

Asarco Hayden Smelter Exposure Investigation

March 2017

A Summary of Findings Hayden and Winkelman, Arizona

Overview

People in Hayden and Winkelman might be exposed to (come in contact with) unhealthy levels of lead and arsenic in the outdoor air, in mine waste piles, and in soil in some non-residential locations. Additionally, they may be exposed to lead from paint in older housing.

In April 2015, the Agency for Toxic Substances and Disease Registry (ATSDR) worked with federal and state agencies, and local leaders to test people in Hayden and Winkelman for levels of lead and arsenic in their bodies. Residents most at-risk for negative health effects from exposure (children, pregnant women, and women of childbearing age) were eligible for testing. ATSDR sent participants their individual results in June 2015.

This is a summary of the full ATSDR report.

Conclusions

Some children in Hayden and Winkelman have been exposed to lead at levels that could harm their health.

Overall, the children and adolescents ATSDR tested in Hayden and Winkelman had higher levels of lead in their bodies than children and adolescents from across the U.S.

ATSDR needs more information to determine how much arsenic participants have in their bodies when air pollution levels are typical for the community. Asarco shut down the smelter for maintenance during the time of ATSDR's testing, reducing lead and arsenic levels in the air.



A Note About the Tests

These tests tell us how much lead and arsenic were in a participant's blood and urine at the time of testing. They don't tell us where the lead and arsenic came from. The amount of lead and arsenic in a person's body can change over time.

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Background

The Asarco Hayden Smelter Plant Site is in rural Arizona, about 90 miles southeast of Phoenix and 70 miles northeast of Tucson. The site includes the towns of Hayden and Winkelman (population 662 and 353, respectively). Past and current copper smelting and processing caused environmental contamination in these towns. Copper ore has been processed here for over 100 years. Asarco continues to operate a copper concentrator and smelter.

The U.S. Environmental Protection Agency (EPA), Arizona Department of Environmental Quality (ADEQ), and Asarco Grupo Mexico LLC (Asarco) are cleaning up contamination at the site through a Superfund alternative process. Between 2008 and 2014, EPA completed residential soil clean up at 266 Hayden and Winkelman yards and publicly accessible areas. Separate from this process, in 2015 EPA and Asarco announced a legal settlement to resolve Clean Air Act violations at the facility.

ATSDR Exposure Investigation Process

Based on requests from the community, EPA asked ATSDR to provide lead and arsenic testing to Hayden and Winkelman residents. In April 2015, ATSDR offered testing to at-risk residents with support from the Arizona Department of Health Services (ADHS), ADEQ, the Centers for Disease Control and Prevention (CDC), and EPA. ATSDR mailed individual results letters to participants in June 2015 and made follow up phone calls to participants whose blood lead results were higher than the investigation follow up level (see Box 1).

Box 1. Lead Follow Up Level

ATSDR followed up with participants with blood lead levels above 5. CDC uses 5 to identify children with blood lead levels that are higher than most children's levels. The units are micrograms per deciliter of blood, abbreviated $\mu\text{g}/\text{dL}$.

Exposure Investigation Report

What did ATSDR do?

ATSDR offered free, voluntary blood lead and urine arsenic testing to children, pregnant women, and women of childbearing age living in Hayden and Winkelman. These people are most at-risk from exposure because they are growing and developing or may become pregnant. ATSDR tested a total of 83 participants from 29 households. We tested:

- 25 children ages 1 – 5 years for lead;
- 29 children ages 6 – 11 years for lead and arsenic;
- 17 adolescents ages 12 – 19 years for lead and arsenic;
- 12 women ages 20 – 40 years for lead and arsenic.

ATSDR also looked at air monitoring data for Hayden and Winkelman from 2013 and 2015 to learn how a shutdown of the smelter affected air quality at the time of the testing. The air data were collected by Asarco with EPA oversight.



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What did ATSDR find?

Lead

Two children had blood lead levels above 5.

- ATSDR found 2 children in Hayden and Winkelman with blood lead levels above the investigation follow up level [(5 micrograms of lead per deciliter of blood ($\mu\text{g}/\text{dL}$)).
- One child was in the age range 1 – 5 and one child was in the age range 6 – 11.
- Two other children had blood lead levels between 4 – 5 $\mu\text{g}/\text{dL}$, near the investigation follow up level.

Children's (including adolescents') blood lead levels were above the U.S. median.

- The median blood lead levels by age group for children and adolescent participants were about two times higher than the U.S. population age groups. See Figure 1 and Box 3.

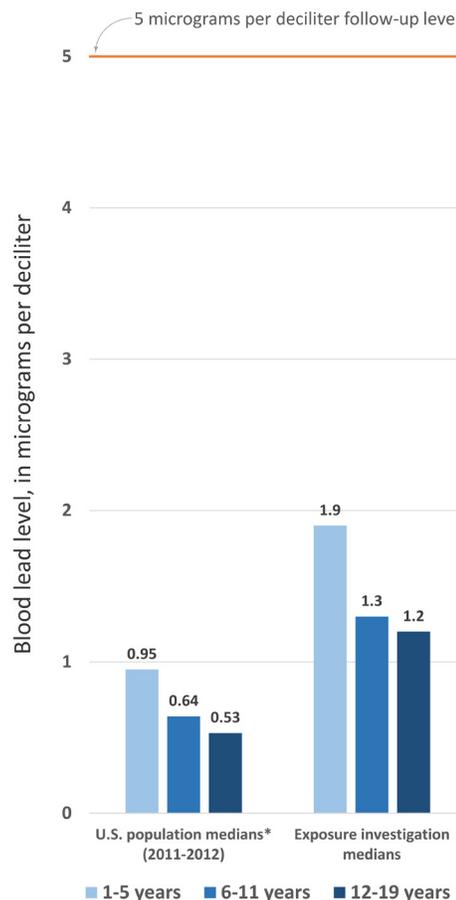
Adult blood lead levels were lower than the U.S. median.

- Median blood lead levels of adult participants (women age 20-40) in Hayden-Winkelman were slightly lower than adults 20 years and older from across the U.S.

Box 2. Lead and Your Health

Lead exposure can cause learning and behavior problems in children and many other health effects. Some of the effects of exposure to lead may never go away. Lead can stay in your body for many years after exposure.

Figure 1: Comparison of blood lead levels in children and adolescents in ATSDR's exposure investigation to those in the U.S. population



*Centers for Disease Control and Prevention. Fourth Report on Human Exposure to Environmental Chemicals, Updated Tables, (February, 2015). Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention. www.cdc.gov/exposurereport/

Box 3. What is the median?

The median is the middle value in a list of numbers. In a set of numbers it separates the higher half from the lower half.

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Arsenic

ATSDR needs more information to determine participants' urinary arsenic levels when air pollution is typical for the area.

- The smelter was shut down before and during the urine testing, so participant arsenic levels may have been lower than they would be typically.

Urinary arsenic levels for all participants were similar to U.S. population results.

- No participants had urinary arsenic levels above the follow up level (28.4 micrograms of arsenic per gram of creatinine). You can read more about the follow up level ATSDR chose for arsenic in the methods section of the full report.

Air Quality

Due to the smelter shutdown, outdoor air pollutant levels were lower before and during the testing.

- In 2015, typical outdoor air pollutant levels in Hayden and Winkelman were
 - 7 times higher for lead and
 - 8 times higher for arsenic than during the smelter shutdown.
- The smelter was shut down for maintenance from April 6 – May 21, 2015.
- ATSDR collected participants' blood and urine samples April 17 – 19, 2015.

Other possible lead and arsenic sources

- **Housing:** About 44% of the housing units were built before 1950. Prior to 1955 there were no limits on lead in paint. Lead was widely used in house paint until the early 1980s. If paint in older housing is deteriorating, children in those homes are at greater risk for higher blood lead levels.
- **Hayden and Winkelman drinking water systems:**
 - **Arsenic:** Although both systems contain low levels of arsenic, they are below the EPA limits and at typical levels seen in other Arizona public water systems.
 - **Lead:** Both systems are well below EPA's action level for lead. Still, lead can get into drinking water from pipes and fixtures in your home. Homes built before 1986 are more likely to have plumbing with lead.
- **Mexican imports:** Some types of imported Mexican pottery and candies may contain lead.
- **Foods:** Some foods such as rice and seafood contain arsenic.



Box 4. Arsenic and Your Health

Exposure to low levels of arsenic for more than 1 year can cause dark patches of "warts" or "corns" on the skin. Arsenic exposure over many years also raises the risk of cancer of the skin, bladder, lung, and liver. Arsenic stays in your urine for about 3 days after exposure.

Box 5. The smelter shutdown and ATSDR's testing results

Since arsenic leaves the body within a few days, the lower level of arsenic in air before testing could have led to less than typical amounts of arsenic in participants' urine during testing. Since lead stays in blood longer, we expect the shutdown did not have much of an effect on lead results.

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What can I do if my child has high blood lead levels?

ATSDR recommends that parents/guardians of the two children whose blood lead results were above the follow up level discuss the child's result with their primary health care provider. Follow the tips below to reduce your family's exposure to lead.

ATSDR further recommends that health care providers follow the Advisory Committee for Childhood Lead Poisoning Prevention's recommendations for management of children with blood lead levels above the CDC reference level.

How can my family reduce exposure to lead and arsenic?

Families and people in Hayden and Winkelman can take the following steps to protect their health.

Keep dirt and dust from getting into your body.

Outside

- Don't play in arroyos or on waste piles; stay away from railroad tracks in Hayden; do not trespass.

At Home

- Wipe shoes on a doormat and remove shoes before entering your house.
- Wet-mop or wet-wipe floors, windowsills, counters and hard-surface furniture every 2 – 3 weeks.
- Make sure your child does not chew on surfaces painted with lead-based paint.

Keep things clean

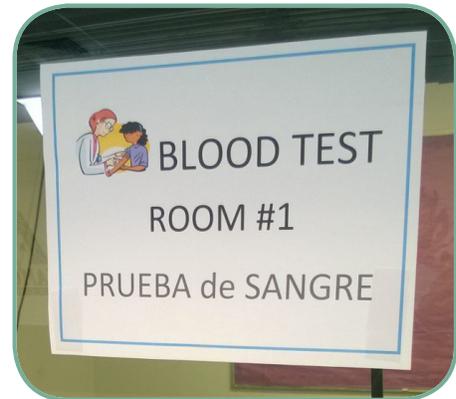
- Wash things children put into their mouths, such as pacifiers, bottles, and toys whenever they fall on the floor or ground.
- Wash your hands and your children's hands before eating and after being outside.
- Wash fruits, vegetables, and root crops (like potatoes) before preparing them to eat.

At work

- If you could be exposed to lead or arsenic in your workplace, change your clothes at work before returning home or immediately after arriving home.
- Wash your work clothes separately from the clothes of other family members.

Pets

- Wash pets that spend time outside and inside your home at least every 2-3 weeks.



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Maintain healthy eating habits for your family.

- Give your family healthful meals rich in iron, calcium, zinc, and vitamin C. Children who eat healthy diets absorb less lead.

Participate in the home lead-based paint testing project Asarco will develop and fund as part of their 2015 legal settlement with EPA.

To learn about the status of this project, contact Amy Veek at Asarco (520-356-3296, aveek@asarco.com).



What will happen next?

To make sure the community is safe, ATSDR recommends that EPA, ADEQ, Gila County Health Department, and Asarco:

- Make changes to the smelter to reduce lead and arsenic in outdoor air.
- Continue environmental sampling and cleanup efforts in Hayden and Winkelman.
- Incorporate these exposure investigation results in future human health risk assessments, as appropriate.
- Implement a home lead testing and abatement project for local residents, as outlined in the legal settlement between EPA and Asarco.

ATSDR will also:

- Plan to offer another round of arsenic testing for existing participants at a time when the smelter is expected to be operating normally.
- Continue to support the development and implementation of the Hayden and Winkelman lead-based paint testing and abatement project outlined in the 2015 EPA/Asarco settlement.
- Give information about lead and arsenic testing to local doctors or nurses, upon request.

Where can I learn more?

- Visit the Asarco Hayden exposure investigation webpage. <http://www.atsdr.cdc.gov/sites/HWAZ/>
- Check out the full report. <http://www.atsdr.cdc.gov/HAC/PHA/HCPHA.asp?State=AZ>
- Learn more about lead. <http://www.atsdr.cdc.gov/toxfaqs/tf.asp?id=93&tid=22>
- Read about arsenic. <http://www.atsdr.cdc.gov/toxfaqs/tf.asp?id=19&tid=3>

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