LA FIRE HEALTH STUDY

DATA BRIEF 7.1

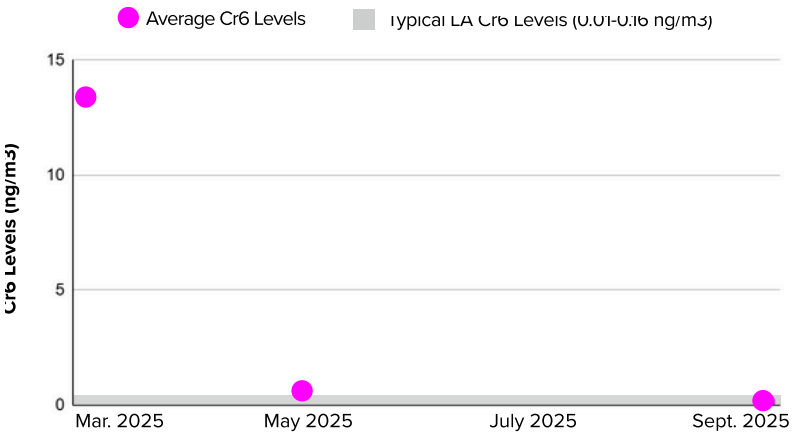
Preliminary Data Findings: Reduced Chromium-6 Levels in Air near LA Burn Zones

Updated: 11/12/2025

UPDATED FINDINGS

- **Background:** In August, the LA Fire HEALTH Study consortium reported that it had detected elevated levels of chromium-6 (Cr6) nanoparticles in air samples that were taken in March, April, and May in the Altadena and Pacific Palisades areas. These findings were published in a preprint journal article[1] and in a Data Brief on the LA Fire HEALTH website.[2]
- **Testing in September found that those levels have decreased and are currently back to the typical low levels detected in Los Angeles.** This was consistent in both the mobile measurements and stationary air samples we collected. South Coast AQMD found similar results with their stationary samples, also collected in September.
- **This is good news for the community.** Our interpretation of the measurements is that chromium-6 weathered back to its more stable and less toxic chromium-3 form over time. Measurements of total chromium in the air are consistent with this interpretation.
- **Further investigation is still needed to determine the source of the Cr6 in earlier measurements**, to help us understand how to prevent more exposures in future wildfires, and to ensure that future debris removal or construction activities in the area do not cause additional exposures.

Below is a chart of the average levels of chromium-6 measured through mobile monitoring in Altadena and Pacific Palisades at their peaks in March, and then again at their low levels in September (in many cases, the measurements were below the detectable limits of the measuring devices used). The gray box indicates typical background levels for the region as measured by South Coast AQMD.[3]



HOW DID WE MEASURE THIS?

Using the same mobile monitoring instruments that were used in March-May, scientists measured particles in the air in burn-impacted areas in Palisades and Altadena throughout one week in September. Samples of particles were collected and examined to determine the concentration of pollutants such as chromium-6. These measurements were then compared to data from South Coast AQMD stationary air quality monitors.

1. Michael Kleeman, Christopher Cappa, Peter Green et al. "Airborne Hexavalent Chromium Nanoparticles Detected Around Cleanup Zones for the 2025 Los Angeles Wildfires," 26 Aug 2025, PREPRINT (Version 1) available at Research Square. https://doi.org/10.21203/rs.3.rs-7401328/v1
2. LA Fire HEALTH Study. "Data Brief 7." https://lafirehealth.org/new-la-fire-health-data-brief-chromium-6-detected-in-air-near-la-burn-zones/
3. South Coast AQMD. 2025 Wildfre Response: Hex Chrome Monitoring. https://www.aqmd.gov/2025-wildfire-response

LA FIRE HEALTH STUDY

DATA BRIEF 7

Preliminary Data Findings: Chromium-6 Detected in Air near LA Burn Zones[1]

Date Released: 8/26/2025

SUMMARY

Air quality monitoring in the Eaton and Palisades fire areas in March and April found elevated levels of chromium-6 (also known as hexavalent chromium, or "hex chrome") in the air. The chromium was mostly in the form of very small particles, called nanoparticles, with size less than 56 nm (nanometers).

More testing is needed to determine how much chromium-6 remains in the air, soil, and dust in the fire-impacted zones now that debris cleanup has mostly been completed.

In the meantime, simple precautions are warranted to help avoid exposure to this potentially carcinogenic form of chromium:

- Use air cleaners or purifiers with HEPA filters inside homes, offices, community spaces, and classrooms in or near the burn zones.
- Upgrade HVAC filters to MERV 13 or higher rated filters.
- Use HEPA vacuums to clean floors and upholstery.
- Remove shoes before entering homes and wipe pets' paws to avoid tracking dust into homes.
- Wear N95 or KN95 masks while cleaning to avoid inhaling particles that may be stirred up during cleaning and debris removal activities.

WHAT YOU SHOULD KNOW

- Recent analysis of airborne particles collected in the outdoor air around the debris cleanup zones for the Eaton and Palisades fires during March and April 2025 detected the presence of airborne metals, including chromium-6.
- Chromium-6, also called hexavalent chromium, is a form of chromium that is more toxic than the usual type of chromium detected in air, soil, and dust, called chromium-3.
- The measured chromium-6 levels were below limits set for workers, but above screening levels for workers and the general public. Screening levels are used to determine when additional investigation is warranted.
- Most of the chromium-6 was found on very small particles in the air, called nanoparticles. This is important for two reasons:
  1. These nanoparticles are small enough to enter cells in our body.
  2. They are small and light enough that they can travel several miles from the burn and debris zones, depending on things like wind speed and wind direction.
- Weather models and previous research on nanoparticles suggest that the particles found in this study could have travelled up to 10km (or ~6 miles) from fire-affected areas.
- These air samples represent conditions on 6 days in March-April, 2025. Conditions can change over time. Additional samples collected more recently are being analyzed now, and more testing is planned to determine if chromium-6 is still in the air.
- Past research suggests that nanoparticles can move inside homes, and there are immediate steps people can take to reduce, and in many cases, prevent their exposure (see page 2).
- Additional testing of air, soil, and dust for chromium-6 and other potential toxins is needed.

1. Michael Kleeman, Christopher Cappa, Peter Green et al. "Airborne Hexavalent Chromium Nanoparticles Detected Around Cleanup Zones for the 2025 Los Angeles Wildfires," 26 Aug 2025, PREPRINT (Version 1) available at Research Square. https://doi.org/10.21203/rs.3.rs-7401328/v1

WHY IT MATTERS

Chromium-6 is a toxic metal that, depending on how much you're exposed to, can impact your lungs. Chronic, long-term exposure is associated with asthma, bronchitis, and decreased lung function. Chromium-6 can also cause lung cancer. Your risk depends on how much you're exposed to, for how long, and other factors like your overall health.

FAQ: FREQUENTLY ASKED QUESTIONS

What is chromium-6?

Chromium-6 is a toxic form of the element chromium (Cr). Chromium is a shiny metal, but materials containing chromium-6 may take on a variety of colors and forms, such as liquids, dusts, mists, or fumes.

Chromium-6 (also written as hexavalent chromium or Cr(VI) or Cr6 or Cr+6) is a chemical form of chromium in which the chromium atoms are in the +6 oxidation state.

Chromium can exist in several forms, but the two most important in environmental and health contexts are:

- Trivalent chromium (Cr3): An essential trace nutrient for humans.
- Hexavalent chromium (Cr6): A highly toxic and carcinogenic form.

Hexavalent chromium became well-known as the chemical that poisoned the community of Hinkley, CA in the 2000 film, *Erin Brockovich*. However, the chromium-6 levels found in Hinckley, CA water were dramatically higher than the airborne levels detected in this study.

Where is chromium-6 usually found?

Chromium-6 is used or produced in a variety of industrial products and processes, including:

- Chrome plating
- Stainless steel production
- Leather tanning
- Wood preservation
- Pigments and dyes
- Corrosion inhibitors

The amounts of chromium-6 detected in this study are well above typical background levels of 0.04 to 0.06 ng/m^3 as measured by AQMD in LA County. More research is needed to determine what the source of the chromium-6 detected in Eaton and Palisades fire zones may be.

Can chromium-6 cause cancer?

Per the California Office of Enviornmental Health Hazard Assessment (OEHHA): "Breathing chromium-6 over a long period of time increases the risk of lung cancer and nasal cancers OEHHA has calculated a cancer risk associated with exposure to chromium-6 if that exposure continues for an entire lifetime. Continual exposure to 0.045 nanograms per cubic meter (ng/m^3) of chromium-6 from all sources combined for 30 years could increase cancer risk to 25 in a million. **Exposure over shorter periods of time would be associated with much lower cancer risks."** Continual exposure to the levels found in this study (13.7 ng/m^3) for 30 or more years would indicate a lifetime cancer risk of approximately 2.5 in 10,000.

What other (non-cancer) health risks can chromium-6 exposure cause?

Breathing chromium-6 at high levels over time can cause or worsen certain health conditions, including:

- Irritation of the nose, throat, and lungs (runny nose, coughing)
- Allergic symptoms (wheezing, shortness of breath)
- Nasal sores and perforation of the membrane separating the nostrils (at very high air levels in workplaces)

What can I do to prevent chromium-6 exposure?

While these findings may seem concerning, many of the mitigation strategies already in use in your home are very effective at removing nanoparticles, including chromium-6. Continue to follow the precautions advised by the DPH and LA Fire HEALTH to clean air and surfaces inside of homes:

- Use HEPA filters in your home: HEPA filters are very effective at removing nanoparticles of this size, including chromium-6, achieving over 99% removal efficiency.
- Use a portable air cleaner or purifier with a HEPA filter to clean the air inside your home.
- Use a vacuum cleaner with HEPA filter to remove dust and debris inside your home.
- Continue to use MERV-13 or higher filters in central HVAC systems. And replace filters according to the manufacturer's recommendation to ensure that they are working efficiently.
- Limit tracking in dirt from outside by taking shoes off at the door and wiping the paws of pets.
- Wear a N95 or KN95 mask when cleaning fire-impacted homes in/near the burn area to avoid inhaling Cr6 or other toxins that may remain in settled dust.

FAQ: FREQUENTLY ASKED QUESTIONS *continued*

What levels of Chromium-6 were found in LA after the fires, and how do they compare to official limits?

Different federal, local, and state agencies set regulations for exposure to certain toxins based on what we know about the health impacts of those toxins, and how much of the toxin is likely to lead to those health impacts.

This study found that city-wide average chromium-6 levels in outdoor air were 13.7 ng/m^3 (+/- 6.2 ng/m^3) in Altadena and Pacific Palisades, the two cities heavily impacted by the fires. These measurements were taken in March and April 2025 using a mobile platform that drove through the city streets. It is very likely that some neighborhoods experienced lower concentrations than average, while others were higher.

To help interpret this data, we compiled a few reference points using standards set by two federal agencies, the National Institute for Occupational Safety and Health (NIOSH) and the Environmental Protection Agency (EPA), and then broke these standards out for workers and the general public.

For workers:

- The city-wide average measured levels are well below the official limits for workers, as set by NIOSH, based on breathing the air for 8 hours per day. However, our measurements were not made directly on work sites, so worker exposures could potentially be higher than the average exposure across the region.
- In addition to the NIOSH limits, the EPA publishes what are called screening levels, which are used to determine if additional investigation is warranted.
  - The city-wide average levels exceed the EPA screening levels for outside air of 13 ng/m^3 when considering non-cancer health effects, and 3 ng/m^3 when considering cancer effects.*

For the general public, there are a few other reference levels we can use to help understand risk:

- The EPA published a level of 30 ng/m^3 for Cr6, which they define as a level that you could breathe continuously, for long durations, that is likely to be without a risk of negative health effects over a lifetime. The amount of Cr6 measured in the air around Altadena and Pacific Palisades in this study is below that level.
- The EPA also publishes screening levels for indoor air. These are not directly comparable to the measurements in the study, which were made outdoors, but offer a useful reference point:
  - EPA's screening levels for indoor air are 3 ng/m^3 for non-cancer effects and less than 0.1 ng/m^3 for cancer effects.

Here is a chart that shows where the levels reported in the research study fall according to different agencies:

Worker Rules	**Level**	**Were city-wide average Cr6 levels within the level?**
NIOSH limit, assuming an 8-hour work day	200 ng/m^3	✅
EPA, Regional Screening** Levels, worker air (non-cancer risks)	13 ng/m^3	❌
EPA, Screening** Levels, worker air (cancer risks)	1.1 ng/m^3	❌
General Public (Residential) Rules	**Level**	**Were city-wide average Cr6 levels within the level?**
EPA Reference Concentration (non-cancer effects)	30 ng/m^3	✅
EPA Screening* Levels (non-cancer risks, residential indoor air)	3.1 ng/m^3	❌
EPA Screening** Levels (cancer risks, residential indoor air)	<0.1 ng/m^3	❌
CA OEHHA chronic Reference Exposure Level (REL)** for non-cancer risks	200 ng/m^3	✅

Notes:

* It is important to know that cancer risks are based on an assumption of a lifetime of exposure.

** Screening levels are used when an area is initially investigated to determine if potentially significant levels of contamination are present such that a more in-depth investigation and assessment is warranted.

*** A chronic REL is a health-based benchmark that is set at a level at or below which adverse non-cancer health effects are unlikely to occur in the general human population when exposed continuously over a lifetime. Levels above the REL do not indicate the health effects will occur, but rather, that the chances of these health effects occurring increase at levels above the REL.

FAQ: FREQUENTLY ASKED QUESTIONS *continued*

What is a HEPA filter and why do I need one?

HEPA stands for high efficiency particulate air [filter] (as officially defined by the U.S. Dept. of Energy). HEPA filters are extremely effective at removing nanoparticles of the size detected in this study. According to the EPA, "This type of air filter can theoretically remove at least 99.97% of dust, pollen, mold, bacteria, and any airborne particles with a size of 0.3 microns (μm). Particles that are larger or smaller are trapped with even higher efficiency." Learn more about HEPA filters on the EPA website here.

HEPA filters can be found on portable air purifiers and air cleaners, as well as on household and industrial vacuums.

What should I do if I suspect I have been exposed to chromium-6?

This study didn't detect city-wide levels of chromium-6 that would cause acute symptoms, but exposure hotspots may have existed in specific neighborhoods. If you are concerned about chromium-6 exposure and develop symptoms (rash, cough, nosebleed, breathing issues), you should consult a health care provider and mention chromium-6 specifically.

Why did it take so long to discover that the air was contaminated with chromium-6, and why haven't soil and air been tested yet?

Air and soil are not routinely tested for chemicals like hexavalent chromium, since it is a rare type of contaminant that is usually only found near contaminated industrial sites. Chromium-6 was one contaminant out of hundreds that were monitored in special studies in the aftermath of the LA fires. It takes significant effort to collect atmospheric nanoparticle samples, and this was a special research project run by highly skilled and expert environmental scientists. Though the air particle samples were collected in March and April 2025, they were then analyzed using a number of different methods, each of which can take weeks to complete.

Once the presence of chromium-6 was detected, the scientists worked quickly to verify the findings and were able to publish the results within days. The preprint was released on August 26, 2025. As soon as the results were verified and submitted as a preprint, the scientists contacted local, state, and federal agencies to notify them of these findings. We welcome continued discussions with relevant agencies, as well as meetings with community leaders in LA to discuss these findings and help communities by trying to answer their questions.

Wildfires are occurring with much higher frequency and burning with much higher temperatures than ever before due to human-caused climate change, and many of the health impacts of these fires are only now coming into focus. One of the goals of the LA Fire HEALTH Study consortium is to better understand the full set of environmental and health impacts of wildfires, especially those that impact urban areas, to keep people currently affected by these fires safe and informed, and to better understand the risks for people who may be affected by future fires.

What needs to happen next?

The study investigators will return to Altadena and Pacific Palisades to make one final measurement of airborne chromium concentrations to see if levels have decreased now that the majority of debris removal operations have been completed. Depending on the findings, additional studies may be planned in coordination with public agencies, but details are still being discussed. Additional investigation may also be warranted to identify the source of the chromium exposure in case preventative measures can be adopted for future fires.

What is PM10?

Airborne particles are one of the most damaging components of air pollution. These particles, also called particulate matter (PM), vary widely in size, shape and chemical composition, and may contain manmade chemicals, metals, organic compounds, carbon, and many other compounds.

Particles are defined by their size for air quality regulatory purposes. Those with a diameter of 10 microns or less (PM10) are inhalable into the lungs and can induce adverse health effects. For comparison, a human hair is 50-70 microns in diameter.

What is a nanoparticle?

Most of the particles detected in this study were considered nanoparticles that were less than 56nm in diameter.

- Nanoparticles are tiny particles that cannot be seen by the human eye.
- They are about 1,000 times smaller than a strand of human hair.
- Inhaled nanoparticles can cross cell membranes and circulate throughout the body. Nanoparticles of many different elements can cause health impacts due to their ability to be absorbed deep into human tissue.

For answers to more questions about the LA fires and your health, please visit: lafirehealth.org/faq

DATA SET 1: Mobile Air Quality Measurements

Preliminary Data Findings: PM_{10} Concentrations in March and April 2025

Data Type: Outdoor Air Quality

Location: Palisades and Altadena

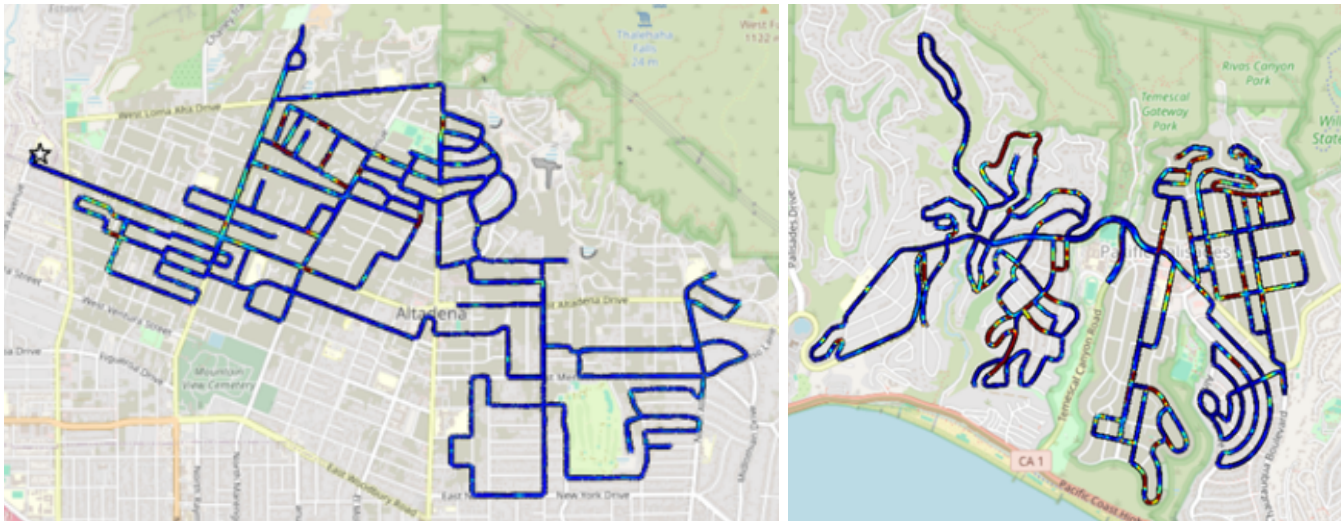
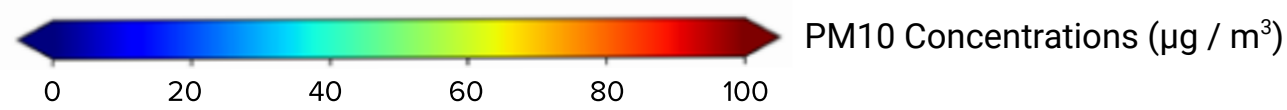


FIGURE 1: *Driving trace through Altadena (left) and Pacific Palisades (right). Color scale indicates PM_{10} concentration (µg / m3) measured with a Quant MODULAIR-PM optical particle counter. Star in left panel indicates the location of stationary sample site at edge of cleanup zone.*



WHAT WE DID

An electric truck with special measurement tools was used as an air quality measurement platform to drive around and sample airborne particle concentrations in/near the Eaton/Altadena (left) and Palisades (right) fire debris cleanup zones in March and April 2025.

METHODS: Samples of particles in different size ranges were collected using a special device (called a Micro Orifice Uniform Deposit Impactor, or MOUDI) so that they could be chemically analyzed for 30 elements including chrome, silver, lead, and arsenic. At the same time, all particles with diameter less than 10 microns (PM10) were collected on filters specially treated with a substance to stabilize chromium-6. By combining these two measurements, we know the concentration of hexavalent chromium nanoparticles. These measurements are city-wide averages, but we can see hotspots in the airborne particle concentrations using other real-time instruments (such as a Quant MODULAIR-PM optical particle counter – see Figure 1 above).

WHAT WE FOUND

The city-wide average concentrations are a combination of high PM10 concentrations around debris removal activities and low concentrations elsewhere. The majority of the chrome was in the form of chromium-6 in the cities of Altadena and Pacific Palisades, and that chromium-6 was in very small particles with diameter less than 56 nm. The city-wide average concentrations of chromium-6 in Altadena and Pacific Palisades were 13.7 ng/m^3 (+/- 6.2 ng/m^3), but zones of higher concentration almost certainly existed near debris cleanup activities. Measurements made by South Coast AQMD also found hotspots for total chromium greater than 100 ng/m^3 but they did not measure hexavalent chrome specifically.