



Maui Wildfire Response

Lead Screening of People Impacted by the August 2023 Maui Fires

Updated May 2024

Key Points

- Elevated blood lead level could indicate potential exposure to toxins in wildfire ash, and normal blood lead level provides reassurance of no significant exposure.
- Collaboration between DOH Public Health Nurses and Healthy Mothers Healthy Babies.
- 557 people were screened for lead from December 2023 – February 2024 at 15 events.
- Of the 557 people tested, 27 (4.8%) had lead detected in a point of care screening test (3.3 ug/dL or greater).
- Of the 27 with lead detected in the screen, 20 (74%) had venous confirmatory tests done.
- Of the 20 with venous confirmatory tests, 5 (25%) had lead detected (2.1 ug/dL or greater) in the venous confirmatory test (Range 2.1 - 5 ug/dL). 75% of positive point of care tests were false positives.
- Overall percent positivity ranged 0.9% (5/557) to 2.2% (12/557) if it is assumed that those without confirmed venous tests are all false positives or all true positives, respectively, and would be 1.2% (6.8/557) if assuming no bias for those who did and did not get confirmatory testing.
- While lead is present in significant concentrations in the wildfire ash, this evaluation provides evidence that people have not had widespread or clinically impactful exposure to lead from environmental contamination.

Background

Lead is one of the toxins found in significant concentrations in the residual ash from the August 2023 fires on Maui. Lead exposure is toxic to developing brains and of particular concern for children and pregnant women. Lead screening is routinely recommended for populations at [high risk](#). Sources of exposure include lead-based paint, and certain jobs and hobbies. The CDC uses a [blood lead reference value](#) of 3.5 micrograms per deciliter ($\mu\text{g}/\text{dL}$) to identify children with blood lead levels that are higher than most children's levels. The CDC's [Adult Blood Lead Epidemiology and Surveillance program](#) uses 5 $\mu\text{g}/\text{dL}$ to indicate an elevated BLL for surveillance purposes.

Because lead is slowly eliminated from the body, it is also useful as an indicator for potential exposure to ash. Elevated lead does not mean that it was caused by ash exposure as there could be other sources of exposure, but a normal lead level is reassuring that significant exposure to the toxins in ash did not occur. In an effort to further understand the potential exposures to the ash, DOH Public Health Nurses (PHNs) and partners from Healthy Mothers Healthy Babies (HMHB) provided lead screening to people impacted by the Maui fires at multiple community events from December-February 2024.

Methods

Lead Screening was done via point-of-care testing using LeadCare II™ machines manufactured by Meridian Bioscience.

Lead screening was offered at the following types of community events:

- Kula and Lahaina Community Meetings
- DOH Lead Testing Events
- Elementary Schools (Princess Elementary)
- University of Hawaii’s Maui Wildfire Exposure Study (MauiWES) Recruitment Events
- First Responder Event

Participants were informed of their results at the time of screening. Because false positive tests are a known limitation of screening using LeadCare II, if lead was detected in their sample, the participant was advised to follow up for a venous blood lead level with their PCP, or they were referred to Malama I Ke Ola. At some of the events, HMHB staff were able to draw the venous sample at the time of the positive screening result and those samples were sent to Diagnostic Lab Services (DLS). Venous results were tracked by DOH via mandatory electronic laboratory reporting. Maui PHNs followed up with participants who screened positive but did not rapidly get a venous confirmatory test.

Results

557 people (99.6% adults) were screened by Maui PHNs and HMHB from December 2023 - February 2024. Of those screened, 27 (4.8%) adults had lead detected in their LeadCare II sample. Of the 27 people with detectable lead during screening, 20 (74%) had venous confirmatory tests. Of those with venous tests, 5 (25%) had lead detected in the confirmatory venous sample, making 15 (75%) of the positive screens, false positives.

| Month | # Tested | Lead Detected in Screen | Venous Confirmatory Test Positive | Venous Confirmatory Test Negative | No Venous Confirmatory Test Done |
|---------------|------------|-------------------------|-----------------------------------|-----------------------------------|----------------------------------|
| December 2023 | 17 | 4 | 0 | 3 | 1 |
| January 2024 | 3 | 2 | - | - | 2 |
| February 2024 | 537 | 21 | 5 | 12 | 4 |
| Total | 557 | 27 | 5 | 15 | 7 |

If it is assumed that the 7 individuals without venous confirmatory tests were false positive screens (i.e. their venous test, if done, would not have detectable lead), then the overall percent positive rate is 0.9% (5/557).

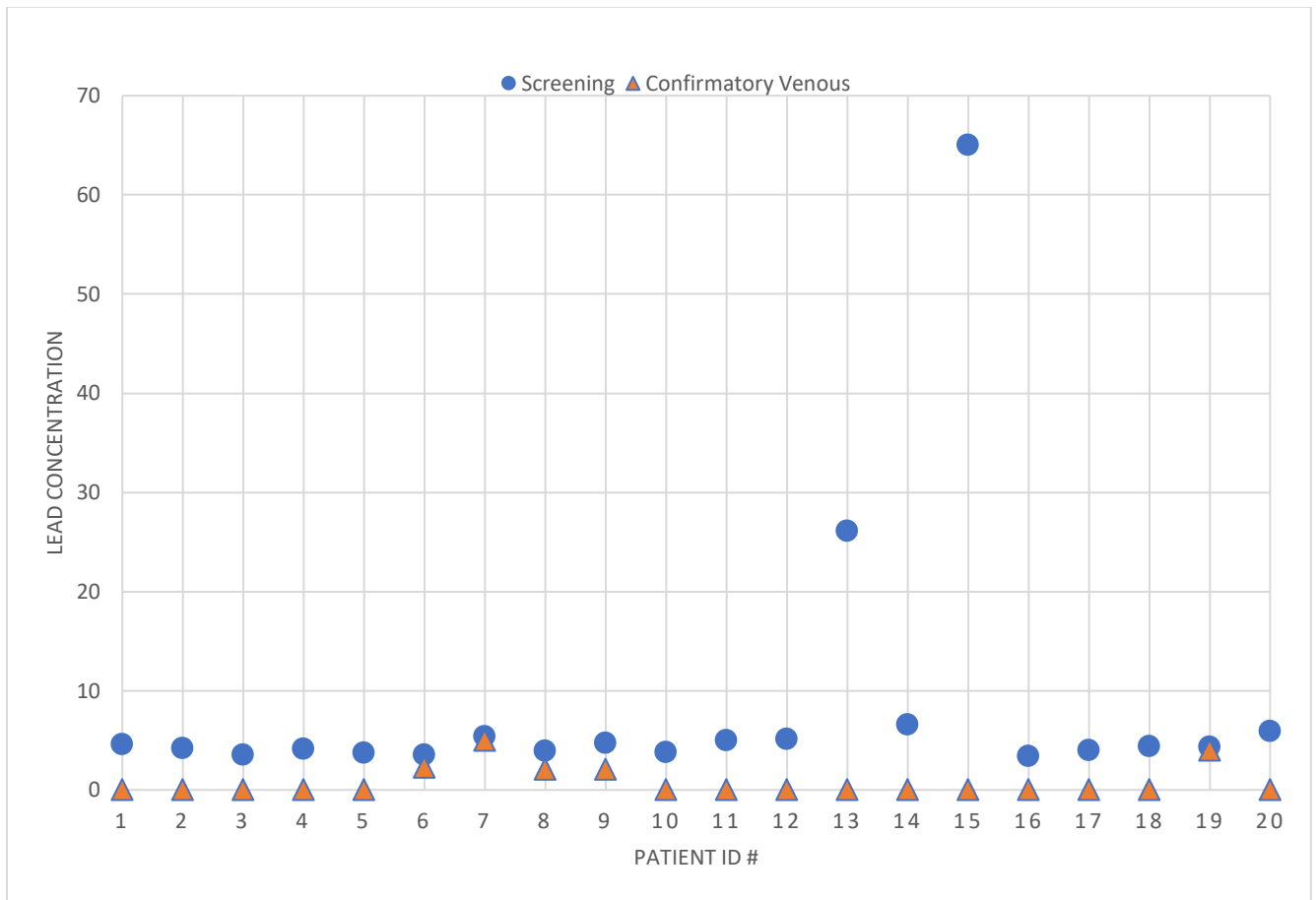
If it is assumed that the 7 individuals without confirmatory venous tests were true positives (i.e. their venous test, if done, would detect lead), the overall percent positive rate of lead detected in this project is 2.2% (12/557).

If it is assumed that there was no bias for those who did and did not get confirmatory testing, then the overall positivity rate would be 1.2% (6.8/557).

The lead levels that were detected in the screening and the venous confirmatory tests were low and not expected to cause health impacts in adults.

| Test Type | Median (ug/dL) | Range (ug/dL) |
|--|----------------|---------------|
| Screening Tests – All (N=27) | 4.2 | 3.5 - 65 |
| Screening Tests – with follow-up venous confirmatory test (N=20) | 4.3 | 3.5 - 65 |
| Venous Confirmatory Tests (N=20) | 0 | 2.1 - 5 |

The figure below shows screening test result (blue circle) and subsequent venous confirmatory test result (orange triangle) by individual. Cases where the venous confirmatory test result (orange triangle) is 0 reflect false positive screening tests.



Conclusions

Based on this lead screening project, there is not evidence of widespread exposure to lead from environmental contamination from the Maui Fires. While lead is present in significant concentrations in the ash, this screening confirms that people have not had clinically impactful exposures to toxins in ash.