Heavy Metals Surveillance in Michigan: Fourteenth Report (January 2023 – December 2023)

Additional Information Available at: www.oem.msu.edu

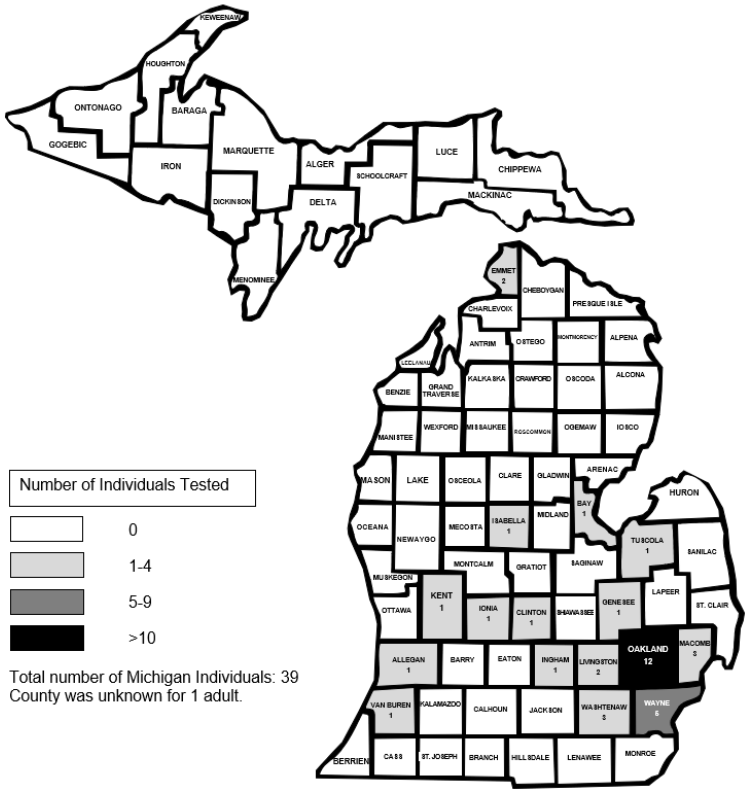
Background

In September 2005, The Michigan Department of Health and Human Services (MDHHS) promulgated rules requiring clinical laboratories to report all clinical test results of arsenic, cadmium, and mercury in blood and urine, under the statutory authority of the Public Health Code. The reporting requirement was established so that MDHHS could improve the tracking and prevention of the impacts on human health of environmental and occupational exposures to these heavy metals. Individuals with results exceeding action thresholds are interviewed to determine the source of exposure to the metal and assess if public health interventions are warranted. MDHHS and Michigan State University partner to collect, analyze, and respond to reports from the laboratories. Since 2012, statistics have been compiled only on reports with test values that are at or above the action threshold.

2023 Results: Laboratory reporting of clinical tests for elevated arsenic, cadmium, and mercury

- 45 reports on 39 people with levels above the action threshold were received from twelve laboratories.
- 39 individuals had a result that exceeded one of the action thresholds. Two individuals had two elevated levels of the same metal. One individual had three elevated levels of the same metal and one elevated level of a second metal. And one individual had two elevated levels for two different metals.
- 72% of the individuals were men. There was one child <16 with a result above the action threshold.

Geographic Distribution of Individuals Tested for Elevated Arsenic, Cadmium, and Mercury Levels in Michigan by County of Residence, 1/1/2023-12/31/2023

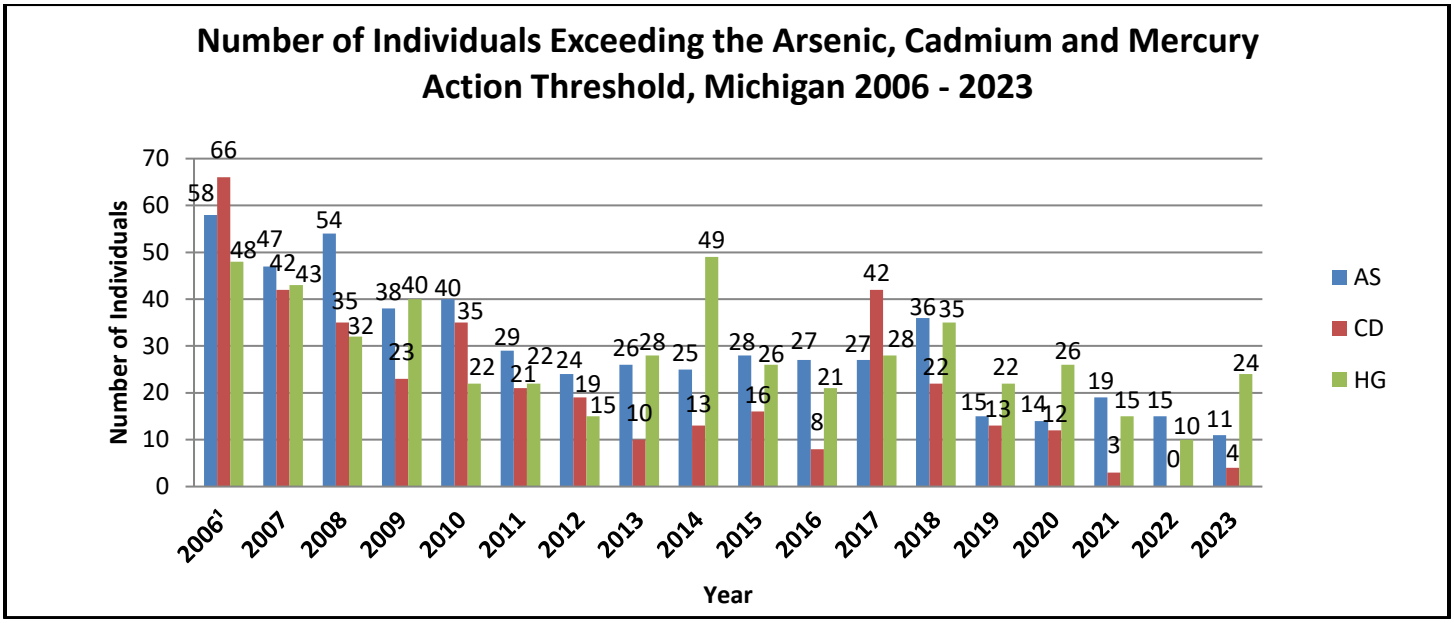


Number of Individuals with Elevated Arsenic, Cadmium or Mercury Levels by Gender and Age Group, Michigan 2023

Age Group	Gender	
	Male	Female
< 16	1	0
16 - 34	4	2
35 - 65	14	4
≥ 65	9	5
Total	28	11

March 20th, 2024

2006-2023: Individuals exceeding action thresholds



[1]The reporting period for the year 2006 spans 10/25/2005 through 12/31/2006.
AS – Arsenic Blood Action Threshold Level is >70 µg/L. Urine Action Threshold Level in Adults is >100 µg/L and in Children ≥50 µg/L.
CD – Cadmium Blood Action Threshold Level is >5 µg/L. Urine Action Threshold Level is >2 µg/L or >3 µg/g creatinine.
HG – Mercury Blood Action Threshold Level in Adults is ≥15 µg/L and in Children >10 µg/L. Urine Action Threshold Level in Adults is >20 µg/L or >35 µg/g creatinine and in Children >10 µg/L.

When the source of exposure was determined, fish consumption was the probable cause of elevated mercury for 18 of 19 (94.7%) individuals. Of the five known sources of arsenic exposure, two (40%) were due to fish consumption, one (20.0%) was due to contaminated drinking water, one (20%) was due to consumption of medicinal supplements, and one (20.0%) was work-related. Of the three identified sources of elevated cadmium, one was due to cigarette smoke, one was due to rice consumption, and one was work-related.

Heavy Metals Poisoning Narratives

Examples of Occupational Exposures 2015-2023:

- 2015 – One individual working for a recyclable material wholesaler had an elevated urine mercury.
- 2017 – One individual working at a nonferrous foundry had an elevated urine cadmium.
- 2021 – One individual working mixing silver amalgams had an elevated blood mercury.
- 2022 – One individual working at a battery recycling facility had an elevated urine cadmium.
- 2023 – One individual working at a metal fabrication facility had an elevated urine arsenic.

Examples of Environmental Exposures 2016-2023:

- 2016 – Two children, who lived in eastern Michigan and drank water from their home well had elevated urine arsenic.
- 2018 – A man in his 60's who ate salmon, swordfish, and tuna a few times a week had an elevated blood mercury.
- 2019 – A man in his 40's who ate yellowtail, salmon, canned albacore tuna and sushi a few times a week had an elevated blood mercury.
- 2020 – A man in his 60's who ate tuna and swordfish a few times a week had an elevated blood mercury.
- 2021 – A man in his 60's who ate tuna a few times a week had an elevated blood mercury.
- 2022 – A women in her 50's who ate salmon and whitefish daily and used a facial cream from a middle eastern store had an elevated blood mercury.
- 2023 – A woman in her 70's who used a face cream purchased from a foreign country had an elevated blood mercury.