

MICHIGAN ADULT LEAD EXPOSURE

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Abstract

The Michigan Public Health Tracking Program (MiTracking) has worked with the Michigan State University (MSU) College of Human Medicine's Occupational and Environmental Medicine (OEM) Division to create a dataset that contains the information needed to calculate measures for adult lead exposure in the State of Michigan for use on the MiTracking data portal. The dataset contains laboratory-reported results of blood lead tests of adults (defined as age 16 and older) with blood lead levels that were ≥ 5 micrograms per deciliter ($\mu\text{g}/\text{dL}$).

Adult lead data include these measures:

- Number of adults (age 16 and older) with a blood lead test result of ≥ 5 $\mu\text{g}/\text{dL}$ and ≥ 25 $\mu\text{g}/\text{dL}$ (all years combined)
- Number of adults (age 16 and older) with a blood lead test result of ≥ 5 $\mu\text{g}/\text{dL}$ and ≥ 25 $\mu\text{g}/\text{dL}$ (5-year aggregates)

Data are stratified by:

- Age at time of test (≥ 16 -24, 25-64, and ≥ 65)
- County of residence at time of test
- Gender (male, female)
- Exposure type
 - Statewide: work-related, non-work-related (firearms, non-firearms), or unable to be determined
 - County-level: work-related; non-work-related; unable to be determined
 - For work-related exposure, the industries where the individuals were exposed were grouped by industry type using the National Institute for Occupational Safety and Health (NIOSH) National Occupational Research Agenda (NORA) sector groupings.¹

(Note: For adults with more than one test in a year, the highest result was selected. For adults with a test result of ≥ 5 $\mu\text{g}/\text{dL}$ or ≥ 25 $\mu\text{g}/\text{dL}$ in more than one year, the test result in the first year of the year grouping - all years combined or five-year group - was chosen.)

Data from the Michigan Adult Blood Lead Epidemiology and Surveillance (ABLES) program were used to create this dataset. ABLES is funded by the National Institute for Occupational Safety and Health (NIOSH) and is a joint project of the MSU College of Human Medicine's OEM Division and the Michigan Department of Health and Human Services (MDHHS).

All users are recommended to read and fully comprehend the metadata prior to data use. To access these data, please visit the [MiTracking data portal](#).

Purpose

Lead exposure can occur after acute or chronic ingestion or inhalation of lead.² Lead in the body can harm the nervous and reproductive systems, kidneys, blood-forming system and can raise blood pressure and cause hypertension.

No safe level of lead has been identified. The Centers for Disease Control and Prevention (CDC) recommended public health actions be initiated for children at the reference level of 5 micrograms of lead per deciliter of blood ($\mu\text{g}/\text{dL}$) or greater but did not review this issue for adults (individuals 16 years or older).³ The Association of Occupational and Environmental Clinics (AOEC)⁴, the Council of State and Territorial Epidemiologists (CSTE)⁴ and the California Department of Public Health⁵ have adopted medical guidelines that recommend a medical response for levels of 5 $\mu\text{g}/\text{dL}$ or greater in adults, and in 2014 the CSTE recommended that a BLL of 5 $\mu\text{g}/\text{dL}$ or greater be considered elevated for adults, as well as children, and that surveillance of blood lead levels in adults reflect this definition change.⁶

Surveillance for lead exposure in adults has focused on occupational exposure because 80 percent or more of adults with BLLs of $\geq 10 \mu\text{g}/\text{dL}$ have had their exposure to lead at work. The Michigan Occupational Safety and Health Administration (MIOSHA) has two legal standards related to employer responsibilities for preventing lead exposure in employees – one for general industry and one for construction.

Adult lead exposure data made available on the MiTracking portal will provide public health professionals, researchers, and the general public with aggregate information on adult lead exposure in the State of Michigan to help identify trends and risk factors for elevated blood lead levels in adults.

Supplemental Information

Blood lead level (BLL) monitoring, including those of children, has been conducted by the State of Michigan since 1992. Between 1992 and 1995, laboratories performing analyses of blood lead specimens, primarily of children, voluntarily submitted reports to the State. The State of Michigan health department (called the Michigan Department of Community Health [MDCH] until May 2015 when it was renamed the Michigan Department of Health and Human Services [MDHHS]) promulgated regulations effective October 11, 1997, that required laboratories to submit reports of blood lead test results of both children and adults for lead to MDHHS. Coincident with the promulgation of this regulation in 1997, Michigan received federal funding from NIOSH to monitor adult BLLs as part of the Adult Blood Lead Epidemiology and Surveillance (ABLES) program. The Michigan ABLES program is operated by Michigan State University, as a bona fide agent of the state. The Michigan ABLES program adopted the NIOSH ABLES definition of “adult” as an individual 16 years or older.

Blood lead testing results are reported by laboratories performing blood lead analyses to the MDHHS Childhood Lead Poisoning Prevention Program (CLPPP) as required by the Public Health Code, and results for adults age 16 and above are sent to the Michigan ABLES program for processing and follow-up. Michigan ABLES defines an elevated blood lead level as 5 $\mu\text{g}/\text{dL}$ or greater. Comprehensive follow-up for individuals with blood lead levels of $\geq 25 \mu\text{g}/\text{dL}$ is conducted in collaboration with MIOSHA.

Keywords

Poisoning; adult lead poisoning; lead exposure; lead; Pb; blood lead levels; elevated blood lead levels; BLL; venous blood sample; blood lead screening; work; occupational health; work-related; MSU

Bounding Coordinates

West Bounding Coordinate: -90.41813399999995

East Bounding Coordinate: -82.418394000000006

North Bounding Coordinate: 48.189534000000002

South Bounding Coordinate: 41.696088000000003

Other Information on Data

Level of Geographic Detail: Statewide and County

Currentness Reference (when data were last updated): 10/7/2020

Frequency at which the data are updated: Annually

Data Status: Complete

Completeness Report

Included in this dataset are blood lead results for all individuals in Michigan 16 years or older tested since 1998 to the most current year available and reported to MDHHS. Data are available at the county and statewide geographic level.

Data Processing Description

All clinical laboratories that analyze blood samples for lead in Michigan must report all adult and child lead results electronically to the MDHHS CLPPP within five working days. The MDHHS CLPPP forwarded the electronic record of all blood lead results on individuals 16 years old or older to the ABLES program at Michigan State University, the bona fide agent of the State for adult blood lead surveillance, where the results were uploaded to a password-protected Access database. The database included identifiers, demographics, information about source of exposure to lead, name/address of employer for work-related exposures, and the North American Industry Classification System (NAICS) code for the employer.⁷ Only venous blood lead results were entered into the database.

When BLL reports were received, they were reviewed for completeness. For reports ≥ 10 $\mu\text{g}/\text{dL}$ that were incomplete, requests were sent to the provider who ordered the test to provide the missing information. Starting in 2016, follow up with the provider to obtain missing information was performed for Flint residents with BLLs 5 $\mu\text{g}/\text{dL}$ or greater.

Each record entered into the database had a visual quality check on a monthly basis for any data entry errors, duplicate entries, missing data, and illogical data.

Individuals were contacted for an interview if:

- they had a BLL of 10 to 24 $\mu\text{g}/\text{dL}$ and the source of their lead exposure could not be identified from the laboratory report
- they had a BLL of 25 $\mu\text{g}/\text{dL}$ or greater, or

- they were a Flint resident with a BLL of 5 or greater and were tested in 2016 or later

A letter was sent to those individuals explaining Michigan’s lead surveillance program and inviting them to answer a 15-20 minute telephone questionnaire about their exposures to lead and any symptoms they may be experiencing. The questionnaire collected patient demographic data, work exposure and history information, symptoms related to lead exposure, information on potential lead-using hobbies and non-work-related activities, and the presence of young children in the household to assess possible take-home lead exposures among these children. Trained interviewers administered the questionnaire.

For the individuals with BLLs of 25 µg/dL or greater whose exposure to lead occurred at work, the Michigan OSHA of the Michigan Department of Labor and Economic Opportunity (LEO) made a determination on the utility of conducting a workplace follow-up.

For individuals with elevated BLLs from exposure to lead at work, the types of industries where they worked were grouped by NAICS codes using the NIOSH NORA Sectors. Two sectors, Mining and Oil and Gas Extraction were combined into one sector due to the small number of blood lead tests in these two sectors.

NORA Sector Group	NAICS Code
Agriculture, Forestry & Fishing (except Wildland Firefighting)	11
Construction	23
Healthcare & Social Assistance	62, 54194, 81291
Manufacturing	31-33
Mining and Oil and Gas Extraction	21
Public Safety (including Wildland Firefighting)	92212, 92214, 92216, 62191
Services (except Public Safety)	51, 52, 53, 54, 55, 56, 61, 71, 72, 81, 92
Transportation, Warehousing & Utilities	48-49, 22
Wholesale & Retail Trade	42, 44-45

Access Constraints

There are no access constraints for data available through the Michigan Environmental Public Health Tracking public portal.

Use Constraints

It is recommended that all users read and fully comprehend metadata prior to data use.

These data cannot be used for commercial purposes and shall not be used to engage in any method, act, or practice to conduct the solicitation or advertisement of goods, services, or real estate to Michigan consumers without first obtaining written permission from the MSU OEM.

To protect confidentiality, cells with more than zero counts but less than six counts are suppressed. Data users are prohibited from attempting to learn the identity of any person included in the data and from linking these data with any other data for the purpose of matching records to identify individuals or entities (such as places of work).

Security Handling Description

If data are distributed, the use constraints specified in this metadata apply to all recipients of the data.

Distribution Liability

The Michigan Public Health Tracking Network is maintained, managed, and operated by the Division of Environmental Health (DEH) within MDHHS. In preparation of these data, every effort has been made to offer the most current, correct, complete, and clearly expressed information possible. Nevertheless, some errors in the data may exist. In particular, but without limiting anything here, MDHHS disclaims any responsibility for source data, compilation, typographical errors, and accuracy of the information that may be contained in these data.

These data do not represent the official legal version of source documents or data used to compile these data. MDHHS further reserves the right to make changes to these data at any time without notice.

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If errors or otherwise inappropriate information is brought to our attention, a reasonable effort will be made to fix or remove it. Such concerns should be addressed to the Michigan Tracking Program (See Contact Information below).

Custom Order Process

For access to unrestricted or public use Michigan-specific data, see: www.oem.msu.edu or call 517-353-1846.

Contact Information

Michigan Department of Health and Human Services
Division of Environmental Health
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