

The California Regional Exposure (CARE) Study 2018 – 2020

Estudio de Exposición
Regional de California (CARE)
2018 – 2020

BIOMONITORING
CALIFORNIA



California Department of
PublicHealth



Cómo escuchar en español

Busque el icono del globo terráqueo (Interpretation) en los controles de Zoom, comúnmente al final de la pantalla. Por teléfono o tableta, haga clic en los tres puntos:

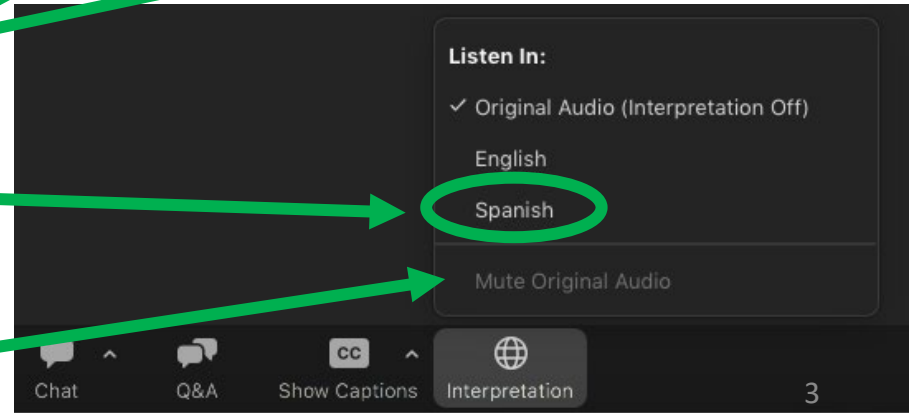
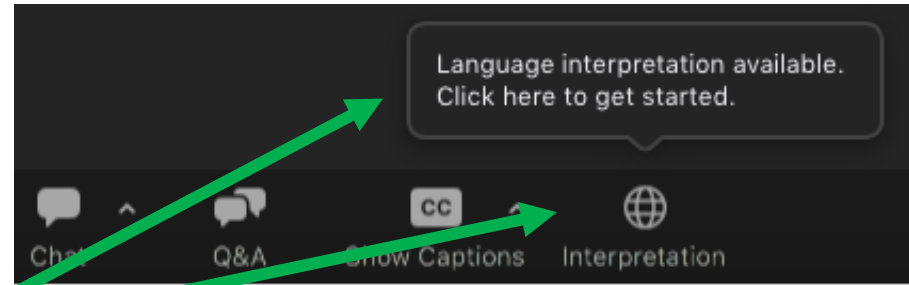
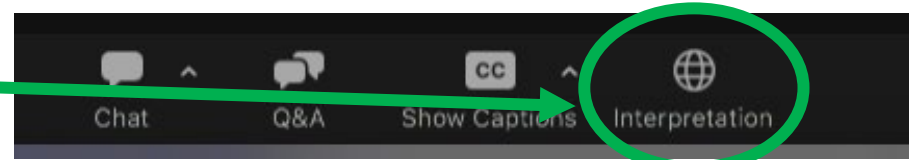


Haga clic en el globo o en la ventana emergente por arriba

Haga clic en "Spanish"

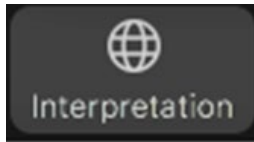
Opcional: Para escuchar solo español, haga clic en "Mute Original Audio"

The webinar will begin shortly, after we review instructions for Spanish interpretation. Thank you for your patience.



Land acknowledgement

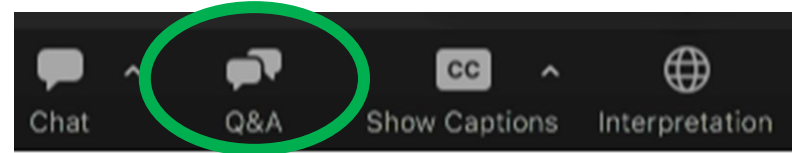
- Learn more about the land you are on: <https://native-land.ca/>
- For more information on the State's relationship with California Native Americans, please visit www.tribalaffairs.ca.gov or contact info.tribalaffairs@gov.ca.gov



Para escuchar en español: Haga clic en el globo terráqueo (Interpretation) en los controles de Zoom, luego haga clic en “Spanish”

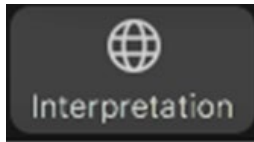
Zoom webinar settings

- We will only use the Q&A feature.



You will not be able to use Chat, Raise Hand, or Unmute.

- Please put all questions (English or Spanish) in the Q&A. We will answer questions verbally at the end.
- If you are having technical problems, please put in the Q&A and someone will help you.

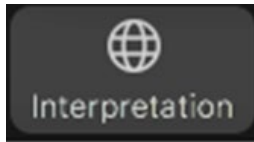


Para escuchar en español: Haga clic en el globo terráqueo (Interpretation) en los controles de Zoom, luego haga clic en "Spanish"



Agenda

- Presentation (45 minutes): Nerissa Wu & Kathleen Attfield
 - Introduction
 - CARE Study Findings
 - Putting Biomonitoring Data to Use
- Question & Answer (15 minutes)



Para escuchar en español: Haga clic en el globo terráqueo (Interpretation) en los controles de Zoom, luego haga clic en “Spanish”

BIOMONITORING CALIFORNIA

MEASURING CHEMICALS IN CALIFORNIANS

CARE Study

California
Regional
Exposure Study



Introduction

Nerissa Wu



'Forever chemicals' found in freshwater fish, yet most states don't warn residents

BY HANNAH NORMAN AND KAISER HEALTH NEWS

December 1, 2023 at 11:38 AM PST



Health Effects of Chronic Arsenic Exposure

Young-Seoub Hong^{1,2}, Ki-Hoon Song³, Jin-Yong Chung¹

¹Heavy Metal Exposure Environmental Health Center, Dong-A University, Busan; ²Department of Preventive Medicine, Busan; ³Department of Dermatology, Dong-A University College of Medicine, Busan, Korea

Cancer-causing chemical found in skincare brands including Target, Proactive, Clearasil



Kathleen Wong

USA TODAY

Published 2:48 p.m. ET March 11, 2024 | Updated 2:48 p.m. ET March 11, 2024

Evidence on the Human Health Effects of Low-Level Methylmercury Exposure

Margaret R. Karagas,¹ Anna L. Choi,² Emily Oken,³ Milena Horvat,⁴ Rita Schoeny,⁵ Elizabeth Kamai,¹ Whitney Cowell,⁶ Philippe Grandjean,² and Susan Korrick^{2,6}

¹Section of Biostatistics and Epidemiology, Geisel School of Medicine at Dartmouth, Hanover, New Hampshire, USA; ²Department of Environmental Health, Harvard School of Public Health, Boston, Massachusetts, USA; ³Department of Population Medicine, Harvard Pilgrim Health Care Institute, Boston, Massachusetts, USA; ⁴Department of Environmental Sciences, Jozef Stefan Institute, Ljubljana, Slovenia; ⁵Channing Laboratory, Department of Medicine, Brigham Young University, Salt Lake City, Utah, USA; ⁶Channing Laboratory, Department of Medicine, Brigham Young University, Salt Lake City, Utah, USA

Dangerous levels of PFAS detected in water for 27 million. Did the EPA find it near you?

Austin Fast and Cecilia Garzella USA TODAY

Published 5:02 a.m. ET Aug. 19, 2023 | Updated 1:00 p.m. ET Aug. 28, 2023



Biomonitoring is the measurement of chemicals in biological material, usually for the purpose of monitoring chemical exposures



BIOMONITORING CALIFORNIA

MEASURING CHEMICALS IN CALIFORNIANS



OEHHA
California Office of Environmental
Health Hazard Assessment



How biomonitoring benefits public health



Gives important information to study participants and the public



Can be used to evaluate how exposures are changing over time



Can be used to evaluate environmental policies

Examples of biomonitoring studies

Focused on specific communities

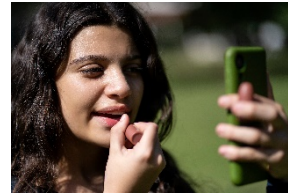


Firefighters are exposed to chemicals in smoke and firefighting foam



Asian Americans are more highly exposed to mercury, arsenic, and PFASs

Intervention studies



Choosing certain cosmetic products can lower chemical exposures



Removing old foam furniture from a house can reduce exposures to some flame retardants

CARE Study



California
Regional
Exposure Study

The California Regional Exposure (CARE) Study



The California Regional Exposure (CARE) Study

Region 2 included:

- Mono
- Inyo
- San Bernardino
- Riverside
- Imperial



The California Regional Exposure (CARE) Study

Region 3 included:

- San Diego
- Orange



CARE Study design



CARE Study
California Regional Exposure Study

Are there chemicals in your body that could harm your health?
¿Hay sustancias químicas en su cuerpo que podrían dañar su salud?

Join the CARE Study!

- Find out if you have arsenic, lead, mercury or other chemicals in your body.
- Learn what you and your family can do to help reduce your contact with these chemicals.
- **Get a \$50 gift card for participating!**

¡Únase al estudio CARE!

- Averigüe si tiene arsénico, plomo, mercurio u otras sustancias químicas en su cuerpo.
- Averigüe lo que usted y su familia pueden hacer para ayudar a reducir el contacto con estas sustancias químicas.
- **¡Si participa, le daremos una tarjeta de regalo de \$50!**



www.cdph.ca.gov/CARE
CAREStudy@cdph.ca.gov

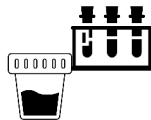
通過電話或電子郵件獲取您所用語言的信
Tumawag o mag-email para sa impormasyon sa iyong wika
Call or email for information in your language

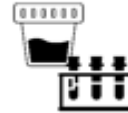
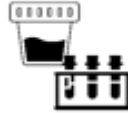
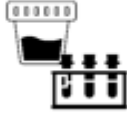
- 300-500 participants per region
- Recruited through mailed postcards, community organizations, and social media
- Focused on:
 - Metals (arsenic, cadmium, lead, mercury)
 - Per- and polyfluoroalkyl substances (PFASs)

CARE Study timeline

Each CARE Study region included:

- Community outreach
- Participant recruitment
- Sample collection
- Laboratory analysis
- Results return
- Statistical analysis





2018

2019

2020

2021



Findings

Kathleen Attfield

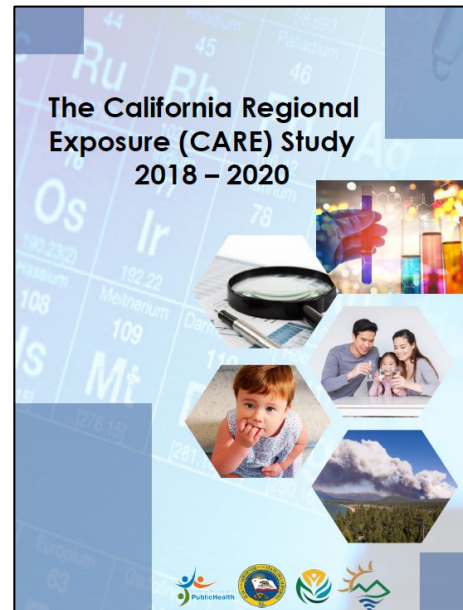
Who participated in the CARE studies?

- Conducted outreach throughout the region
- Invited participants based on:
 - Race/ethnicity
 - Gender
 - Sub-geography
- About 60% finished all study steps
- Applied statistical methods to data to represent the regional populations



Chemical information available in the report

- All participants
 - 10 Metals
 - 12 Per- and polyfluoroalkyl substances (PFASs)
- In a subset
 - 12 Environmental phenols
 - 2 Diesel exhaust indicators



https://biomonitoring.ca.gov/sites/default/files/downloads/CARE_Report.pdf

https://biomonitoring.ca.gov/sites/default/files/downloads/CARE_Report--es.pdf

Chemical information available in the report

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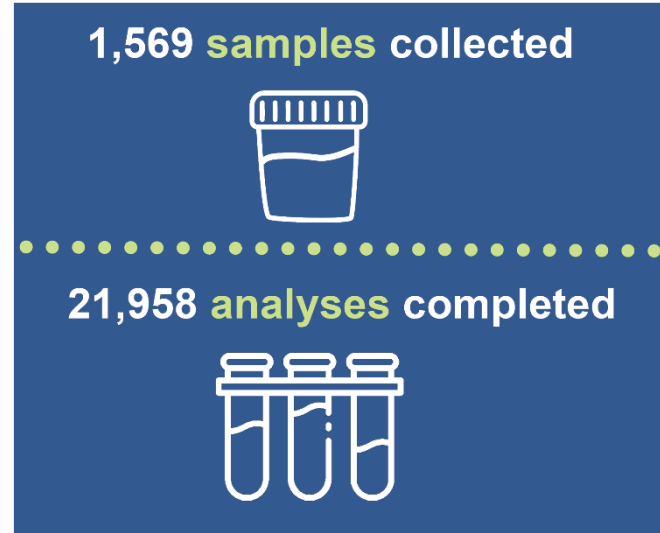


https://biomonitoring.ca.gov/sites/default/files/downloads/CARE_Report.pdf

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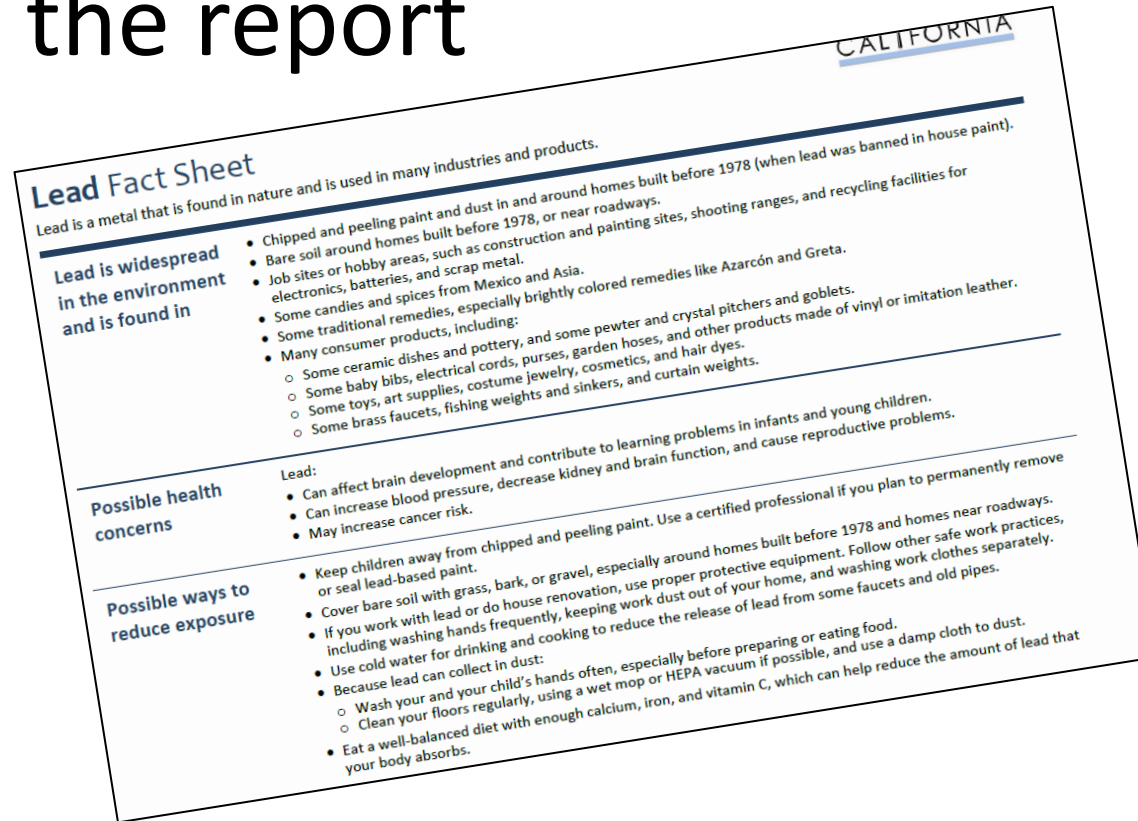
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Chemical information available in the report

CALIFORNIA

Lead Fact Sheet

Lead is a metal that is found in nature and is used in many industries and products.

Lead is widespread in the environment and is found in

- Chipped and peeling paint and dust in and around homes built before 1978 (when lead was banned in house paint).
- Bare soil around homes built before 1978, or near roadways.
- Job sites or hobby areas, such as construction and painting sites, shooting ranges, and recycling facilities for electronics, batteries, and scrap metal.
- Some candies and spices from Mexico and Asia.
- Some traditional remedies, especially brightly colored remedies like Azarcón and Greta.
- Many consumer products, including:
 - Some ceramic dishes and pottery, and some pewter and crystal pitchers and goblets.
 - Some baby bibs, electrical cords, purses, garden hoses, and other products made of vinyl or imitation leather.
 - Some toys, art supplies, costume jewelry, cosmetics, and hair dyes.
 - Some brass faucets, fishing weights and sinkers, and curtain weights.

Possible health concerns

Lead:

- Can affect brain development and contribute to learning problems in infants and young children.
- Can increase blood pressure, decrease kidney and brain function, and cause reproductive problems.

Possible reduce

Table E2: CARE-LA urinary metal concentrations (in µg/L), weighted

Analyte	Detection Frequency	GM (95% CI)	50th percentile	95th percentile	Total	LOD
Antimony	26.2	*	<LOD	0.101	428	0.0300
Arsenic	100	8.06 (6.69, 9.71)	7.91	67.2	428	0.100
Cadmium	100	0.153 (0.130, 0.182)	0.169	0.743	428	0.0100
Cobalt	100	0.217 (0.184, 0.256)	0.210	1.37	428	0.100
Manganese	15.2	*	<LOD	0.174	428	0.0100
Mercury	97.1	0.202 (0.159, 0.256)	0.232	2.63	428	0.300
Molybdenum	100	36.0 (30.5, 42.5)	39.6	160	428	0.0100
Thallium	99.8	0.154 (0.134, 0.178)	0.169	0.527	428	0.0100
Uranium	48.6	*	<LOD	0.116	428	0.0100

- All participants
 - 10 Metals
 - 12 Per- and polyfluoroalkyl substances (PFASs)
- In a subset
 - 12 Environmental phenols
 - 2 Diesel exhaust indicators

Chemical information for this webinar

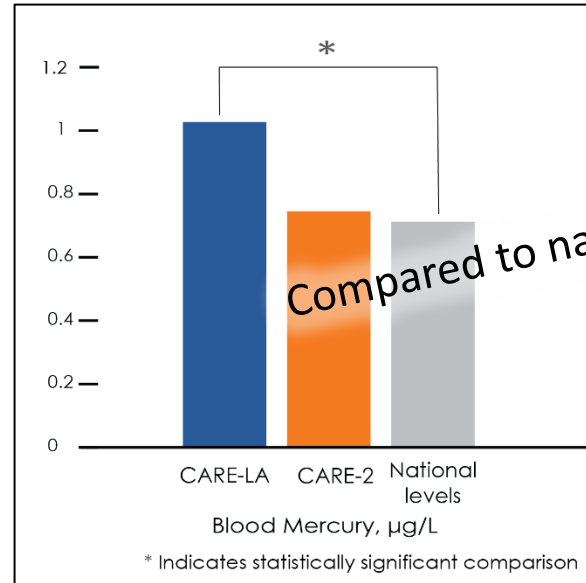
- CARE-LA and CARE-2 participants
 - 4 metals
 - Arsenic, cadmium, lead, mercury
 - Chemicals with programmatic levels of concern

Chemical information for this webinar

- CARE-LA and CARE-2 participants
 - 4 metals
 - Arsenic, cadmium, lead, mercury
 - 5 PFASs
 - Most frequently detected

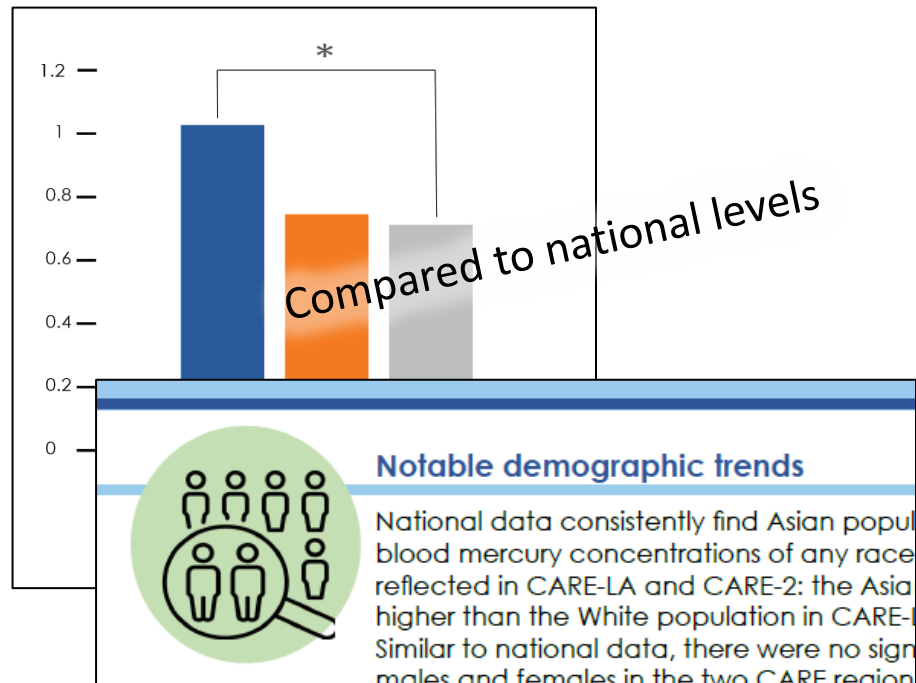
Chemical information for this webinar

- CARE-LA and CARE-2 participants
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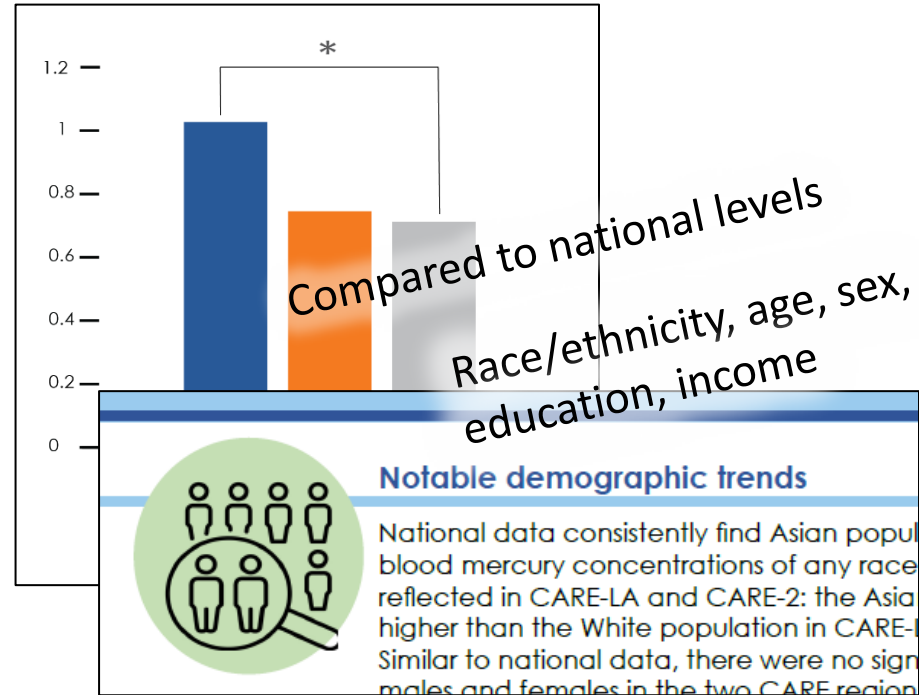
Chemical information for this webinar

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 - 4 metals
 - Arsenic, cadmium, lead, mercury
 - PFASs
 - Most frequently detected



Chemical information for this webinar

- CARE-LA and CARE-2 participants
 - 4 metals
 - Arsenic, cadmium, lead, mercury
 - 5 PFASs
 - Most frequently detected



Arsenic

Where is it found?



Arsenic

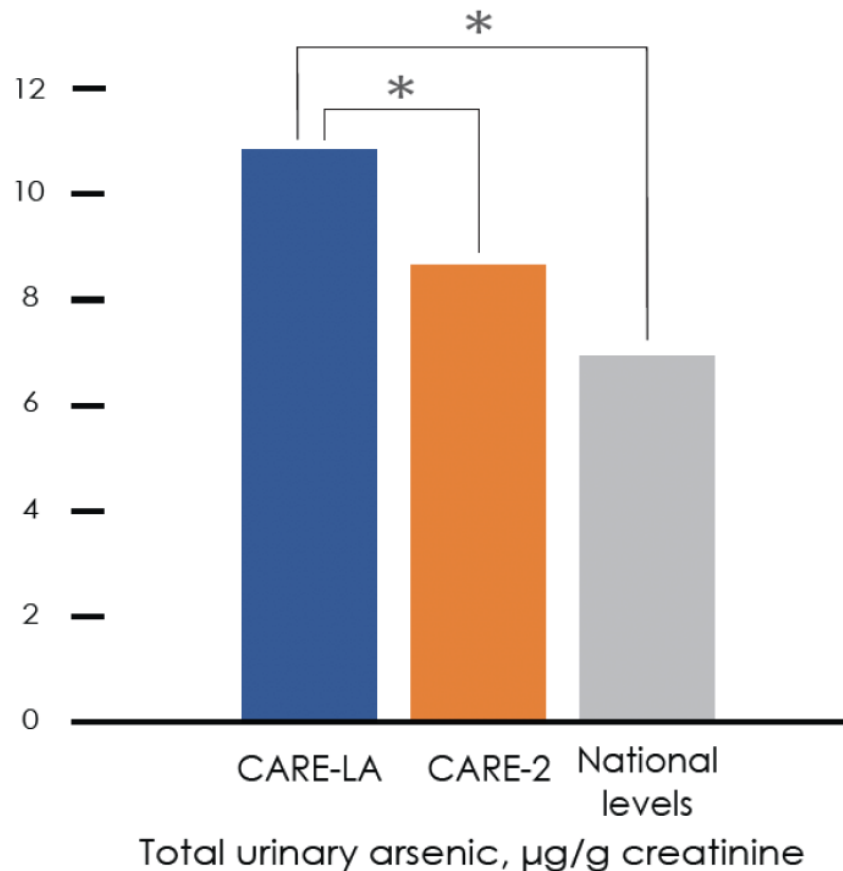
What are the health effects?

- May harm the developing fetus
- May harm the nervous system and affect learning in children
- May contribute to cardiovascular disease and affect lung function
- Can increase cancer risk

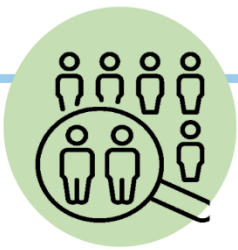


Arsenic

- Levels higher than national levels
- Up to 47% higher in CARE-LA
- 5% of population above the level of concern for inorganic arsenic

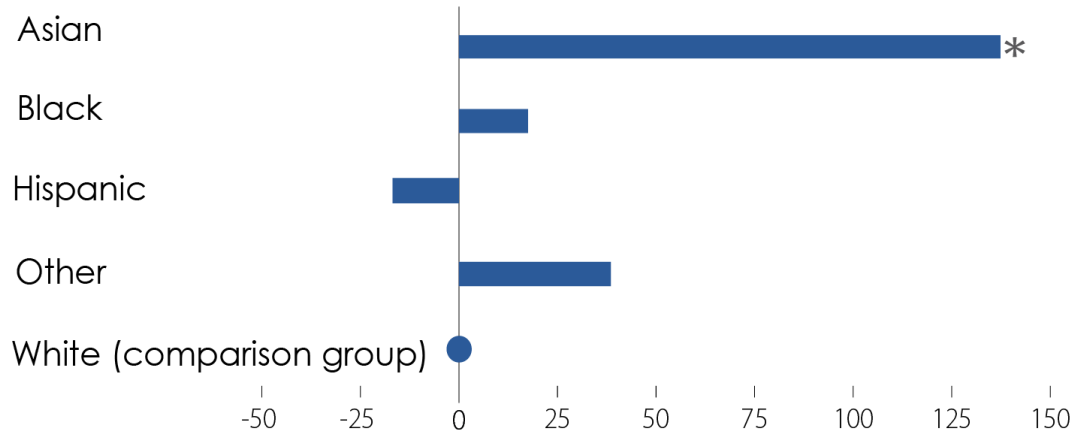


* Indicates statistically significant comparison



Arsenic levels higher in Asian populations - CARE-LA

Adjusted Percent Change (%) by Race/Ethnicity



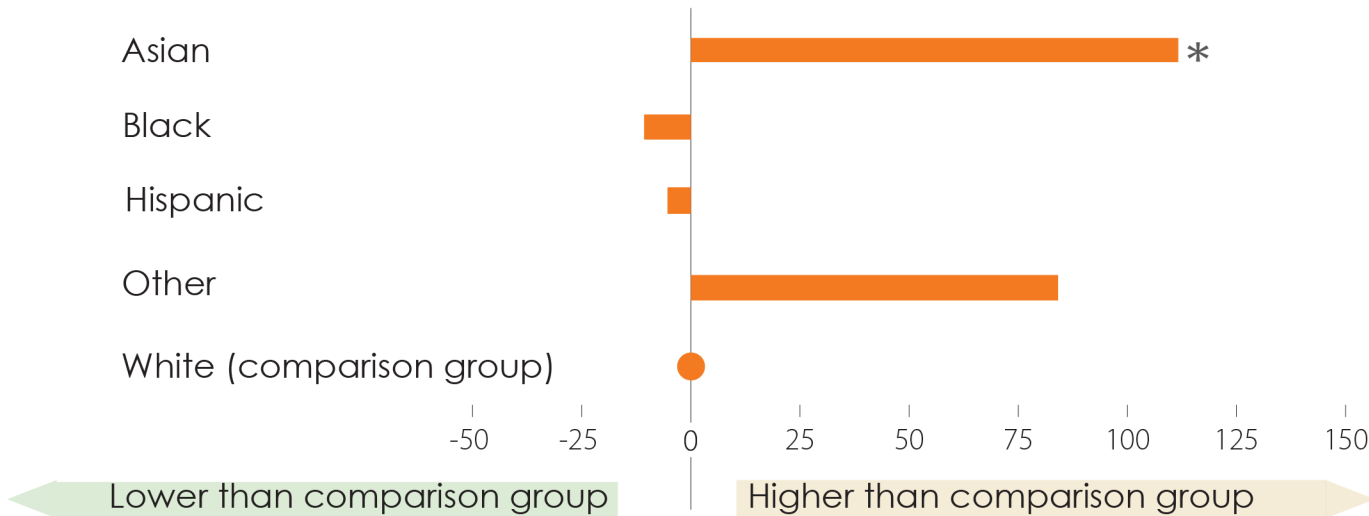
Lower than comparison group Higher than comparison group

* Indicates statistical significance

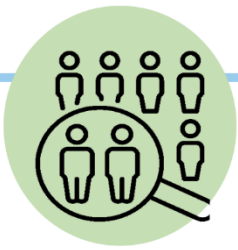


Arsenic levels higher in Asian populations – CARE-2

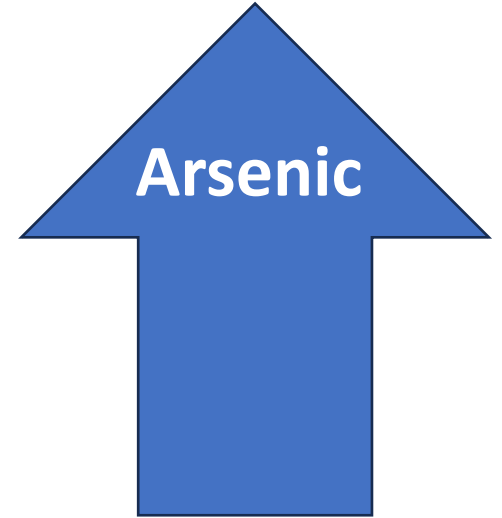
Adjusted Percent Change (%) by Race/Ethnicity



* Indicates statistical significance



Higher arsenic levels
in lower income
categories



Cadmium

Where is it found?



Cadmium

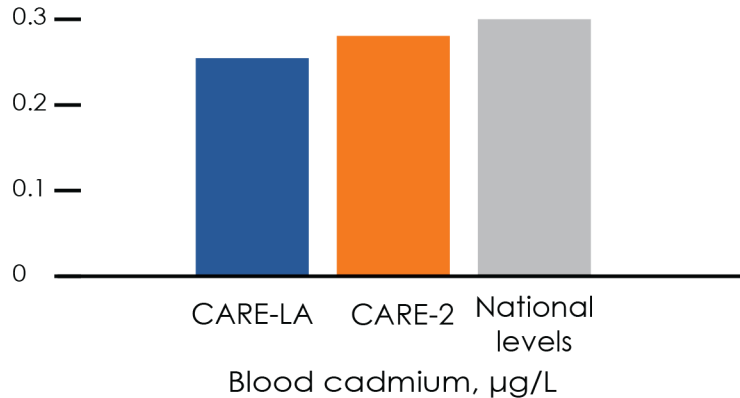
What are the health effects?

- May harm the developing infant and child
- May harm the reproductive system in men
- Can damage the lungs and kidneys
- Can increase cancer risk
- Can weaken bones

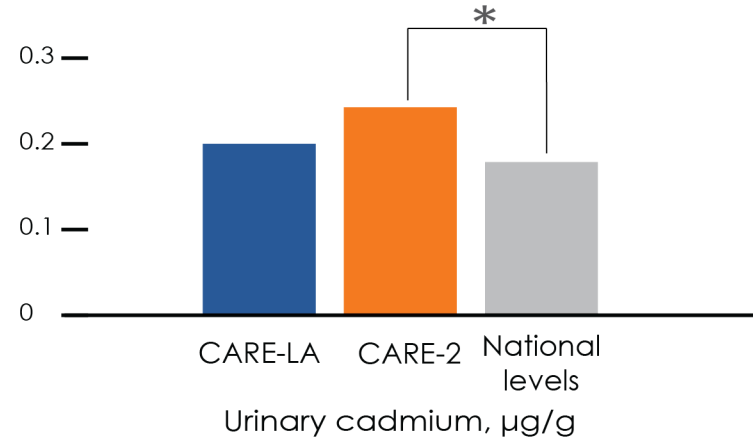


Cadmium

- Blood levels indicate recent exposures; urine levels indicate chronic exposures
- 20% higher urinary levels in CARE-2 than national levels
- No participants with samples above the level of concern



* Indicates statistical significance

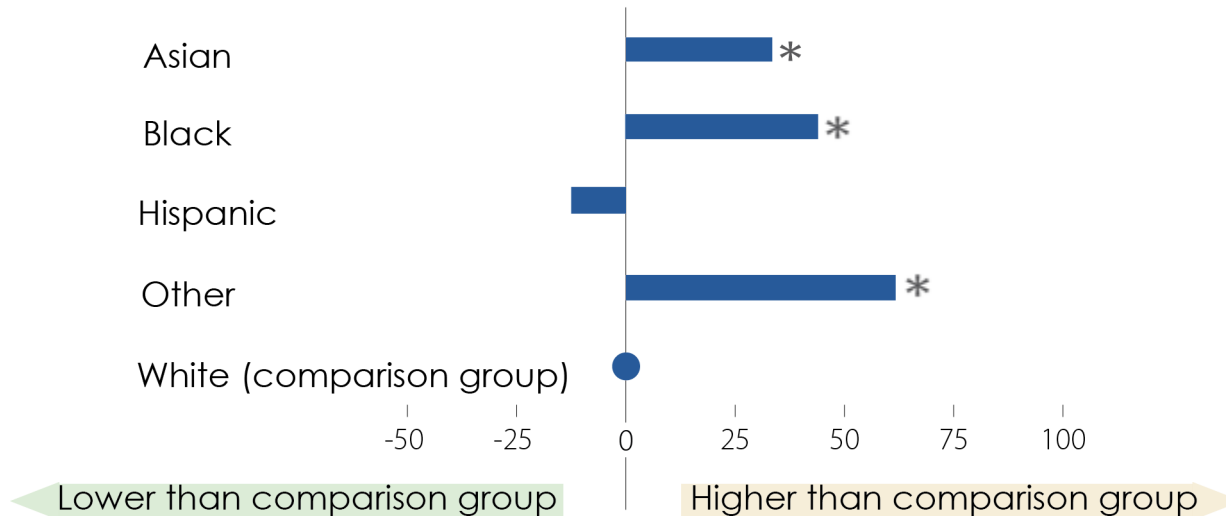


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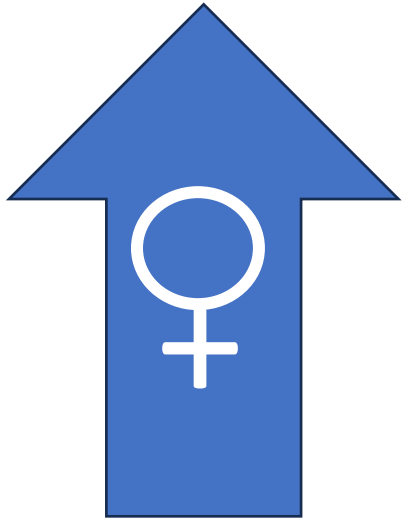


Higher blood levels of cadmium in Asian and Black populations in CARE-LA

Adjusted Percent Change (%) by Race/Ethnicity



* Indicates statistical significance



Higher urinary cadmium levels
in females

Lead

Where is it found?



Lead

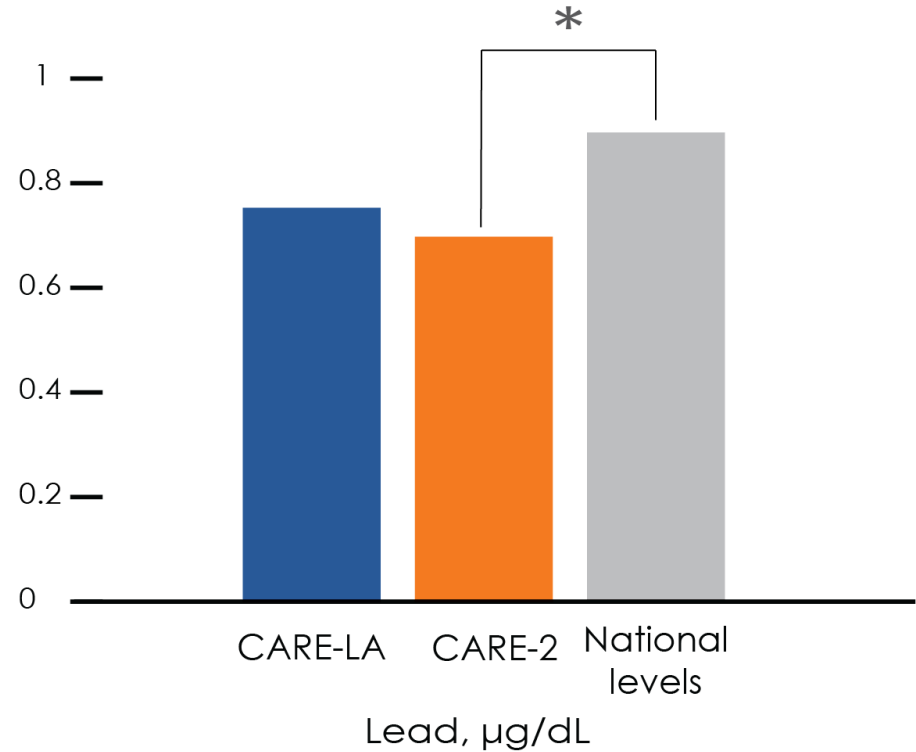
What are the health effects?

- Can affect brain development and contribute to learning problems
- Can increase blood pressure
- Can decrease kidney and brain function
- Can cause reproductive problems
- May increase cancer risk

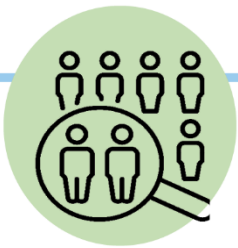


Lead

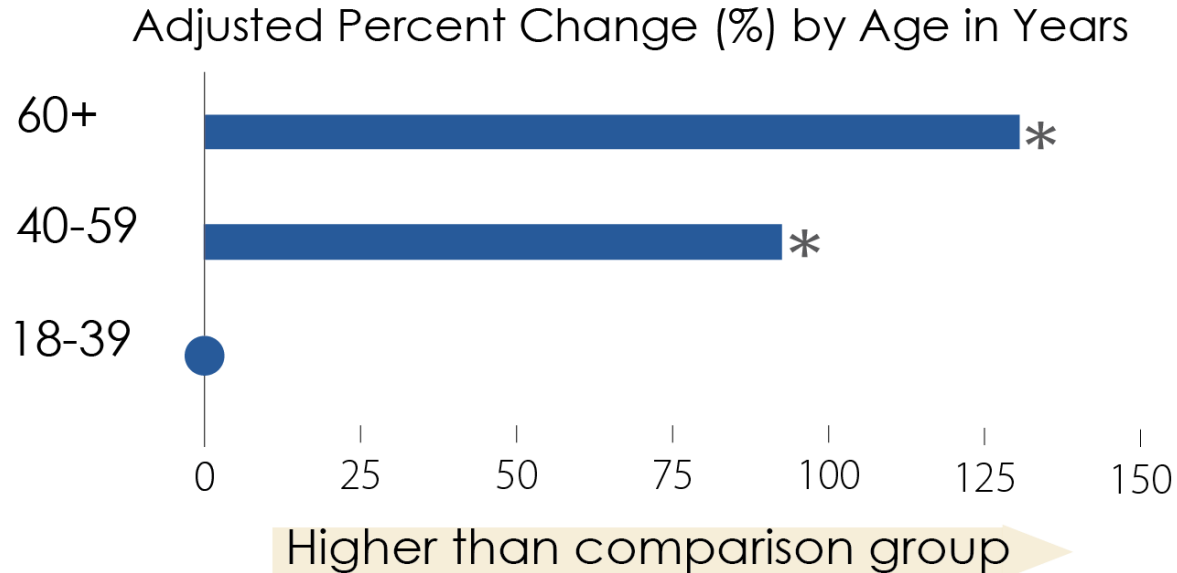
- Lower levels than national levels
- 4 participants with levels above the level of concern



* Indicates statistical significance



Higher lead levels in older age groups - CARE LA

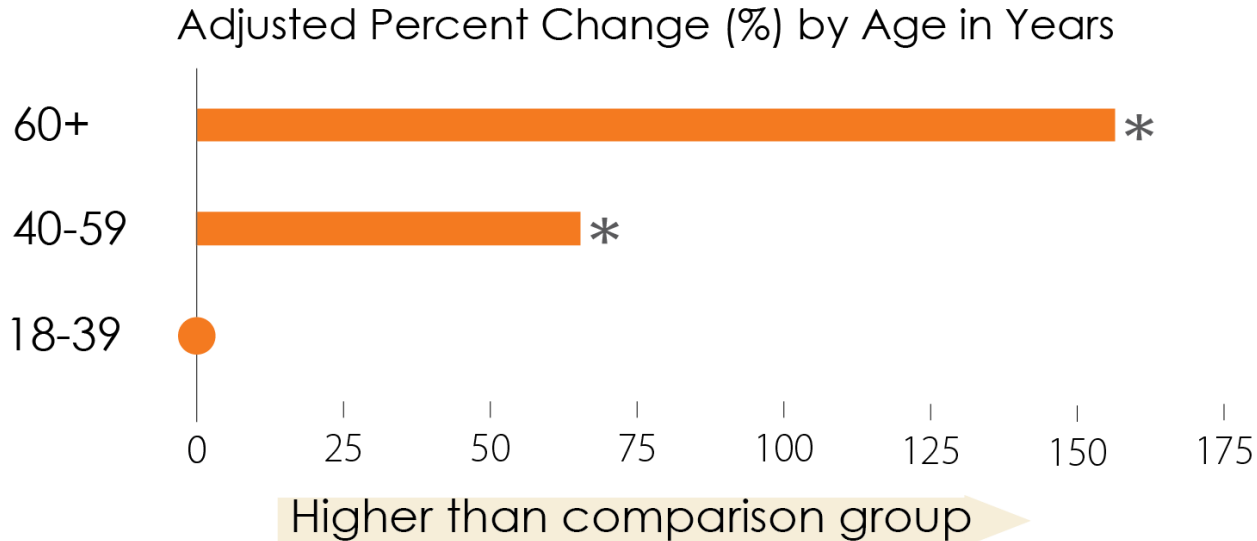


* Indicates statistical significance

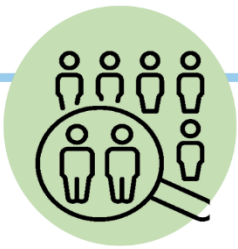


Notable demographic trends

Higher lead levels in older age groups - up to 158% higher in CARE-2



* Indicates statistical significance



Differences in lead levels by racial/ethnic groups or education and income

- Observed in national data
- No differences seen in California data

Mercury

Where is it found?



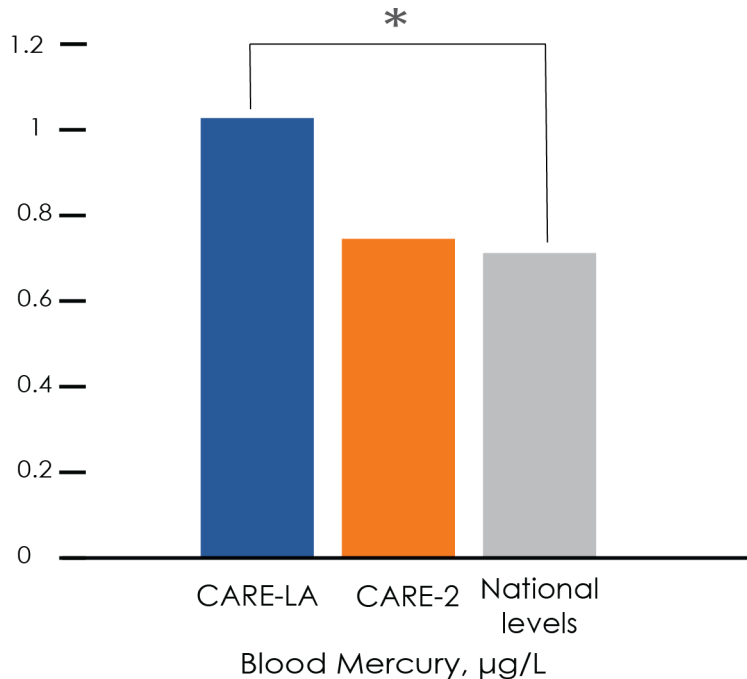
Mercury

What are the health effects?

- Can affect brain development and behavior problems in children
- Can harm the nervous system and kidneys
- May affect the heart
- May increase cancer risk

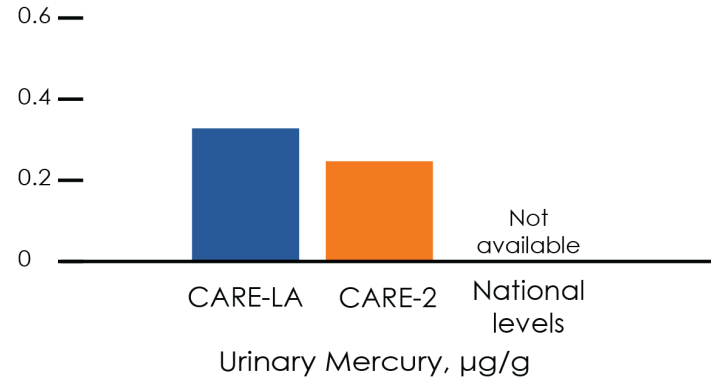


Mercury



* Indicates statistically significant comparison

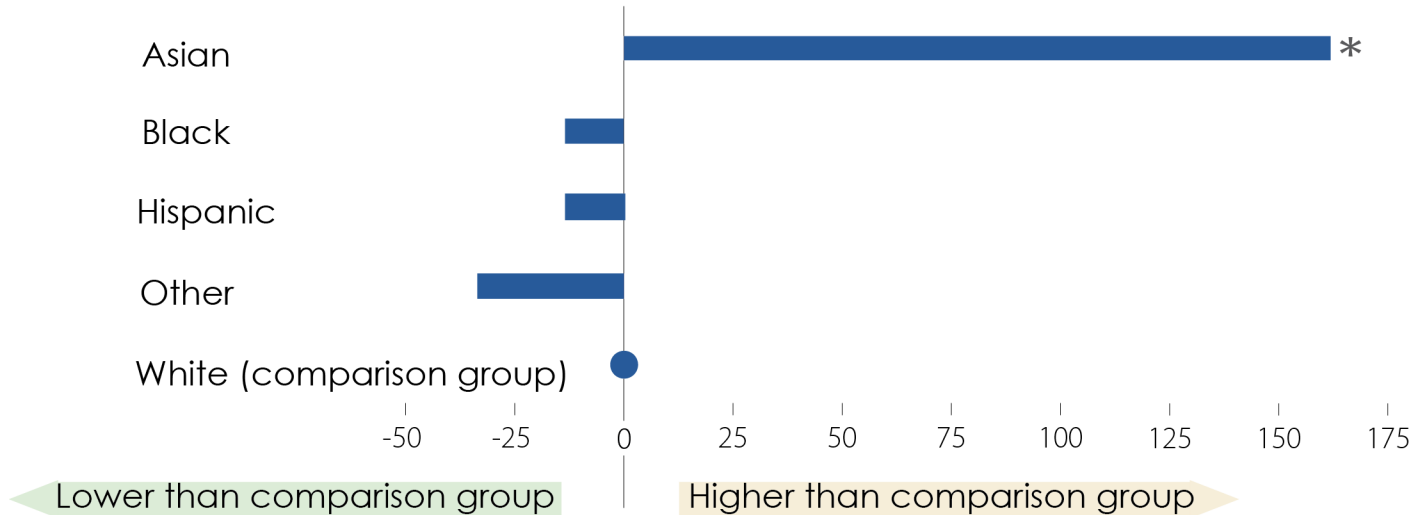
- Different types of mercury
 - Have different sources and toxicity
 - Are measured in blood and urine
- Blood levels in CARE-LA higher than national levels
- 5% of population had blood levels above the levels of concern



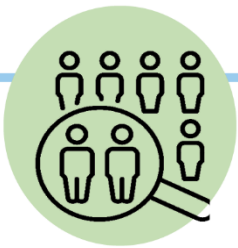


Blood mercury levels higher in Asian populations - CARE-LA

Adjusted Percent Change (%) by Race/Ethnicity

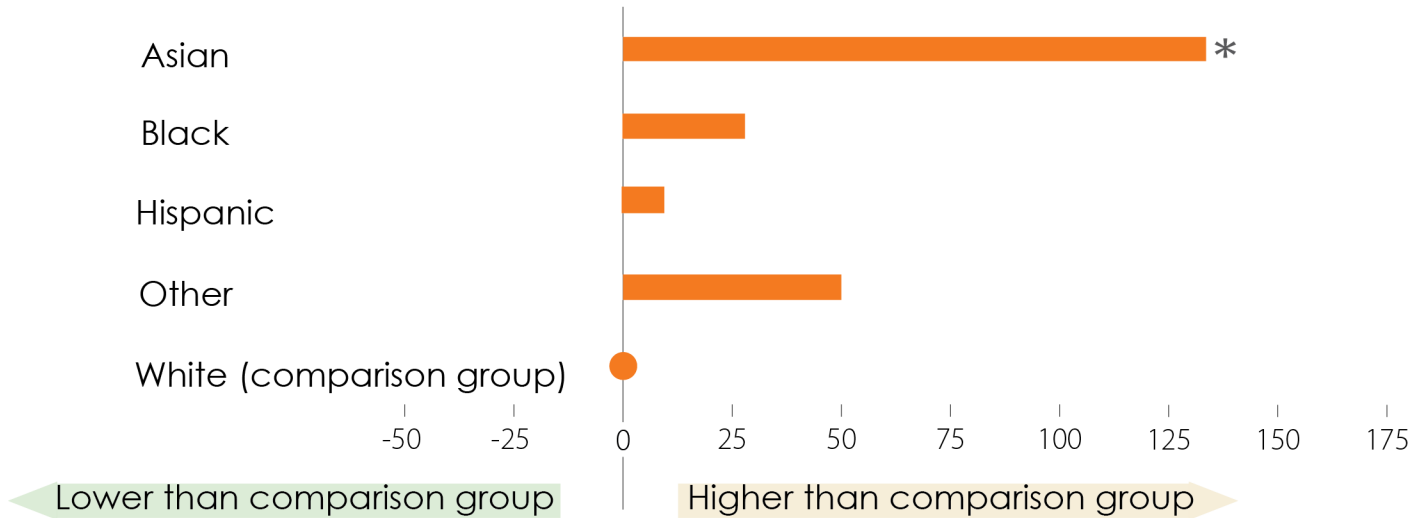


* Indicates statistically significant comparison

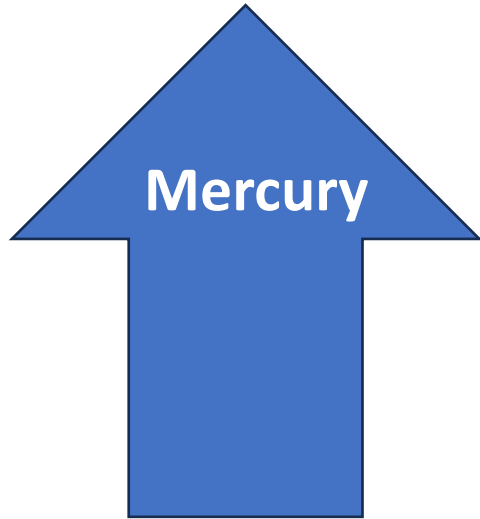


Blood mercury levels higher in Asian populations - CARE-2

Adjusted Percent Change (%) by Race/Ethnicity



* Indicates statistically significant comparison



Higher urinary mercury levels in lower incomes



PFASs (Per- and polyfluoroalkyl substances)

Where are they found?



PFASs

What are the health effects?

- May harm the fetus and child, including effects on growth and development
- May affect the immune system and liver function
- May increase the risk of thyroid disease
- May interfere with the body's natural hormones
- Can increase cancer risk

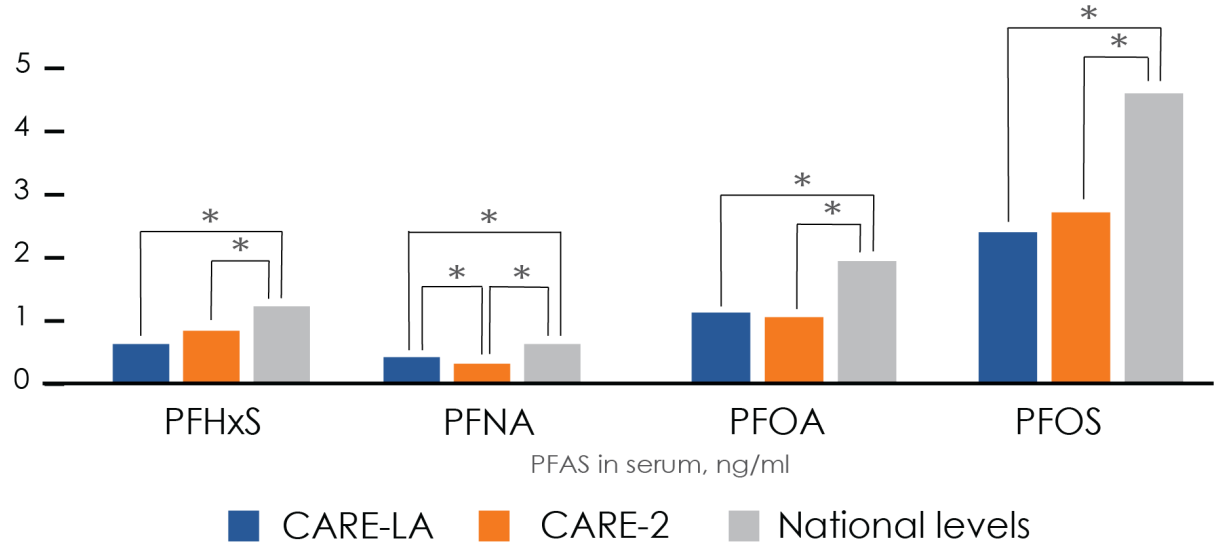




of the population had
PFASs in their body

PFASs

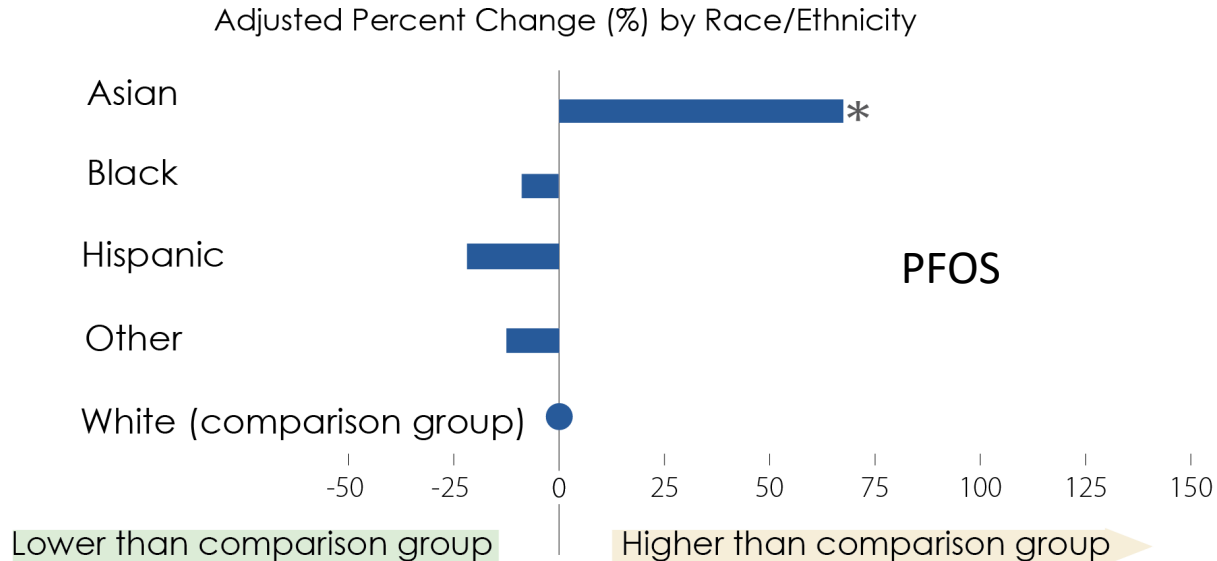
Lower levels
compared to
national levels



* Indicates statistically significant comparison



Higher PFAS levels in Asian populations - CARE-LA

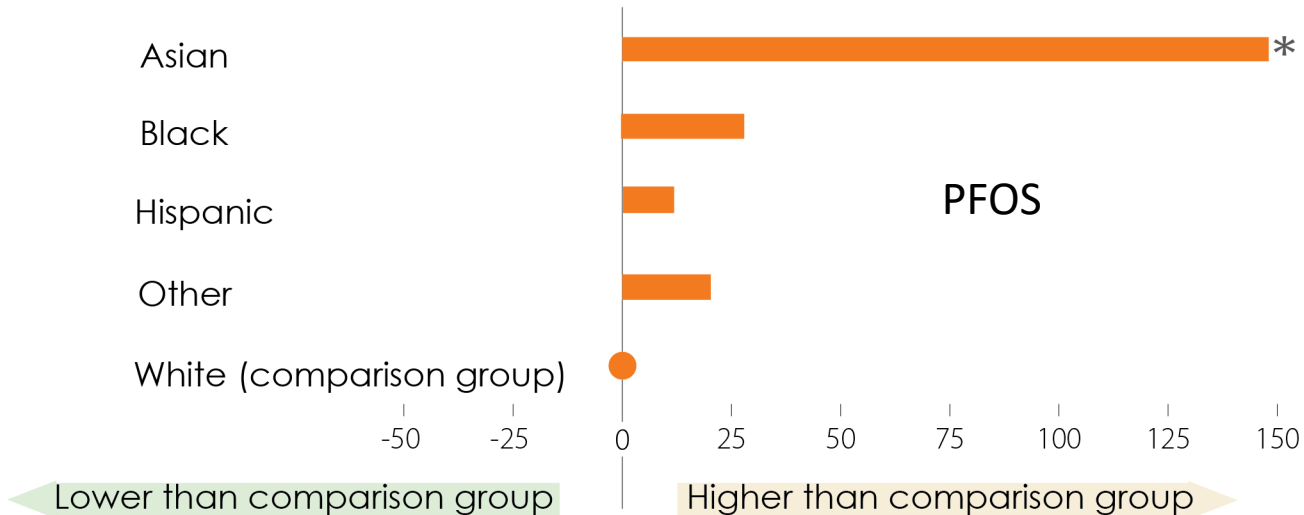


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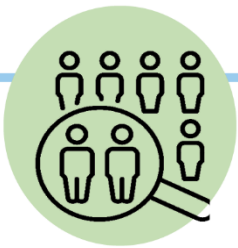


Higher PFAS levels in Asian populations - CARE-2

Adjusted Percent Change (%) by Race/Ethnicity

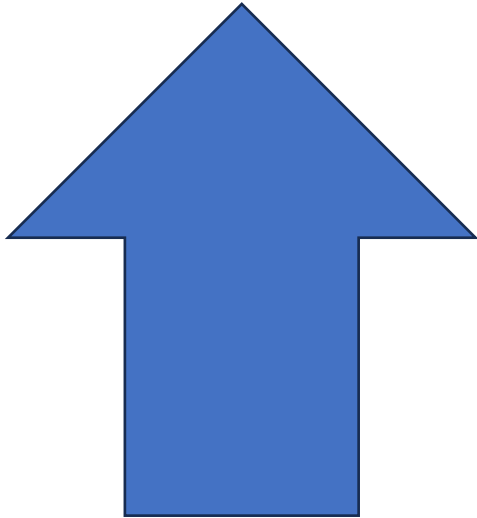


* Indicates statistical significance



Higher PFAS levels in males





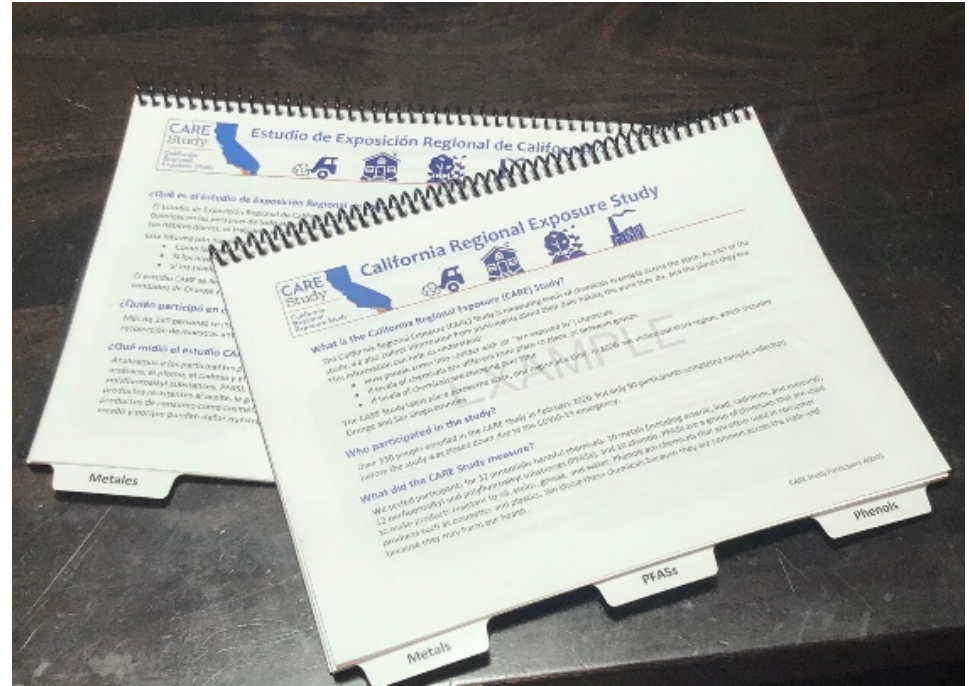
Higher PFAS levels
with older age and
higher income/education



Putting biomonitoring data to use

Returning results to study participants

- Biomonitoring California was created with the belief that everyone has the right to know what is in their bodies
- Biomonitoring California is required to make individual results available to participants



Levels of Concern

If a result for arsenic, cadmium, lead, or mercury is above the Level of Concern

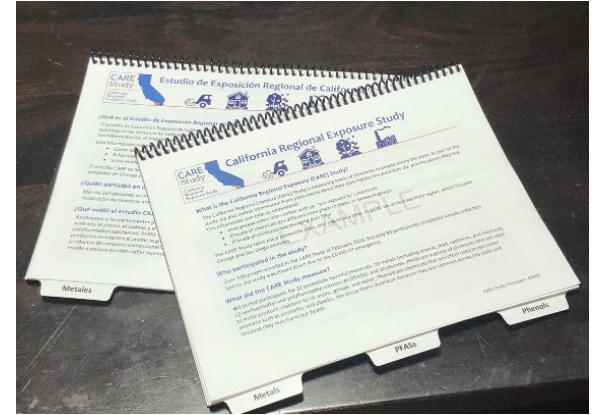


Quicker notification

Phone call to identify possible sources of exposures

Results information

- Results provided with comparisons to others in the study and U.S. values
- Includes information on chemicals, where they are found, and potential health effects





Study findings are shared through public meetings ...



About ▾



Projects ▾



Chemicals ▾



Results ▾



Resources ▾



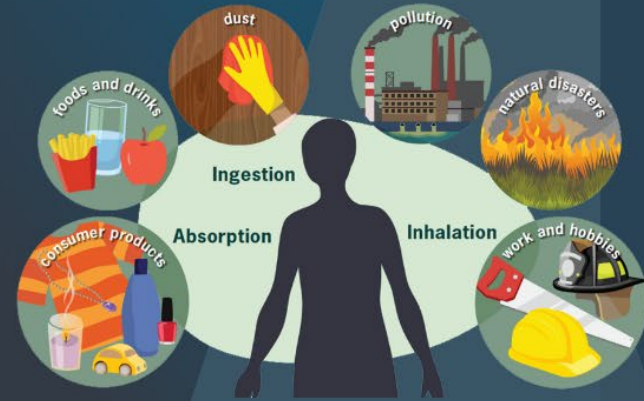
Meetings ▾



En español ▾

What is Biomonitoring?

Biomonitoring is the measurement of chemicals (or their metabolites) in a person's body fluids or tissues, such as blood or urine. It tells us the amount of the chemical that actually gets into people from all sources (for example, from air, soil, water, dust, and food) combined. Because of this, biomonitoring can provide useful information on how much exposure to toxic chemicals a person has had.

[Learn more about biomonitoring](#)[Learn more about Biomonitoring California](#)[Guía sobre el biomonitoreo](#)[Información básica sobre el Programa para el Biomonitoreo de California](#)

... and on the Biomonitoring California website
<https://biomonitoring.ca.gov/>

Ongoing analysis

Additional analyses will be conducted to better understand:

- Racial/ethnic differences
- Socioeconomic differences



Ongoing analysis

Data collected in the CARE Study are also being used to examine if chemical exposures are related to:

- Drinking water sources
- Dietary habits
- How close homes are to pollution sources





Other uses for Biomonitoring California data

- Prioritize public health actions
- Inform public health legislation
- Support legal actions on behalf of California



Thank you!

We could not do this work without:

Study
participants

Community
organizations

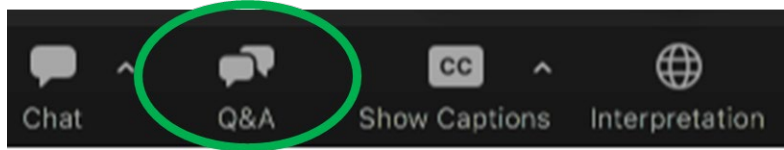
Local public
health
departments



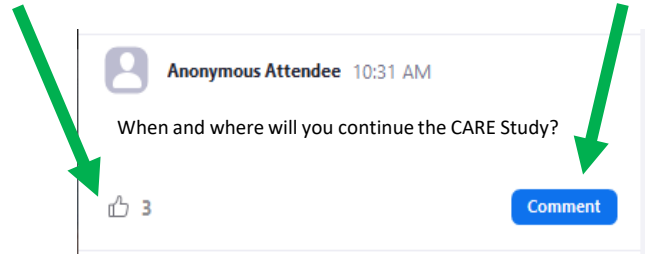
Questions?



- Please type your questions in the Q&A

A screenshot of the Zoom Q&A question input form. It features a text box with the placeholder "Type your question here...". Below the text box is a checked checkbox labeled "Send anonymously", followed by "Cancel" and "Send" buttons. A green arrow points to the "Send anonymously" checkbox.

- You can check this box to hide your name
- You can also upvote questions by clicking on the thumbs up, or add a comment





Frequently asked questions

- What can I do to reduce my chemical exposures?
- How can I get a copy of my results?
- Does CARE show that my neighborhood is high in chemicals?
- Where is the next Biomonitoring California study?

Thank you for attending!



Special thanks to:

- Participants in CARE-LA, CARE-2 & CARE-3
- Community partners & collaborators

More questions?

See the CARE Study report at <https://biomonitoring.ca.gov>
or email us at CAREStudy@cdph.ca.gov