

# 2022 Michigan Substance Use Vulnerability Index Documentation

Updated May 6<sup>th</sup>, 2024

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## Background and Public Health Implications

### Background

Overdose and substance use disorder (SUD) are significant and complex public health problems in Michigan. Between 1999 and 2020, all drug overdose deaths in Michigan increased sixfold.<sup>1</sup> In recent years, significant federal and state funding has been released to address the overdose crisis, and programs and policies aiming to reduce substance use and overdose have expanded. When considering resource allocation and program expansion for overdose, data are crucial to ensure accurate and equitable targeting of interventions. Historically, overdose death data alone have often been used for policy and program planning. However, many factors beyond overdose deaths influence a community’s burdens of, and vulnerability to, adverse outcomes associated with substance use and should be considered in program and policy planning.

### Purpose

With this in mind, in 2020 MDHHS developed the Michigan Substance Use Vulnerability Index (MI-SUVI) as a tool to help guide equitable SUD program and policy decision-making. The MI-SUVI was created to consider the diverse factors that influence a community’s vulnerability related to substance use. The MI-SUVI is a single, standardized score that considers multiple factors that influence a community’s vulnerability related to substance use, including indicators related to substance use burden, resources, and social vulnerability.

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<sup>1</sup> Michigan Substance Use Disorder Data Repository, Michigan Department of Health and Human Services, <https://mi-suddr.com/blog/2021/07/13/all-drug-overdose-deaths/>

The first MI-SUVI was released with 2020 data and will be updated every 2 years. As the overdose crisis is ever-evolving, the MI-SUVI methodology may change as well, designed to best measure a community's vulnerability at that time.

The MI-SUVI score is standardized and available at the county and ZIP Code Tabulation Area (ZCTA) levels. Counties/ZCTAs can be assessed by how far above or below the county/ZCTA average they fall in the total MI-SUVI score, as well as in their substance use burden, substance use resources, and social vulnerability scores.

### Public Health Implications and Considerations

**All communities in Michigan are impacted by substance use.** The MI-SUVI does not describe “good” or “bad” communities with regards to substance use, but rather indicates the extent to which a county has been impacted in comparison to others. The MI-SUVI should not be used alone in decision-making but can be used as a strategic starting point for conversation and to highlight the extent to which certain communities may require further outreach or assessment. **Additional information, such as local knowledge and additional, relevant data indicators should be included in any SUD-related decision-making.**

### Guiding Principles

The development of the MI-SUVI was guided by the following core principles:

1. Health equity was prioritized in how the tool was developed by giving social vulnerability equal weighting to burden and resource components.
2. This tool was created with its end goal in mind: usefulness in allocation of resources and program planning.
3. Stakeholder feedback from policy, programmatic, and data partners, as well as individuals with lived experience, was a crucial part of the development process to ensure the tool's relevance, usefulness, and useability.
4. The methodology for creating this score is data-driven, informed by scientific literature, reviewed by experts, and simple enough that it can be understood by the average Michigander.
5. The final version of this tool, and its methodology, is publicly available, so that any interested party or stakeholder can easily access the report for informed decision-making.
6. The tool will be available at the county-level and at least one sub-county geographic level.

The MI-SUVI is available at: [Michigan.gov/OpioidsData](https://Michigan.gov/OpioidsData). Questions regarding the MI-SUVI may be addressed to the MDHHS Opioid and Emerging Drugs Unit: [MDHHS-MODASurveillance@michigan.gov](mailto:MDHHS-MODASurveillance@michigan.gov).

## 2022 Data Updates and Considerations

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The MI-SUVI is a tool that will be regularly evaluated and updated by the MODA surveillance team. When new SUVU data years are released, updates may occur to the data inclusion criteria or the included data indicators based on the evolving drug and substance use landscape, and the MODA surveillance team's knowledge of statistical and methodological best practices.

The 2022 MI-SUVI is an update to the originally published 2020 MI-SUVI and includes updated data.

While no changes were made to the overall methodology, the inclusion criteria for the arrest rate was updated slightly to be more precise, making the 2022 estimates not comparable to the 2020 estimates. The 2022 MI-SUVI represents the most updated and accurate data indicators at the time of publishing.

Further, in the 2020 MI-SUVI analysis, the out-of-state hospital Aurora Medical Center Bay Area was included in the county-level calculations but was not included in the ZCTA-level calculations. In the 2022 MI-SUVI analysis, Aurora Medical Center Bay Area was included in both the county and ZCTA-level calculations, as many Menominee county overdose patients seek care at the Aurora Medical Center Bay Area hospital in Wisconsin. This change will primarily affect the **49858** ZIP code in **Menominee**.

It is not recommended to compare 2022 MI-SUVI data to 2020 MI-SUVI data to assess trends between the two periods as the final MI-SUVI score is a Z-score, which is based on a comparison to the county or ZCTA mean. The MI-SUVI is meant to be used as point-in-time measure to inform current policy and programmatic planning, rather than for trend analysis. Historical data that can be used to assess trends in substance use and overdose over time can be found at [Michigan.gov/OpioidsData](https://Michigan.gov/OpioidsData) on the dashboard, in public use datasets, and in the reports below the dashboard.

## Methodology

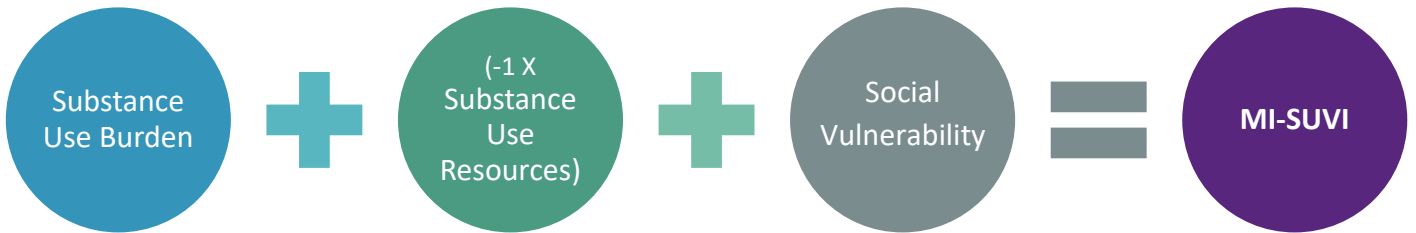
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### Framework overview

The MI-SUVI uses a composite index score (CIS) methodology to aggregate indicators and create the final, standardized score. The framework for the MI-SUVI score is as follows:

1. The outcome of interest for the CIS is a community's vulnerability to adverse substance use outcomes (referred to as the MI-SUVI).
2. The composite MI-SUVI score consists of the following **three equally weighted components** known to affect substance use disorder and overdose at the individual and community level (Figure 1):
  - a. **Substance Use Burden:** negative outcomes associated with SUD that place a burden on individuals and community resources such as the healthcare and justice systems.
  - b. **Substance Use Resources:** resources available to the community that can be used to address the negative outcomes associated with SUD.
  - c. **Social Vulnerability:** a measure of community level characteristics known to be important drivers of health (i.e., social determinants of health).
3. Each of the three components consists of relevant indicators. These indicators are equally weighted *within* the corresponding component.
  - a. Included indicators are standardized by mean and standard deviation (i.e., Z-scores were generated for each indicator; see "Final MI-SUVI Model" and "MI-SUVI Results" sections for explanation of Z-scores and their interpretation).
  - b. Indicators are then divided by the total number of indicators in the component and summed together within the component.
  - c. The resource component is then inverted,  $(-1 \times \text{Resource Z-score})$ , so that a higher score represents a worse outcome (fewer resources), and then the three components are summed together.

**Figure 1.** Overview of MI-SUVI Framework



## MI-SUVI Model

Eight indicators are included in the Michigan MI-SUVI. Figure 2 represents the final model including these eight indicators:

**Figure 2.** Final MI-SUVI Model with Included Indicators\*

### *Substance Use Burden*

$$= \left[ \left( \frac{OD\ Death\ Rate + Nonfatal\ OD\ Emergency\ Healthcare\ Visit\ Rate + Opioid\ Prescribing\ Rate + Drug\ Related\ Arrest\ Rate\ †}{4} \right) \right]$$

### *Substance Use Resources*

$$= \left[ -1 \times \left( \left( \frac{(\% \text{ of population within 30 Min Drive of Treatment Center} + \% \text{ of population within 15 Min Drive of SSP} + Buprenorphine\ Prescribing\ Rate)}{3} \right) \right) \right]$$

*Social Vulnerability* = [Modified Social Vulnerability Index]

$$MI - SUV I = Substance\ Use\ Burden + Substance\ Use\ Resources + Social\ Vulnerability$$

†Drug-related arrest rate is only included in the county-level MI-SUVI score. Drug-related arrest rate is not included in the ZCTA-level MI-SUVI score.

## Standardization Methodology

Before summing indicators within components, indicators are standardized to Z-scores. Z-scores standardize a set of data points based on the mean and standard deviation of the data spread. Z-scores can be used to take data indicators on different scales (ex. overdose deaths and opioid prescription units) and put them on the same, comparable scale. The following is an example of how a Z-score is calculated for a county:

$$\frac{[\text{County "A" Overdose Rate}] - [\text{Mean County Overdose Rate}]}{[\text{Standard Deviation of County Overdose Rates}]}$$

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**County "A" Overdose  
Z-Score**

The component data indicator Z-scores are added together within the component and then divided by the total number of indicators in the component. After then adding the three component scores together, the summed score is then standardized to a Z-score to form the final MI-SUVI score. Here, the mean does not indicate ideal but serves as a reference point. For more information on interpreting Z-scores, see the [Results section regarding MI-SUVI interpretation](#).

### Included Data Indicators

Table 1 below summarizes how included indicators were calculated for inclusion in the model.

**Table 1.** Indicators included in the MI-SUVI, indicator case definitions, and calculation descriptions

Indicators	Numerator Case Definition	Calculation
5-Year Average Overdose Death Rate per 100,000 Residents	Death certificates with an underlying cause of death ICD-10 Code of: X40-X44, X60-X64, X85 or Y10-Y14, by Decedent Residence	(Overdose Deaths among Residents / Resident Population) x 100,000
3-Year Average Nonfatal Overdose Emergency Healthcare Visit Rate per 100,000 Residents <sup>a</sup>	Emergency healthcare visits with an ICD-10-CM diagnosis code of: T36-T50, limited to initial visits for poisonings, by Patient Residence	(Nonfatal Overdose Emergency Healthcare Visits among Residents / Resident Population) x 100,000
Opioid Prescription Units Prescribed per 1,000 Residents	Prescription Units of Opioid Agonists and Partial Agonists Not Used for OUD Treatment, by Patient Residence	(Opioid Prescription Units Dispensed among Residents / Resident Population) x 1,000
Drug Related Arrest Rate per 100,000 Residents	Offences Listed as Drug Related Occurring in and Arrested in Year of Interest by Area of Occurrence	(Arrests for Drug Related Offences Occurring in Area / Resident Population) x 100,000
Percent of Population within 30 Minute Drive of Publicly Funded Treatment Center	Populations of Census Tracts Within a 30 Minute Drive Time Polygon of Geocoded Treatment Center Locations <sup>b,c</sup>	(Number of Residents within 30 Minute Drive of Treatment Center / Total Resident Population) x 100
Percent of Population within 15 Minute Drive of SSP	Populations of Census Tracts Within a 15 Minute Drive Time Polygon of Geocoded SSP Locations <sup>b,c</sup>	(Number of Residents within 15 Minute Drive / Total Resident Population) x 100
Buprenorphine Prescription Units Prescribed per 1,000 Residents	Prescription Units of Buprenorphine, by Patient Residence	(Buprenorphine Prescription Units Dispensed among Residents / Resident Population) x 1,000
Social Vulnerability Index	<i>See "Social Vulnerability Index" Section Below</i>	

**Abbreviations:** OD=Overdose, ICD-10(-CM)=International Classification of Disease, 10th Revision, (Clinical Modification), OUD=Opioid Use Disorder

**Denominator/Population Data:** County-level denominator and population data use National Center for Health Statistics Single-Race estimates, 2018-2022, vintage 2022. ZCTA-level denominator and population data use American Community Survey 5-year estimates of the total population (variable: S0601\_C01\_001E), 2018-2022.

**Crude Rate:** A crude rate is defined as the total number of events, or count, divided by the total population of the selected geography and multiplied by a constant, here, that constant is 100,000.

<sup>a</sup> Emergency healthcare visits were restricted to Michigan hospitals and emergency departments, but included one out-of-state hospital directly across the border in Wisconsin: Aurora Medical Center Bay Area. Approximately 40% of Menominee overdose patients sought care at this Wisconsin medical center between 2018-2022, and therefore Aurora Medical Center Bay Area (WI) was included to accurately capture non-fatal overdoses among Menominee county residents.

<sup>b</sup> Drive time polygons created using the HereR package in R

<sup>c</sup> SSP and SUD treatment centers along borders of states adjacent to Michigan were considered in drive-time analyses.

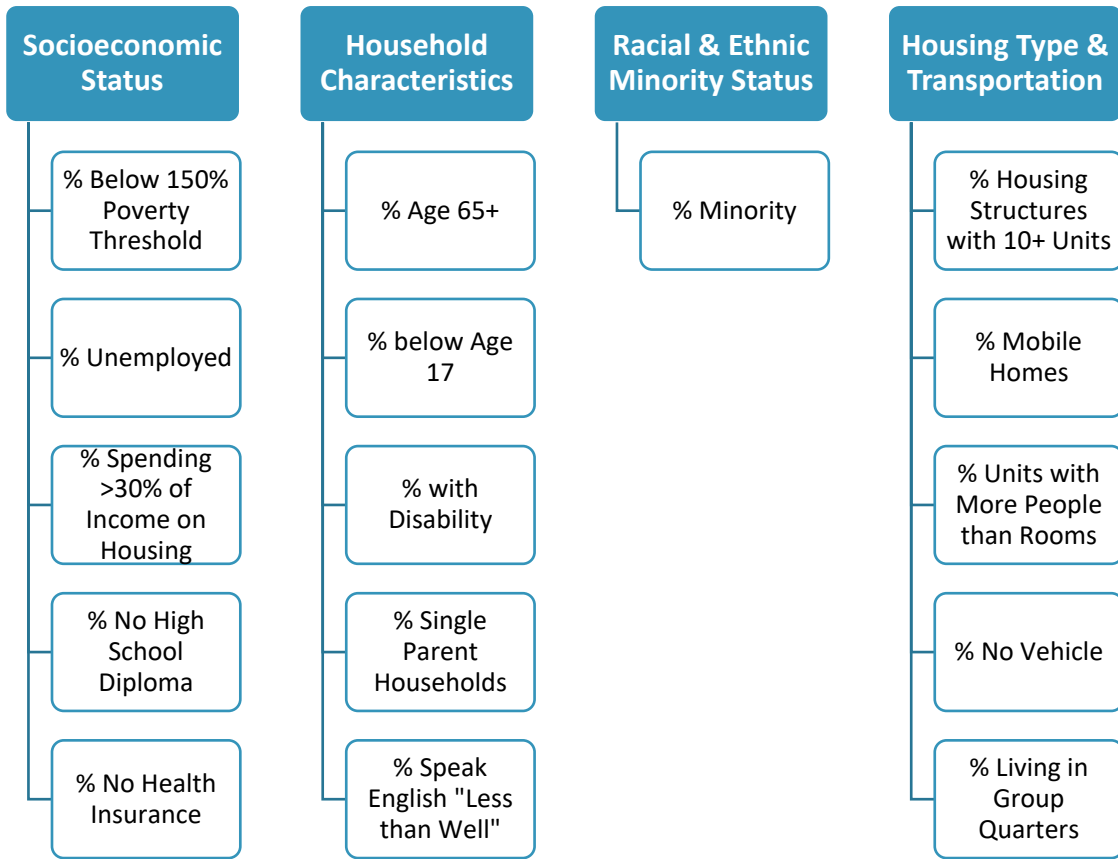
## Social Vulnerability Index

The Social Vulnerability Index (SVI) is a composite indicator created by the Centers for Disease Control (CDC) that assesses indicators of social vulnerability (social characteristics of communities that can lead to negative effects on community health and welfare) to identify communities that may be at higher risk during disasters.<sup>2</sup> Sixteen census variables are a part of the SVI score, making up four “themes” (see Figure 3). Indicators within each theme are standardized by percentile rank, and then added together within themes to create the composite theme score. To create the SVI score, the theme composite scores are summed and then standardized to percentile rank. Relevant indicators are inverted.

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<sup>2</sup> CDC/ATSDR Social Vulnerability Index, Centers for Disease Control and Prevention, <https://www.atsdr.cdc.gov/placeandhealth/svi/index.html>

**Figure 3. CDC Social Vulnerability Index Themes and Indicators**



The CDC SVI was modified in the following ways to incorporate it into the MI-SUVI:

1. SVI indicators were standardized to Z-scores before summing, rather than percentile ranks, to match the MI-SUVI standardization methodology.
2. A fifth theme relating to “Healthcare Connectedness” was added to the SVI, composed of the following data:

**Healthcare Connectedness**

- % without computer with broadband internet access
- % of population within 30 minute drive of acute care hospital\*
- % of population within 15 minute drive of pharmacy\*

\*Hospitals/pharmacies along borders of states adjacent to Michigan were included.

With the above three changes incorporated, this indicator is referred to in the final MI-SUVI model as the “modified SVI”.

## Sub-County MI-SUVI Data: ZIP Code Tabulation Areas

The MI-SUVI is available at the sub-county ZIP Code Tabulation Area (ZCTA) level. This section details the MI-SUVI ZCTA analysis methodology.

### *ZIP Codes and Zip Code Tabulation Areas*

ZIP Code Tabulation Areas (ZCTAs) are geographic representations of ZIP codes created by the Census Bureau and are approximations of ZIP code mailing route boundaries. ZIP codes are not geographic areas but are rather a collection of mailing addresses associated with post office service routes. Thus, ZCTAs were used as the unit of analysis for the MI-SUVI. The majority of ZTCAs in Michigan are the same as ZIP codes (992/1158 (86%) of ZIP codes in Michigan in 2022 matched the Census assigned ZTCA value).

### *MI-SUVI ZIP Code Methodology*

Fatal overdose, nonfatal overdose, opioid prescribing, buprenorphine prescribing, and drug-related arrest data all include ZIP code of residence information. These ZIP codes were converted to ZCTAs using the Uniform Data Systems 2022 ZIP Code to ZCTA crosswalk.<sup>3</sup> These data were then aggregated to the ZCTA level. Rates were calculated using ACS 5-year total population estimates (variable S0601\_C01\_001E) by ZCTA as denominators. SUD treatment and SSP access variables and modified SVI were calculated using ACS data at the ZCTA level.

ZCTA data were standardized and consolidated into the composite MI-SUVI score using the same methodology as county-level scoring, apart from the exclusion of drug-related arrest data (see “Missing/Excluded ZIP Code Data” for rationale).

### *Missing/Excluded ZIP Code Data*

ZIP code information was missing or invalid:

- on average, in 1% of death records per year from 2018-2022 in the 5-year fatal overdose rate
- on average, in <0.1% of emergency healthcare visit records per year from 2020-2022 in the 3-year nonfatal overdose emergency healthcare visit rate
- <0.01% of the time in opioid and buprenorphine prescription unit data in 2022
- 27% of the time in the 2022 drug-related arrest data
  - In 2022, the percent of arrests missing ZIP Code information was assessed by county to determine if ZIP code missingness was random or systematic across counties. This comparison determined that missingness was not at random, with certain counties substantially more impacted by missingness than others (missingness ranged from 0% to 100%).
  - Due to the high level of missingness, and the non-uniform missingness by county, drug-related arrest data were not included in MI-SUVI calculations by ZCTA.

Between 2018-2022, 10 ZCTAs stopped existing and 20 ZCTAs were created. These changes reflect changes in postal routes during this timeframe. These changes have the potential to impact ZCTA MI-SUVI estimates as populations are re-distributed between newly created or merged ZCTAs. Most of these changes involved very small geographic areas with small numbers of residents, but three ZCTA changes were determined to be substantial (see next paragraph). All three of these ZCTAs were newly

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<sup>3</sup>ZIP Code to ZCTA Crosswalk, UDS Mapper, <https://udsmapper.org/zip-code-to-zcta-crosswalk/>



created in 2021 and did not have 0 population, 0 housing units or 0 households. For the 2022 MI-SUVI ZCTA analysis, these three ZCTAs were converted back into the ZCTA that previously captured the geographic area of the newly created ZCTAs for all data indicators apart from the SVI (for SVI data calculations, the original ZCTA data was used and the new ZCTA's data was dropped). The three affected ZCTAs and the ZCTA they were converted to are listed below:

- 49784 was converted to 49788
- 49696 was converted to 49686
- 49685 was converted to 49684

To determine the impact of the ZCTAs deletion/creation, the new or former ZCTA that captured most of the ZCTA was found, and the estimated % of the ZCTA population that was affected by the deletion/creation of the impacted ZCTA was calculated. If the percent of the population impacted was >10%, and the ZCTA also did not have 0 households or 0 housing units, the impact was considered substantial enough to redistribute the ZCTA's data as outlined above.

All other ZCTAs that had 0 population within the past five years (2018-2022) or that had 0 population, 0 households, or 0 housing units in 2022 were excluded from the analysis (25 ZCTAs codes: 49263, 49666, 49764, 49819, 49258, 49084, 49434, 48862, 49430, 49443, 49409, 48410, 49063, 48620, 48143, 48859, 48233, 48242, 48243, 48397, 48551, 48553, 48710, 48825, 49104). 968 ZCTAs remained for analysis after this exclusion.

Five ZCTAs had insufficient samples to calculate an estimate of the percent of population unemployed in the SVI calculations (48411, 48630, 49434, 49722, 49877). For these five ZCTAs, the Michigan median unemployment percent by ZCTA was assigned as an imputation.

#### *ZIP Code Tabulation Area Considerations*

ZIP codes are subject to changes as postal routes change, which may cause discrepancies between the known area of the ZIP code and the ZCTAs included for analysis in this workbook.

## MI-SUVI Results

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MI-SUVI results are available on [Michigan.gov/OpioidsData](https://Michigan.gov/OpioidsData) in the following formats:

1. Maps of the results, county profiles, and comparisons of indicators used to build the MI-SUVI are available on the [Michigan Overdose Data to Action dashboard](#).
2. An Excel document of the raw data used to create the score, as well as the final MI-SUVI statistics, ranks, and percentile ranks is available for download below the dashboard (for both county and ZCTA data).

### MI-SUVI Year

The current version of the MI-SUVI is based on 2022 data. The MI-SUVI will be released on a bi-annual basis (every two years), and the 2024 version of the MI-SUVI will be released once all data sources have complete 2024 data (typically at the end of the following calendar year).

### Interpretation

The final MI-SUVI score is presented as a **Z-score**. Z-scores are used to standardize an indicator by the mean and standard deviation of the data and measure how far above or below average the indicator is.

The MI-SUVI score for a county measures how far above or below the average county substance use vulnerability a county is. For example, if County X has a MI-SUVI score of 2.5, this means that the County X's MI-SUVI score is 2.5 times above the average county MI-SUVI score. If County Y has a MI-SUVI score of 0.1, this means that County Y's MI-SUVI score is comparable to the county average. County X is substantially higher in substance use vulnerability than County Y, which is approximately average in substance use vulnerability. Similarly, the MI-SUVI score for a ZCTA measures how far above or below the average ZCTA substance use vulnerability a ZCTA is. All counties/ZCTAs are impacted by SUD; this index does not describe "good" vs "bad" counties/ZCTAs for SUD interventions or imply that the county/ZCTA average is a sufficient goal to strive for, but rather indicates the extent to which a county/ZCTA has been impacted *in comparison to* other counties/ZCTAs.

A Z-score is a relative measure tied to a mean that provides information regarding how counties/ZCTAs compare to each other. To assess "improvement" in an area, each indicator can be tracked over time for the given area. For example, decreases in the Drug Related Arrest Rate or Overdose Death Rate statistic would represent an "improvement" for that area. A reduction in the county's Drug Related Arrest Rate Z-score or Overdose Death Rate Z-score does not necessarily mean an "improvement" occurred in that area; rather, it means that the specific county's estimate became closer or farther away from the Michigan county average.

MI-SUVI counties/ZCTAs data are also available as a rank (county: 1 to 83, ZCTA: 1 to 968), with 1 being the most vulnerable county and 83/968 being the least vulnerable county, and as a percentile rank (1-100), with higher percentiles corresponding to a higher MI-SUVI score and being more vulnerable.

## Data Limitations

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### General MI-SUVI Limitations

As mentioned in the executive summary, the MI-SUVI is not meant to be the sole consideration for decision-making in the SUD space. The MI-SUVI is a starting point for discussing how to equitably allocate resources and choose communities for interventions. As such, the MI-SUVI should be used in conjunction with local data, subject matter expertise and additional relevant data indicators in decision-making. All components and indicators that make up the MI-SUVI are available to view in the dashboard and Excel document of results; these individual indicators are additionally important to consider when planning programs and policies.

Additionally, the individual indicators that comprise the MI-SUVI have limitations that may have implications for MI-SUVI interpretation in communities. Please see below limitations of the included indicators and take them into account in any decision-making.

### Included Data Indicator Limitations

#### 5-Year Fatal Overdose Rate

This indicator may not be reflective of the most recent trends in fatal overdoses in communities, as it is a 5-year average and more likely to measure historical trends in overdose. Additionally, some rates may have small numerators (1-5), which may lead to unstable results. A 5-year average was chosen to create more stability in estimates with small numerators, but some communities may still have unstable results with small numerator counts.

### **3-Year Non-Fatal Overdose Emergency Healthcare Visit Rate**

This indicator may not be reflective of the most recent trends in non-fatal overdoses in communities, as it is a 3-year average and more likely to measure historical trends in overdose. One major hospital in Washtenaw County does not report emergency healthcare visit data. This likely leads to under-reporting of nonfatal overdoses in Washtenaw County and should be taken into consideration when interpreting Washtenaw County data. Additionally, these data measure healthcare visits, not individuals, and an individual may be in the dataset multiple times if they sought care in an emergency department or hospital for overdose multiple times during the 3-year period. This dataset does not capture non-fatal overdoses that did not present to an emergency department or hospital for care.

### **Opioid Prescription Units Rate**

This indicator is only able to measure the amount of opioids being prescribed to a community, not how many opioids are being inappropriately used or diverted. It cannot capture illicit opioid use, and it does not capture other drug prescriptions besides opioids that may be diverted or misused.

### **Drug-Related Arrest Rate**

This indicator may not capture all drug-related arrests if the drug-related incident occurred in 2022 but the individual was not officially arrested until after 2022. If an individual was arrested on multiple charges, the individual will only appear in the dataset for the more serious offense. Therefore, individuals who were arrested for both a drug-related offense and a more serious offense are not included in this indicator. Additionally, more arrests can be the result of more policing in areas, or bias in certain populations or communities, and not necessarily indicative of greater drug presence in those populations/communities.

### **Treatment Access Percentage**

This indicator only captures proximity to publicly funded treatment centers, not private treatment facilities. Different types of treatment centers (residential vs detox vs outpatient) are not reported separately in this indicator.

### **SSP Access Percentage**

This indicator presents SSPs as static locations, but some SSPs are mobile. In these cases, effort was taken to denote a specific location for each area the SSP served, but it is possible that not all locations serviced by a mobile SSP were captured in this data indicator. This indicator additionally does not stratify by types of services and interventions available by various SSPs.

### **Buprenorphine Prescription Units Rate**

This indicator is only able to measure buprenorphine in communities as an indicator of medication for opioid use disorder (MOUD) treatment; methadone clinics and methadone as MOUD data are not available for analysis in the MI-SUVI. Research has found that buprenorphine is more likely to be prescribed in white, higher SES communities, while methadone is more available in lower income and Hispanic communities.<sup>4</sup> This bias may skew the MI-SUVI resources results.

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<sup>4</sup> Hansen, H.B., Siegel, C.E., Case, B.G, et al. Variation in use of Buprenorphine and Methadone Treatment by Racial, Ethnic and Income Characteristics of Residential Social Areas in New York City.  
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3818282/>

## Modified SVI

This indicator heavily relies on American Community Survey (ACS) data, which are survey data, and is not based on an exact census of every household in the United States. As these data are survey estimates, uncertainty exists in the estimates included in the SVI. While survey estimates likely approximate true estimates, this uncertainty should be considered, particularly at smaller geographic levels than county. Further, for geographic groupings larger than a census tract, communities become less homogenous in terms of demographics and socioeconomic status. This allows for the possibility of aggregating data for dissimilar groups in a single geography and could obscure socially disadvantaged groups in certain areas.

## ZCTA Limitations

ZCTAs are geographic representations of ZIP code postal routes, which can change over time. This may lead to discrepancies between ZIP codes available in the MI-SUVI analysis and the true ZIP code associated with an address. Additionally, as ZCTAs are based on mailing routes and are not based on neighborhood or population characteristics, ZCTAs may be comprised of non-homogenous populations, which may obscure disparities in groups within ZCTAs when data are aggregated (see ZCTA methodology section for explanation on why ZCTAs were chosen).

## MI-SUVI Suggested Citation

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Michigan Department of Health and Human Services. (2024). Michigan 2022 Substance Use Vulnerability Index (Version 1). [Data file]. Retrieved from: [Michigan.gov/OpioidsData](https://michigan.gov/OpioidsData).

## Contact Information

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If you have questions regarding the MI-SUVI, please reach out to the MDHHS Opioid and Emerging Drugs Unit: [MDHHS-MODASurveillance@michigan.gov](mailto:MDHHS-MODASurveillance@michigan.gov).

## Development and 2020 Data

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For more information about the development process of the SUVVI, see the 2020 MI-SUVI documentation available at: [Michigan.gov/OpioidsData](https://michigan.gov/OpioidsData). 2020 MI-SUVI data can also be found at: [Michigan.gov/OpioidsData](https://michigan.gov/OpioidsData) under “Historical Reports” section. The following links can be used to download these documents:

[2020 MI-SUVI Documentation](#)

[2020 County MI-SUVI Results](#)

[2020 ZCTA MI-SUVI Results](#)