

MICHIGAN COMMUNITY DRINKING WATER

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Abstract

This dataset contains the information needed to calculate the nationally consistent data and measures of contaminants in drinking water for two classes of halogenated organic DBPs: HAA5 and TTHM, in the State of Michigan for use on the national and Michigan public portals.

This dataset contains the following metrics for Disinfectant Byproducts (DBPs) concentrations in Michigan Community Water Systems (CWS):

- Number of CWS grouped by average Haloacetic Acids (HAA5) concentrations,
- Number of CWS grouped by average Total Trihalomethane (TTHM) concentrations,
- Number of CWS grouped by maximum HAA5 concentrations,
- Number of CWS grouped by maximum TTHM concentrations,
- Number of persons served by CWS grouped by average HAA5 concentrations,
- Number of persons served by CWS grouped by average TTHM concentrations,
- Number of persons served by CWS grouped by maximum HAA5 concentrations,
- Number of persons served by CWS grouped by maximum TTHM concentrations,
- Average concentration of HAA5 per year for each CWS, and
- Average concentration of TTHM per year for each CWS.

Data from the Michigan Department of Environmental Quality (MDEQ) Safe Drinking Water Information System (SDWIS) were used to create this dataset through a Memorandum of Understanding.

Purpose

These data are used to calculate measures of contaminants in drinking water for two classes of halogenated organic DBPs: HAA5 and TTHM. The dataset is intended to provide Tracking grantees, researchers, other public health professionals, policy-makers, and the general public with summary information on community drinking water quality for the State of Michigan for the two contaminants listed above.

Supplemental Information

The U.S. Environmental Protection Agency (EPA) Maximum Contaminant Level (MCL) for HAA5 in drinking water is 60 µg/L. The EPA's MCL for TTHM is 80 µg/L. Compliance with the MCLs for TTHM and HAA5 is based on locational running annual averages (LRAA), or in other words, a running annual average at each individual sample site. If the running annual average at any site is over the MCL, the system is in violation of the drinking water standard, keeping in mind that DBPs are evaluated on averages and not individual samples. Exposure to a concentration above the MCL does not necessarily mean a person will get sick. These DBPs are generally only a health concern after drinking water with

elevated levels for many years. It is reasonable to expect that all drinking water has small amounts of DBPs if a disinfectant is added to the water.

Limitations of the data:

- Levels of DBPs vary with time, distance from the treatment point, size of the system, and temperature. Testing schedules may not accurately represent short-term levels or even the maximum level that was ever in the water. For instance, samples taken during the warmest month will have levels higher than samples taken during the coldest month. And a measurement taken at one point in a distribution system does not necessarily represent levels throughout the entire system or the level in an individual home.
- These data only give information on CWS. They do not give any information on all drinking water sources, as some individuals have private drinking water wells and some smaller water supplies are not required to do the same testing as CWS.
- The number of people served by a CWS is only an estimate, typically coming from census data, number of service connections, or customer billing lists. These estimates are not updated every year. The sampling regulatory framework is tiered. This means that systems are only required to update their population data as the system's population served changes enough to move into the next regulatory tier.
- These data provide limited ability to compare CWS because of differences in sampling schedules. Different community water systems test for DBPs more or less often based on how many people get water from that community water system, the source of the water for that system, and if testing has detected levels of DBPs above the EPA MCL in the past.
- These data do not tell us how much HAA5 or TTHM an individual person is actually exposed to. This depends on many things such as use of tap water, bottled water, and water at locations away from home.
- Elevated rates of certain health effects in areas with potentially higher exposure to HAA5 or TTHM in drinking water do not necessarily mean that these DBPs are causing that health outcome, for several reasons. First, comparison of water quality data to health measures is done at an aggregate level. There may be different factors contributing to the health of different individuals. Second, it should be noted that events occurring in the same geographic area do not mean one caused the other. Additional investigation is needed to identify the reasons for the health outcomes.

Keywords¹

Total trihalomethanes; 2950, Haloacetic acids (five); 2456, Disinfection byproducts; DBP; Environmental hazard; Environment; Water quality; Public water system; PWS; Community water systems; CWS; ground water; State drinking water dataset; National drinking water dataset; Safe drinking water act; SDWA; safe drinking water information system; SDWIS; MCL; MCL violations; Maximum Contaminant Level; public water supply ID; service area; primary source code

Bounding Coordinates²

¹ From CDC Tracking Program Metadata Creation Tool

West Bounding Coordinate: -90.418133999999995

East Bounding Coordinate: -82.418394000000006

North Bounding Coordinate: 48.189534000000002

South Bounding Coordinate: 41.696088000000003

Other Information on Data

Level of Geographic Detail: Statewide & Community Water System

Currentness Reference (when data were last updated): 03/09/2016

Frequency at which the data are updated: Annually

Data Status: Complete

Completeness Report

This dataset contains community water system records for the State of Michigan for the years 2012-2015. Data for the first quarter of 2012 are not available. These data are used to calculate summary measures of contaminants at the CWS level and do not include any non-community water systems. Community water systems are systems that provide year-round service to not less than 25 residents or not less than 15 units (e.g. cities, townships, apartments, mobile home parks, etc.). Non-community water systems include:

- Type II non-transient non-community public supplies that serve 25 or more of the same people for at least six months per year (e.g. schools),
- Type II transient non-community public supplies that serve 25 or more people (or 15 or more connections) for at least 60 days per year (e.g. campgrounds), and
- Type III public water supplies that serve less than 25 people and 15 connections, or operate for less than 60 days per year (e.g. very small apartment complexes).

This dataset only includes data for two Centers for Disease Control and Prevention (CDC) Tracking Program-required analytes – HAA5 and TTHM. MDEQ tracks many more analytes, and the Michigan portal will be updated as data become available in the Michigan SDWIS. The sampling data are complete for HAA5 and TTHM contaminants as of March 9, 2016.

Data Processing Description

The dataset was processed and created using data provided by MDEQ according to the instructions found in the CDC Standards for Nationally Consistent Data and Measures (NCDMs) within the Environmental Public Health Tracking Network, version 3.0, pages 106-161 (http://ephtracking.cdc.gov/docs/CDC_NCDM_v3.pdf). Data were queried by MDEQ staff from SDWIS.

² From CDC Tracking Metadata Creation Tool

- Sample-level detection limits were provided for the five top-used labs based on Lab ID. Those limits were used to create the most conservative detection limits for unknown labs (~4.9% of total sample results).
- Summary-level data were derived from the sample-level data using the guidelines in the How-To documentation provided by the National Tracking Program. For HAA5 and TTHM, annual mean and maximum concentration values and CWS-level quarterly mean concentration values were calculated using the Drinking Water Indicator Package developed by the Colorado EPHT program.
- CWSs were given contact addresses by MDEQ to represent the service area provided for by the system. These addresses were cleaned internally by the State of Michigan Department of Health and Human Services (MDHHS) and Center for Shared Solutions (CSS) and were standardized to postal standards using the ZP4 program. Addresses were batch geocoded into latitude and longitude coordinates using an ESRI ArcGIS Desktop Address Locator based on a composite of several base layers including: (1) All_Roads from the Michigan GeoRef Framework, (2) Census Tiger files, (3) ESRI North American Detailed Streets, and (4) navteq_here accessed internally by CSS. The ArcGIS default percentage was used to obtain a match. Both matched and tied results were counted as a match. The remaining unmatched addresses were matched via Google Maps. Note: The results do contain some records with missing addresses. Out of the 1,398 CWSs in the inventory dataset, 1,088 were matched with the address locator, 103 tied, and 105 were matched via Google Maps. The remaining 102 addresses were left as "missing." Michigan GeoRef coordinates were changed to latitude/longitude coordinates using ArcGIS Desktop. Missing data were coded according to the Tracking Network data dictionary.
- The dataset was cleaned and processed using SAS 9.3 to recode values of the county field to a 5-digit code (the first two digits were 26 [the state FIPS code] and the three remaining digits were the appropriate county code). For example, the County field value for Wayne County would change from "WAYNE" to "26163".
- "PrincipalCityFeatureID" was found by matching City Name to the codes provided at geonames.usgs.gov/domestic/download_data.htm. Ties were decided upon by whichever lat/long was closest to the address in the inventory dataset.
- Records were de-duplicated according to the February 4, 2016 How-To Guide for Drinking Water Quality NCDMs, Appendix F (page 15) by removing any duplicates with the same YearAssociatedTo and PWSID. One record was removed, leaving a total of 1,397 total CWS.

Access Constraints

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

Security Handling Description

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

Confidentiality of all data is required by law and strictly maintained by the Health Department staff. Section 2631 of the Public Health Code regulates procedures protecting confidentiality and regulating disclosure of data and records.

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, MDHHS disclaims any responsibility for source data, compilation and typographical errors and accuracy of the information that may be contained in these data.

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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 MDEQ. These data may not be used for commercial purposes without first obtaining written permission from the MDEQ.

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 via email or telephone (See Contact Information below).

Custom Order Process

For access to national and multi-state unrestricted or public use data, please see:

<http://ephtracking.cdc.gov>.

For more information or access to unrestricted or public use Michigan-specific data, please visit the [MDEQ community water supply website](#).

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