Overweight and Obesity in Michigan: Surveillance Report

2009

Michigan Department of Community Health

MDCH

Jennifer M. Granholm, Governor
Janet Olszewski, Director

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Key Findings and Recommendations

This surveillance report contains available data on obesity and its associated risk factors in Michigan and the United States. Data are presented to identify populations of concern and emerging trends. Data will also be used to update and/or modify program objectives for the Michigan Department of Community Health (MDCH) Nutrition, Physical Activity and Obesity Prevention programs and its partners. This report will guide and inform the development and implementation of the state strategic plan and associated interventions.

Below you will find the key findings and recommendations from each of the chapters in this report. The key findings identify disparities, priority populations and trends in risk factors and conditions. Please refer to the chapters for more detailed information on the key findings. The recommendations relate to gaps in surveillance systems as well as public health implications from the findings. These are provided to assist MDCH and partners in focusing on the areas in need of the most attention for the reduction of overweight and obesity in Michigan.

Obesity Chapter

Key Findings

Adults:

- Obesity in Michigan has risen 21.8% among adults from 2001 to 2008.
- Michigan had the 8th highest prevalence rate of obesity in the United States in 2008.
- In 2008, 65.3% of Michigan adults were either overweight or obese; 35.2% were overweight and an additional 30.1% were obese.
- Blacks had a significantly higher obesity rate (39.8%) than whites (28.8%).
- Obese adults had a higher prevalence of arthritis, high blood pressure, high cholesterol, asthma, coronary heart disease, stroke, heart attack, diabetes and inadequate sleep compared with non-obese adults.
- Obese adults also reported the highest prevalence of poor life satisfaction, poor general health, poor physical health, poor mental health and activity limitations compared with non-obese adults.

Youth:

- In 2007, 28.9% of Michigan youth, grades 9 through 12, were either overweight or obese; 16.5% were overweight and an additional 12.4% were obese.
- Black youth had a higher obesity rate (18.5%) compared with white youth (11.2%).

Recommendations

- Continue to monitor the trend of overweight and obesity among all populations.
- Identify/develop data sources to provide clinical data on body mass index (BMI), particularly for children.
- Create a surveillance model depicting what an ideal surveillance system would be for all aspects of obesity and its risk factors.
- Develop projects aimed at understanding the racial/ethnic disparities with prevalence of obesity.

Physical Activity Chapter

Key Findings

Adults

- In 2008, 49.4% of Michigan adults did not get the recommended amount of physical activity.
- Physical inactivity increases with age and decreases with education and income.
- In 2008, obese Michigan adults had a significantly higher prevalence of inadequate physical activity and no leisure-time physical activity compared with adults who were not obese.

Youth

- As of 2005, Michigan youth had not yet reached the *Healthy People 2010* targets for vigorous or moderate physical activity.
- Female youth (64.5%) were more likely to not meet the 2008 physical activity guidelines than males (47.3%).
- Black youth had the highest prevalence of excessive television viewing (58.1%) and computer or video game use (30.7%) in 2007.

Recommendations

- Develop a method to compare the 2008 physical activity guidelines with the *Healthy People 2010* targets.
- Locate a source of data for television viewing among adults and young children.
- Develop a surveillance system for monitoring policies and resources at the community level.
- Focus program efforts on the communities and populations of need identified in the chapter (e.g., the City of Detroit for no leisure-time physical activity).

Nutrition Chapter

Key Findings

Adults

- In 2008, 78.3% of Michigan adults consumed inadequate fruits and vegetables.
- Inadequate fruit and vegetable consumption decreased with increasing education. Females (26.6%) were more likely to get an adequate amount than males (16.0%).
- Nearly 1 in 4 Michigan adults went to a fast food restaurant two or more times a week in 2005.

Youth

- In 2007, 83.0% of Michigan youth consumed inadequate fruits and vegetables.
- There were no significant differences by race or gender.
- Almost 30% of youth drank at least one non-diet pop or soda a day. There was a significant difference in soda consumption between males (34.6%) and females (23.1%).

Recommendations

- Repeat the fast food consumption questions on the Michigan Behavioral Risk Factor Survey (BRFS) to monitor change in fast food consumption.
- Find data for Michigan on consumption and or availability of high energy dense foods and sugar sweetened beverages.
- Develop a surveillance system for monitoring policies and resources at the community level (e.g., food availability).
- Develop a system to monitor the population in Michigan receiving food assistance (e.g., free/reduced lunches).
- Direct public health efforts toward improving fruit and vegetable consumption for both youth and adults.

Breastfeeding Chapter

Key Findings

Women

- In 2006, 56.1% of Michigan women who had a live birth reported that they planned to breastfeed before their delivery. Almost 70% of women who had a live birth initiated breastfeeding.
- White, non-Hispanics had a higher prevalence (71.7%) than black, non-Hispanics (55.7%) for breastfeeding initiation.
- The prevalence of breastfeeding initiation increased with education and income.
- Women whose BMI was at a healthy weight had a higher prevalence of ever breastfeeding compared with women whose BMI was higher.
- The average duration of breastfeeding was 6.8 weeks among women who breastfed for longer than a week but discontinued before being surveyed.

Low-Income Children

- The overall prevalence of WIC participants that were breastfed was 49.0%.
- In 2007, 62.3% of participants stopped breastfeeding within 10 days.

Recommendations

- Continue to evaluate initiation and duration trends in both maternal and infant populations.
- Strengthen current efforts aimed at supporting and encouraging women to breastfeed for a longer period of time.
- Locate or create data sources for monitoring the availability of breastfeeding rooms at worksites and the social perceptions of breastfeeding.

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Introduction

The terms overweight and obesity are used as labels for ranges of weight that are greater than what is generally considered healthy for a given height. They identify ranges of weight that have been shown to increase the risk of certain chronic diseases and other health problems.[1] In Michigan, obesity prevalence has risen over 65% among adults since 1995. Only 33.6% of Michigan adults in 2008 had a BMI that was considered a healthy weight. Monitoring the burden of obesity and its risk factors is crucial to addressing this problem.

Overweight and obesity have tremendous consequences on our nation's health and economics. The epidemic is linked to chronic diseases, like coronary heart disease, stroke, and diabetes, as well as increased health care costs. American culture is characterized by environments that promote unhealthy choices. Public health approaches are needed that can create change for populations and can help make healthy choices easy, affordable, and available.[1]

The Nutrition, Physical Activity and Obesity Prevention program at MDCH is funded by the Centers for Disease Control and Prevention (CDC) Division of Nutrition, Physical Activity and Obesity (DNPAO) to lead efforts to prevent and control obesity and other chronic diseases through healthful eating and physical activity.[1] These behaviors are addressed by conducting initiatives that focus on creating policies and environments that make it easier for Michigan citizens to eat healthfully and be physically active.

The CDC DNPAO Program identified six principal target areas critical to the prevention of obesity:

- Increase physical activity.
- Increase consumption of fruits and vegetables.
- Increase breastfeeding initiation, duration and exclusivity.
- Reduce the consumption of high energy dense foods.
- Decrease the consumption of sugar sweetened beverages.
- Decrease television viewing.[1]

This report provides data to support planning and interventions in these areas. *Overweight and Obesity in Michigan: Surveillance Report* will reflect these priority areas as well as the prevalence of obesity. This document will also discuss the risk factors associated with obesity and identify the economic costs and disparate populations associated with them.

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Introduction:

Overweight and obesity can be caused by a combination of genetic, metabolic, behavioral, environmental, cultural, and socioeconomic influences. Behavioral and environmental factors contribute largely to overweight and obesity and provide the greatest opportunity for interventions designed for prevention and treatment. Healthy eating and physical activity are two important behaviors in preventing and treating overweight and obesity and are extremely helpful in maintaining weight loss.[1]

Key Findings:

Adults:

- Obesity in Michigan has risen 21.8% among adults from 2001 to 2008.
- Michigan had the 8th highest prevalence rate of obesity in the United States in 2008.
- In 2008, 65.3% of Michigan adults were either overweight or obese; 35.2% were overweight and an additional 30.1% were obese.
- Blacks had a significantly higher obesity rate (39.8%) than whites (28.8%).
- Obese adults had a higher prevalence of arthritis, high blood pressure, high cholesterol, asthma, coronary heart disease, stroke, heart attack, diabetes and inadequate sleep compared with non-obese adults.
- Obese adults also reported the highest prevalence of poor life satisfaction, poor general health, poor physical health, poor mental health and activity limitations compared with non-obese adults.

Youth:

- In 2007, 28.9% of Michigan youth, grades 9 through 12, were either overweight or obese; 16.5% were overweight and an additional 12.4% were obese.
- Black youth had a higher obesity rate (18.5%) compared with white youth (11.2%).

Adults

Among adults, being overweight refers to having a weight above what is considered healthy for one's height. Regardless of age there is a range of weights considered healthy for any given height. Overweight adults tend to have an increased risk of several health problems relative to those adults with a weight inside the healthy range.[2]

To determine whether or not an adult is overweight or obese, the CDC recommends using the Body Mass Index (BMI). An adult with a BMI of 18.5 but less than 25 is considered to be at a healthy weight, where overweight is classified as a BMI of 25 to 29.9, and obese as a BMI of 30 or greater, Figure 1. Used at the population level, BMI is a reliable screening tool for obesity. However, if an individual is found to be overweight or obese using BMI, a provider may consider using other tools to measure body composition before diagnosing the individual as overweight or obese.[3]

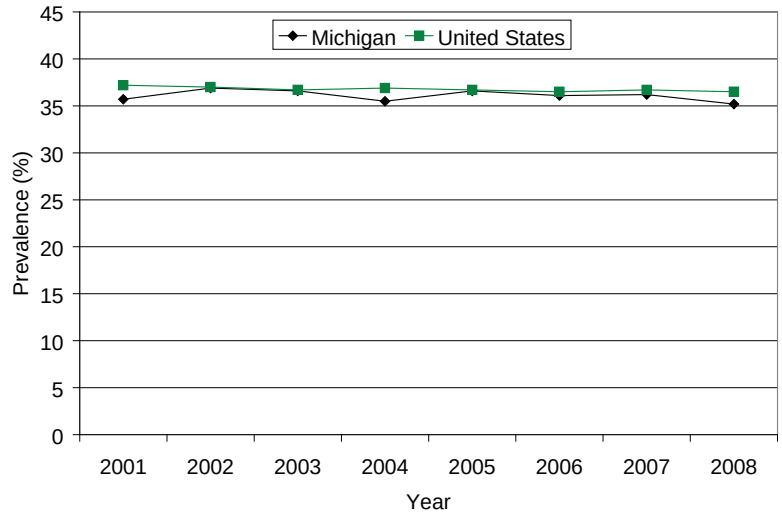
The nationwide direct annual cost among adults for overweight and obesity was $61 billion and the indirect cost was $56 billion.[4]

Figure 1. Body mass index chart for adults, age 20 and over

BMI	Weight Status
<18.5	Underweight
18.5-24.9	Healthy Weight
25.0-29.9	Overweight
≥30.0	Obese

Source: CDC, Department of Health and Human Services.

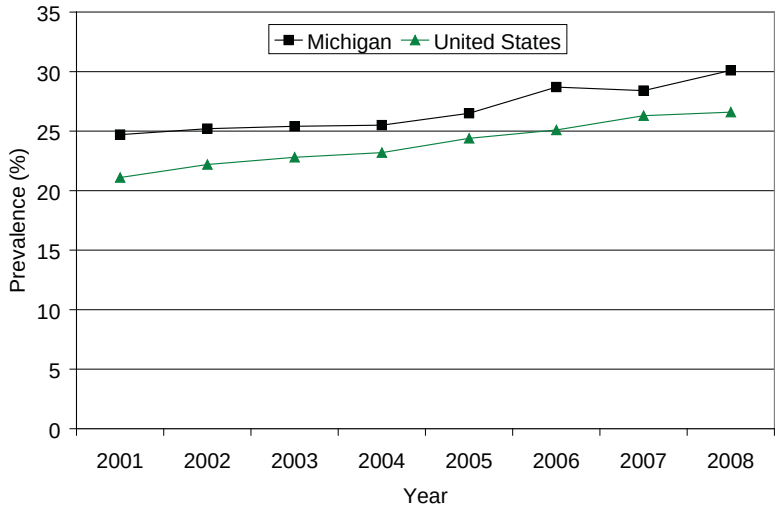
Figure 2. Prevalence of overweight* adults, 18 and over in Michigan and the United States, 2001 to 2008.



Source: Michigan Behavioral Risk Factor Survey (BRFS) and CDC Behavioral Risk Factor Surveillance System.
*The proportion of respondents whose BMI was greater than or equal to 25.0 but less than 30.0.

- In 2008, 35.2% of the Michigan adult population was overweight. This prevalence has not changed since 2001.
- In Michigan, males had a significantly higher prevalence of overweight (40.9%) than females (29.5%), 2008.
- Overweight increased with household income from 27.7% (<$20,000) to 38.0% ($75,000+).
- There were no differences in prevalence of overweight by race or education levels.

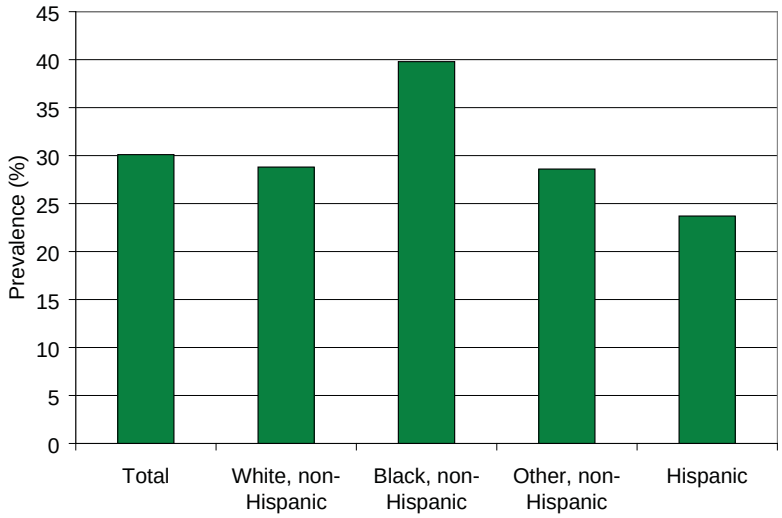
Figure 3. Prevalence of obesity* among adults, 18 and over in Michigan and the United States, 2001 to 2008.



Source: Michigan Behavioral Risk Factor Survey (BRFS) and CDC Behavioral Risk Factor Surveillance System.
*The proportion of respondents whose BMI was greater than or equal to 30.0.

- Michigan had the 8th highest prevalence of obesity in the United States with 30.1% of adults, 2008.
- Michigan's obesity prevalence has risen 21.8% since 2001.
- College graduates (25.2%) were less likely to be obese than adults with less than a college degree.
- In 2008, only 34.7% of Michigan adults were not overweight or obese.

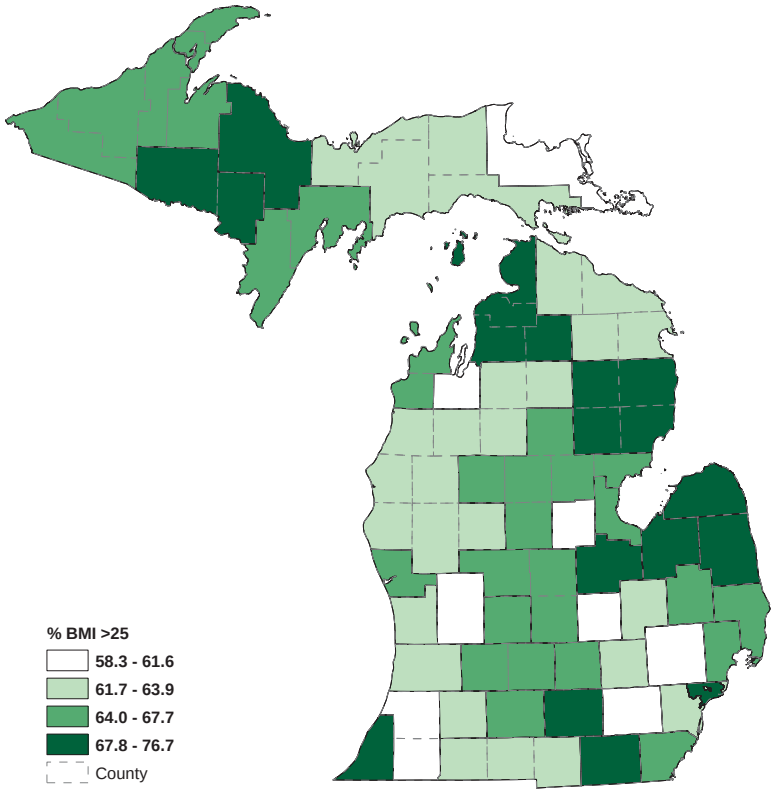
Figure 4. Prevalence of obesity* among adults, 18 and over in Michigan by race and ethnicity, 2008.



Source: Michigan Behavioral Risk Factor Survey (BRFS)
*The proportion of respondents whose BMI was greater than or equal to 30.0.

- In Michigan in 2008, blacks had a significantly higher prevalence of obesity (39.8%) than whites (28.8%).
- In 2008, 42.2% of black females were obese in Michigan - the highest percent of any race/sex group.

Map 1. Prevalence of overweight and obesity among adults, 18 and over in Michigan by local health department jurisdictions, 2005 to 2007.



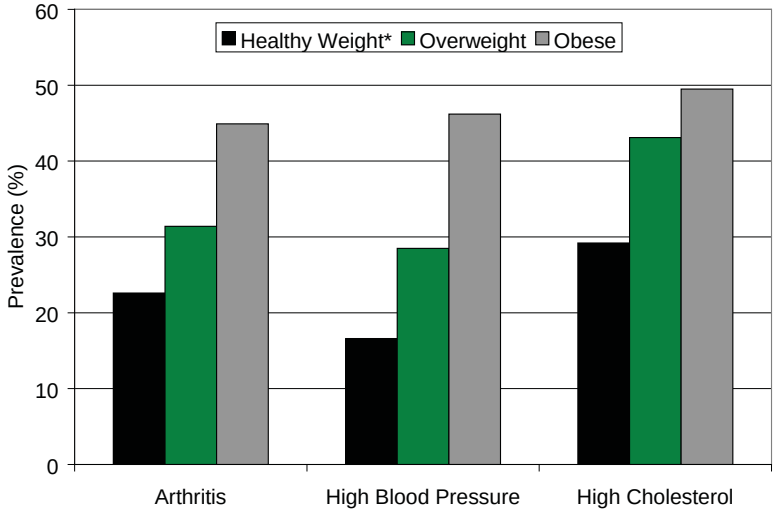
Source: Michigan Behavioral Risk Factor Survey (BRFS)
The proportion of respondents whose BMI was greater than or equal to 25.0.

- In Michigan, the state prevalence for overweight and obesity between 2005 and 2007 was 63.9%. Twenty-seven local health departments (LHD) were above this.
- Marquette (76.7%) had the highest prevalence and Shiawassee (58.3%) had the lowest out of Michigan's 45 LHDs for overweight and obesity.
- Sanilac (39.1%) and Detroit (38.1%) had the highest prevalence of obesity. Marquette (48.4%) and Berrien (45.1%) had the highest prevalence of overweight adults among Michigan's LHDs.
- See Appendix B for a complete list of LHD prevalence rates.

Obesity and Chronic Disease among Adults

As obesity increases so does morbidity for certain diseases such as coronary heart disease (CHD), type 2 diabetes, certain cancers, hypertension, dyslipidemia, stroke, liver and gallbladder disease, osteoarthritis, sleep apnea and respiratory problems. Obesity is also related to complications with pregnancy and other gynecological problems.[2]

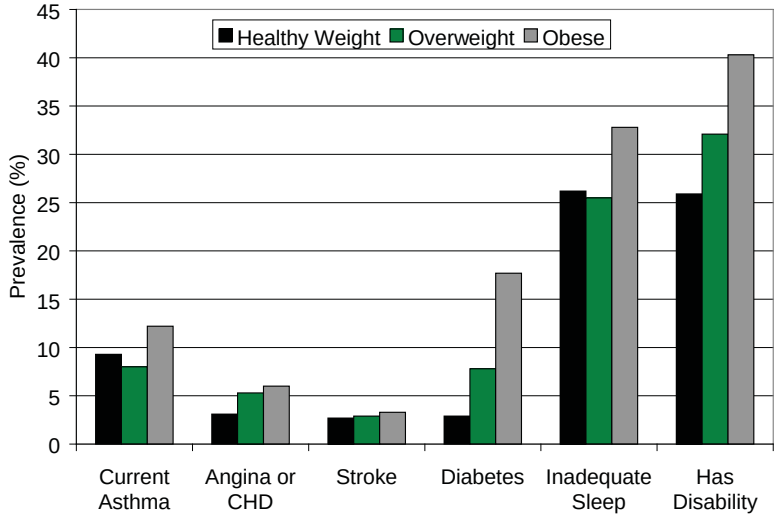
Figure 5. Prevalence of health conditions among adults, 18 and over, by weight status in Michigan, 2007.



Source: Michigan Behavioral Risk Factor Survey (BRFS)
*The proportion of respondents whose BMI was greater than or equal to 18.5 but less than 25.

- In 2007, obese adults had the highest prevalence of the health conditions listed in Figure 5 (arthritis, high blood pressure and high cholesterol), in Michigan.
- There were significant differences between adults with a BMI of healthy weight, overweight and obese for all three of these conditions.

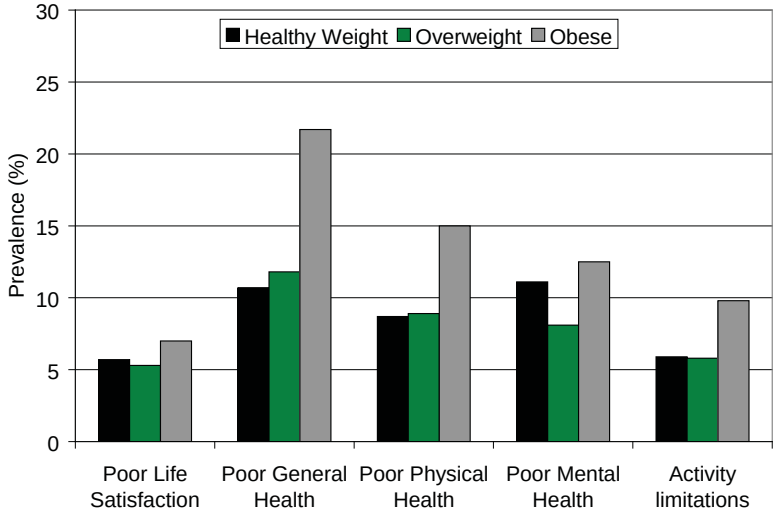
Figure 6. Prevalence of health conditions among adults, 18 and over, by weight status in Michigan, 2008.



Source: Michigan Behavioral Risk Factor Survey (BRFS)
*The proportion of respondents whose BMI was greater than or equal to 18.5 but less than 25.

- In 2008, obese adults had the highest prevalence of the health conditions listed in the figure (asthma, CHD, stroke, diabetes, inadequate sleep and having a disability), in Michigan.
- There were significant differences between obese and healthy weight for CHD, diabetes, inadequate sleep and having a disability.
- There were also significant differences between overweight and obese adults for asthma, diabetes, inadequate sleep and having a disability.

Figure 7. Prevalence of perceived health status among adults, 18 and over, by weight status in Michigan, 2008.



Source: Michigan Behavioral Risk Factor Survey (BRFS)

- In 2008, there were significant differences in the prevalence of fair to poor general health, poor physical health, poor mental health, and activity limitations between overweight and obese adults.
- There were also differences between adults with a healthy weight classification and obese classification for fair to poor general health, poor physical health and activity limitations.

Youth:

As is the case with adults, being overweight or obese is known to be correlated with increased risk of health problems for children. However, unlike adults, children's bodies are developing and they are gaining height as they age. Boys and girls tend to have different growth patterns at different ages. For this reason, when determining whether or not a child's weight is healthy, the BMI is compared to the BMI of other children of the same age and gender.[3]

For comparison, gender-specific standardized growth charts are used to plot the child's BMI against his or her age. From the chart, one can read the child's BMI percentile, or how the child's BMI number compares to that of healthy children of the same age and gender. A child with a BMI within the 5th and 84th percentile is considered to be at a healthy weight, between 85th and 94th is considered overweight, and greater than 95th is obese (Figure 8). Again, BMI is a reliable indicator of health risk at the level of populations. If an individual child is found to be overweight or obese based on BMI percentile, it is recommended that the provider perform further assessments of body composition before diagnosis.[3]

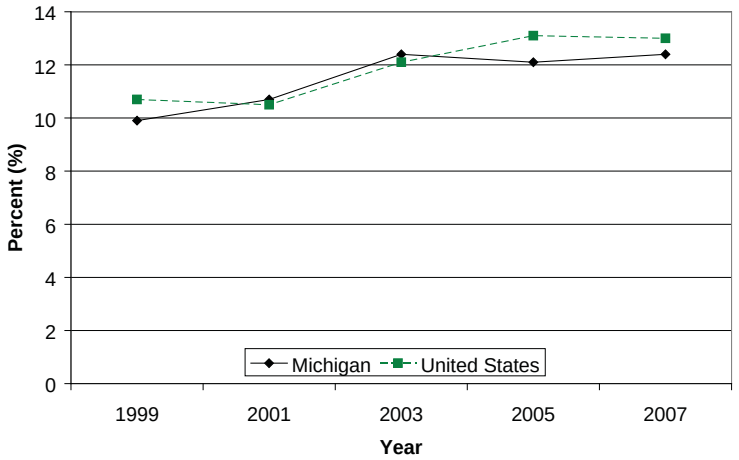
Between 1997 and 1999 annual hospital costs for youth related to obesity was $127 million.[4]

Figure 8. Body mass index chart for children, ages 2 to 19 years

Percentile of Age/Sex	Weight Status
<5th	Underweight
5th - 84th	Healthy Weight
85th - 94th	Overweight
≥95th	Obese

Source: CDC, Department of Health and Human Services.

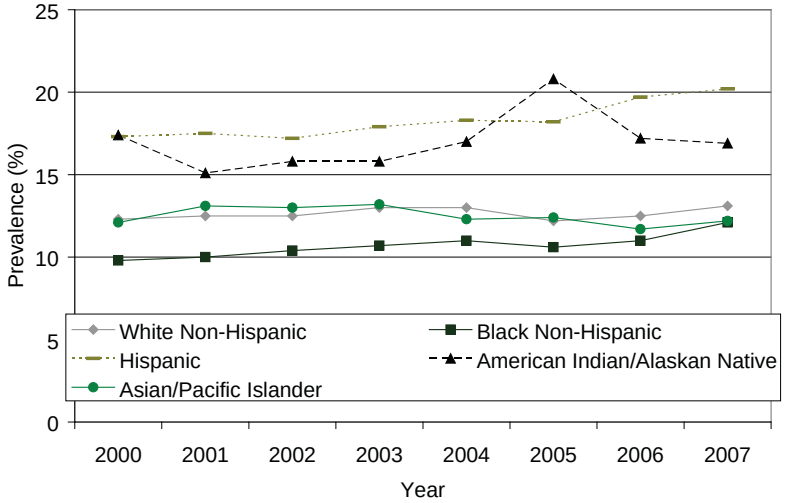
Figure 9. Prevalence of obesity* among youth, grades 9 through 12, in Michigan, 1999-2007.



Sources: Michigan Youth Risk Behavior Survey (YRBS) and CDC Youth Risk Behavior Surveillance System.
*Greater than or equal to the 95th percentile for body mass index, by age and sex.

- The prevalence of obesity among Michigan youth has increased slightly from 10.9% in 1999 to 12.4% in 2007.
- Black youth (18.5%) had a higher prevalence of obesity compared with whites (11.2%).
- Males (15.0%) also had a higher prevalence of obesity than females (9.8%), although not a significant difference.
- In 2007, an additional 16.5% of youth were estimated to be overweight.

Figure 10. Prevalence of obesity* among low-income children, 2 to 4-years-old, in Michigan, 2000-2007.



Sources: Michigan Pediatric Nutrition Surveillance.
*Greater than or equal to the 95th percentile for body mass index, by age and sex.

- In Michigan in 2007, 14.0% of low-income children, 2 to 4 years, were obese.
- Hispanics (20.2%) and American Indians/Alaskan Natives (16.9%) had the highest percent of children that were obese. Black non-Hispanics had the lowest (12.1%).
- An additional 14.7% were overweight.

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Introduction:

Regular physical activity is one of the most important contributors to health and a key factor in maintaining a healthy weight. Regular physical activity decreases the risk of developing other chronic diseases including colon cancer and osteoporosis. Physical activity helps to achieve and maintain a healthy weight while contributing to the health of bones, joints, and muscles. It can also reduce feelings of anxiety and depression.[1]

Physical inactivity is one of the six modifiable risk factors for heart disease and stroke identified by the American Heart Association (AHA) and is strongly correlated with increasing cardiovascular risk factors such as obesity, high blood pressure, high triglycerides, high cholesterol and diabetes.[1]

Even though the benefits of physical activity are apparent, less than half of adults in the United States engage in physical activity regularly.[2] The estimated cost of physical inactivity in 2000 was $76.6 billion in the United States.[3] In 2002, the direct and indirect costs were $8.9 billion in Michigan alone.[4]

Healthy People 2010 aims to reduce the proportion of adults who engage in no leisure-time physical activity to 20%. As of 2005, 40% of adults in the United States were still not getting any physical activity.[5]

Key Findings:

Adults

- In 2008, 49.4% of Michigan adults did not get the recommended amount of physical activity (i.e. Moderate physical activity for a total of at least 30 minutes on five or more days a week or vigorous activity for a total of at least 20 minutes on three or more days per week while not at work).
- Physical inactivity increases with age and decreases with education and income.
- In 2008, obese Michigan adults had a significantly higher prevalence of inadequate physical activity and no leisure-time physical activity compared with adults who were not obese.

Youth

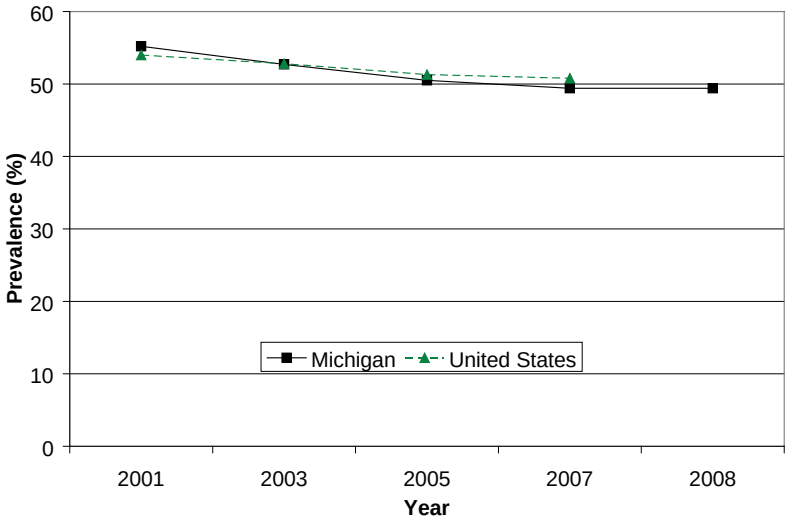
- As of 2005, Michigan youth had not yet reached the *Healthy People 2010* targets for vigorous or moderate physical activity (i.e. Moderate physical activity for a total of at least 30 minutes on five or more days a week or vigorous activity for a total of at least 20 minutes on three or more days per week while not at work).
- Female youth (64.5%) were more likely to not meet the 2008 physical activity guidelines than males (47.3%).
- Black youth had the highest prevalence of excessive television viewing (58.1%) and computer or video game use (30.7%) in 2007.

Adults

The United States Department of Health and Human Services (DHHS) 2008 Physical Activity Guidelines for Americans recommend that adults engage in at least 150 minutes of moderate-intensity physical activity, above usual activity at work or home, or 75 minutes of vigorous physical activity a week to reduce the risk of chronic disease. Activity should be performed in at least 10 minute intervals throughout the week. Adults should also do muscle-strengthening activities on two or more days a week.[6]

Despite the release of new recommendations, data are collected by previous guidelines which recommend moderate physical activity for a total of at least 30 minutes on five or more days a week or vigorous activity for a total of at least 20 minutes on three or more days per week while not at work.[7] Therefore the following results should be read and interpreted accordingly.

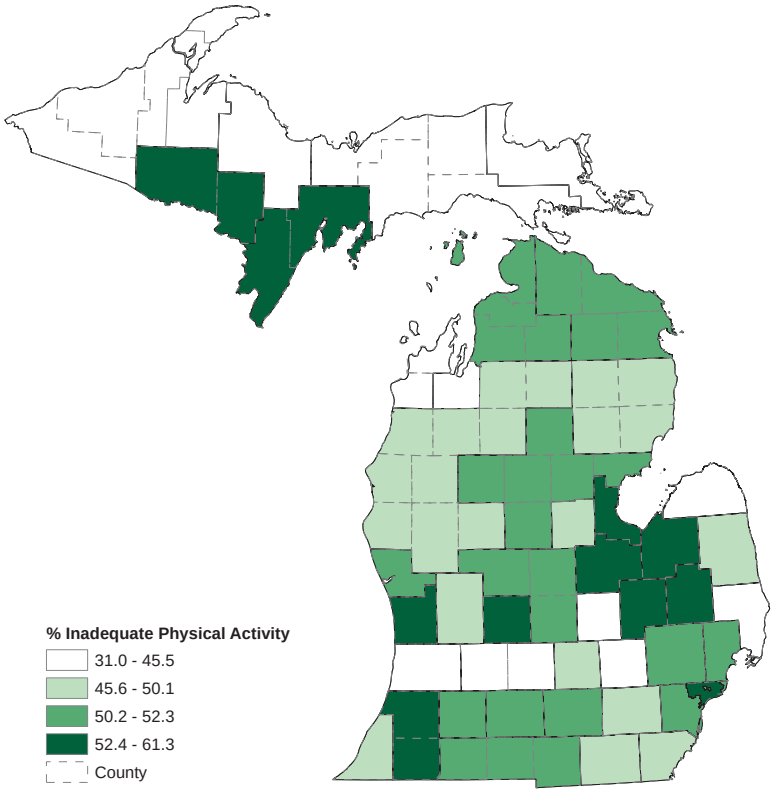
Figure 11. Prevalence of inadequate physical activity* among adults, 18 and over, in Michigan and United States, 2001 to 2008.



Source: Michigan Behavioral Risk Factor Survey (BRFS) and CDC Behavioral Risk Factor Surveillance System.
*The proportion who reported that they do not usually do moderate physical activities for a total of at least 30 minutes on five or more days a week or vigorous activities for a total of at least 20 minutes on three or more days per week while not at work (This question was not included in the national BRFS in 2008).

- In 2008, the prevalence of inadequate physical activity among Michigan adults was 49.4%. This represents a decrease of 5.8% since 2001.
- Inadequate physical activity increases with age from 40.8% among adults aged 18 to 24 years to 64.0% among adults 75 years and older.
- Prevalence also decreases with income: 56.9% of adults with a household income less than $20,000 had inadequate physical activity compared to 44.2% of adults with a household income of more than $75,000.

Map 2. Prevalence of inadequate physical activity* among adults, 18 and over in Michigan by local health department jurisdictions, 2005 to 2007.



Source: Michigan Behavioral Risk Factor Survey (BRFS)
*The proportion who reported that they do not usually do moderate physical activities for a total of at least 30 minutes on five or more days a week or vigorous activities for a total of at least 20 minutes on three or more days per week while not at work.

- The prevalence of inadequate physical activity in Michigan from 2005 to 2007 was 50.1%.
- More than half of adults in 23 local heath department areas were not meeting the physical activity recommendations.
- Van Buren-Cass Local Health Department had the highest prevalence of inadequate physical activity (61.3%) and Luce-Mackinac-Alger-Schoolcraft Local Health Department had the lowest or best (31.0%).
- See Appendix C for a list of all the health department areas and their corresponding prevalences.

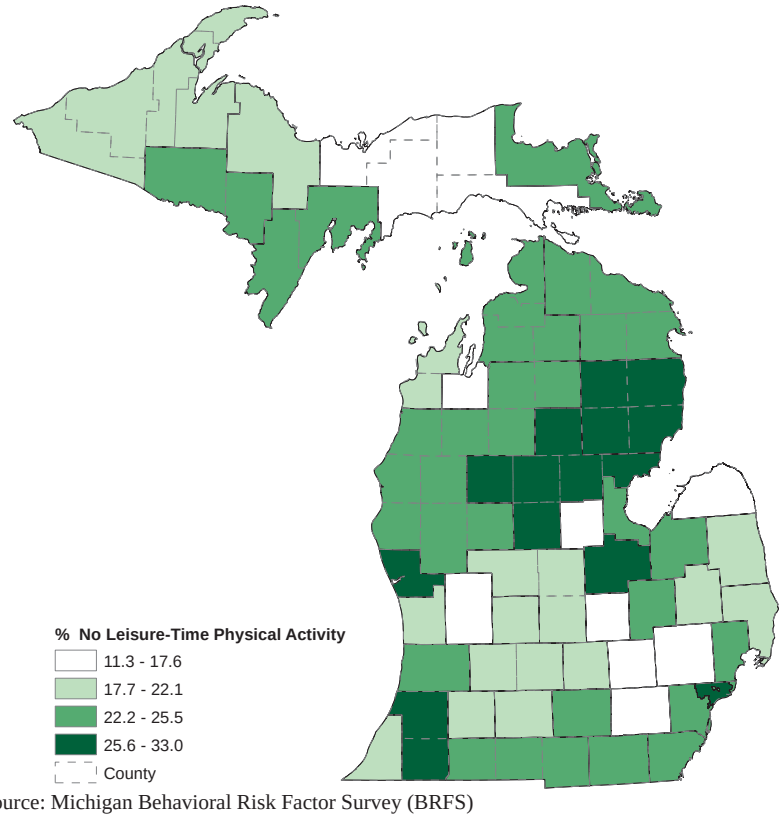
Figure 12. Prevalence of no leisure-time physical activity* among adults, 18 and over in Michigan, 2001 and 2008.

Measure	Prevalence (%) Michigan 2001	Prevalence (%) Michigan 2008
Total	23.5	25.1
Gender		
Male	20.5	22.5
Female	26.2	27.5
Race		
White	22.5	23.6
Black	29.9	30.3

Source: Michigan Behavioral Risk Factor Survey (BRFS)
*The proportion who reported not participating in any leisure-time physical activities or exercises, such as running, calisthenics, golf, gardening, or walking, during the past month.

- In 2008, the prevalence of no leisure-time physical activity was 25.1%. This has remained steady over the past few years.
- No leisure-time physical activity increases with age from 18.1% among adults aged 18-24 to 40.1% among adults 75 years and above but decreases with education and household income.
- In Michigan, females (27.5%) had a higher prevalence of no leisure-time physical activity compared with males (22.5%).

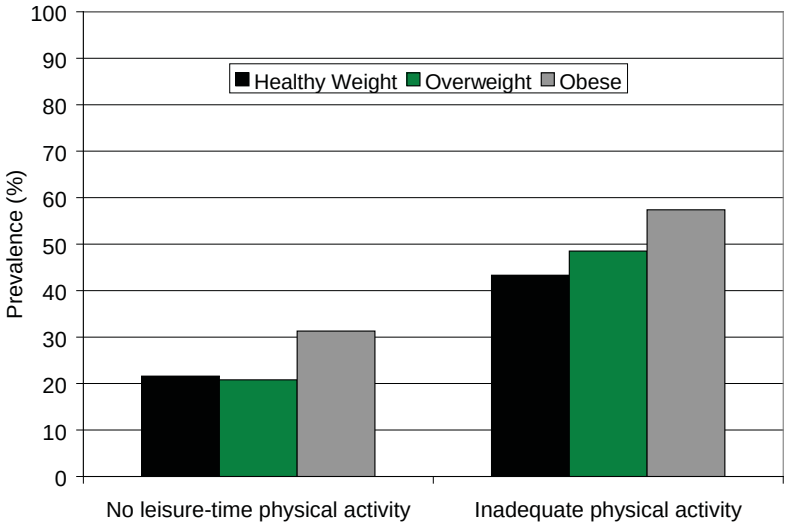
Map 3. Prevalence of no leisure-time physical activity* among adults, 18 and over in Michigan by local health department jurisdictions, 2005 to 2007.



Source: Michigan Behavioral Risk Factor Survey (BRFS)
*The proportion who reported not participating in any leisure-time physical activities or exercises, such as running, calisthenics, golf, gardening, or walking, during the past month.

- The prevalence of no leisure-time physical activity in Michigan from 2005 to 2007 was 22.1%.
- The City of Detroit had the highest prevalence, 33.0% of no leisure-time physical activity and Grand Traverse County had the lowest, 11.3%.
- Out of Michigan's 45 local health departments, only 15 have met the *Healthy People 2010* target set at 20%.
- See Appendix C for a list of all the health department areas and their corresponding prevalences.

Figure 13. Prevalence of no leisure-time physical activity or inadequate physical activity among adults, 18 and over by weight status in Michigan, 2008.



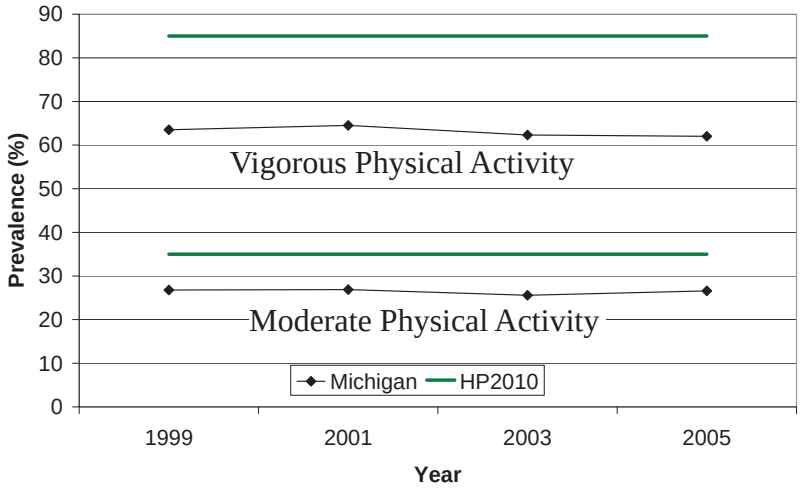
Source: Michigan Behavioral Risk Factor Survey (BRFS)

- In 2008, Michigan adults who were obese reported significantly more inadequate physical activity and no leisure-time physical activity compared with adults that reported a BMI that was normal or overweight.
- Prevalence of inadequate and no leisure-time physical activity increases as BMI increases.
- Women reported a higher prevalence of inadequate and no leisure-time physical activity than males within each BMI range. However, the differences were not significant.

Youth

Before the 2008 Physical Activity Guidelines for Americans were published, it was recommended that youth participate in moderate physical activity at least 30 minutes a day on five or more days per week or participate in vigorous activity for at least 20 minutes on three or more days per week.[6]

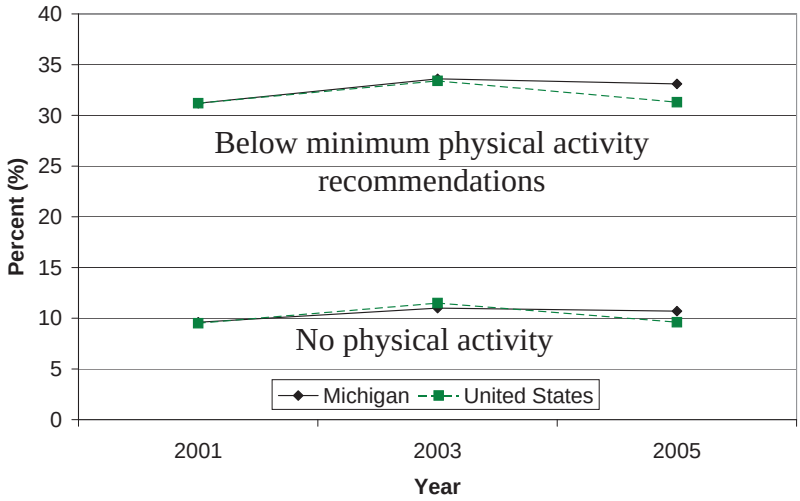
Figure 14. Prevalence of physical activity among youth, grades 9 through 12, in Michigan compared to the *Healthy People 2010* targets, 1999 to 2005.



Sources: Michigan Youth Risk Behavior Survey and *Healthy People 2010*.

- The *Healthy People 2010* target for vigorous physical activity among youth was set for 85.0%. Michigan youth had not reached this target in 2005, with a prevalence of 62.0%.
- The *Healthy People 2010* target for moderate physical activity was set for 35.0%. Michigan youth were also still below this target with a prevalence of 26.6% in 2005.

Figure 15. Prevalence of physically inactivity* among youth, grades 9 through 12, in Michigan and United States, 2001 to 2005.



Sources: Michigan Youth Risk Behavior Survey and CDC Youth Risk Behavior Surveillance System.

*The proportion who reported that they do not usually do moderate physical activity for a total of at least 30 minutes on five or more days a week or vigorous activities for a total of at least 20 minutes on three or more days per week.

- In 2005, 33.1% of Michigan youth did not meet the recommended amount of physical activity.
- More females (36.8%) than males (29.3%) did not meet the recommended amount of physical activity.
- In 2005, 10.7% of Michigan youth reported no physical activity in the last seven days.

The DHHS 2008 Physical Activity Guidelines for Americans recommend that children and adolescents ages 6 to 17 years do at least 60 minutes of physical activity each day. Most of this time should be spent doing either moderate-intensity (such as bicycle riding or brisk walking) or vigorous-intensity (such as running, jumping rope, or dancing) physical activity in intervals of 10 minutes or more. Vigorous-intensity activity should be done on at least three days per week. Muscle-strengthening activity (such as playing on playground equipment, climbing trees, and playing tug-of-war) and bone-strengthening activity (such as basketball or hopscotch) should also be done on at least three days per week. Physical activity should be enjoyable, varied, and appropriate for the child or adolescents age.[6]

Figure 16. Prevalence of not achieving 60 minutes of physical activity five or more days in the past week, among youth grades 9 through 12 in Michigan and United States, 2007.

Measure	Prevalence (%) Michigan	Prevalence (%) U.S.
Total	56.0	65.3
Gender		
Male	47.3	56.3
Female	64.5	74.4
Race/Ethnicity		
Black	59.0	68.9
White	54.2	63.0
Hispanic	60.9	69.8

Sources: Michigan Youth Risk Behavior Survey and CDC Youth Risk Behavior Surveillance System.

- The proportion of youth who did not achieve the recommended weekly physical activity is higher in the United States (65.3%) than in Michigan (56.0%).
- Females (64.5%) were more likely to get inadequate physical activity than males (47.3%).
- Almost 30% of students reported currently being enrolled in a daily physical education class, of these, 44.5% reported exercising or playing sports for more than 20 minutes per class.

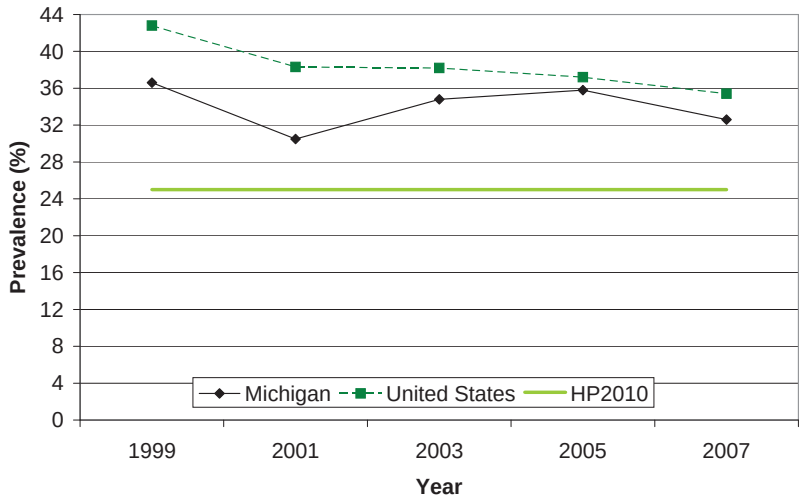
Television Viewing

Television (TV) viewing creates an additional barrier to physical activity. TV viewing is associated with reduced resting metabolic rate, displaced physical activity, excess energy intake through snacking, and exposure to the marketing of high energy-dense foods through commercials.

Research has shown that children and adults who watch a greater number of hours of television are more likely to be overweight or obese. In addition, children who watch more television are more likely to become obese when they are adults. The American Academy of Pediatrics recommends that children under two years of age not watch any TV and that children two years old and above watch no more than one to two hours of TV per day.

Decreasing TV viewing has been shown to have positive health effects. In a school-based intervention where children decreased their TV watching, their body mass index also decreased.[8]

Figure 17. Prevalence of excessive* TV viewing among youth, grades 9 through 12, in Michigan and United States compared to *Healthy People 2010* target, 1999 to 2007.



Sources: Michigan Youth Risk Behavior Survey and CDC Youth Risk Behavior Surveillance System.
*The proportion of youth that watched three or more hours of television a day on an average school day.

- In 2007, the prevalence of excessive TV viewing among youth in Michigan was 32.6%.
- This prevalence has decreased 10.9% since 1999 in Michigan and 17.3% in the United States.
- In 2007, prevalence of excessive TV viewing was significantly higher among blacks (58.1%) than whites (26.6%) and Hispanics (39.6%).
- National and Michigan rates remain above the *Healthy People 2010* target for television viewing.

Figure 18. Prevalence of excessive* computer or video game use among youth, grades 9 through 12, in Michigan and United States, 2007.

Measure	Prevalence (%) Michigan	Prevalence (%) U.S.
Total	22.9	24.9
Gender		
Male	27.5	29.1
Female	18.0	20.6
Race/Ethnicity		
Black	30.7	30.5
White	21.3	22.6
Hispanic	24.8	26.3

Sources: Michigan Youth Risk Behavior Survey and CDC Youth Risk Behavior Surveillance System.
*The proportion of youth who played video or computer games or used the computer for something that was not schoolwork three or more hours per day on an average school day.

- The prevalence of computer or video game use among youth is about the same in Michigan (22.9%) as in the United States (24.9%).
- In Michigan, males (27.5%) are significantly more likely to play large amounts of video or computer games than females (18.0%).
- Similar to television viewing, blacks (30.7%) have the highest prevalence of excessive video or computer game use, higher than whites (21.3%).

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Introduction:
The 2005 Dietary Guidelines for Americans[1] published by the U.S. Department of Health and Human Services and the United States Department of Agriculture recommend that adults consume a variety of nutrient-dense foods and beverages within and among the basic food groups. Research shows that healthy eating can contribute to maintaining a healthy weight or losing excess weight. This in turn can help lower people's risk for chronic diseases, including heart disease, stroke, some cancers, diabetes, and osteoporosis. However, a large gap remains between healthy dietary patterns and what Americans actually eat.[1]

Substituting foods relatively high in water and fiber (low energy dense) for foods high in carbohydrates, fat, protein or alcohol (high energy dense) will tend to help a person feel full while consuming fewer calories. Most fruits and vegetables have a lower energy density than foods from other food groups.[2]

It is estimated that each year in the United States more than $33 billion in direct medical costs and $9 billion in lost productivity resulting from heart disease, stroke, cancer and diabetes are attributed to poor eating habits. Healthy food does not have to be expensive when it is available. One study showed that consumers could get three servings of fruits and four servings of vegetables daily for an average cost of 64 cents per day (in 1999 dollars).[3]

Key Findings:
Adults
- In 2008, 78.3% of Michigan adults consumed inadequate fruits and vegetables.
- Inadequate fruit and vegetable consumption decreased with increasing education. Females (26.6%) were more likely to get an adequate amount than males (16.0%).
- Nearly 1 in 4 Michigan adults went to a fast food restaurant two or more times a week in 2005.

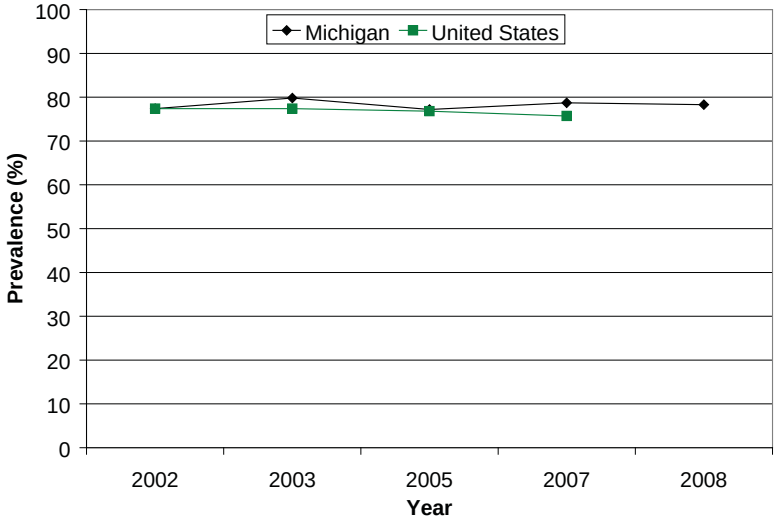
Youth
- In 2007, 83.0% of Michigan youth consumed inadequate fruits and vegetables.
- There were no significant differences by race or gender.
- Almost 30% of youth drank at least one non-diet pop or soda a day. There was a significant difference in soda consumption between males (34.6%) and females (23.1%).

Adults

The 2005 Dietary Guidelines for Americans[1] recommend that adults eat between 1.5 to 2.5 cups of fruit daily and 2.5 to 4 cups of vegetables daily, depending on age, gender, and amount of regular physical activity, see Appendix D. Within a week, adults are advised to choose options from all five of the vegetable subgroups (dark green, orange, legumes, starchy and other vegetables). Eating a diet high in fruits and vegetables is associated with lowering your risk of developing diseases such as cancer.[2]

Although the 2005 guidelines recommend 4 to 6.5 cups of fruit and vegetables per day, data is still collected based on the *Healthy People 2010* goals.[4] These goals state that adults should get two servings of fruit and three servings of vegetables per day for a total of five servings.

Figure 19. Prevalence of inadequate fruit and vegetable consumption* among adults, 18 years and over in Michigan and United States, 2002 to 2008.

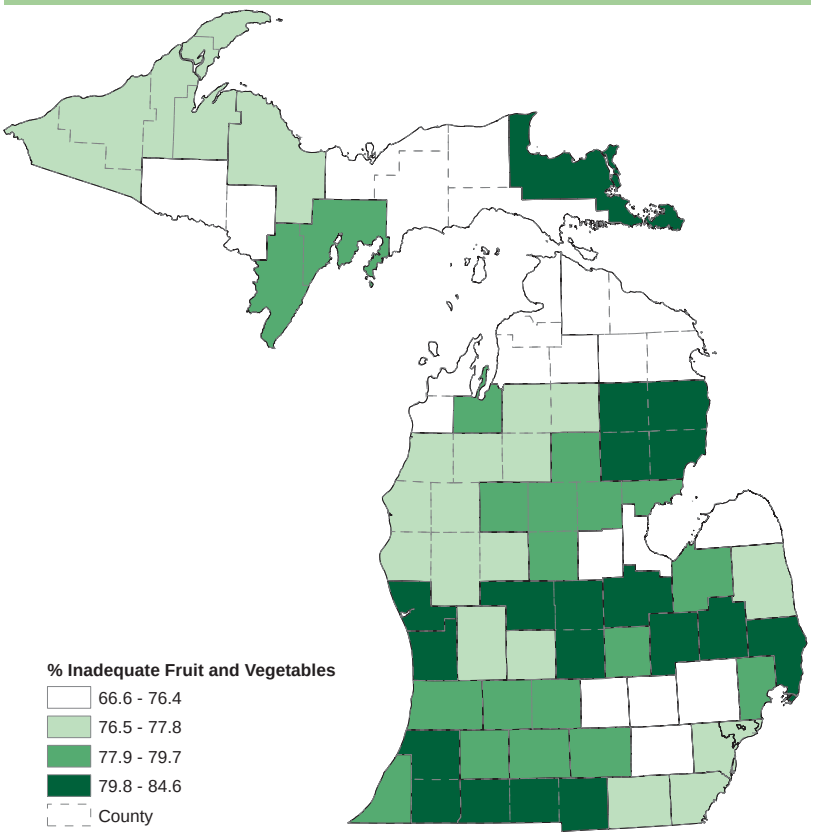


Sources: Michigan Behavioral Risk Factor Survey (BRFS) and CDC Behavioral Risk Factor Surveillance System.

*The proportion whose total reported consumption of fruits (including juice) and vegetables was less than five times per day (The national BRFS did not include this question in 2008).

- In 2008, the prevalence of inadequate fruit and vegetable consumption was 78.3% among Michigan adults.
- Females (73.4%) had a lower prevalence of inadequate fruit and vegetable consumption than males (84.0%).
- Consumption of fruits and vegetables did not differ by race or household income.
- Adults who were high school graduates (83.8%) had a higher prevalence of inadequate fruit and vegetable consumption compared with adults with a college education (73.5%).

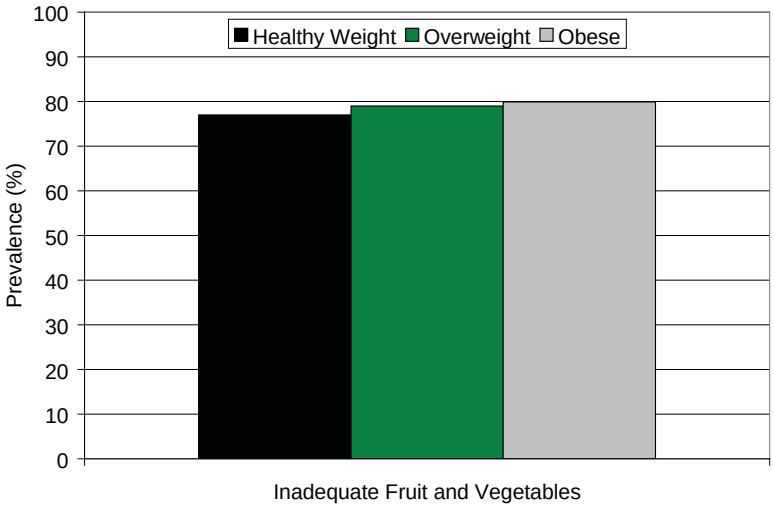
Map 4. Prevalence of inadequate fruit and vegetable consumption* among adults 18 and over in Michigan by local health department jurisdiction, 2005 to 2007.



Source: Michigan Behavioral Risk Factor Survey (BRFS)
*The proportion whose total reported consumption of fruits (including juice) and vegetables was less than five times per day.

- The prevalence of inadequate fruit and vegetable consumption in Michigan from 2005 to 2007 was 77.8%.
- More than 75% of adults in 38 of the 45 local heath department areas reported inadequate fruit and vegetable consumption.
- Muskegon Local Health Department had the highest reported inadequate fruit and vegetable intake (84.6%) and Benzie-Leelanau Local Health Department had the lowest (66.6%). This difference is not significant.
- See Appendix E for a list of all the health department areas and their corresponding prevalences.

Figure 20. Prevalence of inadequate fruit and vegetable consumption among, adults 18 and over, by weight status in Michigan, 2008.



Source: Michigan Behavioral Risk Factor Survey (BRFS)

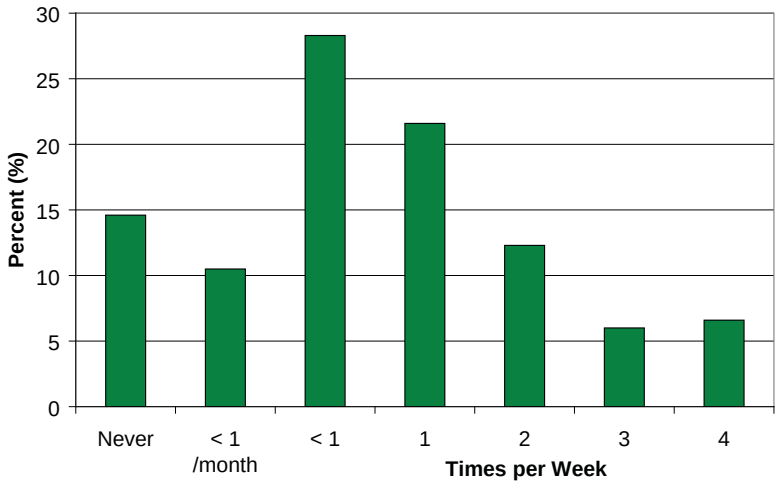
- In 2008, Michigan adults who were obese reported a slightly higher prevalence of inadequate fruit and vegetable consumption (79.9%) compared with adults that reported a BMI that was normal (77.0%) or overweight (79.0%). These differences, however, were not statistically significant.

Fast Food

The consumption of fast food, a recent trend in the American lifestyle, is a suggested contributor to the rise in obesity.[5] Meals consumed away from home tend to be low in fruits and vegetables, generously portioned, served in combination packages, and offered with sugar-sweetened beverages. It stands to reason that today, eating away from home can make it difficult to follow the current evidence-based dietary advice. See Appendix I for the survey question used in this analysis.

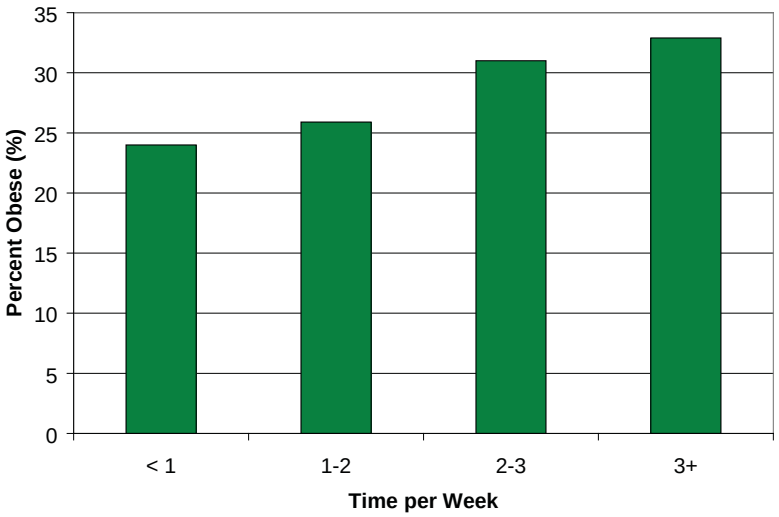
The proportion of all food expenditures that represent meals consumed out of the home has increased from 25% in 1957 to 49% in 2007. Of the meals and snacks consumed out of the home the proportion of sales that were from fast food restaurants increased from 5% in 1958 to 37% in 2007.[3]

Figure 21. Prevalence of fast food consumption among adults, 18 and over, in Michigan, 2005.



Sources: Michigan Behavioral Risk Factor Survey (BRFS).

Figure 22. Prevalence of obesity by frequency of fast food consumption among adults, 18 and over, in Michigan, 2005.



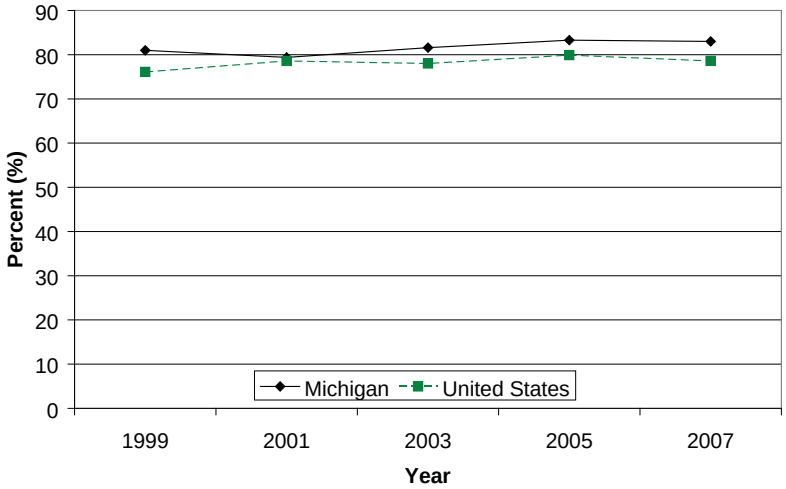
Sources: Michigan Behavioral Risk Factor Survey (BRFS).

- In 2005, nearly one-in-four (24.9%) Michigan adults went to a fast food restaurant two or more times a week.
- The prevalence of fast food consumption for males (30.4%) was higher than for females (20.0%) and blacks (30.3%) was higher than whites (23.9%).
- There were no differences by education but prevalence did decrease with age from 36.5% of 18 to 24 year-olds to 11.3% of those aged 65 and older.
- The prevalence of obesity increased with increased number of visits to fast food restaurants in a week from less than once a week (24.0%) to more than three visits a week (32.9%).
- The odds of being obese were about 60% greater for those eating fast food two or more times a week compared to those consuming it less frequently.
- The most frequent reason people reported going to a fast food restaurant was speed and convenience (62.7%).

Youth

The 2005 Dietary Guidelines for Americans[1] recommend that children, ages 2 to 18 years, eat between 1 to 2.5 cups of fruit daily and 1 to 4 cups of vegetables daily, depending on calorie needs, see Appendix A. These recommendations also encourage children to consume 2 to 3 cups of fat-free or low-fat milk products a day.

Figure 23. Prevalence of inadequate fruit and vegetable consumption* among youth, grades 9 through 12, in Michigan and United States, 1999 to 2007.



Sources: Michigan Youth Risk Behavior Survey and CDC Youth Risk Behavior Surveillance System.
*Percentage of students who ate fruits and vegetables (excluding french fries, fried potatoes and potato chips) less than five times per day.

- In the past nine years, the prevalence of Michigan youth that haven't met the minimum recommendations for fruits and vegetables fluctuated from 81.0% in 1999 to 83.0% in 2007.
- In 2007, prevalence of inadequate fruit and vegetable consumption among Michigan youth was similar among blacks (78.3%), Hispanics (82.1%) and whites (83.9%).
- The prevalence for females (83.6%) and males (82.3%) were very similar in Michigan, 2007.

Figure 24. Prevalence of youth, grades 9 through 12, who consumed the following items one or more times per day in Michigan and United States, 2007.

Measure	Prevalence (%) Michigan	Prevalence (%) U.S.
Fruit	84.3	85.3
Green Salad	64.7	64.1
Potatoes	71.4	69.1
Carrots	48.3	46.3
Other Vegetables	82.2	82.4
Milk (3 or more glasses)	14.5	14.1

Sources: Michigan Youth Risk Behavior Survey and CDC Youth Risk Behavior Surveillance System.

- In 2007, the prevalence of white youth who consumed the following: fruit, green salad, potatoes, carrots, other vegetables and milk was significantly higher than black youth. However, white youth (16.1%) had a similar prevalence as black youth (21.7%) for eating five or more servings of fruits and vegetables per day.
- Michigan's prevalence was similar to the United States for all of the items in the table.

Sugar-Sweetened Beverages

Sugars can be found naturally in nutrient dense foods such as fruit or milk. Sugars can also be added to beverages such as soda, however, soda provides calories but few or no nutrients. The more sugar-sweetened beverages a person consumes, the more likely he or she is to be overweight.[6]

Figure 25. Prevalence of youth, grades 9 through 12, that drank soda or pop* one or more times per day in the past week in Michigan and United States, 2007.

Measure	Prevalence (%) Michigan	Prevalence (%) U.S.
Total	28.9	33.8
Male	34.6	38.6
Female	23.1	29.0
Black	25.8	37.6
White	29.9	34.0
Hispanic	27.2	33.4

* Percentage of students who drank a can, bottle, or glass of soda or pop (not including diet soda or diet pop) at least one time per day during the seven days before the survey.
Sources: Michigan Youth Risk Behavior Survey and CDC Youth Risk Behavior Surveillance System.

- In 2007, the prevalence of Michigan youth that drank at least one pop per day (28.9%) was lower than the United States youth (33.8%) prevalence.
- There was a statistically significant difference between prevalence of male (34.6%) and female (23.1%) soda or pop drinkers in Michigan.
- The racial pattern between Michigan and the United States for soda consumption is different.

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Introduction:

Breastfeeding has many health and personal benefits for mothers and babies and is consequently recommended as the best start for life. Breast milk is easy to digest and contains antibodies that can protect infants from bacterial and viral infections.[1] Exclusive breastfeeding is sufficient to support optimal growth and development for approximately the first 6 months.[2]

Some studies suggest that infants who are breastfed have decreased rates of sudden infant death syndrome in the first year of life, type 1 and type 2 diabetes, lymphoma, leukemia, and Hodgkin's disease. Research also indicates that women who breastfeed may have lower rates of certain breast and ovarian cancers.[2]

Since 1981 there have been a number of studies that have provided varying degrees of support that breastfeeding reduces the risk of obesity among children. Three reports, which combined data from many studies over the past 30 years, suggest a 15% to 30% reduced risk for obesity for children who were breastfed. This relationship was stronger for exclusive breastfeeding than for breastfeeding combined with formula; the longer the babies continued to breastfeed, the less likely they were to become obese.[3]

Michigan collects data on breastfeeding primarily from two surveys. The first is the Pregnancy Risk Assessment Monitoring Survey (PRAMS) which surveys women that had a live birth within the year. The second is the Pediatric Nutrition Surveillance System (PedNSS) which collects information on the health and nutrition of participants in federally-funded maternal and child health programs. In Michigan PedNSS is populated exclusively by participants of the state's Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), see Appendix D for more information.

Key Findings:

Women

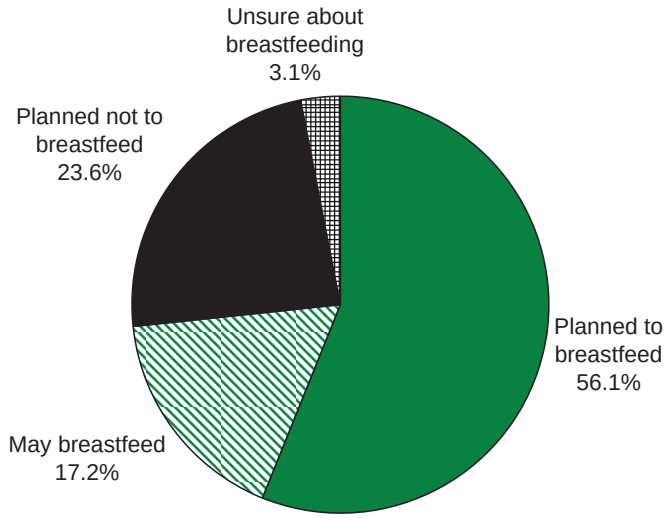
- In 2006, 56.1% of Michigan women who had a live birth reported that they planned to breastfeed before their delivery. Almost 70% of women who had a live birth initiated breastfeeding.
- White, non-Hispanics had a higher prevalence (71.7%) than black, non-Hispanics (55.7%) for breastfeeding initiation.
- The prevalence of breastfeeding initiation increased with education and income.
- Women whose BMI was at a healthy weight had a higher prevalence of ever breastfeeding compared with women whose BMI was higher.
- The average duration of breastfeeding was 6.8 weeks among women who breastfed for longer than a week but discontinued before being surveyed.

Low-Income Children

- The overall prevalence of WIC participants that were breastfed was 49.0%.
- In 2007, 62.3% of participants stopped breastfeeding within 10 days.

Women who had a live birth:

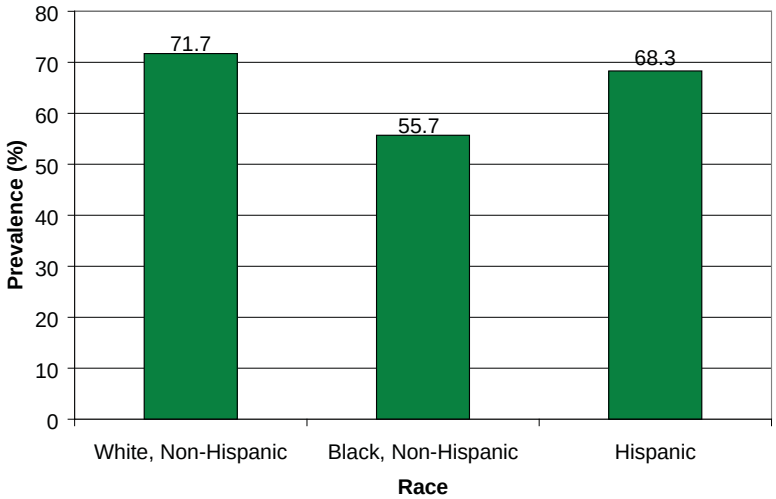
Figure 26. Pre-delivery breastfeeding plans, Michigan 2006.



Source: Michigan Pregnancy Risk Assessment Monitoring System (PRAMS)

- In 2006, 56.1% of women planned to breastfeed and an additional 17.2% thought they might breastfeed.
- The prevalence of women who reported they thought they were going to breastfeed prior to delivery increased with educational attainment.
- In 2006, 81.7% of women reported that during at least one of their prenatal care visits a health professional spoke with them about breastfeeding their baby.

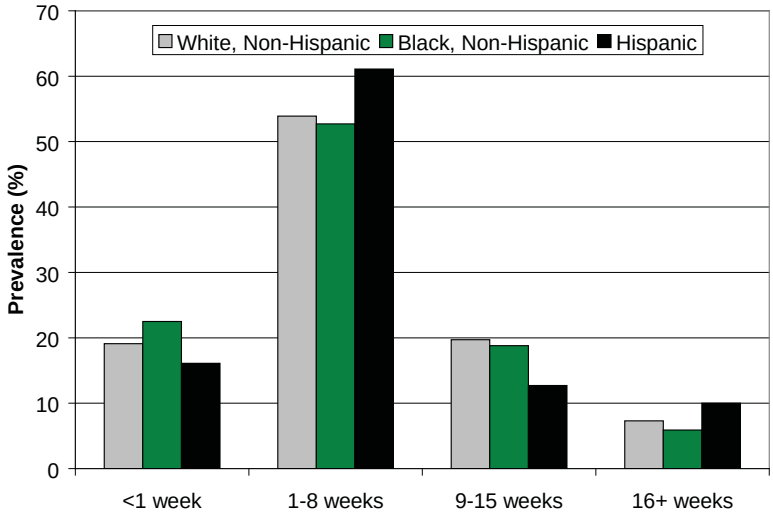
Figure 27. Prevalence of breastfeeding initiation among women by race/ethnicity, Michigan 2006.



Source: Michigan Pregnancy Risk Assessment Monitoring System (PRAMS)

- In 2006, 69.2% of women reported they had initiated breastfeeding. This is below the 2005 national rate (74.2%) and the *Healthy People 2010* goal (75%).
- White, non-Hispanics reported the highest prevalence (71.7%) and black, non-Hispanics the lowest (55.7%).
- The prevalence of breastfeeding increased with education and income, 2004 to 2006 survey data.
- Women whose pre-pregnancy BMI was a healthy weight range reported the highest prevalence of ever breastfeeding (74.1%) compared with women whose BMI was higher.

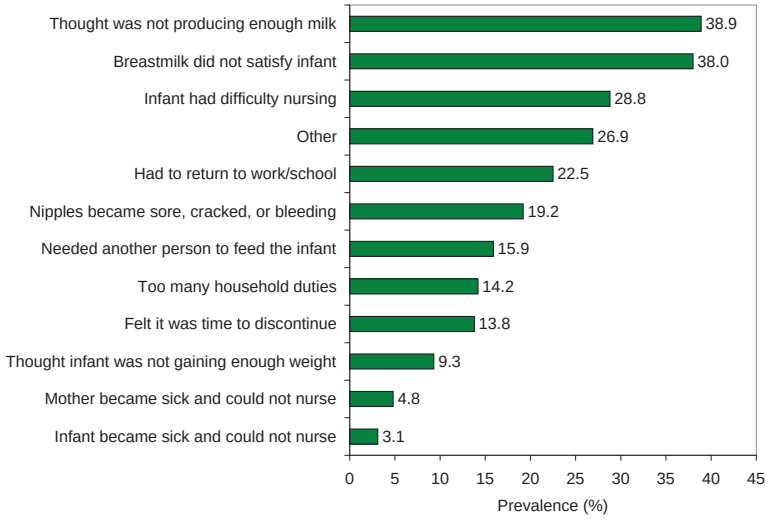
Figure 28. Breastfeeding duration among women who breastfed for longer than a week, but discontinued before surveyed, by maternal race/ethnicity, Michigan 2006.



Source: Michigan Pregnancy Risk Assessment Monitoring System (PRAMS)

- In 2006, Michigan women who breastfed for longer than a week, but discontinued before being surveyed, on average breastfed for 6.8 weeks.
- Breastfeeding duration did not significantly vary by race/ethnicity.
- Women with a college degree or higher breastfed their infants for the longest period (7.6 weeks).
- Women aged 18 and younger breastfed for an average of 4.2 weeks. Women in the age group 25 to 29 years, where the highest proportion of births occur, averaged 6.7 weeks of breastfeeding.

Figure 29. Barriers to breastfeeding continuation among women who breastfed longer than a week, but discontinued breastfeeding before surveyed, Michigan 2004 to 2006.

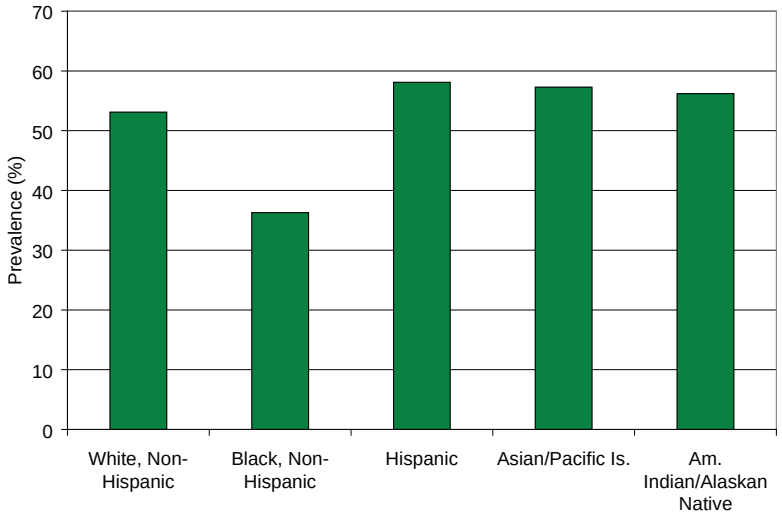


Source: Michigan Pregnancy Risk Assessment Monitoring System (PRAMS)

- The most frequently reported barriers to breastfeeding were that the mother didn't think she was producing enough milk (38.9%) and that the milk did not satisfy the infant (38.0%).

Low-Income Infants:

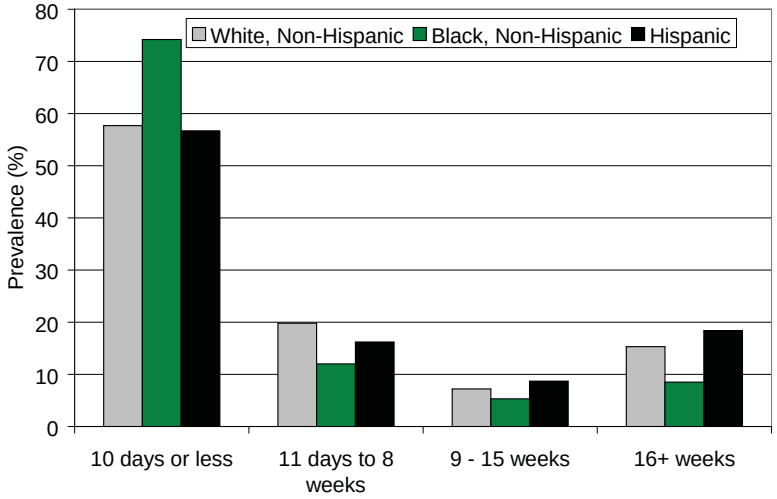
Figure 30. Prevalence of breastfeeding initiation among WIC participants, by race/ethnicity, Michigan 2007.



Source: Michigan Pediatric Nutrition Surveillance

- In 2007, the overall prevalence of breastfeeding among infants in the WIC system was 49.0%.
- The racial group with the lowest prevalence of ever being breastfed was black, non-Hispanic infants (36.3%).
- Almost 45% of PedNSS infants were never breastfed.
- There were no differences in breastfeeding initiation by mothers' prenatal BMI status.

Figure 31. Breastfeeding duration among WIC participants, by race/ethnicity, Michigan 2007.



Source: Michigan Pediatric Nutrition Surveillance

- In 2007, 62.3% of the participants stopped breastfeeding within 10 days.
- The majority of infants, among all race-ethnic groups, stopped breastfeeding within 10 days, with the highest rate among black, non-Hispanic infants (74.2%).
- There were no differences in breastfeeding duration by mothers' prenatal BMI status.

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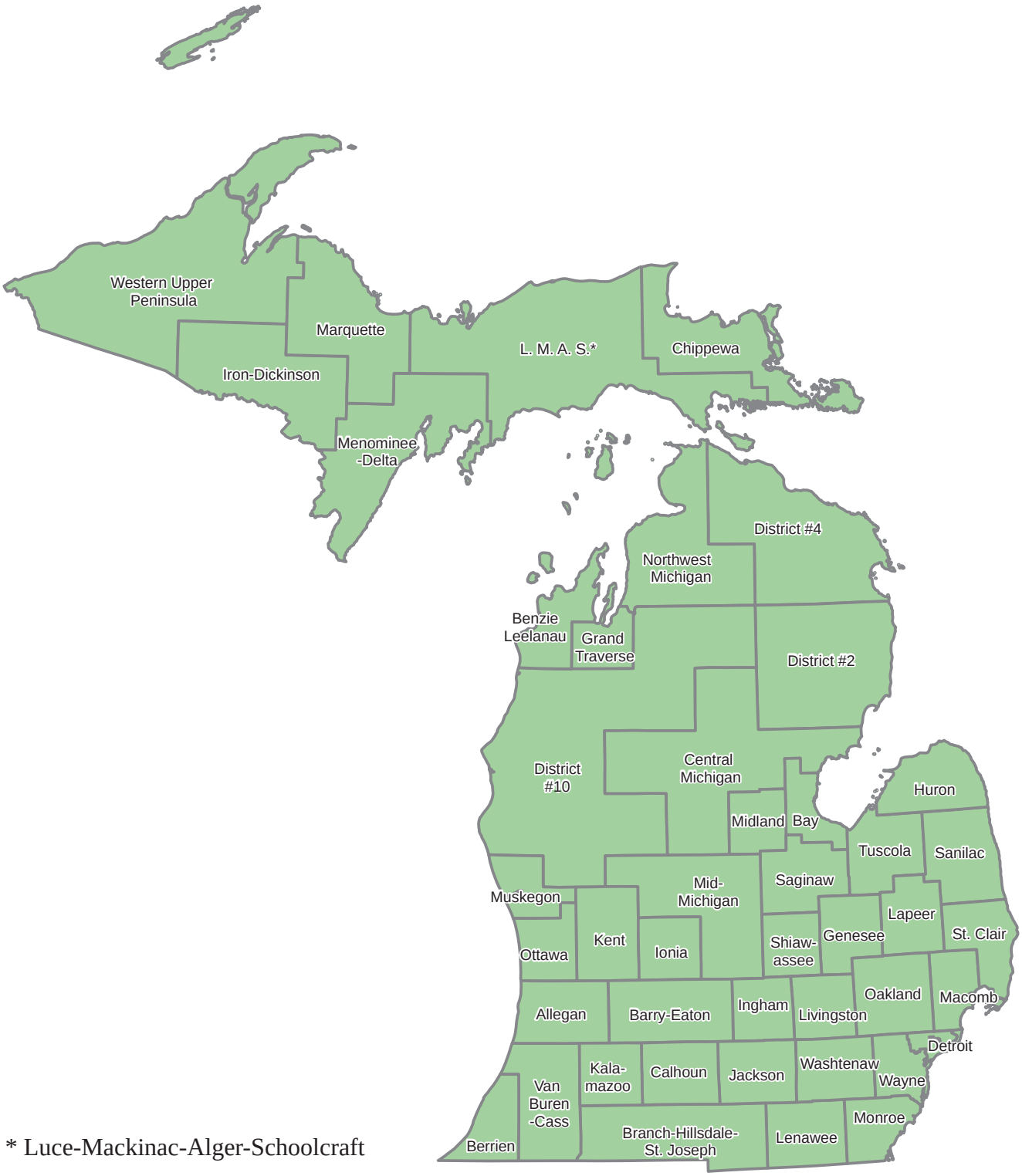
Appendix A: The Local Health Department Jurisdictions in Michigan.



* Luce-Mackinac-Alger-Schoolcraft

Appendix B: Overweight and obesity prevalence rates for Michigan adults, 2005 to 2007.

Local Health Department	Obese (%)	Overweight (%)	Overweight or Obese (%)
Allegan	28.6	35.3	63.9
Barry-Eaton	29.0	36.2	65.2
Bay	27.7	36.5	64.2
Benzie-Leelanau	31.5	32.9	64.4
Berrien	26.2	45.1	71.3
Branch-Hillsdale-St. Joseph	29.2	34.7	63.9
Calhoun	26.9	37.2	64.1
Central Michigan	27.0	38.7	65.7
Chippewa	36.1	25.5	61.6
Detroit	38.1	31.0	69.1
District #10	26.8	36.4	63.2
District #2	35.0	33.4	68.4
District #4	23.2	40.3	63.5
Genesee	27.6	35.1	62.7
Grand Traverse	23.9	37.0	60.9
Huron	30.3	39.0	69.3
Ingham	27.8	38.5	66.3
Ionia	28.9	35.4	64.3
Iron-Dickinson	33.7	36.7	70.4
Jackson	27.7	40.5	68.2
Kalamazoo	25.3	36.9	62.2
Kent	25.1	36.3	61.4
Lapeer	33.5	33.2	66.7
Lenawee	29.7	41.0	70.7
Livingston	27.1	35.5	62.6
Luce-Mackinac-Alger-Schoolcraft (LMAS)	28.0	35.5	63.5
Macomb	25.9	38.1	64.0
Marquette	28.3	48.4	76.7
Menominee-Delta	26.1	38.6	64.7
Midland	24.5	35.7	60.2
Mid-Michigan	31.5	33.6	65.1
Monroe	26.5	38.7	65.2
Muskegon	29.1	38.6	67.7
Northwest Michigan	25.7	43.2	68.9
Oakland	21.6	37.2	58.8
Ottawa	25.1	37.6	62.7
Saginaw	33.8	35.3	69.1
Sanilac	39.1	29.3	68.4
Shiawassee	25.9	32.4	58.3
St. Clair	30.5	34.8	65.3
Tuscola	36.3	33.2	69.5
Van Buren-Cass	24.1	36.0	60.1
Washtenaw	23.6	35.1	58.7
Wayne, excluding Detroit	27.7	34.6	62.3
Western Upper Peninsula	33.1	34.2	67.3

Source: Michigan Behavioral Risk Factor Survey (BRFS)

Appendix C: Physical inactivity prevalence rates for Michigan adults, 2005 to 2007.

Local Health Department	No Leisure Time Physical Activity	Inadequate Physical Activity
Allegan	23.2	42.8
Barry-Eaton	20.2	43.4
Bay	22.5	54.9
Benzie-Leelanau	21.9	35.6
Berrien	21.7	46.7
Branch-Hillsdale-St. Joseph	23.7	51.5
Calhoun	21.5	51.8
Central Michigan	26.5	51.0
Chippewa	24.5	45.5
Detroit	33.0	56.7
District #10	23.5	47.6
District #2	28.5	49.8
District #4	25.5	50.2
Genesee	25.5	53.2
Grand Traverse	11.3	41.9
Huron	13.9	41.3
Ingham	20.6	49.7
Ionia	19.9	54.0
Iron-Dickinson	24.1	55.8
Jackson	22.6	51.8
Kalamazoo	18.8	52.3
Kent	17.6	47.6
Lapeer	19.9	54.2
Lenawee	23.9	46.5
Livingston	14.5	42.8
Luce-Mackinac-Alger-Schoolcraft (LMAS)	17.5	31.0
Macomb	22.3	51.7
Marquette	20.7	44.4
Menominee-Delta	23.5	54.8
Midland	17.2	47.9
Mid-Michigan	22.1	51.0
Monroe	22.9	47.3
Muskegon	28.8	50.8
Northwest Michigan	25.2	51.7
Oakland	17.3	50.4
Ottawa	18.3	53.4
Saginaw	28.0	55.9
Sanilac	20.4	47.2
Shiawassee	15.5	34.1
St. Clair	19.9	45.3
Tuscola	24.0	53.4
Van Buren-Cass	27.0	61.3
Washtenaw	17.0	45.8
Wayne, excluding Detroit	23.7	50.4
Western Upper Peninsula	19.1	45.0

Source: Michigan Behavioral Risk Factor Survey (BRFS)

Appendix D: Fruit and vegetable recommendations by age, gender and activity level.

Females	Age	Fruits	Vegetables	Males	Age	Fruits	Vegetables
Less Active	2-3	1 cup	1 cup	Less Active	2-3	1 cup	1 cup
	4-8	1 cup	1.5 cups		4-8	1.5 cups	1.5 cups
	9-13	1.5 cups	2 cups		9-13	1.5 cups	2.5 cups
	14-18	1.5 cups	2.5 cups		14-18	2 cups	3 cups
	19-30	2 cups	2.5 cups		19-30	2 cups	3 cups
	31-50	1.5 cups	2.5 cups		31-50	2 cups	3 cups
	51+	1.5 cups	2 cups		51+	2 cups	2.5 cups
Moderately Active	2-3	1 cup	1 cup	Moderately Active	2-3	1 cup	1 cup
	4-8	1.5 cups	1.5 cups		4-8	1.5 cups	1.5 cups
	9-13	1.5 cups	2 cups		9-13	1.5 cups	2.5 cups
	14-18	2 cups	2.5 cups		14-18	2 cups	3 cups
	19-30	2 cups	2.5 cups		19-30	2 cups	3 cups
	31-50	2 cups	2.5 cups		31-50	2 cups	3 cups
	51+	1.5 cups	2.5 cups		51+	2 cups	2.5 cups
Active	2-3	1 cup	1 cup	Active	2-3	1 cup	1 cup
	4-8	1.5 cups	1.5 cups		4-8	1.5 cups	2 cups
	9-13	1.5 cups	2.5 cups		9-13	2 cups	2.5 cups
	14-18	2 cups	3 cups		14-18	2.5 cups	3.5 cups
	19-30	2 cups	3 cups		19-30	2.5 cups	4 cups
	31-50	2 cups	3 cups		31-50	2.5 cups	3.5 cups
	51+	2 cups	2.5 cups		51+	2 cups	3 cups

Source: Created using CDC More Matters and Dietary Guidelines for Americans

Appendix E: Prevalence rates for Michigan adults who do not meet the recommendations for fruit and vegetable consumption, 2005 to 2007.

Local Health Department	Inadequate Fruit and Vegetables
Allegan	78.5
Barry-Eaton	78.0
Bay	76.4
Benzie-Leelanau	66.6
Berrien	78.9
Branch-Hillsdale-St. Joseph	81.9
Calhoun	78.1
Central Michigan	79.7
Chippewa	83.7
Detroit	77.2
District #10	77.8
District #2	83.8
District #4	75.8
Genesee	82.1
Grand Traverse	78.7
Huron	75.2
Ingham	71.3
Ionia	77.0
Iron-Dickinson	68.8
Jackson	78.6
Kalamazoo	78.3
Kent	77.0
Lapeer	80.1
Lenawee	77.8
Livingston	74.7
Luce-Mackinac-Alger-Schoolcraft (LMAS)	71.5
Macomb	79.0
Marquette	76.7
Menominee-Delta	79.7
Midland	70.8
Mid-Michigan	83.4
Monroe	76.8
Muskegon	84.6
Northwest Michigan	76.2
Oakland	75.4
Ottawa	82.1
Saginaw	80.4
Sanilac	77.3
Shiawassee	78.5
St. Clair	79.8
Tuscola	77.9
Van Buren-Cass	82.0
Washtenaw	72.7
Wayne, excluding Detroit	77.7
Western Upper Peninsula	76.7

Source: Michigan Behavioral Risk Factor Survey (BRFS)

Appendix F: Healthy People 2010 goals related to obesity, physical activity, nutrition and breastfeeding.

(Objective 16-19) Increase the proportion of mothers who breastfeed their babies to 75% in early postpartum period, 50% at 6 months and 25% at 1 year. Also, increase the proportion of mothers who breastfeed exclusively to 40% through 3 months and 17% through 6 months.
(Objective 19-1) Increase the proportion of adults who are at a healthy weight to 60%.
(Objective 19-2) Reduce the proportion of adults who are obese to 15%.
(Objective 19-3) Reduce the proportion of children and adolescents who are overweight or obese to 5%.
(Objective 19-4) Reduce the growth retardation among low-income children under age 5 years to 5%.
(Objective 19-5) Increase the proportion of persons aged 2 years and older who consume at least two daily servings of fruit to 75%.
(Objective 19-6) Increase the proportion of persons aged 2 years and older who consume at least three daily servings of vegetables, with at least one-third being dark green or orange vegetables to 50%.
(Objective 19-7) Increase the proportion of persons aged 2 years and older who consume at least six daily servings of grain products, with at least three being whole grains to 50%.
(Objective 19-8) Increase the proportion of persons aged 2 years and older who consume less than 10 percent of calories from saturated fat to 75%.
(Objective 19-9) Increase the proportion of persons aged 2 years and older who consumer no more than 30 percent of calories from total fat to 75%.
(Objective 19-10) Increase the proportion of persons aged 2 years and older who consume 2,400mg or less of sodium daily to 65%.
(Objective 19-11) Increase the proportion of persons aged 2 years and older who meet dietary recommendations for calcium to 75%.
(Objective 19-12) Reduce iron deficiency among young children and females of childbearing age to 5% of children aged 1 to 2 years, 1% for children aged 3 to 4 years and 7% for nonpregnant females aged 12 to 49 years.
(Objective 19-13) Reduce anemia among low-income pregnant females in their third trimester to 20%.
(Objective 19-14) (Developmental) Reduce iron deficiency among pregnant females.
(Objective 19-15) (Developmental) Increase the proportion of children and adolescents aged 6 to 19 years whose intake of meals and snacks at school contributes to good overall dietary quality.
(Objective 19-16) Increase the proportion of worksites that offer nutrition or weight management classes or counseling to 85%.
(Objective 19-17) Increase the proportion of physician office visits made by patients with a diagnosis of cardiovascular disease, diabetes, or hyperlipidemia that include counseling or education related to diet and nutrition to 75%.

(Objective 19-18) Increase food security among U.S. households to 94% and in so doing reduce hunger.
(Objective 22-1) Reduce the proportion of adults who engage in no leisure-time physical activity to 20%.
(Objective 22-2) Increase the proportion of adults who engage regularly, preferably daily, in moderate physical activity for at least 30 minutes per day to 30%.
(Objective 22-3) Increase the proportion of adults who engage in vigorous physical activity that promotes the development and maintenance of cardiorespiratory fitness 3 or more days per week for 20 minutes or more per occasion to 30%.
(Objective 22-4) Increase the proportion of adults who perform physical activities that enhance and maintain muscular strength and endurance to 30%.
(Objective 22-5) Increase the proportion of adults who perform physical activities that enhance and maintain flexibility to 43%.
(Objective 22-6) Increase the proportion of adolescents who engage in moderate physical activity for at least 30 minutes on 5 or more of the previous 7 days to 35%.
(Objective 22-7) Increase the proportion of adolescents who engage in vigorous physical activity that promotes cardiorespiratory fitness 3 or more days per week for 20 or more minutes per occasion to 85%.
(Objective 22-8) Increase the proportion of the Nation's public and private schools that require daily physical education for all students to 25% for middle and junior high schools and to 5% for senior high schools.
(Objective 22-9) Increase the proportion of adolescents who participate in daily school physical education to 50%.
(Objective 22-10) Increase the proportion of adolescents who spend at least 50 percent of school physical education class time being physically active to 50%.
(Objective 22-11) Increase the proportion of adolescents who view television 2 or fewer hours on a school day to 75%.
(Objective 22-12) (Developmental) Increase the proportion of the Nations' public and private schools that provide access to their physical activity spaces and facilities for all persons outside of normal school hours (that is, before and after the school day, on weekends, and during summer and other vacations).
(Objective 22-13) Increase the proportion of worksites offering employer-sponsored physical activity and fitness programs to 75%.
(Objective 22-14) Increase the proportion of trips made by walking to 25% for adults aged 18 years and older and to 50% for children and adolescents aged 5 to 15 years.
(Objective 22-15) Increase the proportion of trips made by bicycling to 2% for adults aged 18 years and older and to 5% for children and adolescents aged 5 to 15 years.

Source: *Healthy People 2010*, Chapters 16, 19 and 22.

Appendix G: List of abbreviations.

AHA ..... American Heart Association
BMI ..... Body Mass Index
BRFS ..... Behavioral Risk Factor Survey
CDC ..... Centers for Disease Control and Prevention
CHD ..... Coronary Heart Disease
DHHS ..... Department of Health and Human Services
DNPAO ..... Division of Nutrition, Physical Activity and Obesity
HP 2010 ..... *Healthy People 2010*
LHD ..... Local Health Department
L.M.A.S. ..... Luce-Mackinac-Alger-Schoolcraft
MDCH ..... Michigan Department of Community Health
PedNSS ..... Pediatric Nutrition Surveillance System
PRAMS ..... Pregnancy Risk Assessment Monitoring System
TV ..... Television
WIC ..... Women, Infants and Children
YRBS ..... Youth Risk Behavior Survey

Appendix H: Methods

Prevalence

Prevalence is the proportion of individuals in a population who have the condition at a point in time or during a given time period. It is often used to describe the health burden on a given population. Prevalence is computed by dividing the number of existing cases at a particular point or period in time by the total population from which the cases came. It is often multiplied by 100 and expressed as a percent. In this report, prevalence estimates are generated in the analysis of data from the Behavioral Risk Factor Surveillance System and Youth Risk Behavior Survey.

$$\text{Prevalence} = \frac{\text{Number of existing cases of disease}}{\text{Total population}}$$

For example, 25.1% of adults in Michigan do not participate in leisure-time physical activity. This is the prevalence of no leisure-time physical activity. The number of survey respondents who reported no leisure-time physical activity was divided by the total number of respondents that were asked the question. This proportion is also weighted to adjusted for the survey design and nonresponse.

Geographical Information System Mapping

Environmental Systems Research Institute's (ESRI) ArcGIS Map was used to create the maps presented in the report. Data used in the maps were from the Behavioral Risk Factor Survey. Analyses of the data used in the maps were performed externally from the ArcGIS program.

Appendix I: Data Sources

Name: Michigan Behavioral Risk Factor Surveillance System
Acronym: BRFSS
Basic Purpose and History: The BRFSS is a source of estimates of the prevalence of certain health behaviors, conditions, and practices associated with leading causes of death. Michigan has conducted the BRFSS survey since 1987.
Data Collection Process: Annual estimates are based on data collected by telephone from a sample of Michigan adults selected using random-digit dial methods. It is a population-based representative sample of non-institutionalized Michigan residents. The data are weighted to represent estimates for the general adult population. BRFSS interviewers use a Computer Assisted Telephone Interviewing (CATI) system, which provides the interviewer with prompts. The interviewer types the respondent's responses directly into the computer, providing quality control and minimizing interviewer error.
Population Included: A record is a completed telephone interview. The selected respondent must be a Michigan resident, 18 years of age or older who lives in a private residence and has a telephone. One randomly selected adult from a household is interviewed.
Additional Information: For more information about the BRFSS and national data for comparison, visit http://www.cdc.gov/brfss/index.htm. For a complete report from the Michigan survey, visit http://www.michigan.gov/brfs.

Fast Food Questions:

- The next questions are about eating out. How often do you usually go to a fast food restaurant?
- When you go to a fast food restaurant, what is the main reason you choose this type of a restaurant instead of another type?

Name: Youth Risk Behavior Survey
Acronym: YRBS
Basic Purpose and History: YRBS was designed to determine the prevalence of health-risk behaviors among high school students. It was also designed to monitor trends and progress toward achieving national health objectives. Michigan first administered the survey in 1997.
Data Collection Process: A two-stage cluster sampling method is implemented in which public schools with grades 9 through 12 are first selected, followed by classes within those schools. The questionnaire is self-administered by students. The survey is conducted every odd year at the national, state and local levels.
Population Included: Public and private school students in grades 9 through 12 are eligible to participate.
Additional Information: For more information about the YRBS and national data for comparison, visit http://www.cdc.gov/HealthyYouth/yrbs/index.htm.

Name: Pregnancy Risk Assessment Monitoring System
Acronym: PRAMS
Basic Purpose and History: PRAMS is a surveillance program that is conducted in collaboration with the Centers for Disease Control and Prevention and state health departments. The purpose is to collect data on postpartum mothers regarding maternal attitudes and experiences before, during and after pregnancy. Michigan first administered the survey in 1988.
Data Collection Process: A mixed method data collection procedure is used consisting of mail surveys with telephone follow up for non-respondents. Women are sampled between 2 and 6 months postpartum. Using birth certificates, women are randomly selected with oversampling of specific populations with historically lower response rates.
Population Included: The selected respondent must be a female Michigan resident who had a live birth in that survey year.
Additional Information: Visit CDC's PRAMS website (http://www.cdc.gov/prams/) for more information about the PRAMS and national data for comparison.

Name: Pediatric Nutrition Surveillance System
Acronym: PedNSS
Basic Purpose and History: PedNSS is a national surveillance systems administered by the CDC. It is used by public health professionals to collect, analyze, and disseminate information on the health and nutrition of participants in federally-funded maternal and child health programs. In Michigan, PedNSS is populated exclusively by participants of the state's Special Supplemental Nutrition Program for Women, Infants, and Children (WIC).
Data Collection Process: In Michigan, information about each participant is recorded at the local WIC agency and verified by a nurse, registered dietitian, nutritionist, or competent professional authority. The information goes directly into the mainframe computer system (M-TRACX), is extracted quarterly, and sent to the CDC. There the information is edited and crosschecked for accuracy. BMI values are calculated from the child's last reported height and weight values and their age is based on their whole year at the time of reporting.
Population Included: Four eligibility criteria must be met for persons to enroll in the Michigan WIC Program: 1) be a pregnant or postpartum woman, infant, or child (under the age of five); 2) be a resident of Michigan; 3) have an income at or below 185% of the Poverty Income Guideline or participate in another state-administered program that utilizes the same income guideline; and 4) be classified by a health professional as "nutritionally at risk." Annually, Michigan WIC serves an estimated 60,000 women and 220,000 infants and children under the age of five years old.
Additional Information: For more information about WIC and PedNSS visit www.michigan.gov/wic and http://www.cdc.gov/PEDNSS/.

Appendix J: References

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