

Michigan Chronic Disease Map Portfolio

A collection of
Geographic
Information System
(GIS) Maps
Developed by a
Chronic Disease GIS
Team



The purpose of this document is to share maps that have been developed by a Michigan Chronic Disease Geographic Information System (GIS) team. The training was provided by the Centers for Disease Control and Prevention Division for Heart Disease and Stroke Prevention in collaboration with The University of Michigan Children’s Environmental Health Initiative and the National Association of Chronic Disease Directors. The GIS trainings focused on building GIS capacity for chronic disease prevention and treatment in State Health Departments. http://www.cdc.gov/dhdsp/programs/gis_training.htm

The maps included in this Portfolio are a reflection of the range of work done following the GIS training. These are being shared to provide ideas for public health colleagues. Maps reflect a range of data such as mortality, hospitalization, behavioral, program, and survey data. The maps included are considered living documents that change with new questions and data; then are revised or updated as relevant. Each map in this portfolio has an explanation of the original question that led to the development of the map, data sources for the map, and how the map was used in program planning and/or evaluation. To check to see if a more recent version is available contact the author of the map whose information is listed below.

Michigan Chronic Disease GIS Team

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The GIS Team also received support from Cassie Larrieux, Ed Hartwick, and Sarah Rockhill.

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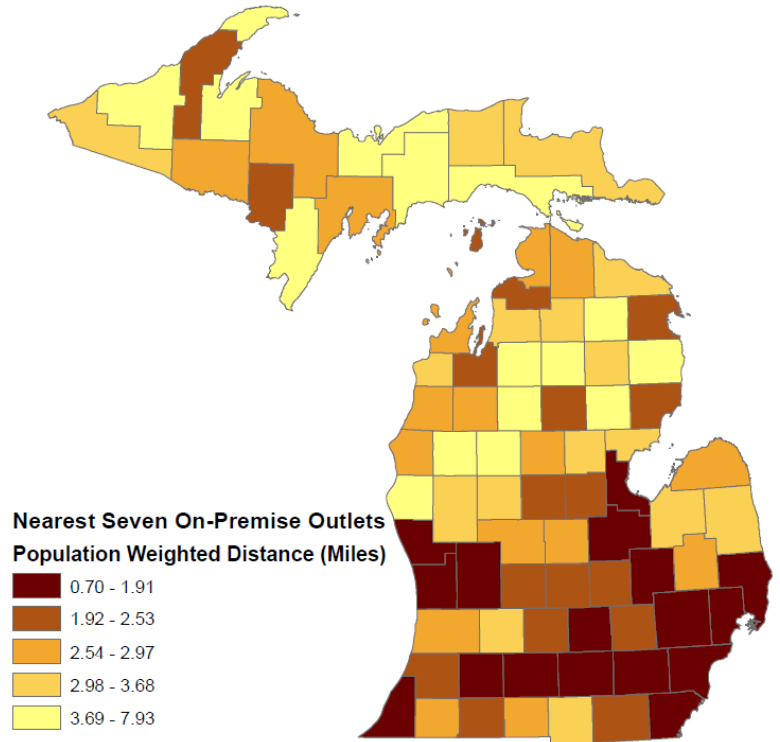
Population-Weighted Distance to the Nearest Seven On-Premise Alcohol Outlets by County in Michigan, 2012

Author: Hannah Jary **Date:** 2014

Question: Which counties in Michigan have high accessibility to on-premise alcohol outlets?

Data Source: Michigan Liquor Control Commission licenses, 2012, weighted with the 2010 Census populations

Interpretation/Use: This map shows counties with a higher density of on-premise alcohol outlets, such as bars and restaurants, in darker colors. Areas with higher availability of alcohol through increased outlet density may be targets for excessive alcohol consumption prevention strategies.



Data Source: Michigan Liquor Control Commission liquor license list, 2012

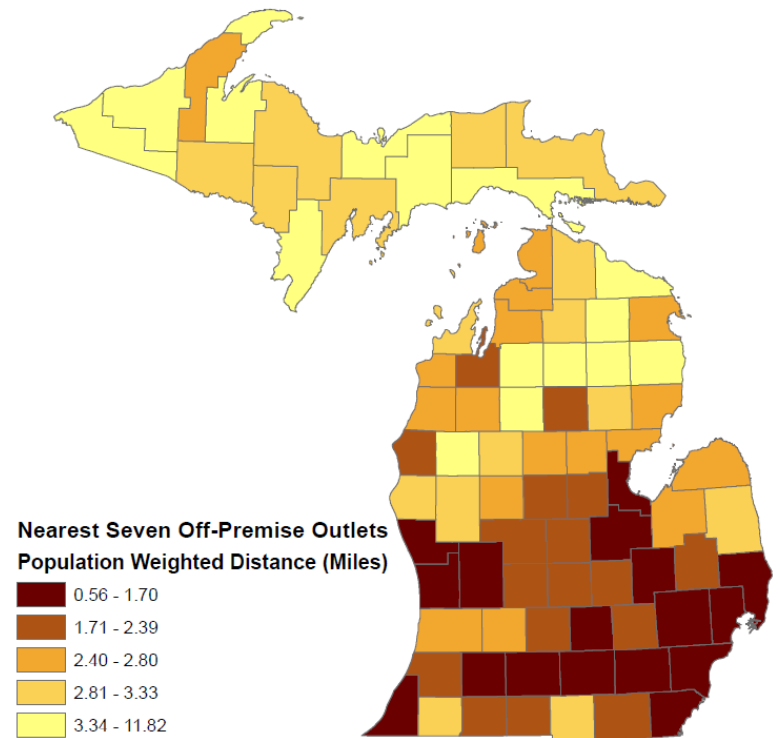
Population-Weighted Distance to the Nearest Seven Off-Premise Alcohol Outlets by County in Michigan, 2012

Author: Hannah Jary **Date:** 2014

Question: Which counties in Michigan have high accessibility to off-premise alcohol outlets?

Data Source: Michigan Liquor Control Commission licenses, 2012, weighted with the 2010 Census populations

Interpretation/Use: This map shows counties with a higher density of off-premise alcohol outlets, such as liquor stores, in darker colors. Areas with higher availability of alcohol through increased outlet density may be targets for excessive alcohol consumption prevention strategies.



Data Source: Michigan Liquor Control Commission liquor license list, 2012

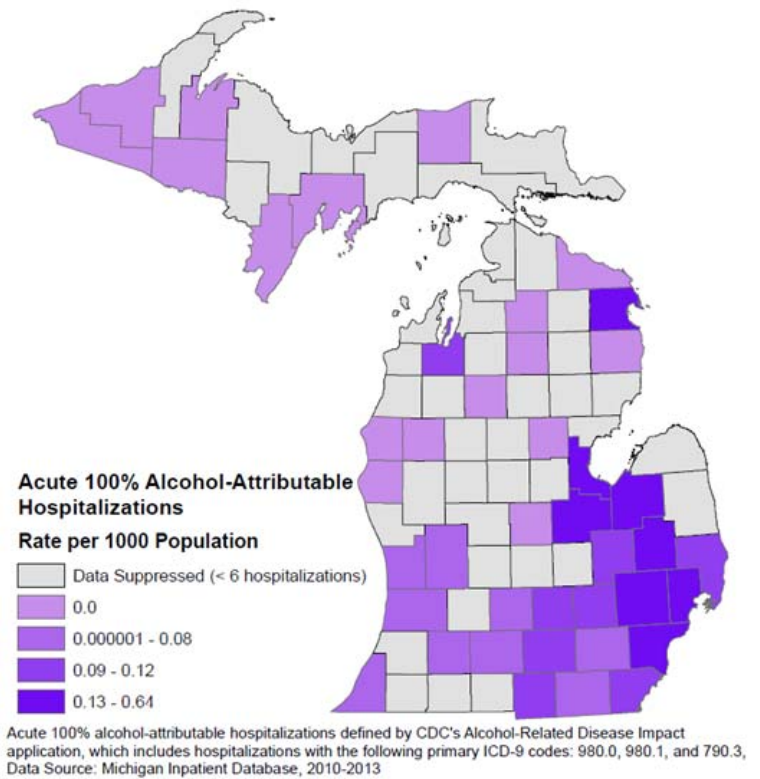
Acute 100% Alcohol-Attributable Hospitalization Rate per 1000 Population, by County in Michigan, 2010-2013

Author: Hannah Jary **Date:** 2015

Question: Which counties in Michigan have high rates of acute 100% alcohol-attributable hospitalizations?

Data Source: Michigan Inpatient Database, 2010-2013

Interpretation/Use: This map shows counties whose residents have a higher rate of acute 100% alcohol-attributable hospitalization rate in darker colors. Areas with higher hospitalization rates may be targets for excessive alcohol consumption prevention strategies.



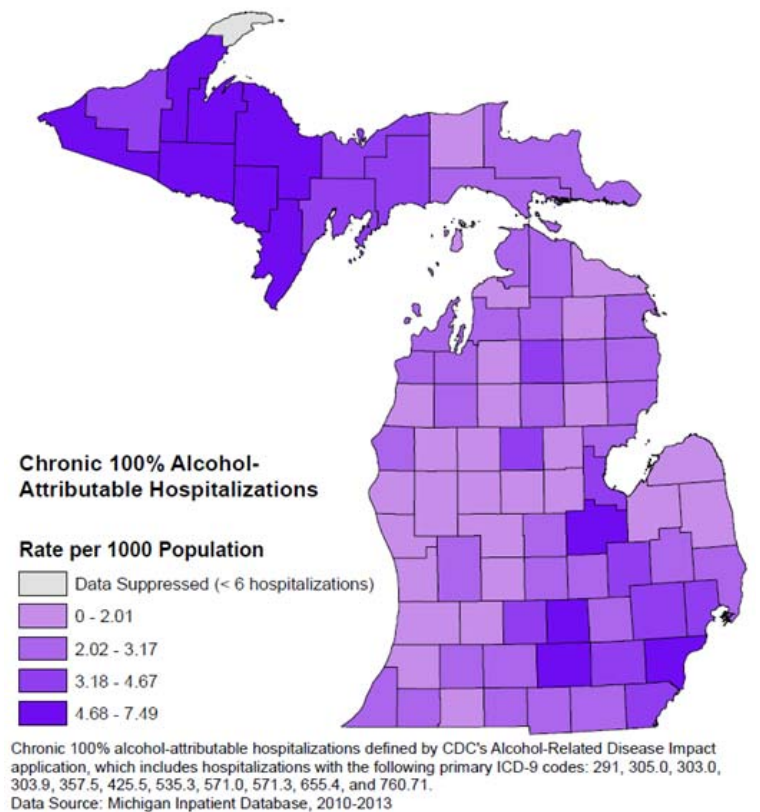
Chronic 100% Alcohol-Attributable Hospitalization Rate per 1000 Population, by County in Michigan, 2010-2013

Author: Hannah Jary **Date:** 2015

Question: Which counties in Michigan have high rates of chronic 100% alcohol-attributable hospitalizations?

Data Source: Michigan Inpatient Database, 2010-2013

Interpretation/Use: This map shows counties whose residents have a higher rate of chronic 100% alcohol-attributable hospitalization rate in darker colors. Areas with higher hospitalization rates may be targets for excessive alcohol consumption prevention strategies.



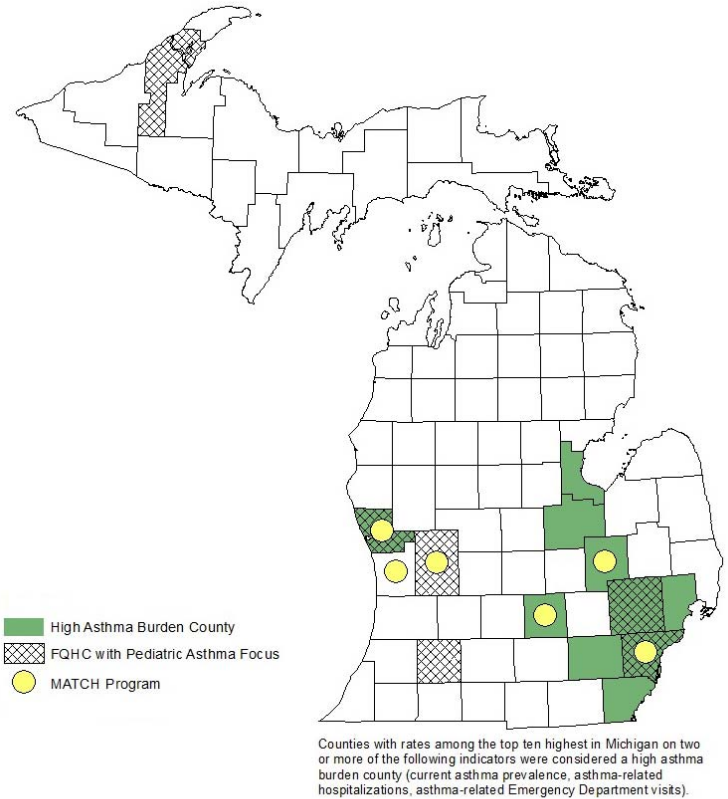
Michigan High Asthma Burden Counties, with Pediatric Asthma Focus FQHC and MATCH Program Locations

Author: Beth Anderson **Date:** 2015

Question: Where should asthma programs be placed in Michigan that have the most need?

Data Source: Behavioral Risk Factor Survey, Michigan Inpatient Data Base, Medicaid and program locations

Interpretation/Use: Three sources of asthma burden data were utilized to identify the counties with the highest asthma burden in Michigan. The sites used for this map included FQHCs with a Pediatric Asthma Focus and MATCH programs. The FQHCs, already in high-burden areas and serving high-risk clients, self-selected a focus on pediatric asthma as part of participation in a new MPCA grant.



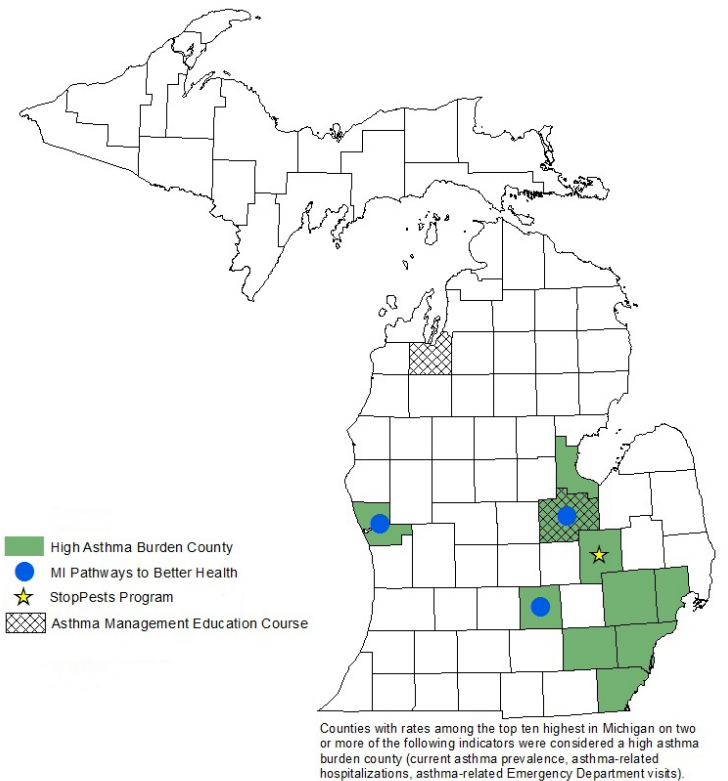
Michigan High Asthma Burden Counties, with Michigan Pathways to Better Health, StopPests Program and Asthma Management Education Course Locations

Author: Beth Anderson **Date:** 2015

Question: Where should asthma programs be placed in Michigan that have the most need?

Data Source: Behavioral Risk Factor Survey, Michigan Inpatient Data Base, Medicaid and program locations

Interpretation/Use: Site selection for the Asthma Management Education courses was determined by high-burden area (Saginaw) and at the request of partners (Traverse City). Michigan Pathways to Better Health sites were determined by their three-year CMS Innovation project proposal. StopPests Program site was selected based on partner involvement, and housing commission interest and capacity.



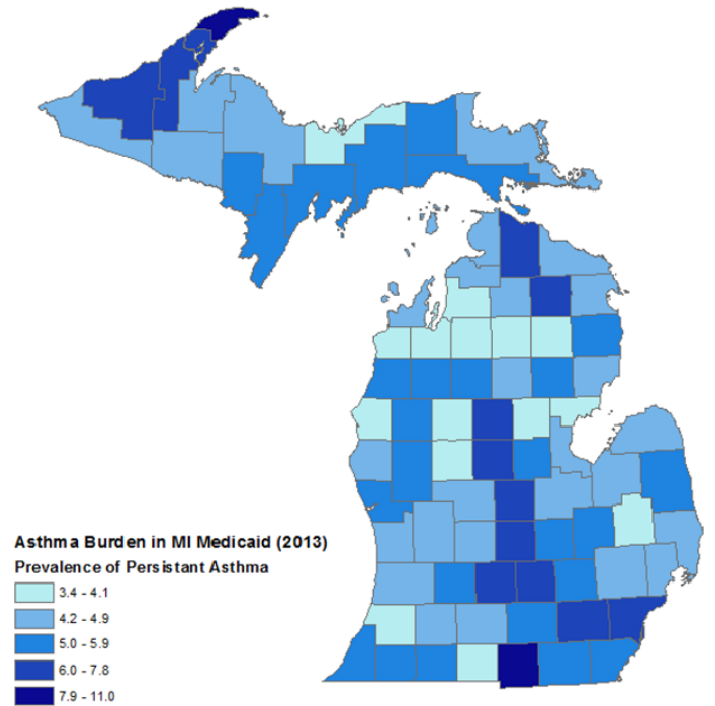
Prevalence of Persistent Asthma by County of Residence, Children (≤ 17 years), Medicaid, Michigan, 2013

Author: Erika Garcia **Date:** 2014

Question: What counties in Michigan have high age-adjusted rates of persistent asthma among the pediatric population in Medicaid?

Data Source: Prepared by the MDHHS Lifecourse Epidemiology and Genomics Division with source data from the Michigan Medicaid Data Warehouse. HEDIS® ASM specification applied annually to define persistent asthma.

Interpretation/Use: Asthma is one of the most common chronic disorders in childhood. This map is used by the State Asthma Program to identify areas of high asthma burden among the Michigan Medicaid population.



2013 Data Notes: Prepared by the Michigan Department of Community Health, Lifecourse Epidemiology & Genomics Division with source data from the Michigan Medicaid Data Warehouse, 2013. Age-adjusted to the 2000 U.S. Standard Population. Medicaid population of children 17 years and younger is restricted to those with continuous Medicaid enrollment (11+ months), full Medicaid coverage, and no other insurance.

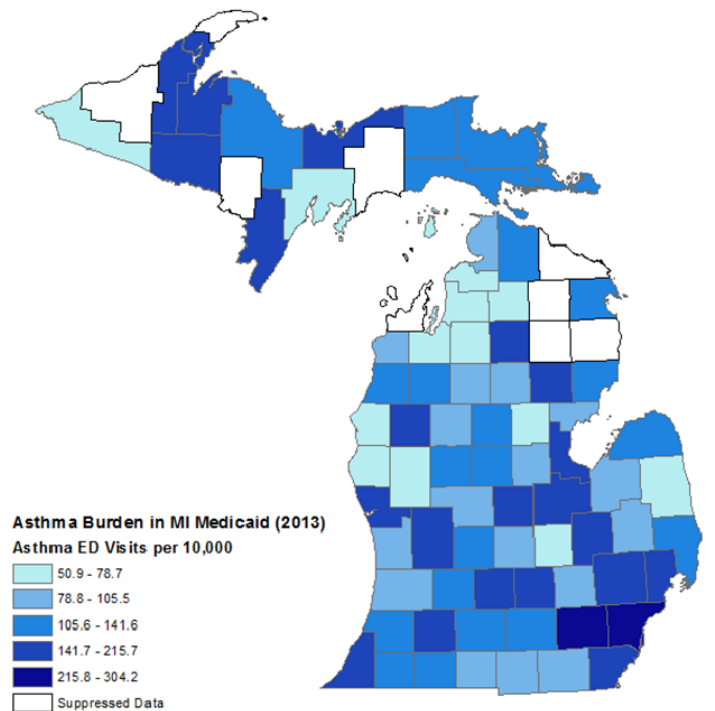
Rate of Asthma Emergency Department Visits per 10,000, Children (≤ 17 years), Medicaid, Michigan, 2013

Author: Erika Garcia **Date:** 2014

Question: What counties have a high age-adjusted rate of asthma emergency department visits among children with persistent asthma in Michigan Medicaid?

Data Source: Prepared by the MDHHS Lifecourse Epidemiology and Genomics Division with source data from the Michigan Medicaid Data Warehouse. HEDIS® ASM specification applied annually to define persistent asthma and emergency department visits.

Interpretation/Use: A high asthma emergency department rate can be viewed as an indication that a healthcare system (i.e., providers, public health agencies, schools, insurers, community programs, parents, etc.) could benefit from improved communication, coordination, and primary care access.



2013 Data Notes: Prepared by the Michigan Department of Community Health, Lifecourse Epidemiology & Genomics Division with source data from the Michigan Medicaid Data Warehouse, 2013. Age-adjusted to the 2000 U.S. Standard Population. Medicaid population of children 17 years and younger is restricted to those with continuous Medicaid enrollment (11+ months), full Medicaid coverage, and no other insurance.

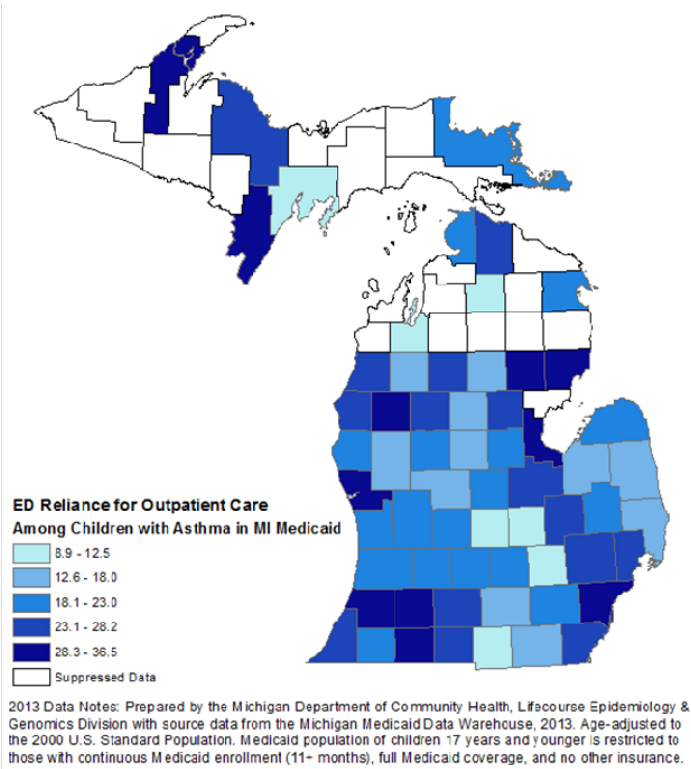
Rate of Emergency Department Reliance, Children (≤17 years) with Persistent Asthma, Medicaid, Michigan, 2013

Author: Erika Garcia **Date:** 2014

Question: What counties have a high age-adjusted rate of emergency department reliance for asthma among children with persistent asthma in Michigan Medicaid?

Data Source: Prepared by the MDHHS Lifecourse Epidemiology and Genomics Division with data from the Michigan Medicaid Data Warehouse. HEDIS® ASM specification applied annually to define persistent asthma and emergency department and outpatient visits.

Interpretation/Use: Emergency department reliance is an indicator of primary care utilization within a hospital setting as opposed to a doctor’s office. For those with at least one outpatient or ED visit, this indicator is calculated by dividing the total number of emergency department visits by the sum of ED visits plus outpatient visits [EDcount/(EDcount + OPcount)].



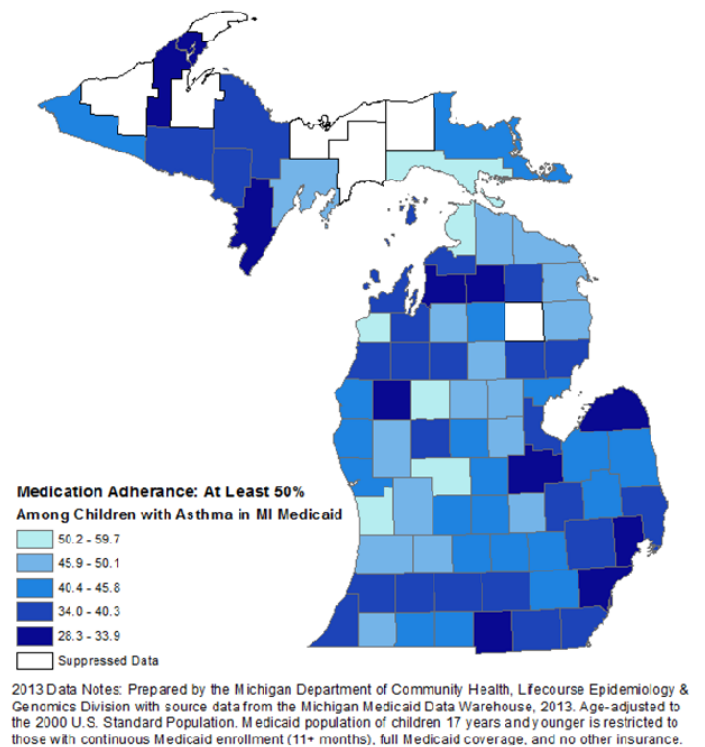
Percent of Children (≤17 years) with Persistent Asthma Who Remained on an Asthma Controller Medication for at Least 50% of Their Treatment Period, Medicaid, Michigan, 2013

Author: Erika Garcia **Date:** 2014

Question: What counties in Michigan have low age-adjusted rates of medication adherence among the pediatric asthma population in Medicaid?

Data Source: Prepared by the MDHHS Lifecourse Epidemiology and Genomics Division with source data from the Michigan Medicaid Data Warehouse HEDIS® MMA specification applied annually to define persistent asthma and medication use.

Interpretation/Use: An asthma controller medication taken on regular basis has been shown to improve disease outcomes. In 2013, 36.4% children in Michigan Medicaid with persistent asthma had an asthma controller for at least 50% of their treatment period.



Estimated Michigan Breast and Cervical Cancer Control Program (BCCCP) Eligible Women by County since Enrollment Started for the Healthy Michigan Plan (HMP)

Author: Mike Carr

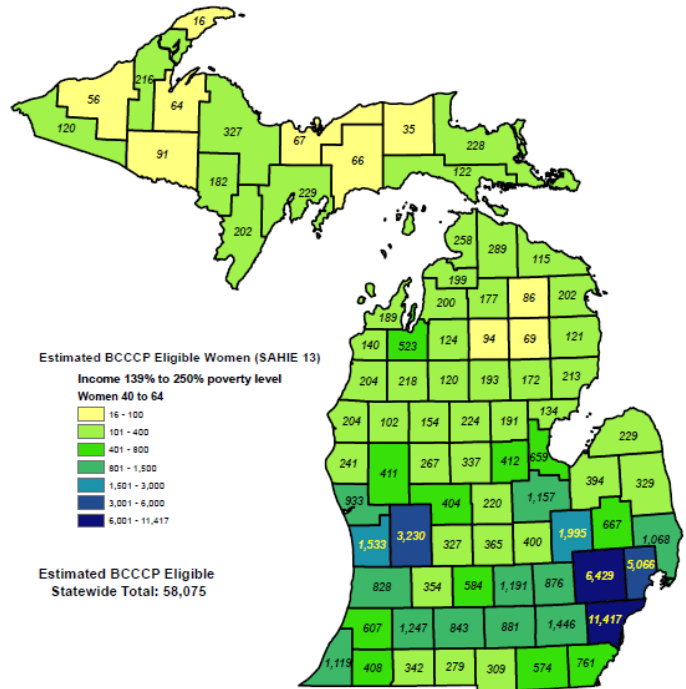
Date: 2015

Question: What is the estimated eligible population for Michigan BCCCP women (age 40-64) based on the 139% to 250% Federal Poverty Level (FPL) range from the Small Area Health Insurance Estimates (SAHIE)?

Data Source: Small Area Health Insurance Estimates (SAHIE) joint CDC-Census project.

<https://www.census.gov/did/www/sahie/data/>

Interpretation/Use: The map shows the number of women eligible for services in the BCCCP independent from the HMP. This is equivalent to women at 139% to 250% FPL. HMP is intended to serve women less than or equal to 138% FPL. SAHIE is currently the only source for this data.



Michigan BCCCP Eligible Women by Sub-county Regions (Grand Rapids Area)

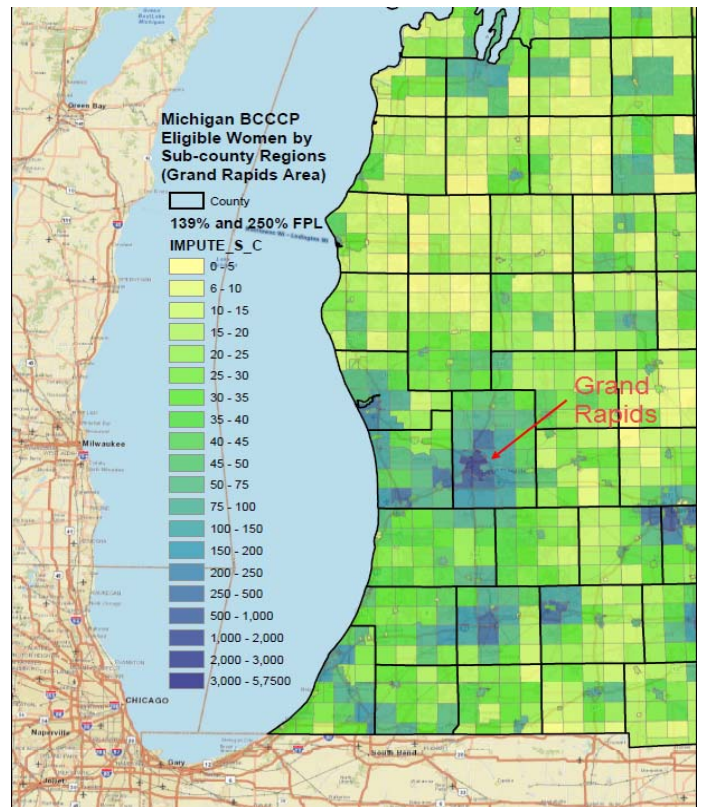
Author: Mike Carr

Date: 2015

Question: SAHIE data are only provided at the county level. What if we take age eligible population estimates of women from sub-county areas and impute SAHIE data onto those smaller regions?

Data Sources: SAHIE joint CDC-Census project. American Community Survey 2013 (5 year) estimates of population by sex and age. Michigan Center for Shared Solutions Township and City Data, version 10a.

Methods/Interpretation: ACS data by township area was determined for women age 40-64 by combining smaller age group categories. ACS calculation data was linked to corresponding township geography using county, type (township or city), and area name. Using the ACS data calculations, the proportion of women in each township compared to its county was determined. County level data from SAHIE was then imputed to township/city regions based on the computed proportions. As expected, this method distinguishes rural areas from populated areas within counties, producing greater geographic variability than the original SAHIE data.



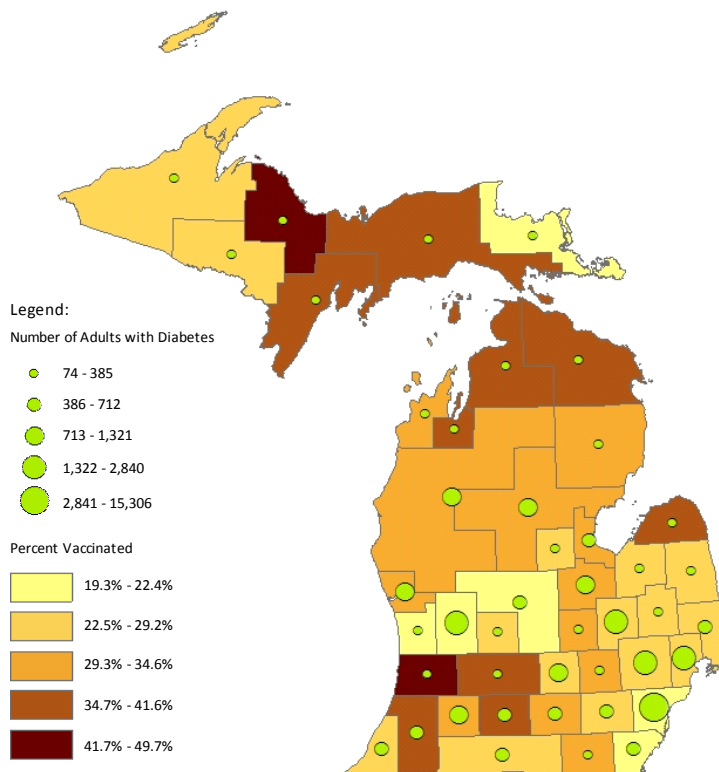
Number of Adults with Diabetes (18-64 yrs) and Percent Who Received Influenza Vaccine, Medicaid, Local Health Departments in Michigan, August 1, 2011 to March 31, 2012

Author: Michelle Byrd Date: 2015

Question: What percent of adult Medicaid beneficiaries with diabetes were vaccinated during the 2012 influenza season?

Data Source: Michigan Medicaid Data Warehouse

Interpretation/Use: This map provides the number of adult beneficiaries with diabetes and percent who received a vaccine during the 2012 influenza season. Local health departments can use this data for an estimation of vaccination coverage among adults Medicaid recipients with diabetes in their jurisdiction.



The diabetes definition was based on 2012 Health Plan Employer Data Information Set (HEDIS®) criteria of paid claims or encounters with ICD-9-CM diagnosis codes (250, 357.2, 362.0, 366.41, 648.0) in either calendar year encompassed by influenza season. Adults were 18-64 years, fully covered by Medicaid, but no other insurance during at least the 8-month time period of influenza season. Receipt of influenza vaccine was based on paid claims/encounters indicating the administration of vaccination during influenza season. These results cannot be generalized to adults with diabetes and other insurance, uninsured, or not continuously enrolled in Medicaid during the eight-month period.

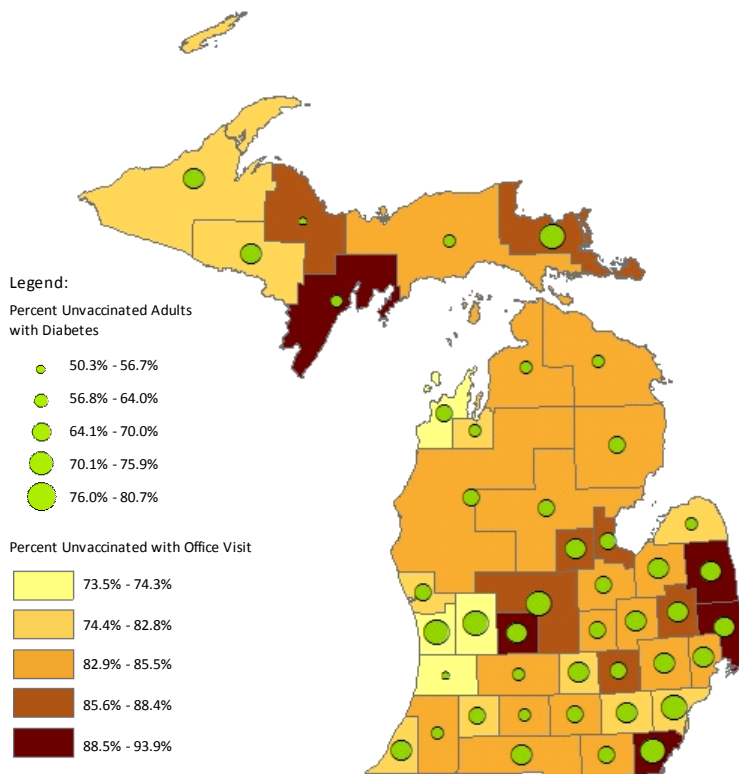
Percent of Unvaccinated Adults with Diabetes (18-64 yrs) and Percentage of Them Who Had a Primary Care Office Visit, Medicaid, Local Health Departments in Michigan, October 2011 to February 2012

Author: Michelle Byrd Date: 2015

Question: Are there missed opportunities for adult Medicaid beneficiaries with diabetes to receive the influenza vaccine?

Data Source: Michigan Medicaid Data Warehouse

Interpretation/Use: This map provides the percent of adult Medicaid beneficiaries with diabetes who did not have paid claims/encounters indicating that they received the influenza vaccine during the 2012 season and percent who had an office visit during the peak of the season. These data inform local health departments that opportunity exists at office visits for health professional to counsel and press the need for patients to receive the influenza vaccine.



The diabetes definition was based on 2012 Health Plan Employer Data Information Set (HEDIS®) criteria of paid claims or encounters with ICD-9-CM diagnosis codes (250, 357.2, 362.0, 366.41, 648.0) in either calendar year encompassed by influenza season. Adults were 18-64 years, fully covered by Medicaid, but no other insurance during at least the 8-month time period of influenza season. Receipt of influenza vaccine was based on paid claims/encounters indicating the administration of vaccination during influenza season. Office visit was based on 2012 HEDIS®-adapted definition for visits between October of previous year and February of following year. These results cannot be generalized to adults with diabetes and other insurance, uninsured, or not continuously enrolled in Medicaid during the eight-month period.

Percent of Hypertension Among Adults (18-64 years) living with a Disability, Medicaid, Michigan, 2012

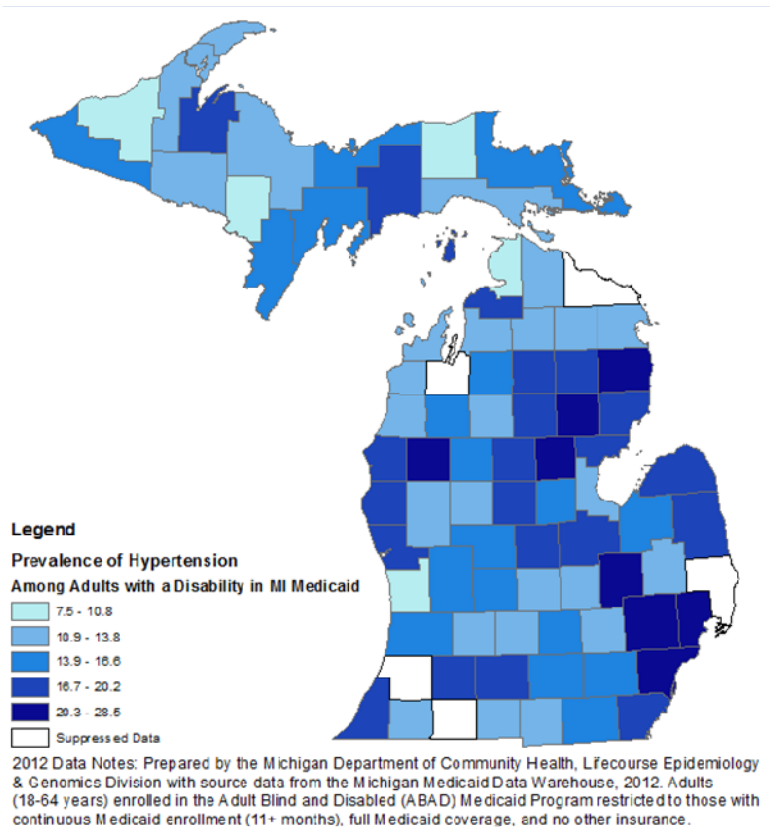
Author: Erika Garcia

Date: 2014

Question: What counties in Michigan have a high rate of hypertension among the adult MI Medicaid population enrolled in the Adult Blind and Disabled Program (ABAD).

Data Source: Prepared by the MDHHS Lifecourse Epidemiology and Genomics Division with source data from the Michigan Medicaid Data Warehouse. HEDIS® CBP specification applied annually to define hypertension.

Interpretation/Use: Hypertension is an important contributor to the burden of disease, disability and death. Measuring and understanding potential disparities in hypertension rates within the ABAD population as well as between ABAD and the non-disabled adult population in MI Medicaid is an important quality metric.



Percent of Cardiovascular Disease Among Adults (18-64 years) living with a Disability, Medicaid, Michigan, 2012

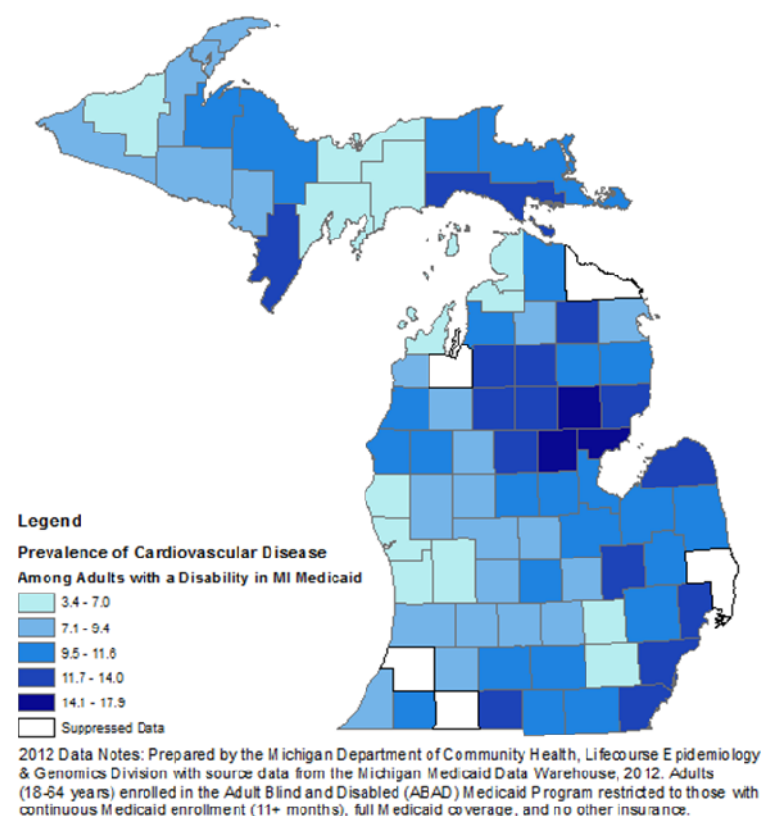
Author: Erika Garcia

Date: 2014

Question: What counties in Michigan have a high rate of cardiovascular disease among the adult MI Medicaid population enrolled in the Adult Blind and Disabled Program (ABAD).

Data Source: Prepared by the MDHHS Lifecourse Epidemiology and Genomics Division with source data from the Michigan Medicaid Data Warehouse. HEDIS® CMC specification applied annually to define cardiovascular conditions.

Interpretation/Use: In Michigan, cardiovascular disease is the top cause of death with the State ranking 8th worst for cardiovascular disease mortality. Measuring and understanding potential disparities in cardiovascular disease rates within the ABAD population as well as between ABAD and the non-disabled adult population in MI Medicaid is an important quality metric.



Hospitals Participating in Michigan's Ongoing Stroke Registry to Accelerate Improvement in Care (MOSAIC) Program, 2015

Author: Adrienne Nickles **Date:** 2015

Question: Where are hospitals participating in MOSAIC located?

Data Source: Michigan's Ongoing Stroke Registry To Accelerate Improvement in Care (MOSAIC) Program

Interpretation/Use: This map is used by MOSAIC and partners to identify areas where MOSAIC hospitals are located, and to determine priority areas for hospital recruitment. Twenty-five hospitals are currently participating in the program. This map will be updated as MOSAIC participation increases and will be shared with partners.



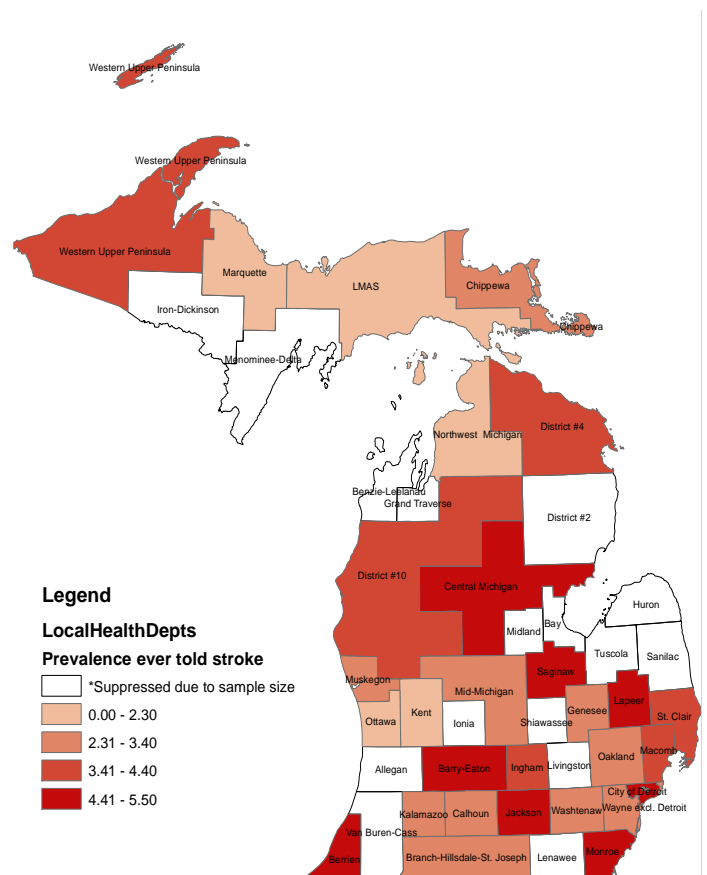
Prevalence of Adults in Michigan who had ever been told by a Doctor that they had a Stroke, by Local Health Department Jurisdiction, 2011-2013

Author: Adrienne Nickles **Date:** 2015

Question: What local health department jurisdictions in Michigan have high prevalence of adults reporting that they have had a stroke?

Data Source: Michigan Behavioral Risk Factor Surveillance System, 2011-2013.

Interpretation/Use: This map is used by MDHHS to identify areas with higher prevalence of adults who reported ever having a stroke. Fourteen local health department jurisdictions were above the overall state prevalence. This map will be updated and presented to Heart Disease and Stroke Prevention partners as updated data become available.



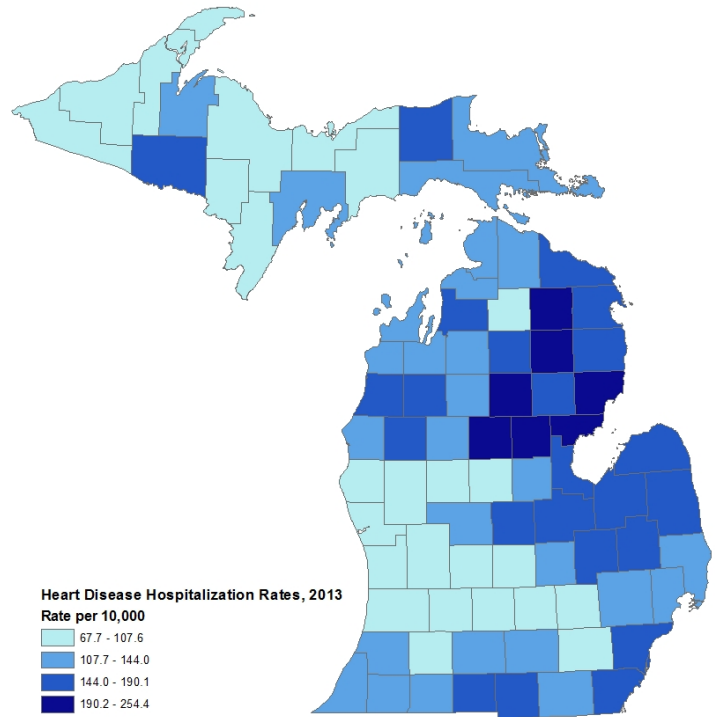
Heart Disease Hospitalization Rates by County, 2013

Author: Kara Wise **Date:** 2015

Question: Which counties in Michigan have the highest hospitalization rates of heart disease?

Data Source: Michigan Resident Inpatient Files, Division for Vital Records and Health Statistics, Michigan Department of Health and Human Services.

Interpretation/Use: This map shows the highest hospitalization rates by county throughout Michigan. This information can be used to target program interventions for the Heart Disease and Stroke Prevention Unit to reduce cardiovascular disease as well as hypertension.



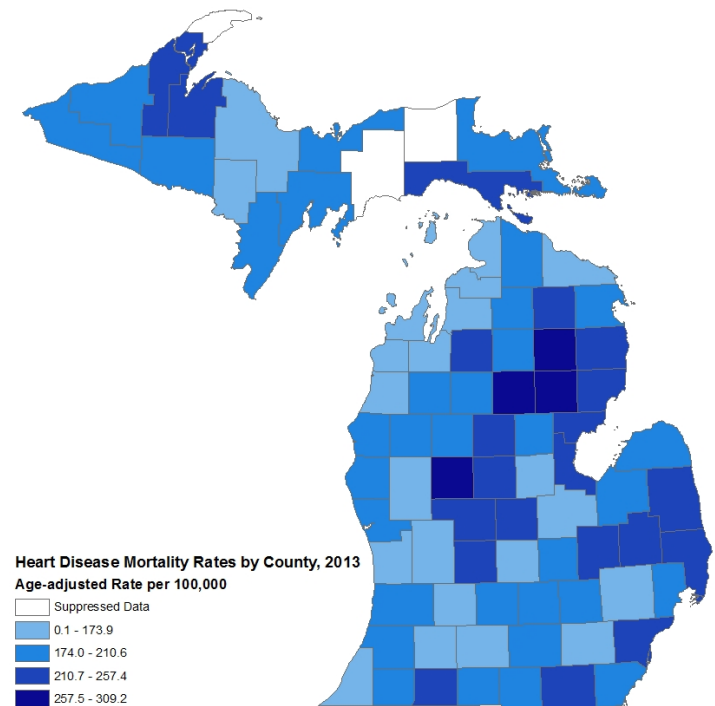
Age-adjusted Heart Disease Mortality Rates by County, 2013

Author: Kara Wise **Date:** 2015

Question: Which counties in Michigan have the highest mortality rates of heart disease?

Data Source: 2013 Michigan Death Certificate Registry. Division for Vital Records & Health Statistics, Michigan Department of Health and Human Services; Population Estimate, National Center for Health Statistics.

Interpretation/Use: This map shows the highest age-adjusted mortality rates by county throughout Michigan. This information can be used to target program interventions for the Heart Disease and Stroke Prevention Unit to reduce cardiovascular disease as well as hypertension.



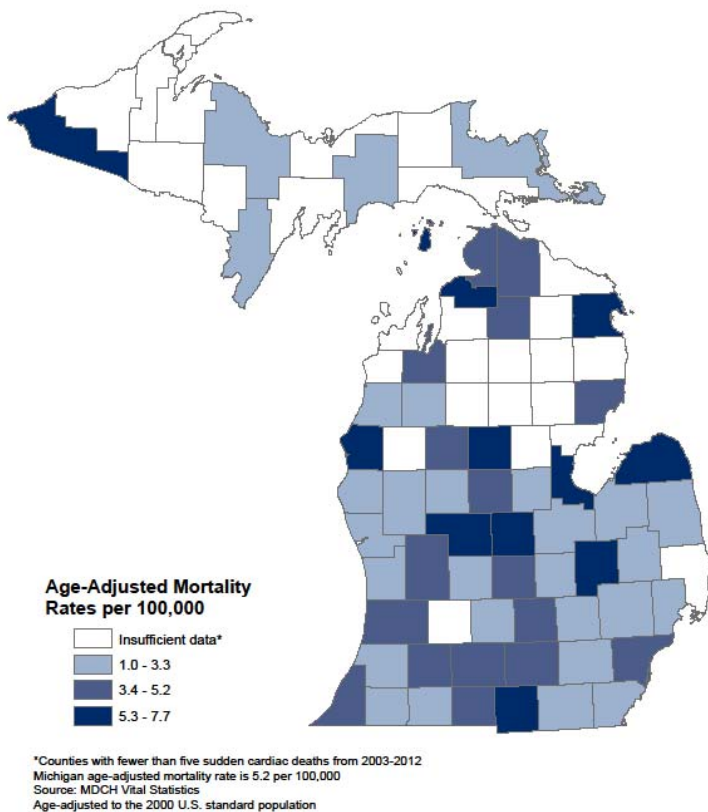
Age-Adjusted Mortality Rates of Sudden Cardiac Death of the Young among Michigan Residents, Ages 1-39 by County of Residence, 2003-2012

Author: Beth Anderson **Date:** 2014

Question: What counties in Michigan have high age-adjusted rates of sudden cardiac death of the young?

Data Source: MDHHS Vital Statistics, 2003-2012.

Interpretation/Use: This map is used by MDHHS to identify areas with higher mortality rates of sudden cardiac death of the young. Eleven counties were above the state rate. This map was originally published in the report *Too Young to Die: The Impact of SCDY in Michigan 1999-2008* and has been updated and presented to partners every few years.



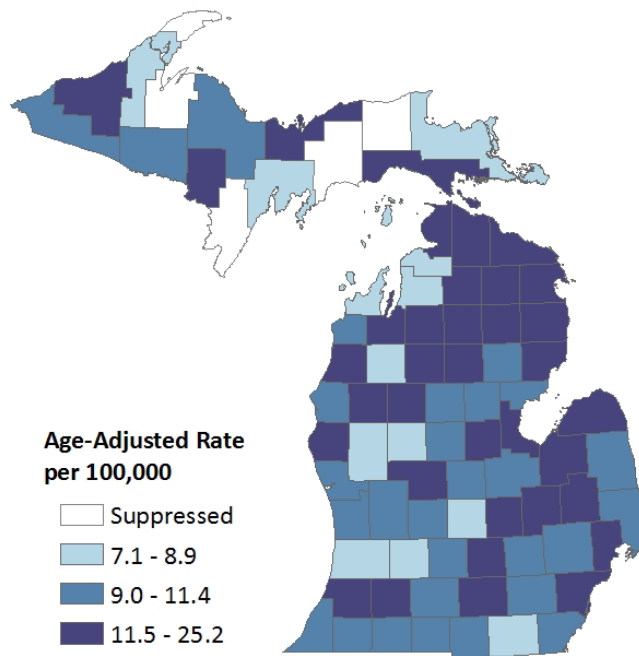
Age-Adjusted Oral Cancer Incidence Rates for Michigan by County 2008-2012

Author: Beth Anderson **Date:** 2015

Question: What counties in Michigan have high age-adjusted incidence rates of oral cancer?

Data Source: Michigan Cancer Surveillance Program, 2008-2012.

Interpretation/Use: This map is used by MDHHS to identify areas with higher incidence rates of oral cancer. The data is shared with partners to determine where education needs to occur across the state. This data has been included in factsheets and data briefs that are available to the public. Thirty-six counties were above the state rate for the five-year period.



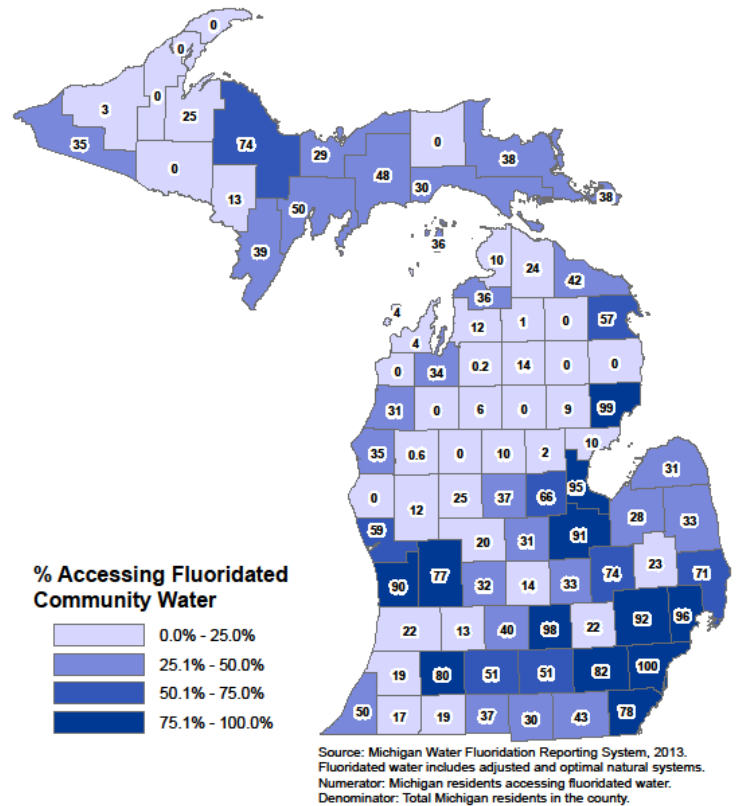
Percent of Michigan Residents with Access to Fluoridated Water by County, 2013

Author: Beth Anderson **Date:** 2015

Question: What percent of Michigan residents have access to fluoridated water?

Data Source: Michigan Water Fluoridation Reporting System (WFRS), 2013

Interpretation/Use: Michigan residents are on a variety of water systems (ex. community public water supply and private water supply) and not all systems adjust their water supply for optimal fluoride benefits to reduce tooth decay. In 2013, 71.5% of Michigan residents were on water systems with fluoridated water. Fluoridated water has been shown to prevent tooth decay. The map is used to examine the areas in Michigan with low or no access to fluoridated water. The denominator in this map is all Michigan residents.



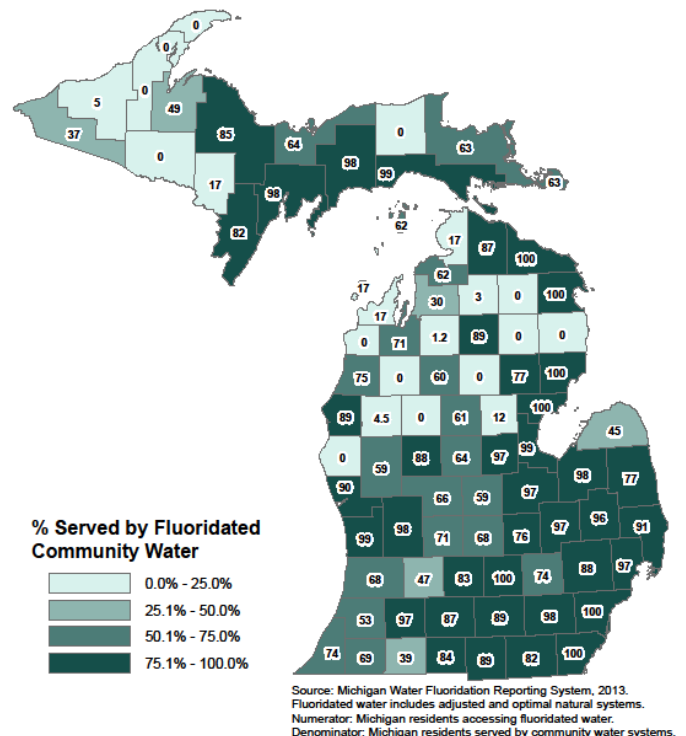
Percent of Michigan Residents on Community Water Systems with Access to Fluoridated Water by County, 2013

Author: Beth Anderson **Date:** 2015

Question: What percent of Michigan residents on community water systems have access to fluoridated water?

Data Source: Water Fluoridation Reporting System, 2013

Interpretation/Use: Most Michigan residents are on community water systems, however, not all community water systems adjust their systems for optimal fluoride benefit. Some have adequate natural levels, or chose not to fluoridate. Of the residents in Michigan on community water systems, 88.7% are on fluoridated water systems. The MDHHS oral health program has a goal to keep this rate around 90% by providing fluoridation equipment grants to water systems operators.



Percent of Live Births Under 37 Weeks of Gestation, by County, Michigan 2012

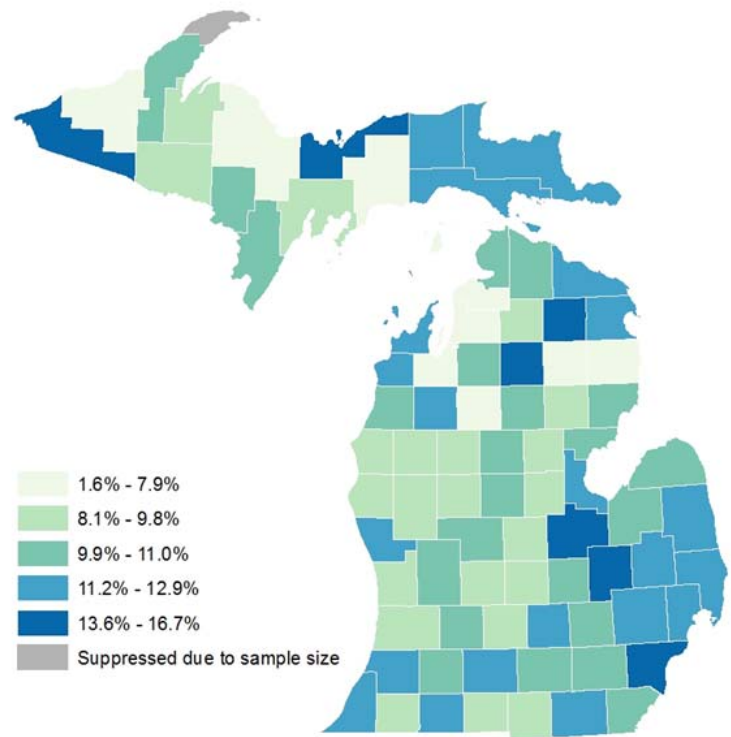
Authors: Mary Kleyn and Sarah Rockhill

Date: 2015

Question: Which counties in Michigan have a percentage of infants born preterm (less than 37 weeks of gestation)?

Data Source: 2012 Michigan Resident Live Birth File

Interpretation/Use: This map shows counties with a higher percentage of infants born preterm. Areas with higher percentages of preterm births may be targets for pre-conception and inter-conception prevention strategies for reducing preterm birth.



Source: 2012 Michigan Resident Live Birth File

Percent of Live Births Under 2,500 Grams, by County, Michigan 2012

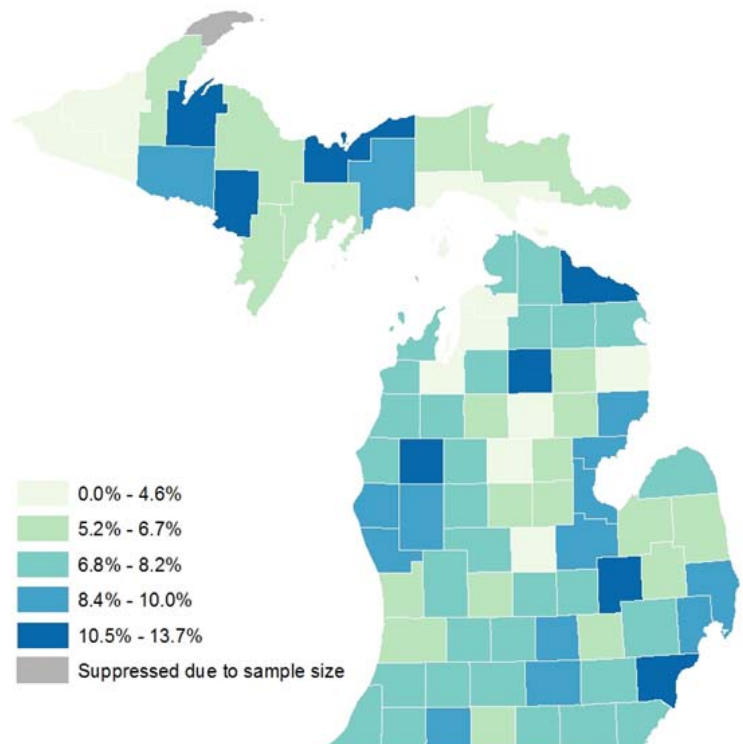
Authors: Mary Kleyn and Sarah Rockhill

Date: 2015

Question: Which counties in Michigan have a percentage of infants born low birth weight (less than 2,500 grams)?

Data Source: 2012 Michigan Resident Live Birth File

Interpretation/Use: This map shows counties with a higher percentage of infants born with low birth weight. Areas with higher percentages may be targets for pre-conception and inter-conception prevention strategies for reducing the number of infants with a birth weight under 2,500 grams.



Source: 2012 Michigan Resident Live Birth File