

# Michigan Total Pesticide Illnesses and Injuries

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## Abstract

The Michigan Department of Health and Human Services (MDHHS), Michigan Environmental Public Health Tracking Program (MiTracking) worked with the Michigan Pesticide Illness and Injury Surveillance Program to create a dataset that contains acute pesticide illnesses and injuries reported to the State of Michigan. The reported cases meet the surveillance case definition of a confirmed case to the National Public Health Surveillance System. A confirmed case includes a pesticide-exposed person who developed at least two symptoms after the exposure that are consistent with the known pesticide toxicology.

The data include the following measures:

- Crude rate of confirmed pesticide illnesses and injuries per 100,000 population.
- Number of confirmed pesticide illnesses and injuries.

These data are available by year for all Michigan residents and for two age groups: children under 6 years old and people 6 years and older. The U.S. Environmental Protection Agency (EPA) uses these two age groups to allow for a better understanding of younger children pesticide ingestion. Data are available from 2012 to the most recent year available.

This dataset is updated every year.

Case data are from the Michigan Pesticide Illness and Injury Surveillance Program. The National Institute for Occupational Safety and Health (NIOSH) funds Michigan State University College of Human Medicine's Division of Occupational and Environmental Medicine (MSU OEM) to conduct this surveillance program.

Michigan's Public Health Code requires health care providers (including Michigan's Poison Center and ambulance response units), health care facilities and employers to report to the state information about individuals with known or suspected pesticide poisoning. MDHHS has designated MSU to be its bona fide agent to receive and analyze these reports. As well, the surveillance system collects information on pesticide-exposed individuals who have been reported to the Pesticide and Plant Pest Management (PPPM) Division of the Michigan Department of Agriculture and Rural Development (MDARD). See Supplemental Information below for data reporting limitations.

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 public health professionals, researchers and the public with summary information on Michigan acute pesticide illnesses and injuries.

Pesticide poisoning is a potential public health threat due to widespread pesticide use. A pesticide is any substance or substance mixture used to prevent, destroy, repel, or reduce pests and the damage caused by pests.<sup>1</sup> Pests are living organisms that occur where they are not wanted or that cause damage or nuisance to crops, humans or other animals. Pests can include insects, weeds, fungi, rodents, and germs. The term pesticide includes insecticides, herbicides, fungicides, rodenticides, disinfectants, plant regulators/defoliants/desiccants and nitrogen stabilizers.

This dataset provides summary information on Michigan acute pesticide illnesses and injuries public health professionals, researchers and the general public.

### Supplemental Information

Pesticide poisoning is reportable under the Public Health Code (Part 56 of Act 368 of 1978 as amended and R 325.71-5). These two parts of the public health code require health care providers (including Michigan's Poison Center and ambulance response units), health care facilities and employers to report to the state information about individuals with known or suspected chemical poisoning and known or suspected occupational disease including pesticide poisoning. As well, the surveillance system collects information on individuals with pesticide exposures who have been reported to the PPPM Division of MDARD. The PPPM receives complaints about pesticide misuse and health effects. PPPM conducts investigations to address potential violations of pesticide laws as mandated. Other data sources include coworkers and worker advocates.

The potential for pesticides to harm people depends on the dose (amount, length of exposure and chemical concentration), the route of entry into the body (e.g., inhalation, eye[s], skin) and the toxicity of the pesticide. Pesticides have a toxicity range from low toxicity, through slightly toxic, moderately toxic, to very toxic. Pesticide products are often mixtures including one or more active ingredients. They also have inert ingredients that have no effect on the target pest but may have adverse human health effects.

#### *Data Limitations*

Pesticide illness and injuries reporting is likely to be incomplete for a number of reasons, including:

- Diagnosis of pesticide illness/injury is challenging because:
  - The pesticide toxicity symptoms can be the same as those that occur with common conditions such as allergies, acute conjunctivitis or acute gastrointestinal illness.<sup>2</sup>

- Health care providers receive limited education in the recognition and diagnosis of the toxic effects of pesticides. Patient evaluations may not consider pesticides.<sup>3</sup>
- Exposed individuals may not seek medical care for certain exposures or symptoms.
- Even when diagnosed, pesticide illnesses and injuries may not be reported due to worker and health care provider reluctance to involve state agencies, the providers' busy work schedules or lack of Public Health Code reporting knowledge.
- Migrant workers face additional barriers such as language difficulties, lack of access to care and job loss or deportation fears if they are not legal residents.<sup>4</sup>

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### Keywords

Pesticide; pesticide poisoning; pesticide exposure; insecticide; insecticide poisoning; insecticide exposure; herbicide; herbicide poisoning; herbicide exposure; disinfectant; sterilant; chlorine; pesticide-related illness

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### Bounding Coordinates

Geographically, all cases in this dataset occurred within 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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- Level of Geographic Detail: Statewide only.
  - Currentness Reference (when data were last updated): 3/12/2024.
  - Frequency at which the data are updated: Annually.
  - Data Status: Complete.

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### Completeness Report

The dataset includes counts of all reported cases of an acute pesticide-related illness or injury occurring in Michigan for the years 2012 through the most recent year available that met criteria for "confirmed case."<sup>5</sup>

Crude rates will lag one year behind counts due to a lag in population data.

Incidents where a person did not call Michigan's Poison Center or seek medical care would not be reported. In addition, the reported cases may not include all the cases that sought treatment.

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## Data Processing Description

**Data Source and Inclusion Criteria:** The Michigan Pesticide Illness and Injury Surveillance Program receives acute pesticide exposure reports from health care providers (including Michigan’s Poison Center and ambulance response units), health care facilities, employers, MDARD, worker advocates, and workers. Reports are then evaluated, and if they meet the case definition for a confirmed case established by NIOSH<sup>5</sup>, this dataset includes them.

NIOSH funds the surveillance program.

### Case Definition:

In brief, a person who has been exposed to a known pesticide and develops two or more signs or symptoms after that exposure that could be related to the exposure based on known toxicology is considered a confirmed case.

Reported cases are classified based on criteria related to (1) work exposure documentation (2) adverse health effects documentation, and (3) evidence supporting a causal relationship between pesticide exposure and health effects. The possible classifications are definite, probable, possible, suspicious, unlikely, insufficient information, and exposed but asymptomatic. Cases classified as definite, probable, possible or suspicious are considered confirmed cases and are included in this dataset.

See the detailed case definition document<sup>5</sup> for the criteria matrix for classifying cases and additional details.

### Rate Calculations:

Crude rates per 100,000 population were calculated by dividing the number of confirmed cases by the population using the Census Bureau Annual Estimates of the Resident Population by Single Year of Age and Sex: April 1, 2020 to July 1, 2022 for Michigan ([State Population by Characteristics: 2020–2023](#)) and multiplying by 100,000. Specific ages were not collected for most cases, so age-adjusted rates were not calculated.

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## Access Constraints

There are no access constraints for data available through the MiTracking Data Portal.

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## Use Constraints

All users are recommended to 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 Michigan Pesticide Illness and Injury Surveillance Program for the MiTracking Program for the purposes of compiling, integrating and disseminating environmental hazard, exposure, and health effects data. MDHHS specifically disclaims responsibility for any analyses, interpretations, or conclusions made by those who access this information.

These data remain the property of the Michigan Pesticide Illness and Injury Surveillance Program. They cannot be used for commercial purposes and shall not be used to engage in any method, act, or practice to conduct the solicitation of 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).

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### **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. Section 2631 of the Public Health Code regulates procedures protecting confidentiality and disclosure of data and records.

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### **Distribution Liability**

The Michigan Environmental Public Health Tracking Program 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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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 MiTracking Program.

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### Custom Order Process

For more information or access to unrestricted or public use Michigan-specific data, see [MSU OEM Pesticide Illness and Injury](#).

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