



Date

Name

Address

City, State Zip

Dear [Name]:

Thank you very much for taking part in the Biomonitoring Exposures Study (BEST) in 2013. As part of this study, we are measuring the levels of up to about 90 chemicals in blood and urine.

Your participation in this important project is helping us learn more about the presence of chemicals in California residents and possible environmental sources of these chemicals.

The first set of laboratory tests has been completed and your results are enclosed. This mailing includes results for 15 chemicals we measured in your blood. If we analyze your blood or urine samples for additional chemicals, you will receive your remaining test results at a later date, after laboratory analyses are completed.

This mailing includes:

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Part 1: Metals in blood – lead, mercury, cadmium, and manganese. For each metal, you will find a summary of your results and information about that metal.

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Part 2: Perfluorochemicals, or PFCs, in blood. This section includes a summary of your results, a list of the 11 PFCs that we looked for, and information about these chemicals.

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You can compare your results to:

- Results for other participants who participated in BEST in 2013.
- Results from a study of the general U.S. population.
- Levels of concern. If you had a result above a level of concern, you should already have heard from us about this. If needed, we provided advice on ways to reduce your exposure to protect your health. For the chemicals in this packet, levels of concern have been set for lead, mercury, and cadmium. There is not enough scientific information available to set levels of concern for the other chemicals.

Thank you again for your participation in this study – you are helping us lay the foundation to measure chemicals in people throughout California. Ultimately, information from biomonitoring studies, combined with other research, can be used to learn how chemicals may affect our health and to support efforts to prevent exposure to harmful substances.

If you have any questions, please feel free to call either of us at the numbers listed below.

Sincerely,

Stephen K. Van Den Eeden, PhD  
BEST Director  
Kaiser Division of Research  
510-891-3718

Michael DiBartolomeis, PhD, DABT  
BEST Director  
Biomonitoring California  
510-620-3620

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# **Biomonitoring Exposures Study (BEST)**

## **Your Chemical Lab Results**

*Samples collected in 2013*

To maintain confidentiality, your name is not printed on this packet. You may choose to write your name here:

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# Frequently Asked Questions about the Biomonitoring Exposures Study

## What can I learn from the *Biomonitoring Exposures Study (BEST)* about chemicals in my body?

As a participant in the BEST biomonitoring project, you are receiving in this packet the levels of 15 chemicals our laboratory tested for in your blood. We also provide information on ways you might have been exposed to these chemicals. Many of the chemicals we test for are widespread in the environment and consumer products, and it is difficult to avoid exposure to them. For each chemical in this packet, we also provide information about actions you could take to help reduce your exposure.

For most of the chemicals that we biomonitor, there is not enough scientific information available to know how much can be in anyone's body without causing harm. Therefore, we cannot tell you whether the chemical levels measured in your body might affect your health.

## Can I compare my results to others?

You can compare your chemical levels to those of other Kaiser members who participated in BEST in 2013. You can also compare your results to those from a national study of U.S. adults. Some chemicals may be higher in BEST participants than in people from the rest of the country, while others might be lower. Comparing your results to those of other people cannot tell you what level of any chemical might be a health concern.

## How does my participation make a difference?

BEST will help us learn more about chemical levels in Central Valley residents and lay the foundation for a larger statewide biomonitoring study. Information from biomonitoring studies, combined with other research, can be used to learn more about how chemicals may affect health. Biomonitoring can also support government efforts to reduce exposures to harmful chemicals.

## Can the amount of a chemical in my body change over time?

Yes. The amount of a chemical in your body depends on many factors, including how much and how often you have had contact with that chemical, and how long it takes for your body to remove it.

## What is the Biomonitoring Exposures Study (BEST)?

Researchers at Kaiser Permanente and Biomonitoring California conducted BEST to learn about levels of certain chemicals in residents of California's Central Valley. We chose these chemicals based on many factors, including whether: (1) they are commonly found in the environment or consumer products, and (2) there are known or suspected health concerns about them.

Individuals were recruited after being randomly selected from adult Kaiser Permanente members in seven Central Valley counties.

About 300 Kaiser Permanente members completed questionnaires and donated blood and urine samples. These samples will have been tested for up to about 90 chemicals by the end of the study.

# Your Lead Lab Result

## Part 1: Metals in Blood

We tested your blood for lead. Lead is a metal that is found in nature and is used in many industries and products.

| Your lead result | Lowest result found in this study | Highest result found in this study | Number of participants in this study with lead found in their blood | Middle level in the U.S. | 95 <sup>th</sup> percentile in the U.S. | Level of concern* |
|------------------|-----------------------------------|------------------------------------|---|--------------------------|---|-------------------|
| 2.5              | 0.14                              | 10.7                               | All 311   | 1.1                      | 3.4                                     | 10 and above      |

All the numbers above are in micrograms per deciliter ( $\mu\text{g}/\text{dL}$ ).

## Did you find lead in my blood?

Yes. Your lead result was 2.5  $\mu\text{g}/\text{dL}$ .

## What can I compare my result to?

You can use the table above to compare your lead result to:

- **Other participants in this study.** We found lead in all 311 participants tested. The results ranged from 0.14 to 10.7  $\mu\text{g}/\text{dL}$ .
- **Middle level in the U.S.** Half the adults tested in the U.S. had a result below 1.1  $\mu\text{g}/\text{dL}$  and half above.
- **95th percentile in the U.S.** 95% of adults tested in the U.S. had a result below 3.4  $\mu\text{g}/\text{dL}$ .

The U.S. middle level and 95th percentile do not tell us anything about what level of lead in blood might be a health concern. We are providing this information so that you can compare your result to those of other U.S. adults.

- **Level of concern.** Your lead result was below the level of concern.

The next page explains more about lead.

\*This is the level of concern for men age 18 and older, and women age 50 and older.

# Frequently Asked Questions about Lead

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## Where is lead found?

Lead is widespread in the environment and is found in:

- 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 and near roadways.
- Job sites or hobby areas, such as construction and painting sites, shooting ranges, and electronics, battery, and scrap metal recycling facilities.
- Some candies and spices from Mexico and Asia, and some brightly colored traditional remedies such as Azarcon and Greta.
- Many consumer products, including:
  - Some ceramic dishes and pottery; 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 sinkers, and curtain weights.

## What are 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.
- May increase cancer risk.

## What are possible ways to reduce exposure?

- Keep children away from chipped and peeling paint. Use a certified professional if you plan to permanently remove or seal lead-based paint.
- Cover bare soil with grass, bark, or gravel, especially near homes built before 1978.
- If you work with lead or do house renovation, use proper protective gear. Keep work dust out of your home. Shower after working. Wash work clothes separately.
- Use cold water for drinking or cooking to reduce release of lead from some faucets and old pipes.
- Wash your and your children's hands before eating or drinking.
- Clean your floors regularly, using a wet mop where you can, and dust with a damp cloth.
- Eat a well-balanced diet with adequate calcium, iron, and vitamin C, which can help reduce the amount of lead that your body absorbs.

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### For more information:

California's Childhood Lead Poisoning Prevention Program at (510) 620-5600, or go to: [www.cdph.ca.gov/programs/CLPPB/Pages/default.aspx](http://www.cdph.ca.gov/programs/CLPPB/Pages/default.aspx)  
California's Occupational Lead Poisoning Prevention Program at (510) 620-5740, or go to: [www.cdph.ca.gov/programs/olppp/Pages/default.aspx](http://www.cdph.ca.gov/programs/olppp/Pages/default.aspx)

# Your Mercury Lab Result

## Part 1: Metals in Blood

We tested your blood for mercury. Mercury is a metal that is found in nature. It is released into the environment when coal is burned, by some industries, and from past use in gold mines. Mercury builds up in certain types of fish.

| Your mercury result | Lowest result found in this study | Highest result found in this study | Number of participants in this study with mercury found in their blood | Middle level in the U.S. | 95th percentile in the U.S. | Level of concern* |
|---------------------|-----------------------------------|------------------------------------|--|--------------------------|-----------------------------|-------------------|
| 0.57                | 0.07                              | 13.4                               | 309 of 311   | 0.79                     | 5.0                         | 10 and above      |

All the numbers above are in micrograms per liter ( $\mu\text{g/L}$ ).

## Did you find mercury in my blood?

Yes. Your mercury result was 0.57  $\mu\text{g/L}$ .

## What can I compare my result to?

You can use the table above to compare your mercury result to:

- **Other participants in this study.** We found mercury in 209 of the 311 participants tested. The results ranged from 0.07 to 13.4  $\mu\text{g/L}$ .
- **Middle level in the U.S.** Half the adults tested in the U.S. had a result below 0.79  $\mu\text{g/L}$  and half above.
- **95th percentile in the U.S.** 95% of adults tested in the U.S. had a result below 5.0  $\mu\text{g/L}$ .

The U.S. middle level and 95th percentile do not tell us anything about what level of mercury in blood might be a health concern. We are providing this information so that you can compare your result to those of other U.S. adults.

- **Level of concern.** Your mercury result was below the level of concern.

The next page explains more about mercury.

\*This is the level of concern for men age 18 and older, and women age 50 and older.

# Frequently Asked Questions about Mercury

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## Where is mercury found?

- Certain types of fish and seafood. This is the most common source of exposure to mercury.
- Some imported face creams used for skin lightening, anti-aging, or acne.
- Silver-colored dental fillings.
- Glass thermometers, older barometers, and blood pressure gauges.
- Fluorescent lights, including compact fluorescent light (CFL) bulbs.

## What are possible health concerns?

Mercury:

- Can affect brain development and cause learning and behavior problems in infants and children who were exposed in the womb.
- Can harm the nervous system and kidneys.
- May affect the heart.
- May increase cancer risk.

## What are possible ways to reduce exposure?

- Choose fish that are lower in mercury, such as salmon, tilapia, trout, canned light tuna, sardines, anchovies, and oysters.
- Avoid fish that are high in mercury, such as shark, swordfish, orange roughy, bluefin, and bigeye tuna.
- Do not use imported skin lightening, acne treatment, or anti-aging creams unless you are certain that they do not contain mercury.
- Properly recycle CFL bulbs (see below).
- Properly clean up broken thermometers, CFL bulbs, and other items containing mercury (see below). Do not let children play with silver liquid from items like mercury thermometers.

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### For more information:

Guide for choosing fish that are lower in mercury: [www.oehha.ca.gov/fish/pdf/2011CommFishGuide\\_color.pdf](http://www.oehha.ca.gov/fish/pdf/2011CommFishGuide_color.pdf)

Advice on mercury in fish that you catch: [www.oehha.ca.gov/fish/hg/index.html](http://www.oehha.ca.gov/fish/hg/index.html) or call (510) 622-3170

Concerns about mercury exposure – contact the California Poison Control System hotline:

[www.calpoison.org/home.html](http://www.calpoison.org/home.html) or 1-800-222-1222

Cleaning up mercury spills, such as from broken thermometers or CFL bulbs: <http://www.epa.gov/mercury/spills/>

For CFL recycling location: Visit [www.1800recycling.com](http://www.1800recycling.com), enter your zip code, click on “Hazardous”, and check box for “Compact Fluorescent Lights” ; or call 1-800-CLEANUP (253-2687)

# Your Cadmium Lab Result

We tested your blood for cadmium. Cadmium is a metal that is found in nature and is used in many industries and products.

| Your cadmium result | Lowest result found in this study | Highest result found in this study | Number of participants in this study with cadmium found in their blood | Middle level in the U.S. | 95 <sup>th</sup> percentile in the U.S. | Level of concern |
|---------------------|-----------------------------------|------------------------------------|--|--------------------------|---|------------------|
| 0.61                | 0.07                              | 1.7                                | All 311  | 0.30                     | 1.7                                     | 5 and above      |

All the numbers above are in micrograms per liter ( $\mu\text{g/L}$ )

## Did you find cadmium in my blood?

Yes. Your cadmium result was 0.61  $\mu\text{g/L}$ .

## What can I compare my result to?

You can use the table above to compare your cadmium result to:

- **Other participants in this study.** We found cadmium in all 311 participants tested. The results ranged from 0.07 to 1.7  $\mu\text{g/L}$ .
- **Middle level in the U.S.** Half the adults tested in the U.S. had a result below 0.30  $\mu\text{g/L}$  and half above.
- **95<sup>th</sup> percentile in the U.S.** 95% of adults tested in the U.S. had a result below 1.7  $\mu\text{g/L}$ .

The U.S. middle level and 95th percentile do not tell us anything about what level of cadmium in blood might be a health concern. We are providing this information so that you can compare your result to those of other U.S. adults.

- **Level of concern.** Your cadmium result was below the level of concern.

The next page explains more about cadmium.

# Frequently Asked Questions about Cadmium

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## Where is cadmium found?

- Cigarette and other tobacco smoke.
- Some cheap metal jewelry, including some charms.
- Rechargeable batteries labeled NiCd or NiCad.
- Metal plating and solder.
- Some red, yellow, and orange decorative paints, which may be used on glassware and pottery.

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## What are possible health concerns?

Cadmium:

- May affect brain development in young children.
- Can damage the lungs and kidneys.
- Can increase lung cancer risk.
- Can weaken bones.

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## What are possible ways to reduce exposure?

- Do not smoke or let children breathe cigarette or other tobacco smoke.
- Do not let children wear or play with cheap metal jewelry or charms.
- Do not let children handle rechargeable batteries labeled NiCd or NiCad.
- Properly recycle batteries (see below).
- If you do any welding or metalworking, be sure that your work area is well ventilated and use proper protective equipment.
- Keep children away from welding fumes and other metal vapors and dusts.
- Eat a well-balanced diet with adequate iron, which can help reduce the amount of cadmium that your body absorbs.

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## For more information:

Cadmium fact sheets: [www.oehha.ca.gov/public\\_info/facts/cd\\_facts.html](http://www.oehha.ca.gov/public_info/facts/cd_facts.html) and [www.atsdr.cdc.gov/tfacts5.pdf](http://www.atsdr.cdc.gov/tfacts5.pdf)

For battery recycling: Visit [www.1800recycling.com](http://www.1800recycling.com), enter your zip code, click on “Electronics”, and check box for “Batteries (Rechargeable)”; or call 1-800-CLEANUP (253-2687)

For concerns about cadmium in consumer products: call the Consumer Product Safety Commission hotline at 1-800-638-2772

# Your Manganese Lab Result

## Part 1: Metals in Blood

We tested your blood for manganese, an essential nutrient. **It is normal and healthy to have some manganese in your body and your blood.** Manganese is also a metal that can be toxic at high levels. The most common way to be exposed to excess manganese is through jobs that involve working with metals, such as welding.

| Your manganese result | Lowest result found in this study | Highest result found in this study | Number of participants in this study with manganese found in their blood | Middle level in the U.S. | 95 <sup>th</sup> percentile in the U.S. | Level of concern   |
|-----------------------|-----------------------------------|------------------------------------|--|--------------------------|---|--|
| 5.9                   | 3.4                               | 21.4                               | All 311  | 9.0                      | 16.7                                    | No state or federal agency has established a level of concern for manganese. |

All the numbers above are in micrograms per liter ( $\mu\text{g/L}$ ).

## Did you find manganese in my blood?

Yes. Your manganese result was 5.9  $\mu\text{g/L}$ .

## What can I compare my result to?

You can use the table above to compare your manganese result to:

- **Other participants in this study.** We found manganese in all 311 participants tested. The results ranged from 3.4 to 21.4  $\mu\text{g/L}$ .
- **Middle level in the U.S.** Half the adults tested in the U.S. had a result below 9.0  $\mu\text{g/L}$  and half above.
- **95<sup>th</sup> percentile in the U.S.** 95% of adults tested in the U.S. had a result below 16.7  $\mu\text{g/L}$ .

The U.S. middle level and 95th percentile do not tell us anything about what level of manganese in blood might be a health concern. We are providing this information so that you can compare your result to those of other U.S. adults.

No state or federal agency has established a level of concern for manganese. It is normal and healthy to have some manganese in your blood. The next page explains more about manganese.

# Frequently Asked Questions about Manganese

Manganese is an essential nutrient that we get mainly from food. It is also a metal used in many industries and products. The most common way to be exposed to excess manganese is through jobs that involve working with metals, such as welding.

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## Where is manganese found?

- Certain foods, such as nuts, grains, beans, and leafy green vegetables.
- Some drinking water sources.
- Certain metal alloys, such as steel.
- Some welding rods.
- Certain chemicals used in agriculture to kill fungus.

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## Does my body need manganese?

- Some manganese is needed to support many vital processes in the body, such as building bones and healing wounds.

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## What are possible health concerns of too much manganese?

- Too much manganese:
- May be associated with learning and behavior problems in children.
  - Can harm memory, thinking, mood, and balance in adults.

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## How can I maintain a healthy level of manganese?

- Eat a well-balanced diet with adequate iron, which can help you maintain a healthy level of manganese.
- If you do any welding or metalworking, be sure that your work area is well ventilated and use proper protective equipment.
- Keep children away from welding fumes and other metal vapors and dusts.

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### For more information:

Manganese fact sheet: [www.atsdr.cdc.gov/tfacts151.pdf](http://www.atsdr.cdc.gov/tfacts151.pdf)

# Your PFC Lab Results

Part 2: PFCs in Blood

## Perfluorochemicals (PFCs)

We tested your blood for 11 perfluorochemicals (PFCs). Perfluorochemicals are used to make various products resistant to oil, stains, grease, and water.

### Did you find PFCs in my blood?

Yes. We found 8 PFCs in your blood.

### What can I compare my results to?

You can use the table on the next page to compare each PFC result to:

- **Other participants in this study.** We found some PFCs in most of the 311 participants tested.
- **Middle level in the U.S.** Half the adults tested in the U.S. had a result below the middle level and half above.
- **95th percentile in the U.S.** 95% of adults tested in the U.S. had a result below the 95<sup>th</sup> percentile.

The U.S. middle levels and 95th percentiles do not tell us anything about what levels of PFCs in blood might be a health concern. We are providing this information so that you can compare your results to those of other U.S. adults.

No state or federal agency has established a level of concern for any PFC. Scientists are still studying how PFCs might affect people's health. The next page contains a table with your PFC results, followed by a page that explains more about PFCs.

# Your PFC Lab Results

## Part 2: PFCs in Blood

| PFC tested    | Your PFC result (µg/L) | Lowest result found in this study (µg/L) | Highest result found in this study (µg/L) | Number of participants in this study with this PFC found in their blood | Middle level in the U.S. (µg/L) | 95 <sup>th</sup> percentile in the U.S. (µg/L) | Level of concern   |
|---------------|------------------------|--|---|---|---------------------------------|--|--|
| PFOS          | 12.3                   | 0.33                                     | 49.8                                      | 304 of 311  | 10.1                            | 34.1   | No state or federal agency has established a level of concern for any PFC. |
| PFOA          | 3.1                    | 0.19                                     | 47.7                                      | 307 of 311  | 3.3                             | 7.7  |  |
| PFHxS         | 3.6                    | 0.08                                     | 17.6                                      | 308 of 311  | 1.7                             | 6.0  |  |
| PFDeA         | 0.29                   | 0.07                                     | 3.4                                       | 269 of 311  | 0.30                            | 0.90   |  |
| PFDoA         | Not found              | 0.15                                     | 3.5                                       | 8 of 311  | *                               | 0.10   |  |
| PFHpA         | Not found              | 0.03                                     | 0.46                                      | 197 of 311  | *                               | 0.20   |  |
| PFNA          | 0.91                   | 0.08                                     | 4.7                                       | 309 of 311  | 1.2                             | 3.9  |  |
| PFOSA         | 0.18                   | 0.04                                     | 0.19                                      | 88 of 311   | *                               | **   |  |
| Et-PFOSA-AcOH | 0.27                   | 0.02                                     | 3.4                                       | 165 of 311  | *                               | 0.10   |  |
| Me-PFOSA-AcOH | 0.19                   | 0.03                                     | 3.7                                       | 303 of 311  | 0.17                            | 0.96   |  |
| PFUA          | Not found              | 0.02                                     | 1.2                                       | 275 of 311  | 0.20                            | 0.90   |  |

\* The middle level in the U.S. cannot be calculated because this PFC was not found in enough people.

\*\* The 95th percentile in the U.S. cannot be calculated because this PFC was not found in enough people.

# Frequently Asked Questions about Perfluorochemicals (PFCs)

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## Where are PFCs found?

- Some foods, such as some red meat and packaged snacks like potato chips. It is not yet known which foods might regularly contain PFCs.
- Certain grease-repellent paper food containers, such as some microwave popcorn bags, take-out boxes, or fast-food wrappers.
- Stain-resistant carpets and some carpet cleaning solutions.
- Stain-, water-, and wrinkle-resistant fabrics and some stain- and water-repellent sprays.
- Most non-stick cookware.

## What are possible health concerns?

Scientists are still studying how PFCs might affect people's health. There is concern that some PFCs:

- May affect the developing fetus and child, including possible changes in growth, learning, and behavior.
- May decrease fertility and interfere with the body's natural hormones.
- May affect the immune system.
- Might increase cancer risk.

## What are possible ways to reduce exposure?

Scientists are not sure how best to reduce exposure to PFCs. However, you can:

- Limit how often you eat foods from grease-repellent paper containers.
- Avoid buying stain-resistant carpets.
- Avoid buying products labeled stain-resistant, water-resistant, or wrinkle-free, such as some fabrics, furniture, or clothes.
- Avoid using sprays and carpet cleaning solutions that contain PFCs.
- Because PFCs can come out of products and collect in dust, wash your hands often, especially before eating and preparing food, clean your floors regularly, and use a damp cloth to dust.

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### For more information:

National Biomonitoring Program fact sheet on PFCs: [www.cdc.gov/biomonitoring/PFCs\\_FactSheet.html](http://www.cdc.gov/biomonitoring/PFCs_FactSheet.html)