruction. Decreased FEV1 may indicate conditions like asthma or COPD. Nearly half of all MauiWES participants showed FEV1 readings potentially indicative of obstructive lung disease. Those with abnormal levels of both FEV1 were encouraged to seek follow up care to confirm these readings.

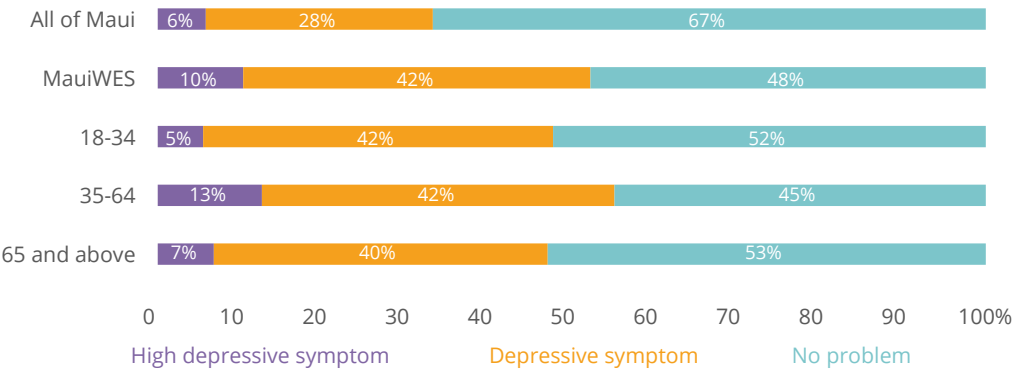


# Mental Health

*The MauiWES study finds very concerning rates of mental health issues among survivors. 51% of participants showed depressive symptoms, 35% reported low self-esteem, 30% had moderate to severe anxiety, and 4.4% had considered suicide in the past month. We find that mental health effects are impacting the survivor population beyond those directly exposed to smoke, ash and debris.*

## Depression

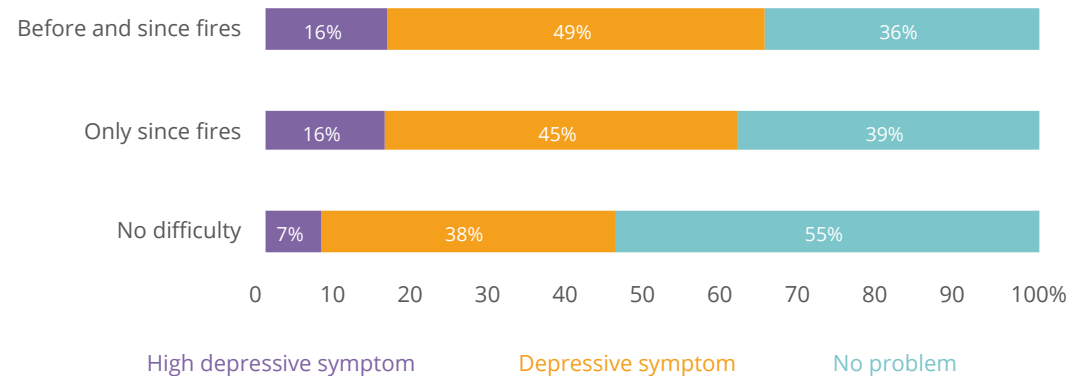
### Depression by age



More than half of the MauiWES cohort have depressive symptoms. This is a marked difference compared to the data for all of Maui from the UHERO Rapid Survey collected in June 2023 where a third of Maui residents report such symptoms. Depression rates are highest in middle age. This may be related to financial and family care responsibilities that have been exacerbated by disaster-related uncertainty. It is also concerning that people experiencing depressive symptoms

also report greater difficulties with accessing healthcare services. It is imperative that mental health care is available to all people who are struggling with mental health concerns.

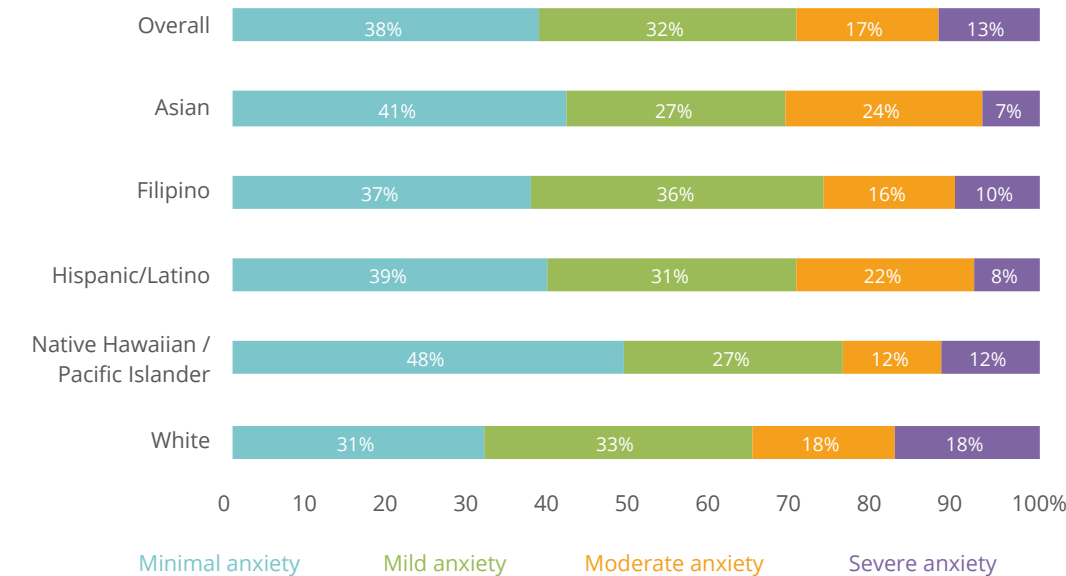
**Did you have any difficulties accessing medical care or medications? - by depressive symptom**



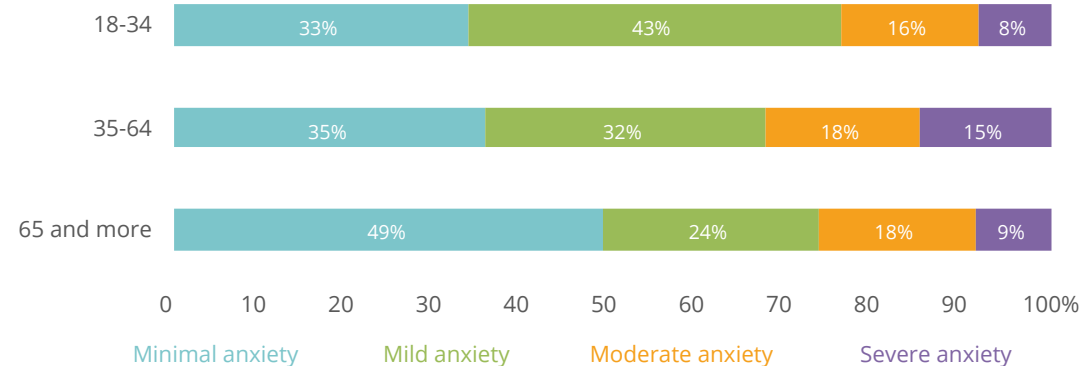
**Anxiety**

Around 30% of participants reported symptoms of moderate or severe anxiety. People aged between 35 and 64 years old overall reported the highest levels of anxiety, with more than 15% of people having symptoms of severe anxiety.

**Anxiety Severity by race**



**Anxiety Severity by age**

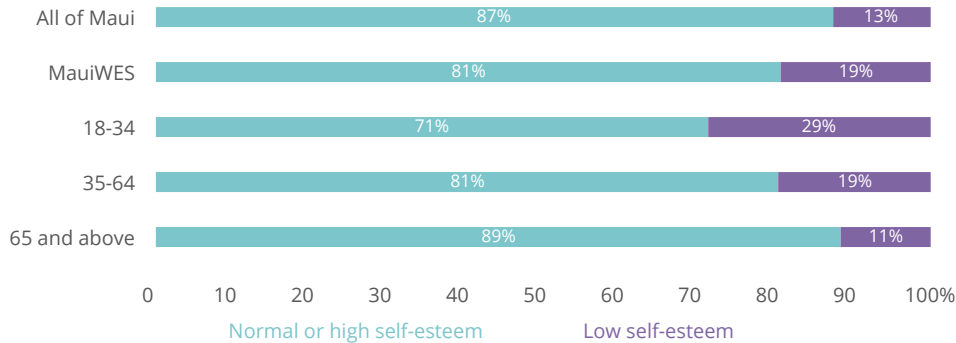


Self-esteem

In terms of self-esteem, the MauiWES results are similarly concerning. About 20% of respondents reported low self-esteem. This is more than twice as many as in the UHERO Rapid Survey data for all of Maui before the wildfires

Young people under 35 years report the highest percentage of low self-esteem.

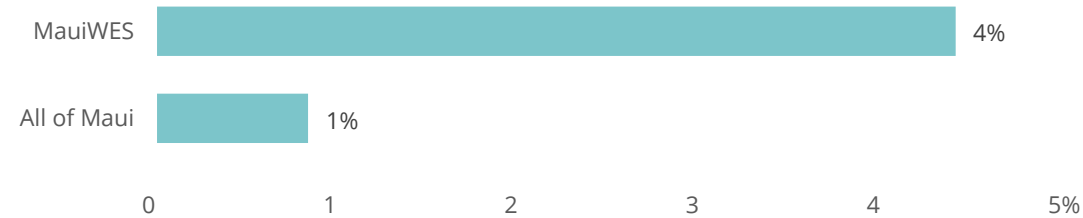
Self-esteem by age



Suicidal ideation

We surveyed respondents about whether they experienced suicidal ideation during the past month. Overall, 4.4% of survey respondents (28 individuals) contemplated suicide during the past month, which is notably higher than the 0.8% of the respondents living on Maui in the UHERO Rapid Survey from June 2023.

During the past month, did you ever seriously consider attempting suicide?



Impact of the wildfires on keiki, kupuna and pets

Participants were asked about the impact of the wildfires on their children, elderly family members, and pets. 43% reported exposure of household members to wildfire debris, smoke, or ash. respiratory and throat symptoms were the most common. Differences in symptoms were observed between those with and without difficulties accessing medical care. Among those exposed, more than 60% did not receive medical care for symptoms. 42% of participants had pets. More than 20% reported pet fatalities and more than a third reported adverse effects on their pets due to the wildfires.

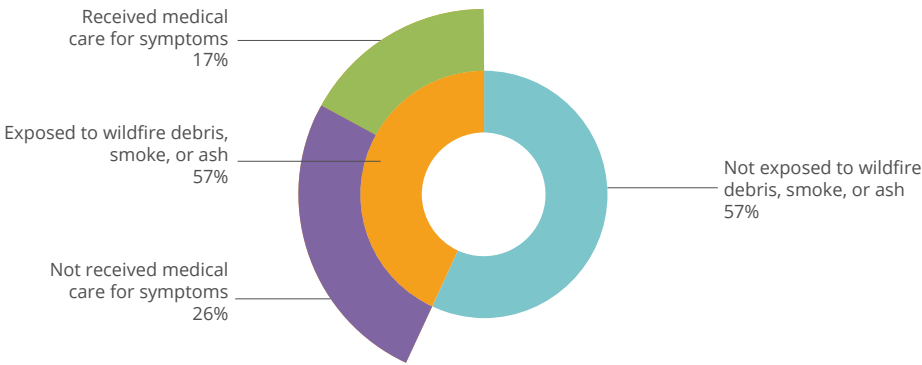
The participants were asked about the impact of the wildfires on their children, elderly family members and pets. 43% of the individuals reported that their children or other household members have been exposed to wildfire debris, smoke or ash during the wildfires. They were also asked about symptoms that their children or other household members experienced. The

results show that respiratory/throat symptoms were the most common symptoms among the participants, followed by fatigue/pain, eye or skin irritation, and mental health.

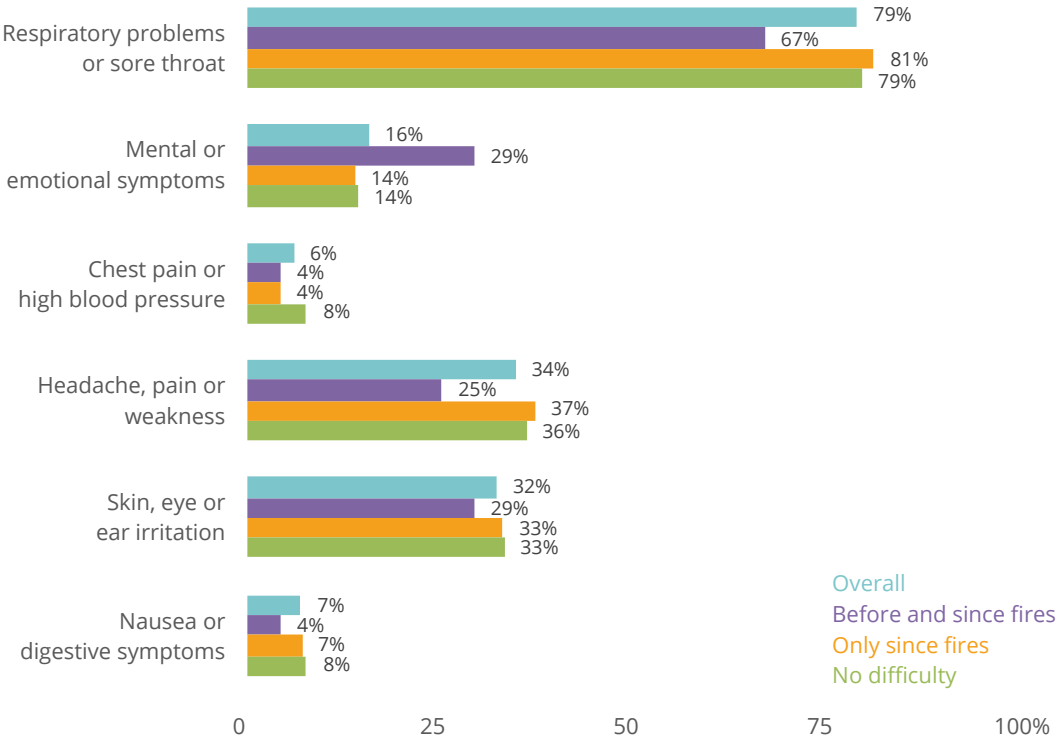
We also looked at differences in the symptoms experienced by children or family members by difficulty accessing medical care and medications. Almost 80% of individuals who had difficulty in medical access since the wildfires reported that their children or family members experienced respiratory/throat symptoms, about 37% of these individuals reported that their family members, children experienced headache, pain or weakness, and 7% had nausea or digestive symptoms. People who have had persistent difficulties accessing medical care were also more likely to report that their children and family members experienced mental or emotional symptoms.

Among the individuals who were exposed to wildfire debris, smoke or ash, more than 60% had not received medical care for symptoms.

**Have any children or other household members been exposed to wildfire debris, smoke, or ash? Have they received any medical care for these symptoms?**

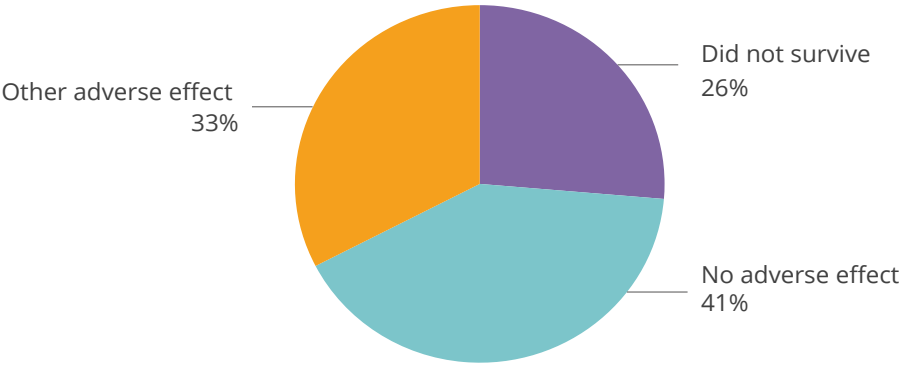


**Symptoms experienced by children or family members in overall sample and by difficulties in medical access**



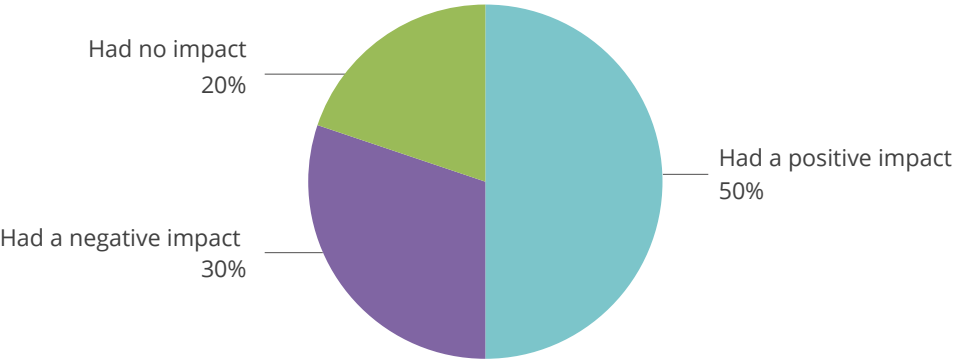
Participants were also asked whether they had any pets during the Maui wildfires. More than 26% of individuals who had pets during the Maui wildfire reported that their pets or some of their pets did not survive the wildfires. More than a third of the participants reported that their pets experienced adverse effects due to the wildfires.

**Effects of the wildfires on pets**



It is well known that pets are an important source of emotional support. We asked participants about the effect of having their pets during the Maui wildfires recovery on their emotional well-being and stress levels. Half of the participants reported that having pets had a positive impact on their emotions and reduced stress in the aftermath of the fires.

**Having pets with you during the Maui wildfires affected your emotional well-being and stress levels**



# Description of Survey Respondents and Methodology

For this study, adult participants from Maui were recruited with the assistance of local community organizations such as Roots Reborn, Maui Medic Healers and Tagnawa for Maui. Interested individuals were invited to attend recruitment events hosted at the Royal Lahaina Resort in Lahaina, the J. Walter Cameron Center in Wailuku, and the Kula Lodge in Kula.

Study data were derived from 679 adult volunteers who had been affected by the wildfires on Maui. They took part in MauiWES from January 26th to March 3rd, 2024. Although the data collected is invaluable, it is important to understand that it was obtained from a convenience sample, which means it might not represent the entire population affected by the wildfires.

Health measurements were recorded by trained staff using various methods. For saliva samples, participants were instructed to spit into a tube, close it securely, and then shake it. For buccal swab samples, participants gently rubbed the inside of their cheek with a swab. Urine samples



were self-collected by the participants using a sterile cup, ensuring they did not touch the inside of the cup. Blood samples were taken by certified personnel using a Safety-Lok Blood Collection set. i-STAT Chem 8 and Chem 4 were also performed. The i-STAT Chem 8 is a comprehensive panel that measures key blood chemistry levels, including electrolytes, enzymes, and gasses, to provide a broad overview of metabolic functions. The i-STAT Chem 4, on the other hand, offers a focused assessment, typically measuring critical electrolytes that are essential for basic metabolic processes. Lastly, lung function was assessed with a spirometer device known as the Easyone Air; each participant performed the test at least three times, and the best reading was recorded. Participants were provided their results when ready. This process was quick, allowing for immediate results. Participants were informed of their results shortly after testing, ensuring they were aware of their health status. The procedure was conducted with care to ensure participant comfort and safety, and all materials were safely disposed following the tests.

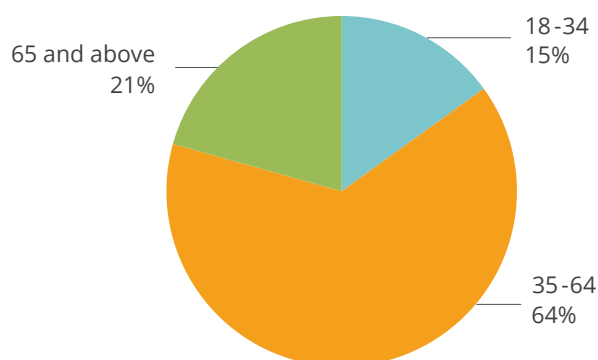
We gathered mental health data through validated questionnaires. Depression was measured using the Center for Epidemiological Studies Depression (CES-D) scale, which asks about symptoms like restless sleep and loneliness over the past week. Self-esteem was assessed with the Rosenberg Self-Esteem Scale, while anxiety levels were measured using the General Anxiety Disorder-7 (GAD-7) scale, which asks about symptoms of generalized anxiety disorder over the past two weeks.

To assess food insecurity, we utilized the six-item food security scale created by the National Center for Health Statistics.

## Age distribution

The report features a diverse age range of participants, with a strong representation from those aged 35 and above. Notably, there's a higher proportion of older individuals in our study compared to the general population of Maui, indicating a slightly enriched presence of senior participants in the study.

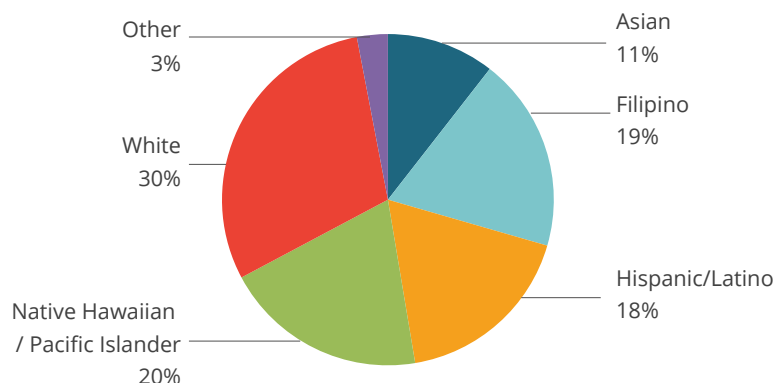
### Age



## Race and ethnicity distribution

Below, we provide an overview of the racial and ethnic makeup of our survey participants, based on their self-reported information. When participants identified with more than one race or ethnicity, they were asked to choose the one they felt most aligned with. Notably, our survey successfully included a significant proportion of Hispanic respondents (18%), a group that is often underrepresented in Hawai'i's research cohorts. Additionally, around 30% of our participants identified as White, 20% as Native Hawaiian, 19% as Filipino, and another 11% as non-Filipino Asian, including Japanese, Chinese, Korean, among others.

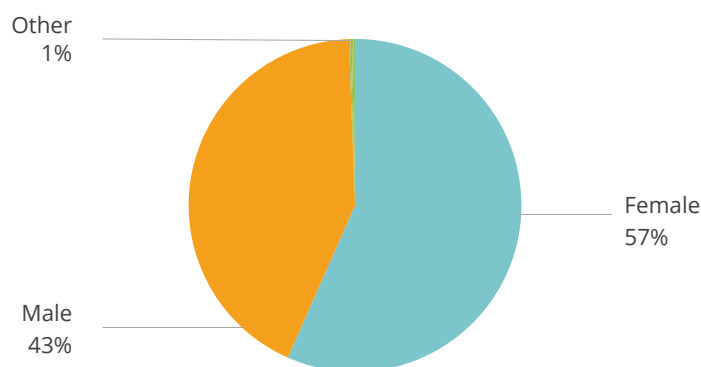
### Race and ethnicity



### Gender distribution

In our study, 56.5% of the participants identified as female, 42.9% as male, and 0.6% identified as transgender, genderqueer or another gender.

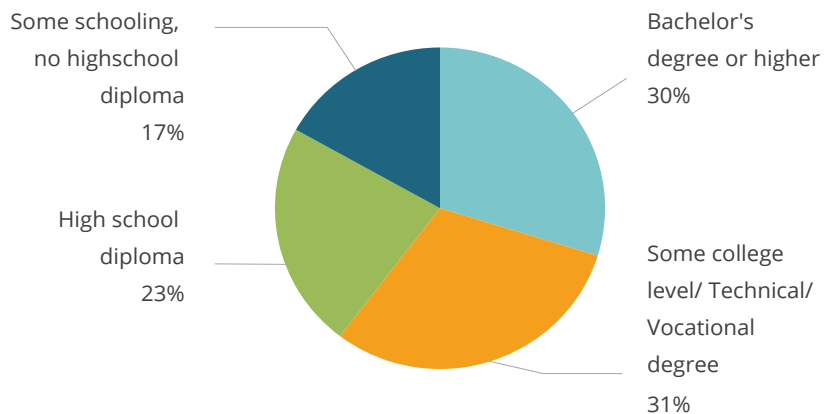
#### Do you think of yourself as?



### Education distribution

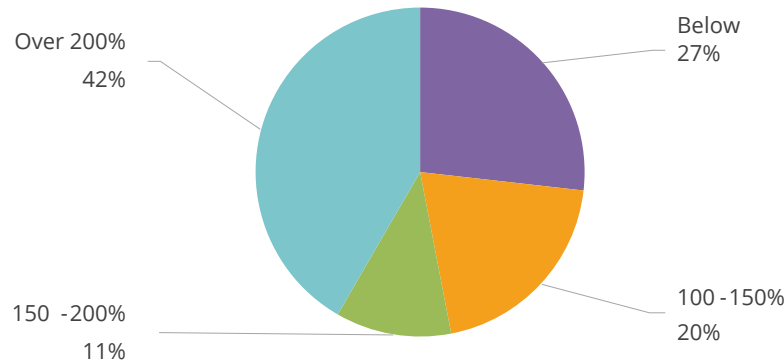
The survey successfully included a wide range of educational backgrounds, including successfully reaching out to individuals without a high school degree. Approximately one in three respondents obtained a bachelor's degree or higher, one in three participants completed some college or had a Technical or Vocational degree. 23% of the participants' highest educational attainment was a high school diploma whereas 17% of the participants had some schooling without a high school diploma.

#### What is your highest level of education?



## Poverty Distribution

### Relation to the poverty line

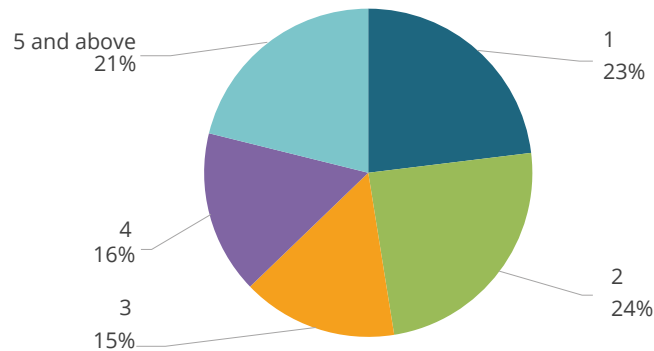


Respondents in the study were categorized according to their income and household size using federal poverty guidelines specific to Hawai'i. The federal poverty line takes into account household size. For example, for a household of two people, the federal poverty line is \$22,680 and for a household of five people it is \$40,410. The breakdown revealed that over a quarter of the respondents fell below the poverty line, with an additional fifth having incomes ranging from 100% to 150% of this threshold. Furthermore, one-tenth of households remained below twice the poverty line, while the remaining two-fifths have incomes exceeding double the poverty line.

## Household size and number of children and older people in the household

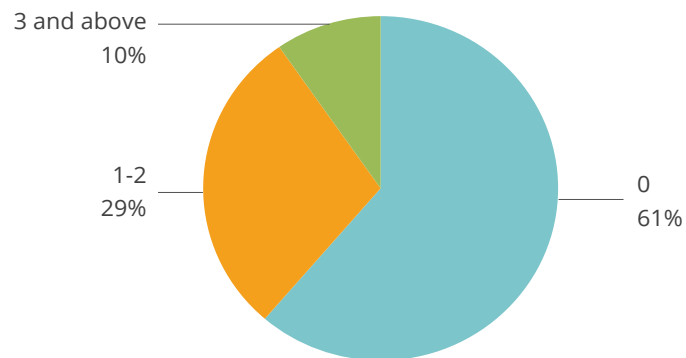
Respondents were asked how many people were currently living in their households, including themselves. Approximately one in four individuals were living alone, while a quarter of respondents lived in a household with two individuals. More than 20% lived in a household with five or more individuals.

### How many people are currently living in your household, including yourself?

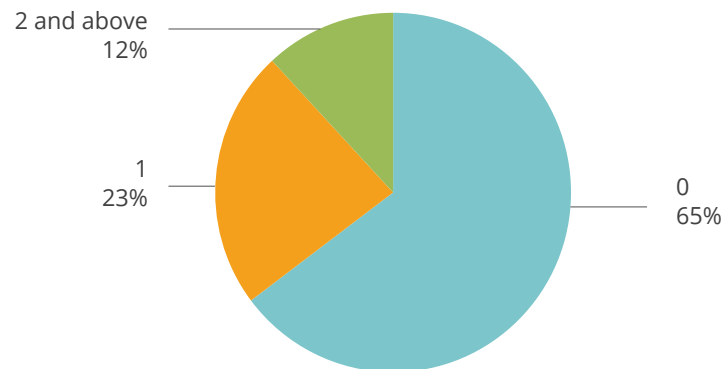


In the survey, we asked participants how many children (under 18 years old) and people aged 65 or older lived in their households. Over 61% reported no children under 18 years old, and 29% reported one or two children. Similarly, 65% reported no one aged 65 or older in their household, while 23% reported one household member aged 65 or older. Only 12% reported having two or more people in their household aged 65 or older.

How many children (under 18 years old) are in your household?



How many people in your household are aged 65 or older?



## Limitations

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The data used in this study were gathered from a convenience sample of 679 adults residing in Maui who were impacted by the wildfires and participated in the MauiWES study between January 26th and March 3rd, 2024. While this data provides valuable insights, several limitations must be acknowledged.

Firstly, the sample is not broadly representative of all individuals affected by the wildfires, as it comprises participants who were available to attend our recruitment events and/or had connections to our community partners. This self-selection bias means the findings may not fully reflect the wider affected community's experiences and needs.

Secondly, the reliance on self-reported data introduces the possibility of bias, with participants potentially offering responses they perceive as more socially acceptable rather than their true experiences or behaviors. Additionally, participants may hesitate to disclose information on sensitive topics such as certain health behaviors, health outcomes, and socioeconomic factors due to fear of stigma, particularly concerning issues like mental health. This reluctance can lead to underreporting or misreporting, especially among specific demographic groups, further complicating data accuracy.

This issue is inherent in survey-based research and can lead to discrepancies between reported and actual circumstances.

Thirdly, the current dataset represents a relatively small fraction of the broader population affected by the wildfires. Although it provides important initial insights, it is not exhaustive of the myriad issues faced by the community. As the study progresses, more funding is secured and partnerships with more community organizations are forged, the participant base will become more diverse, enhancing the coverage of the data.

Another limitation of our study is the utilization of the UHERO Rapid Survey as a comparison group of unexposed individuals prior to the wildfires. This dataset encompasses residents from the entire island of Maui, rather than solely the populations directly affected by the fires, due to insufficient representation from areas like Lahaina and Kula. In addition, the UHERO Rapid Survey data includes relatively more people with higher levels of education and higher incomes than the overall Maui population. This sample composition may explain some of the observed differences when we use it for comparisons to the MauiWES cohort, in addition to the true effects of the wildfires.

Lastly, the current analysis of the data is primarily descriptive and does not infer causality. The study's cross-sectional nature at this stage limits the ability to draw direct connections between the wildfires and specific health outcomes. However, as the study evolves into a longitudinal research project and data on the pre-fires health status and healthcare utilization of the participants can be accessed, it will provide more robust evidence on the causal impacts of the wildfires on the community's health.

Despite these limitations, the data collected in MauiWES represents some of the most comprehensive information currently available regarding the ongoing health and social challenges Maui residents faced in the aftermath of the wildfires. As the study expands and matures, it will offer increasingly valuable insights into the long-term effects of such disasters on affected populations.

## Acknowledgments and Support

---

We are grateful for the support provided by the Hawai'i Community Foundation Maui Strong Fund Grant and Kaiser Permanente, which enabled the initiation and continuation of MauiWES, supported the gathering of this data, and facilitated the creation of this report.

The recruitment of participants would not have been possible without the strong support at recruitment events of the [Maui Medic Healers Hui](#), [Roots Reborn](#), Tagnawa for Maui and [Healthy Mothers Health Babies Coalition for Hawai'i](#) teams. Special thanks to Noelani Ahia, Nikima Glatt, Lonaka Petines, Veronica Mendoza Jachowski, Genesis Gil, Stephanie Villalobos, AnnDionne Selestine, Nadezna Ortega, Michelle Hyman, Sunny Chen for their continuous support.

We also thank the Scientific and Community Advisory Boards who helped to refine the study design and logistics.

It is important to note that the opinions and findings presented in this report are solely those of the authors and do not necessarily reflect the views of the Hawai'i Community Foundation, our community partners and Scientific and Community advisory boards.

**MauiWES Staff supporting recruitment and data analysis:** Amada Torres, Austin Derderian, Binh Le, Bryan Cole Suechting, Connor Kamaehu Coelho Slavens, Krit Phankitnirundorn, Lesley Kealani Umeda, Nina Picher Allan, Nicole Siegal, Noelle Claudine Rubas, Rafael Aniu Peres-David, Ivan Rivadeneyra, Riley Kauilani Wells, Rosa Hyoyeun Lee, Samia Valeria Ozorio Dutra, Brennan Yoshiro Yamamoto, Jonas Yee.



## Community Partners

This report would not have been possible without the support of the Maui Medic Healers Hui, Roots Reborn and Tagnawa for Maui who have been unconditionally supporting the recruitment of participants. In addition, the Healthy Mothers Healthy Babies Coalition supported the testing of lead for participants. We also acknowledge other partners who have been directing study participants including:

American Lung Association, Hawai'i Integrated Analytics, Hawai'i Healthcare Hui, Papa Ola Lokahi, UH Maui College - CTAHR, University of Hawai'i Cancer Center and the College of Social Sciences Health Policy Initiative.

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- **18 years or older**
- **Survey, health exam, and clinical samples** to observe metals and other contaminants.
- **You will receive \$100 upon completing the study that day.**

## Upcoming events

### **Makawao – Whole Body Wellness (1135 Makawao Ave)**

Saturday, August 3, 10am to 4pm

### **Kihei – Island Health (2439 South Kihei)**

- Sunday, August 4, 10am to 4pm
- Saturday, August 17, 10am to 4pm
- Sunday, August 18, 10am to 4pm

### **Lahaina Comprehensive Health Center**

- Tuesdays in August, 10am to 4pm

### **Wailuku – UH Maui College and other locations**

- Fridays in August, 10am to 4pm

Register online to save time.

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- 18 años o más
- Encuesta en español, examen de salud y muestras clínicas para observar metales y otros contaminantes.
- Usted Recibira \$100 al terminar el estudio ese dia

## Próximos eventos

### Makawao -Whole Body Wellness (1135 Makawao Ave)

- Sábado 3 de agosto, 10am a 4pm

### Kihei -Island Health (2439 South Kihei)

- Domingo 4 de agosto, 10am a 4pm
- Sábado 17 de agosto, 10am a 4pm
- Domingo 18 de agosto, 10am a 4pm

### Lahaina Comprehensive Health Center

- Todos los martes de agosto, 10am-4pm

### Wailuku - UH Maui College y otros sitios

- Todos los viernes de agosto, 10am-4pm

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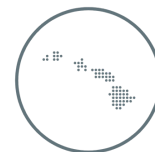
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