

# MICHIGAN CARBON MONOXIDE POISONING ED VISITS

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## **Abstract**

This dataset contains information on emergency department visits for Michigan residents admitted with unintentional (accidental) or undetermined intent carbon monoxide poisoning. Visits were included if they contained one or more of the following ICD-10-CM codes in any diagnosis field: ICD10-CM T58.01\*, T58.04\*, T58.11\*, T58.14\*, T58.2X1\*, T58.2X4\*, T58.8X1\*, T58.8X4\*, T58.91\*, and T58.94\*<sup>1</sup>. Intentional or purposeful CO poisoning records (ICD-10-CM T58.02\*, T58.03\*, T58.12\*, T58.13\*, T58.2X2\*, T58.2X3\*, T58.8X2\*, T58.8X3\*, T58.92\*, or T58.93\*) were excluded. The data were aggregated and stratified by state of residence, admission year, and fire-relatedness (whether the CO poisoning was caused by a fire or not). The dataset was processed using data from both the Michigan Resident Outpatient and Michigan Resident Inpatient Databases supplied from the Michigan Health and Hospital Association (MHA) Service Corporation.

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**

This dataset provides data for both the National Environmental Public Health Tracking Network and the Michigan Environmental Public Health Tracking Network. It is intended to provide public health professionals, researchers, and the general public with summary information on CO poisoning ED visits in the State of Michigan. The data include the following CO poisoning emergency department (ED) measures:

- (1) Number of ED visits for CO poisoning
- (2) Crude rate of CO poisoning ED visits per 10,000 population
- (3) Age-adjusted rate of CO poisoning ED visits per 10,000 population

## **Supplemental Information**

These emergency department data are provided by the Michigan Health and Hospital Association (MHA) to the Michigan Department of Health and Human Services (MDHHS) through a contractual agreement. The MHA annually collects data for the Michigan Outpatient Database (MODB) and Michigan Inpatient Database (MIDB) from patient records supplied by

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<sup>1</sup> Note '\*' includes all sub variation codes.

Michigan acute care hospitals and hospitals in contiguous areas of Ohio, Indiana, Wisconsin, and several other states.

Hospitals included in the data file (which *does not* include federal facilities [such as Veterans Affairs or Indian Health Service hospitals]) are grouped into MHA hospital IDs of which there are both Michigan and out-of-state hospitals. Records from Michigan emergency departments include both Michigan residents and non-Michigan residents whereas records from out-of-state hospitals only include Michigan residents. Data provided by the hospitals were carefully checked and edited by the MHA to ensure the validity of the data received. The data were further reviewed and verified by staff in the Michigan Division of Environmental Health.

Using the subsequent year's discharge-based dataset, the Michigan Tracking Program created an admission-based dataset for all ED visits in a year. Data for non-Michigan residents and for ED visits from federal facilities (such as Veterans Affairs or Indian Health Service hospitals) were excluded.

Data have been de-identified to protect patient confidentiality.

Because the MODB ED data only include patients who are treated and released from the ED, patients who visit the ED and are admitted for inpatient treatment were obtained from the Michigan Inpatient Database (MIDB). Please see the Hospitalizations metadata for supplemental information on the MIDB.

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**Keywords**

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Carbon monoxide; carbon monoxide poisoning; unintentional poisoning; indoor pollution; toxic gas; combustion; smoke; CO; Monoxide; Carbon monoxide emergency department visits; emergency department; ED; ED visits

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**Bounding Coordinates**

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Geographically, all cases in this dataset occurred among residents of the State of Michigan. This means that all cases fit within the latitude/longitude coordinates listed below.

West Bounding Coordinate: -90.41813399999995

East Bounding Coordinate: -82.418394000000006

North Bounding Coordinate: 48.189534000000002

South Bounding Coordinate: 41.696088000000003

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**Other Information on Data**

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**Level of Geographic Detail:** State

**Currentness Reference (when data were last updated):** 2/4/2021

**Frequency at which the data are updated:** Annually

**Data Status:** Complete

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### ***Completeness Report***

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These data were based only on discharge diagnosis codes (ICD-10-CM) T58.01\*, T58.04\*, T58.11\*, T58.14\*, T58.2X1\*, T58.2X4\*, T58.8X1\*, T58.8X4\*, T58.91\*, and T58.94\*. Intentional or purposeful CO poisoning records (ICD-10-CM T58.02\*, T58.03\*, T58.12\*, T58.13\*, T58.2X2\*, T58.2X3\*, T58.8X2\*, T58.8X3\*, T58.92\*, or T58.93\*) were excluded.

The MODB and MIDB are missing data from some acute care hospitals, so there are certain parts of the state that are not well represented. This is a limitation of both databases.

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### ***Data Processing Description***

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The dataset was processed and created using data from the Michigan Outpatient Database (MODB) and the Michigan Inpatient Database (MIDB) obtained with permission from the Michigan Health and Hospitalization Association (MHA) Service Corporation. The dataset was prepared using the instructions found in the CDC Environmental Public Health Tracking How-To-Guide for Data Submission: Carbon Monoxide Poisoning ED Visits, July 2019. MODB and MIDB data are discharge-based datasets but admission-based datasets for emergency department visits and hospitalizations were created using the year of interest and subsequent year of data (to capture cases admitted in one year and discharged the following year).

- A new dataset was created for ED visits including both patients who were admitted as inpatients from the emergency department and those who were treated and released (outpatients) with any diagnosis of CO poisoning.
- This new dataset was cleaned and processed using SAS 9.4 to exclude non-Michigan residents.
- Patients from MODB marked as an observation stay were also included as an ED visit.
- Multiple ED visits were considered separate events if they occurred more than 48 hours apart.
- Transfers between acute care hospitals were not excluded from the data.
- Counts of emergency department visits for CO poisoning were aggregated by admission year and fire-relatedness.
  - Cause of CO poisoning was established as fire-related, non-fire related, or unknown mechanism based on the assigned ICD-10-CM diagnosis code.
- Rates were calculated using vintage bridged-race population estimates available through the National Vital Statistics System (NVSS) for years in between each

census (e.g. 2011-2019) and U.S. Census Bureau population for census years (e.g. 2020, when available).

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### ***Access Constraints***

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There are no access constraints for data available through the Michigan Environmental Public Health Tracking program public portal. Where applicable, restricted data will only be released to users after a written request detailing the purpose of the request, intended use for the data, and specifics on the security and privacy measures to be taken to safeguard patient privacy and prevent unauthorized access to or use of the data. Such requests are reviewed and approved by MHASC. Contact MHASC at [datakoala@mha.org](mailto:datakoala@mha.org) for more information.

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### ***Use Constraints***

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All users read and fully comprehend the metadata prior to data use. Efforts have been made to ensure the accuracy of the data. These data are supplied by MHA to MDHHS for submission to the National Environmental Public Health Tracking Network at CDC. The data are also used by the Michigan Tracking Network to compile, integrate, and disseminate environmental hazard, exposure, and health effects data pursuant to criteria and requirements set forth by the CDC. MHA and MDHHS specifically disclaim responsibility for any analyses, interpretations, or conclusions made by those who access this information.

These data remain the property of the MHA and 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.

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 hospitals).

When looking at small geographic levels (e.g., ZIP code), users must take into consideration appropriate cell suppression rules imposed by the data providers or individual state programs. Even at the county level it can be expected that the measures generated will often be based upon numbers too small to report or present without violating state and federal privacy guidelines and regulations. Careful adherence to cell suppression rules in cross tabulations is necessary and methods to increase cell sizes by combining data across time (e.g., months, years) and geographic areas may be appropriate.

**Usage rights:** Portions of this data are taken from a proprietary database owned and maintained by the Michigan Health & Hospital Association Service Corporation (MHASC). All rights reserved. This data may not be used for commercial purposes without first obtaining written permission from the MHASC. Contact MHASC at [datakoala@mha.org](mailto:datakoala@mha.org) for more information.

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**Data Limitations**

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ED data, by definition, do not include individuals who do not receive medical care for their CO poisoning at the emergency department. It also would not include individuals who are admitted to the hospital without first visiting the emergency department.

Differences in rates over time or by area may reflect differences or changes in diagnostic techniques and criteria and in the coding of CO poisoning.

Rates at the state and/or county level will not necessarily reflect the CO poisoning burden at a more local level (i.e., neighborhood).

Rates at the state and/or county level will not be geographically resolved enough to be linked with many types of environmental data.

Differences in rates by area may be due to different socio-demographic characteristics and associated behaviors. When comparing rates across geographic areas, a variety of non-environmental factors, such as access to medical care, can impact the likelihood of persons visiting the emergency department for CO Poisoning.

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**Data Suppression**

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The Michigan Environmental Public Health Tracking Program and its data partners have applied appropriate cell suppression rules imposed by the data providers and/or using guidance from the CDC. Even at the county level it can be expected that the measures generated will often be based upon numbers too small to report or present without violating state and federal privacy guidelines and regulations.

Staff have adhered to the cell suppression rules by suppressing all counts greater than 0 and less than 6 (the corresponding rates based on these small counts have also been suppressed). [Complementary \(or secondary\) suppression](#) has also been completed to prevent any back calculation of suppressed cells. For some data, it was necessary to increase cell sizes by combining data across time (e.g., years) and geographic areas (statewide instead of county-level data).

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**Security Handling Description**

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

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**Distribution Liability**

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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 and 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.

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### ***Custom Order Process***

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For access to national and multi-state unrestricted or public use data, please see:  
<http://ephtracking.cdc.gov>

For access to unrestricted or public use Michigan-specific data, please contact the Michigan Health & Hospital Association Service Corporation (MHASC) at  
[datakoala@mha.org](mailto:datakoala@mha.org) for more information.

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### ***Contact Information***

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