

MICHIGAN HEAT ILLNESS ED VISITS

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Abstract

This dataset contains emergency department visits for Michigan residents with a diagnosis of heat illness (ICD-10-CM T67.*, X30.*, or X32.*¹) in the absence of excessive heat of manmade origin (ICD-10-CM W92.*). These diagnoses include heat stroke and sunstroke (hyperthermia), heat syncope/collapse, heat exhaustion, heat cramps, heat fatigue, heat edema, and other/unspecified clinical effects attributed to excessive heat exposure, between May and September (inclusive). The data are aggregated and stratified by county of residence (including city of Detroit separately from Wayne county), admission year, and race.

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. State and county-level population data came from the National Center for Health Statistics Bridged-Race, Postcensal Population Estimates (Vintage 2018).

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 heat illness emergency department (ED) visits in the State of Michigan. The data include the following heat stress illness emergency department measures:

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

¹ 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.

Hospitals do not report patient's county of residence. Thus, MHA derived codes for county of residence from the patient's reported zip code and zip/county population weights. When a zip code intersects more than one county, MHA used only the largest weight. For example, for 100 records, if zip code X intersects counties A (weight = 60%) and B (weight = 40%), MHA would assign all 100 records to county A.

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.

Keywords

Heat illness; Heat stroke; Hyperthermia; Heat stress; Sun stroke; Heat collapse; Heat cramp; Heat exhaustion from water depletion; Heat exhaustion from salt depletion; Heat exhaustion, unspecified; Other specified heat effects; Unspecified effects of heat and light; Health effect caused by excessive heat due to weather; ictus solaris; Effect from unknown cause of excessive heat; Heat illness emergency department visits; emergency department; ED; ER; ED visits.

Bounding Coordinates

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

Other Information on Data

Level of Geographic Detail: State, County, City of Detroit

Currentness Reference (when data were last updated): 5/19/2021

Frequency at which the data are updated: Annually

Data Status: Complete

Completeness Report

These data include emergency department visits of Michigan residents from non-federal acute care hospitals with a visit date between May 1 and September 30. These data do not include visits from Veteran Affairs, Indian Health Service, or other federal facilities or hospitals. These data are based on ED visits for which any of the following ICD-10-CM codes were listed: T67, X30, or X32, in the exclusion of W92 (exposure to manmade heat).

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.

Data Processing Description

The dataset was processed and created using data from the Michigan Resident Outpatient and Inpatient Files, 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: Heat Stress 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.

- A new dataset was created for ED visits including patients who were admitted as inpatients from the emergency department, held in observation status, and those who were treated and released from the ED (outpatients) between May 1 and September 30 with a diagnosis of heat stress (excluding manmade heat exposures).

- This new dataset was cleaned and processed using R Version 3.6.1. Non-Michigan residents were excluded. Records were assigned a five-digit county FIPS code based on their geocoded-census tract of residence if available. Records with missing census tract information were assigned a county FIPS code based on the MHA-assigned county included in the provided data. Detroit and out-Wayne County residence was assigned based on census tract of residence.
- Duplicates, identified as records with the same values for sex, date of birth, admission date, and zip code, were removed from the dataset.
- Racial category values were assigned as follows: American Indian or Alaska Native = 1; Asian or Pacific Islander = 2; Black = 3; White = 4.
- Transfers between acute care hospitals were not excluded from the data.
- Counts of emergency department visits for heat illness were aggregated by county and race.
- County-level rates were calculated using vintage postcensal estimates of the resident population of the United States available through the National Center for Health Statistics (NCHS). Rates for Detroit and out-Wayne County were calculated using American Community Survey 5 Year Estimates for the underlying population by age.
- Age-standardized rates were calculated using the direct standardization method and the 2000 U.S. population as the standard population.

Access Constraints

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 for more information.

Use Constraints

All users must read and fully comprehend the metadata prior to data use. Efforts have been made to assure 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 provide environmental hazard, exposure, and health effects data according 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, appropriate cell suppression rules were 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 these data are taken from a proprietary database owned and maintained by the Michigan Health & Hospital Association Service Corporation (MHASC). All rights reserved. These data may not be used for commercial purposes without first obtaining written permission from the MHASC. Contact MHASC at datakoala@mha.org for more information.

Data Limitations

ED data, by definition, do not include individuals who do not receive medical care for their heat illness 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 heat illness.

Reporting rates at the state and/or county level will not show the true heat illness burden at a more local level (e.g., neighborhood).

Reporting 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 heat illness.

Data Suppression

The Michigan Environmental Public Health Tracking Program and its data partners have applied appropriate cell suppression rules imposed by the data providers and/or from 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).

Data submission to the MODB and MIDB is voluntary, therefore hospital participation may vary from year to year. Numbers and rates are suppressed for counties that contain hospitals with 100 or more licensed beds that did not report emergency department data for those years.

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 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 this data at any time without notice.

It is strongly recommended that careful attention be paid to the contents of the metadata file associated with these data to evaluate dataset limitations, restrictions, or intended uses. MDHHS shall not be held liable for improper or incorrect use of the data described and/or contained herein.

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The sale or resale of the data, or any portions thereof, is prohibited unless with the express written permission of MDHHS and MHASC. Portions of this data are taken from a proprietary database owned and maintained by the MHASC. All rights reserved. These data may not be used for commercial purposes without first obtaining written permission from the MHASC.

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 according to the contact information listed below.

Custom Order Process

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 for more information.

Contact Information

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