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ADDRESSING MICHIGAN'S
OBESITY PROBLEM

AUGUST 2014

REPORT 387

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AUGUST 2014

REPORT 387

This CRC report was made possible through a grant from
the Michigan Health & Hospital Association.

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Summary

With one of the highest rates of obesity in the country, Michigan has a weight problem. Currently, one in every three Michigan adults and one in eight children are obese. Obesity is associated with major health risks such as diabetes, coronary heart disease, hypertension, stroke, asthma, and other serious chronic diseases.

In addition to increased health risks, obesity results in significant economic costs. Obese individuals are more likely to have a number of serious medical conditions and thus incur higher medical costs. These costs increase significantly among those classified as severely obese. The high rate of obesity among those insured through Medicaid, a state and federally funded health insurance program for low-income individuals and families, means that more tax dollars are being funneled toward this problem, leaving less for other important policy matters such as education and local governments.

Lesser known costs of obesity are a reduction in the productivity of the workforce through absenteeism, short-term and long-term disability, and reduced productivity while present at work. These factors increase business costs and diminish the competitiveness and economic viability of Michigan businesses.

Additionally, obesity has environmental and human capital costs. More gasoline is consumed by transporting obese persons, raising fuel expenditures and increasing emissions of greenhouse gases. Obese children and adolescents tend to perform lower than average in school and on average will eventually complete fewer years of school than their healthy weight peers. As obesity rates climb, it is becoming more difficult to find physically capable workers who can serve in the military, work in public safety positions and other jobs requiring manual labor. These factors diminish Michigan's human capital through reduced capacity of the workforce.

Obesity Rates in Michigan. While on average, 31.1 percent of Michigan adults are obese, the rates by

county vary widely. Saginaw County has the highest adult obesity rate at 39.7 percent of its adult population, while Washtenaw has the lowest rate at 23.3 percent of its adult population. This CRC report explores reasons why these rates may vary across the state and why Michigan's obesity rate is so much higher than that in most other states.

Risk Factors for Obesity. A plethora of factors can and do contribute to obesity. Obesity results when individuals intake a higher amount of energy (food) than they expend (physical activity). Researchers generally posit that no one factor drives increased caloric intake or decreased physical activity that results in obesity. In fact, various factors and institutions within a population may explain the complexity of these influences on obesity. These factors include societal norms and values; sectors of influence such as government, health care, education, and businesses; the behavioral setting of communities, worksites, health care, and schools; and the demographic, psychosocial, and genetic factors of an individual, their home, and their family.¹

More specifically, risk factors for obesity may include:

- Limited access to nutritious foods and easy access to low nutrition foods;
- Low rates of activity among children and adolescents during school and outside of school;
- Lack of opportunity for and access to physical activity among adults during the workday and in their communities;
- High prices for healthy foods;
- Confusion about nutrition facts and general lack of knowledge of healthy nutrition and lifestyle principles;
- Insufficient coverage of obesity treatment by health insurers;

¹ IOM (Institute of Medicine). *Accelerating Progress in Obesity Prevention: Solving the Weight of the Nation*. Washington, DC: The National Academies Press. 2012.

- Distribution of the costs of obesity among everyone, not just obese persons; and
- Insufficient public health expenditures.

Each of these factors are complex and often interact with one another. Most of these risk factors are real and present issues driving obesity rates in Michigan.

The Role of Government in Obesity Policy. While obesity is very much an individual and personal matter, the widespread costs of obesity demonstrate that the rise in obesity rates impact everyone. Whether or not, and if so, how, the government should intervene to remedy this problem is widely debated. On one hand, many market failures leading to obesity may warrant government intervention: asymmetric information in food nutrition, the limited ability of children to assess the consequences of food and activity choices, and the distribution of the financial costs of obesity to all taxpayers through support of Medicaid. Government also has a long history of intervening in similar matters: requiring bike helmets, restricting smoking in public places, and placing taxes on tobacco and alcohol products, to name a few.

On the other hand, government intervention in the choices of what food people consume, the amounts they consume, and how they spend their leisure activities limits personal choices. Businesses' ability to capitalize on market demand may also be stunted through restrictions on the calorie content in foods, food portion sizes, and the ability to market to certain groups. However, there are proven effective policies that may garner support from stakeholders on both sides of the issue.

School, State, and Local Level Policy Solutions. Based on these factors, and how relevant they are to Michigan's obesity crisis, CRC has identified roughly a dozen potential policy solutions. These solutions are categorized by those best implemented at the school-level, at the state-level, and at the local or community level. These solutions include school-level policies that:

- Ensure availability to healthy food options and minimize access to unhealthy foods;
- Expand opportunities and requirements for physical activity before, during, and after

school hours; and

- Include health education in the curriculum for all grades.

State-level policies include those that:

- Increase public health spending;
- Set and enforce nutrition and physical education standards for all grades;
- Institute a tax on unhealthy foods to decrease consumption and subsidize healthy foods to make them more affordable;
- Adopt and enforce nutrition and physical activity requirements for child care providers; and
- Encourage greater cost-sharing, penalties, and incentives for employer health insurance plans that encourage healthy lifestyles and access to health improving services.

Local-level policies include those that:

- Use zoning and financial incentives to influence food access such as increased availability of healthy foods and decreased access to fast foods;
- Incorporate consideration of active and healthy lifestyles in local government planning processes;
- Improve safe physical activity options for children and adults; and
- Expand community programs that target obesity prevention and reduction.

Because there is no one cause for the growth of obesity in the state, there is not a simple solution. School, state, and local leaders have already learned this through the variety of programs and policies they have implemented. A multitude of factors contribute to the growing instance of obesity and a variety of solutions must be executed. School, state, and local government policies have a unique role in that they have the potential to do a great deal of good, but in the end, they cannot force residents or students to eat less or exercise more. Their role is one that shapes the environment in which we live, work, and learn so as to create opportunities, incentivize actions, and educate about both.

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Michigan has a weight problem. Just fifteen years ago, one in every five adults were classified as obese; today one in every three adults are classified as obese. While in general the problem rests on an increase in caloric intake and a decline in physical activity, many technological, cultural, socioeconomic, environmental, lifestyle, health, community, and infrastructure factors have contributed to weight gain across the state and country over the last 50 years. The economic and health consequences are severe:

- Obesity raises medical expenditures as obese persons are more likely to have one or more serious health conditions;
- Obesity is associated with increased absences from work and decreased at-work productivity, negatively impacting the local, state, and national economies;
- Environmental costs are also higher as it takes more fuel to transport heavier persons;
- Obesity leads to a number of other costs such as lower educational attainment and reduced quality of life.

Being overweight and obese are not the same. Obesity is a condition resulting from too much body fat and is associated with more serious health problems compared to being overweight. Given Michigan's

high obesity rate, the state is paying many of these costs now, but these costs will rise as overweight and obese children and adolescents become overweight and obese adults. Reducing obesity rates may lead to many economic benefits. Lower medical spending may reduce health insurance premium rates. Employers, including the state and local governments, school districts, and private businesses, would not only see greater productivity from their workforce, but a healthier workforce may also be an economic development advantage.

Obesity in both adults and children is an important public policy issue in Michigan and has been recognized as a public health issue by Governor Snyder who called for a variety of policy solutions in his 2011 special message on health.¹ Public policy's role in the obesity epidemic has just begun and not all solutions for improving a region's weight crisis have been rigorously studied for cost effectiveness. Since there is no single cause to the obesity epidemic, similarly there cannot be just one solution. However, public policy options for reducing obesity are plentiful. This report focuses on those public policy options that have demonstrated evidence of effectiveness. A few policy options for which research is lacking are included if they were recommended by experts in the obesity policy arena.

The Difference between Overweight and Obese Weight Classifications

Weight classifications are typically based on an individual's Body Mass Index (BMI), which is a body fat estimator that uses an individual's height and weight to gauge body fat. BMI is the result of dividing weight in kilograms by height in meters squared.

For purposes of weight classification for health and other measures, adults are classified as overweight if their BMI is between 25 and 29.9. Adults are classified as obese if their BMI is 30 or higher. A severely obese classification is used sometimes and is defined as an individual with a BMI of 35 or higher. For example, an adult, male or female, who is 5 feet 10 inches in height and weighs 210 pounds has a BMI of 30.1, putting him or her just within the obese weight status classification. An individual who is 5 feet 4 inches and weighs 150 pounds has a BMI of 25.7 placing him or her in the overweight weight status classification.

For children and adolescents, being overweight and obese are defined by age and gender to reflect changes in body fat at different stages of growth. The Center for Disease Control and Prevention (CDC) classifies children and adolescents who are at the 85th through 94.9th percentile of BMI based on the distribution of heights and weights by age and gender as overweight. Those who are at the 95th percentile or higher are considered obese. For example, a 14 year old boy who is 5 feet 2 inches in height and weighs 130 pounds has a BMI for age at the 90th percentile and is classified as overweight. A six year old girl who is 3 feet 9 inches in height and weighs 55 pounds has a BMI for age in the 95th percentile is classified as obese.

Economic Costs of Obesity

Interestingly, while national obesity rates have increased over the last 50 years (doubled in the last 30 years), the rate of adults classified as overweight has remained stable.² Many of the health and economic costs related to obesity are caused by the growing prevalence of obesity, rather than overall weight gain. Obesity leads to many costs—personal, financial, and economic. Individuals who are obese may experience a reduced quality of life from disease and complications related to the extra weight. They may be discriminated against and may be excluded from many activities in which they would like to partake because of their weight and health status. Obesity is associated with many tangible and nontangible costs. Researchers have identified the major measurable costs from obesity to include medical expenditures, productivity losses, transportation costs, and costs associated with a decline in human capital accumulation.

In Michigan, approximately 10.3 percent of medical expenditures may be attributable to obesity.

Direct Medical Expenditures

Michigan’s medical expenditures have grown at an increasing rate over the last 50 years (see **Box** on page 3). Obesity is just one of the factors causing the rate of growth in medical expenditures to consistently outpace growth in other areas of the economy.¹ At the state level, these costs include direct private medical expenditures and expenditures made through state appropriations to the state’s Medicaid program.

Medical Expenditures

Direct medical expenditures for obese individuals are higher than those for individuals in a normal weight range. The higher costs arise mainly because obese individuals have a higher risk of having one or more serious health conditions: Type 2 diabetes, high cholesterol, high blood pressure, coronary heart disease, stroke, asthma, and others. The costs of diagnosing and treating these diseases and their related complications drive medical spending for the obese at the individual level and as the prevalence of obesity

increases, aggregate medical spending increases as well. One study found that the increase in obesity-related medical spending is primarily driven by an increase in the prevalence of obesity rather than higher treatment costs for obese patients.³

These costs are substantial but the exact amount is difficult to pin down. A recent study estimates the annual cost of treating adult obesity in the United States to be \$168.4 billion or 16.5 percent of national medical expenditures.⁴ Other reports have lower cost estimates of around 9 percent of annual medical costs.⁵ One study found that the rise in obesity alone contributed to 10.4 percent of the total rise in health care spending nationwide between 1987 and 2009.⁶ Another study estimated that the costs of obesity, by way of preventable, obesity-related diseases, will increase by anywhere from \$48 billion to \$66 billion per year in the United States

by 2030.⁷ Research is mixed as to whether children and adolescents who are overweight or obese have higher medical expenditures when compared to normal weight children, even though the former are less healthy.

In Michigan, approximately 10.3 percent of medical expenditures may be attributable to obesity.⁸ These costs include those for prescription drugs and inpatient and outpatient medical care. In a 2011 Special Message, Governor Snyder indicated that Michigan spends \$3 billion annually on medical costs related to obesity.⁹

A recent study by the Center for Healthcare Research & Transformation found that severely obese individuals (those with a Body Mass Index (BMI) equal to and greater than 35) have a much higher incidence of disease and comorbid conditions, and consequently have much higher health care costs than those who are overweight (BMI of 25-29.9) or moderately obese (BMI of 30-34.9).¹⁰ For example, for the Michigan adults in their study, 36.6 percent were overweight, 20.5 percent were moderately obese, and 14.3 percent were severely obese (the prevalence of these weight categories are similar to national trends). However, 32.7 percent of health

¹ See [CRC Report 383](#), “Health Care Costs in Michigan: Drivers and Policy Options” (May 2013) for a more in depth discussion on health care costs in Michigan and the various factors driving these costs.

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The Health Care Cost Problem

Obesity is one component of a larger economic crisis: rising health care costs. Expenditures for health care weigh heavily on each individual, business, and government in this nation. Because health care expenditures are growing faster than the economy as a whole, each of these groups is required to pay a greater share of their income or revenues toward this expense. For individuals, this has critical health quality and income impacts. Individuals and families may choose to put off important preventative care or forgo treatment altogether because of costs. According to the August 2011 Kaiser Family Foundation *Health Tracking Poll*, this is exactly what individuals and families are doing (See **Table A**).

Table A
Practices in Treatment Due to High Health Care Costs, 2011

Percent of Adults Age 18-64 who Reported:	Among Persons	
	Insured	Uninsured
Relying on home remedies or over the counter drugs instead of going to the doctor	26%	68%
Postponed getting needed health care	21	67
Skipped dental care or checkups	24	64
Did not fill a prescription for medicine	20	54
Skipped a recommended medical test or treatment	16	51
Cut pills in half or skipped doses of medicine	12	37

Source: Kaiser Health Tracking Poll. The Kaiser Family Foundation, Publication #8217-F August 2011.

Businesses that offer health insurance to employees also are impacted by this trend. In 2012, 98 percent of large firms (200 or more employees) and 61 percent of small firms (3 to 199 employees) provided health care for their employees and when the Patient Protection and Affordable Care Act of 2010 (ACA) fully goes into effect in 2015, employers with more than 100 fulltime employees will be required to either offer affordable health insurance or pay

penalties. Employers with 50 to 99 fulltime employees have until 2016 to provide coverage for their employees before they face penalties. Because of rising costs, businesses have been faced with the choice of purchasing less expensive health plans for their employees, shifting the cost of premiums to employees, or having to assume the cost burden themselves. However, many argue that this latter tactic is often indirectly borne by employees as well through lower wages, limited wage increases, or employee layoffs to cover the cost of increased premiums. This is taking its toll on both large and small businesses, but especially for small businesses that pay up to 18 percent more per worker than large firms for the same health insurance policy.^a

Some health care spending may lead to better health outcomes, although comparisons to other countries reveal that United States' spending results in limited, or sometimes negative, relative health benefits.^b However, this spending creates a tradeoff that may hamper the economy. Dollars and resources spent on health care cannot be put toward other productive activities. Higher premium costs are reducing businesses' capacity to grow through investment and households' ability to spend their incomes in other parts of the economy. Rising costs make it more expensive for businesses to hire new employees or retain existing ones and may suppress wages. All of these factors make it difficult for Michigan and United States businesses to compete in the global market.

States are addressing the concerning health care cost growth. During the 2000's, Michigan was able to limit its spending growth in Medicaid to address budget shortfalls, but many of the cuts were not sustainable in the long run. An example of this is dental care, an optional Medicaid service that states often cut to address budget deficits. Studies have shown that reducing or eliminating dental services leads to high long run costs because people will often seek emergency dental care in emergency rooms, a much more expensive form of treatment.^c Other strategies, like

^a Executive Office of the President Council of Economic Advisers. "The Economic Effects of Health Care Reform on Small Businesses and their Employees." July 25, 2009. <http://www.whitehouse.gov/assets/documents/CEA-smallbusiness-july24.pdf>

^b For example, among a sample of developed countries, the United States had one of the highest fatality rates for in-hospital deaths for those admitted for myocardial infarction and hemorrhagic strokes, despite spending much more per capita in health care than any other country. See David A. Squires. "The U.S. Health System in Perspective: A Comparison of Twelve Industrialized Nations." The Commonwealth Fund, Publication 1532, Volume 16, July 2011.

^c John Buntin. "What Experts Think of Five Medicaid-Savings Strategies." *Governing*. August 31, 2011. Accessed September 6, 2011. www.governing.com/topics/health-human-services/what-experts-think-five-medicaid-savings-strategies.html

improving the overall health of the population, may actually increase expenditures in the short run because of greater spending on preventative services. However, improving the health of the population is likely to lead to long term declines in overall health spending.

While medical costs and overall health care costs have been growing over the last 40 years, curbing the incidence of obesity and even the costs of treating it may only have a limited impact on the cost growth trend. A change to the health care cost growth rate will occur only in cases where there are reductions in a condition or disease that had been increasing its share of overall health care expenditures. In cases where a disease or condition's share is constant or declining, the level of health care spending will drop with reductions in the condition, but the growth rate of expenditures will continue, albeit from a lower base.^d

^d For a more in-depth discussion on health care costs in Michigan and the various factors driving these costs, see [CRC Report 383](#).

care costs were incurred by those overweight, 21.4 percent by those moderately obese, and 22.5 percent by those severely obese. The prevalence of Type 2 diabetes among the severely obese was about twice that of those who were moderately obese. The prevalence of congestive heart failure, coronary artery disease and hypertension was also higher among those classified as severely obese compared to those in other weight categories.

Consequently, the average annual health care cost for a severely obese individual was 51 percent greater than that for a moderately obese individual, 76 percent greater than for an overweight individual, and 90 percent greater than for a healthy weight individual (See **Table 1**).

Medicaid

Those covered by Medicaid, a federal and state funded insurance program for low income individuals and families, have a higher prevalence of obesity than those who are uninsured, privately insured, or enrolled in Medicare (Medicare is a federally funded insurance program for those aged 65 and older).¹¹ Nationally, obesity prevalence among the Medicaid

population is 31.7 percent compared to 21.8 percent among Medicare enrollees and 25.2 percent among those covered through other insurance. Medicaid spending for the obese is costly; because of higher rates of obesity among those enrolled in Medicaid and because of the increased enrollment in Medicaid due to the Patient Protection and Affordable Care Act of 2010 (ACA), the costs of obesity related to state Medicaid spending are a major concern.

Nationally, Medicaid finances between 9 percent and 19 percent of all obesity spending. Michigan state government's spending for Medicaid consumes about 15 percent of own-source revenues and is a growing part of the budget, crowding out other state spending such as K-12 education, higher education, human services, and local government revenue sharing. Michigan's Medicaid expenditures attributable to obesity were 10th highest among states, not adjusting for population. If all obese people were normal weight, it is estimated that Michigan's Medicaid expenditures could be reduced by 12.9 percent.¹²

Productivity and Other Employer Costs

Additional economic costs of obesity come from workforce absenteeism, reduced at-work productivity, and costs related to disability and premature mortality. Obese employees miss more days of work because of short-term illnesses, long-term disabilities, and premature death. Productivity expenses may be calculated using

Table 1
Medical Costs by Weight Category

	Percent of Study Population	Percent of Total Annual Health Care Costs	Average Annual Health Care Costs Per Individual
Healthy Weight	28.6%	23.5%	\$ 3,722
Overweight	36.6	32.7	4,043
Moderately Obese	20.5	21.4	4,718
Severely Obese	14.3	22.5	7,117

Source: Hemmings, Brandon and Udow-Philips, Marianne. *Obesity in Michigan: Impact and Opportunity*. January 2014. Center for Healthcare Research & Transformation. Ann Arbor, MI.

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the indirect costs of paid absence from work associated with being overweight, obese, and severely obese. One 2008 study put the yearly costs of paid absences for self-insured employers at \$1,404 per overweight employee, \$1,511 per obese employee, and \$1,414 per severely obese employee.¹³ Nationwide, costs to businesses from obesity absenteeism may be as much as \$4.3 billion annually.¹⁴

Obese employees' productivity may also be reduced when they are physically present at work when compared to other workers; this is referred to as presenteeism. One study estimated that obese workers were 98.5 percent as productive as non-obese workers and another study puts this cost to employers at \$506 per obese worker annually.^{15,16} Some researchers have estimated the annual national costs of presenteeism to be \$8 billion.¹⁷

Employers may also bear the cost of obesity in higher life insurance premiums and more frequent payouts for workers' compensation to employees who are obese compared to those who are not.¹⁸

As a risk factor for obesity, physical inactivity also has productivity costs. The Governor's Council on Fitness, Health, and Sports estimated that in 2002, lost productivity from physical inactivity cost Michigan employers \$8.7 billion (in 2002 dollars), which makes up the largest direct cost to businesses from physical inactivity (other direct costs are medical costs and workers' compensation). Costs were calculated using actual wages paid to Michigan workers, the number of Michigan workers, and the average hours lost due to physical inactivity. This includes the costs from

absenteeism, presenteeism, short-term disability, and on-the-job injuries. The Council found that physical inactivity resulted in the loss of 162 productive hours per worker, which equates to approximately 20 days of lost work annually. On average, because of inactivity, workers lost 16 hours of work to absence, 14.5 hours to short-term disability, and 131.5 hours to limited functioning each year.¹⁹ Inactivity is a risk factor for obesity, but because not everyone who is inactive is obese these numbers are larger than they would be if calculating Michigan productivity costs to businesses as a result of obesity specifically.

Other Economic Costs

In addition to costs to individuals, businesses, and governments through direct medical costs, Medicaid, and productivity, researchers have also calculated that obesity adds transportation and human capital costs. Transportation costs result from the extra fuel needed to transport more weight in commercial and noncommercial transportation. While financial costs are associated with the extra fuel needed for transport, the extra fuel also leads to higher emissions of greenhouse gases. The cost to Michigan individuals, businesses, and governments is unknown, but researchers have calculated that the additional fuel required nationally by cars because of higher average passenger weights is 39 million gallonsⁱⁱ annually for each additional pound of average passenger weight.²⁰

Costs to human capital (defined as the skills, knowledge, and other assets of the population) are also

ⁱⁱ 39 million gallons is equal to about 0.05 percent of annual total passenger vehicle fuel nationally.

More Costs of Inactivity

The Governor's Council on Physical Fitness, Health and Sports reported in 2002 that 55 percent of Michigan adults were inactive.^f They calculated that the cost of physical inactivity (a risk factor for obesity) in Michigan was \$8.9 billion or approximately \$1,175 per adult. Adjusting for inflation and population changes this equates to about \$11.8 billion and \$2,140 per adult^e in 2014 dollars assuming no changes to the levels of physical inactivity. The Council expected that these costs would rise to \$12.7 billion by 2007 but these numbers were not calculated during that time to determine the accuracy of the estimate. These costs are mostly borne by employers, through health insurance premiums and lost productivity, and by the State of Michigan through its Medicaid program. Approximately \$69 million of this cost is to Medicaid and equates to under one percent of the total cost. The Governor's Council on Fitness, Health, and Sports estimated that in 2002, physical inactivity cost employers \$8 million in direct workers' compensation costs and another \$32 million in indirect costs.

^e 5,506,371 adults in Michigan in 2013-14.

^f Chenoweth, David. "The Economic Cost of Physical Inactivity in Michigan." Report prepared by Glenna DeJong, Lorinda Sheppard, Marilyn Lieber, and David Chenoweth. Michigan Fitness Foundation. 2003.

important in that they reflect the effects of obesity on educational attainment, skill development and potentially overall learning. Studies have shown that:

- Obese women completed 0.3 fewer years of school on average.²¹
- Fifteen year old males in the 90th percentile or above for BMI were 3.3 percent more likely to drop out of school than those males in the second or third BMI quartiles.
- Obese 16 year old females were likely to progress more slowly in school, attending and completing fewer grade levels than those in the second or third BMI quartiles.²²
- Among children aged 2 to 3 years old, obesity is associated with reduced functioning in verbal skills, social skills, motor skills, and activities of daily living.²³
- Obese students are more likely to miss school days and have lower GPAs. Researchers are not sure if the lower GPAs are the result of more missed school days or a result of lower productivity, as is seen in adults.²⁴

Reducing obesity rates may also have an economic development advantage. Since workers with healthy weights are more productive and cost less to insure, companies may be incentivized to move into communities with lower rates of obesity and deterred from those with higher rates. In other words, a state or community with high obesity rates may be less desirable as a business location because of the less productive workforce and higher health, life, and disability insurance costs. CRC is not aware of any instances where health has played a major role in a

company's decision of where to locate.

Discrimination is another important cost of obesity. Employers are less likely to hire obese workers than normal weight workers with the same qualifications and those obese individuals who are hired report encountering barriers to professional success because of stereotypes of work-related qualities.²⁵ Other research finds that obese workers are being paid lower wages and have lower household incomes.²⁶ One study found that for women, a one-unit increase in BMI was directly associated with 1.83 percent lower hourly wages.²⁷ Discrimination against overweight and obese individuals results in an underutilization of available skills, which translates to economic costs for the individuals being discriminated against as well as to society as a whole.ⁱⁱⁱ

Other societal consequences for increased prevalence of obesity include:

- Fewer eligible men and women are able to serve in the military;
- Fewer men and women meet physical requirements mandated for public safety positions (firefighter and police);
- Decreased supply of workers for jobs requiring manual labor and/or decreased productivity if roles cannot be sufficiently filled by physically able individuals.

The costs of obesity are pervasive throughout society and touch every family, business, and government regardless of weight status. If obesity rates continue to climb, the consequences and costs will grow more pronounced and apparent.

ⁱⁱⁱ Previously discussed research reported that obese employees have a lower productivity rate which may seem to justify the discrimination of employers against obese workers. However, the lower productivity is an average, and does not characterize all obese workers. In contrast, discrimination is usually all inclusive despite tangible or proven individual differences in ability among the discriminated population. Discrimination is also an issue because employers may not choose or may not be able to properly assess the capabilities of obese workers individually rather than as a group.

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Obesity in Michigan

In 2012, 31.1 percent of adults in Michigan were obese. In that same year, 65.6 percent of the adult population was either overweight or obese. Michigan had the 10th highest obesity rate in the nation as well as high rates of chronic disease associated with obesity. In Michigan, 10.5 percent of adults had diabetes and 34.2 percent had hypertension. Children are not faring any better, though obesity rates among high school students are below national averages (See **Table 2**).

If unchecked, Michigan may expect its percentage of obesity-related health care costs to increase 19 percent by 2030, when up to 59.4 percent of the state's residents may be obese. By shaving the state's projected average adult BMI by 5 percent over this period, the obesity rate could be reduced to 53.4 percent by 2030, and potential health care spending could be reduced by 7.7 percent (from the 19 percent estimate, if nothing changes), saving the state \$8.7 billion by 2020 and \$24.2 billion by 2030.²⁸

Table 2
Obesity and Overweight Indicators and Associated Chronic Diseases in Michigan

Adults (2012)	Michigan Rate	National Rank
Obesity	31.1%	10
Overweight & Obese	65.6	-
Diabetes	10.5	17
Hypertension	34.2	12

Children and Adolescents (2013)	Michigan Rate	National Average
Percentage of overweight high school students	15.5	16.6%
Percentage of obese high school students	13.0	13.7
Percentage of obese low-income children, ages 2-4 (2011)	13.2	-
Percentage of obese children ages 10-17 (2011)	14.8	-

Note: For rank, 1= high rate, 51= low rate, among 50 states and Washington D.C.

Sources: "F as in Fat: How Obesity Threatens America's Future, 2013." Trust for America's Health, Issue Report: August 2013.
Youth Risk Behavior Survey, Centers for Disease Control and Prevention, 2013

Obesity by County

While Michigan's overall adult obesity rate is 31.1 percent, the obesity rate among counties varies greatly. The state's lowest county-wide obesity rate is 23.3 percent in Washtenaw and the highest obesity rate is 39.7 percent in Saginaw County at (See **Table 3**).

No clear pattern emerges regarding the location of counties with the highest obesity rates. Counties with obesity rates below the statewide average are spread throughout the state, but counties with obesity rates at or above the statewide average tend to be in the lower half of the Lower Peninsula or the eastern most part of the Upper Peninsula (See **Map 1**).

The average statewide obesity rate does not appear to be skewed by higher obesity rates in Michigan's most populated counties. Wayne County, the Michigan county with the largest population, has an above average obesity rate of 34.3 percent while the second most populated county, Oakland, has a below average obesity rate of 26.9 per-

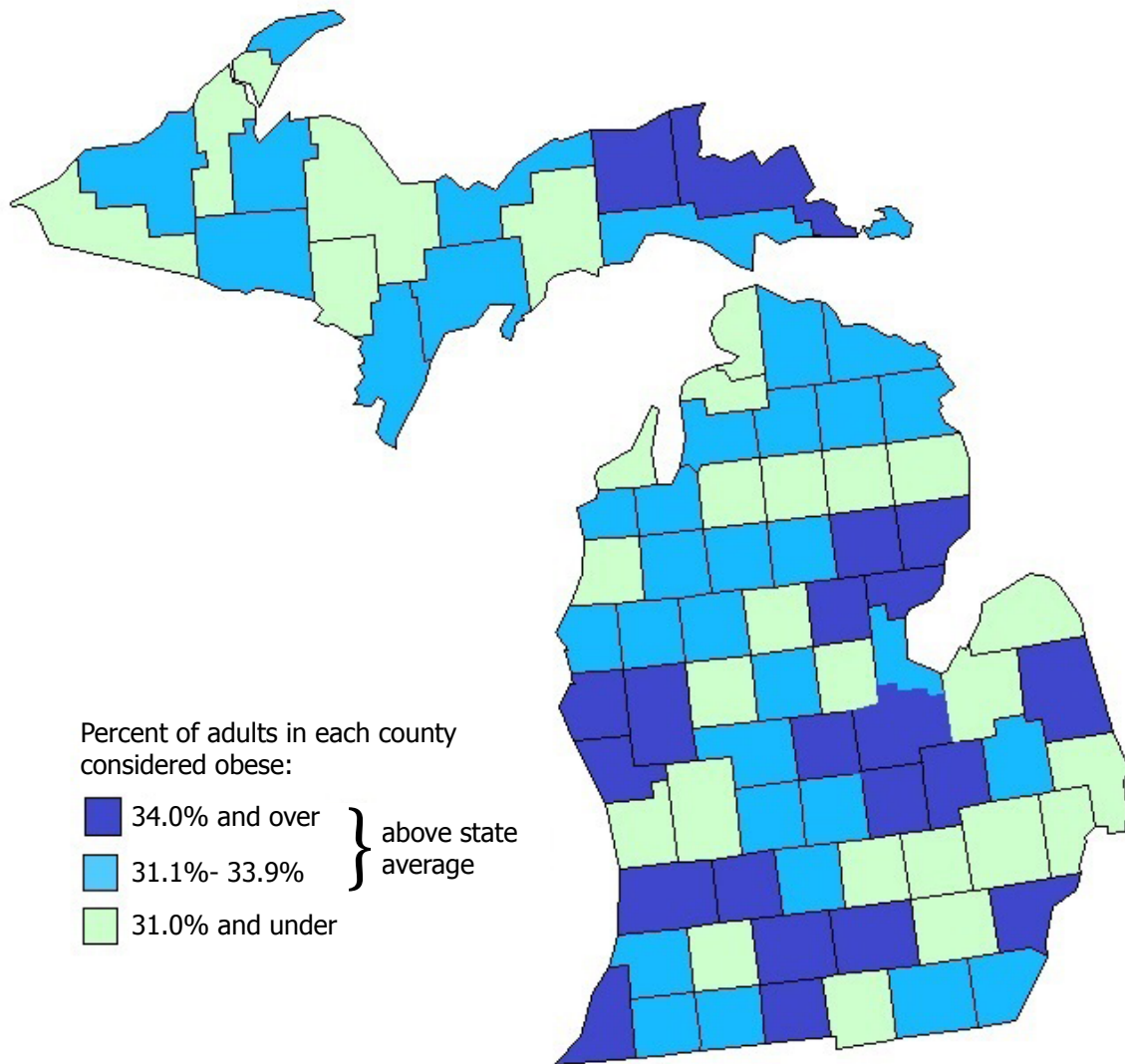
Table 3
Adult Obesity Rate and Rank by County, 2010

Rank	County	Obesity Rate
<i>Counties with Highest Obesity Rates</i>		
1	Saginaw	39.7%
2	Chippewa	37.9
3	Calhoun	37.1
4	Barry	37.0
5	Gratiot	37.0
<i>Counties with Lowest Obesity Rates</i>		
79	Houghton	26.7%
80	Livingston	26.6
81	Leelanau	26.5
82	Ottawa	25.5
83	Washtenaw	23.3

Note: For rank, 1=high rate, 83=low rate. Full list of counties and rank can be found in **Appendix A**.

Source: United States Department of Agriculture, Economic Research Service, Food Access Research Atlas, February 2014.

**Map 1
Obesity Rates by County, Michigan, 2010**



Source: United States Department of Agriculture, Economic Research Service, Food Access Research Atlas, February 2014.

cent. Furthermore, the average obesity rate in the ten counties with the smallest populations is 31.8 percent, whereas the average obesity rate in the ten counties with the largest populations is 28.5 percent.

At a county level, per capita personal income appears to correlate inversely with the obesity rate, where counties with higher personal incomes tend to have lower obesity rates. While the average per capita personal income in Michigan in 2012 was \$33,768, the average per capita personal income among the ten counties with the lowest obesity rates was

\$39,277 and the average per capita personal income among the ten counties with the highest obesity rates was \$33,123.²⁹ Looking at counties with obesity rates above and below the average statewide obesity rate reveals a similar pattern. For the 55 counties with obesity rates above 31.1 percent, the average per capita personal income was \$32,439, whereas the remaining counties with average obesity rates below the statewide average had a per capita personal income of \$36,379. (See **Appendix A** for obesity rates, population, and per capita personal income for all counties in Michigan)

Obesity Risk Factors

Obesity results when individuals intake a higher amount of energy (food) than they expend (activity). While an increase in food intake or a decline in the energy expended would lead to weight gain, this process can be magnified and accelerated when energy intake increases while energy expenditure decreases. In trying to determine why developed countries have such a high rate of obesity, researchers with the National Bureau of Economic Research found that 82 percent of adult obesity is from excess caloric intake while only 18 percent is caused by insufficient levels of physical activity.³⁰

Attributing the rise in obesity rates to increased calorie intake does not isolate an obvious policy solution. Researchers generally posit that there is no one factor driving increased caloric intake or decreased physical activity that results in obesity. The Institute of Medicine (IOM) identifies various levels and sectors of influence on obesity within a population that may explain the complexity of these influences on obesity. These factors include:

- Societal norms and values;
- Sectors of influence such as government, health care, education, and businesses;
- Behavioral setting of communities, worksites, health care, and schools; and
- The demographic, psychosocial, and genetic factors of an individual, their home, and their family.

For example, the availability of food in venues outside the home, the increase in sedentary job functions and settings, and health insurance coverage can all influence the amount of energy consumed and the

amount expended.³¹

Summarizing the factors causing obesity IOM states, "Americans are now accustomed to the very societal influences that predispose the average person to gain excess weight... Modern, technologically sophisticated lifestyles characterized by dependence on cars; jobs that require limited physical effort; labor-saving devices at home; sedentary entertainment; and the widespread availability of good-tasting, high-calorie foods and beverages are the cultural norm. Americans are steeped in a consumer culture in which many of the rewards of daily life, including food-related pleasures, are increasingly shaped by marketers and in which electronic media are a major source of information, social communication, and recreation for many people."³² It is for this reason that all the levels and sectors of influence on obesity must be considered when designing policy to address the prevention and treatment of obesity: obesity risks permeate most aspects of daily life.

Michigan has a higher rate of obesity than most states, so presumably some characteristics of Michigan's culture, demographics, schools, communities, and/or infrastructure are more conducive to higher obesity rates. Identifying these factors may provide insight as to how individuals, businesses, and policymakers can help to reduce the social and financial costs of obesity to the state. Unfortunately, not all factors influencing obesity are identifiable or quantifiable. This section summarizes the obesity risk factors deemed by CRC to be most applicable to Michigan's obesity condition and discusses their role in an effort to elucidate these obesity-causing characteristics.

Risk Factors Impacting Children and Adolescents

Obesity Risk Factor 1

ACCESS TO LOW NUTRITION FOODS AT SCHOOL

Children and adolescents can consume up to half of their total daily calories at school, and some of this food has low nutritional value.

School-aged children and adolescents typically consume two types of foods at school: meals and snacks. While many students bring their own packed lunches, the meals served at school often meet nutri-

tion standards set by the United States Department of Agriculture (USDA) and more recently snacks and other competitive foods do as well.

School Lunch and Breakfast Programs

Federal law addresses the nutritional content of food sold in public schools, nonprofit private schools, and residential child care institutions that participate in the National School Lunch Program and the National School Breakfast Program. These programs provide

cash subsidies and donated commodities to school districts and independent schools that choose to take part in the program. In return, schools must serve meals that meet federal requirements, and they must offer free or reduced-price meals to eligible students.

The USDA released updated school meal standards for the National School Lunch Program in 2010. Meals must now include more fruits, vegetables, whole grains, and low-fat dairy products, and less sugar and unhealthy fats, and over time meals will contain less sodium. Schools must also provide students with access to free water at meals. These meal programs are an important part of students' diets and are especially impactful on children and adolescents from low-income families, who are at higher risk of being obese and more likely to participate in free or reduced price school breakfast and lunch programs.

Competitive Foods

The USDA defines competitive foods as food and beverages sold at school that are not part of the USDA school meals program. In 2013, the USDA updated the nutrition standards for school snacks and beverages in schools that participate in the National School Lunch Program; these standards will apply beginning in the 2014-15 school year. These standards apply to food and beverages sold outside of school meal programs, but on school campus at any time during the school day. The minimum standards call for these competitive foods to contain more fruits, vegetables, low-fat dairy, whole grains, and lean proteins as main ingredients. The standards also limit sugar, fat, and sodium. Prior to the updated USDA standards, many states had competitive food healthfulness policies that were stricter than the federal requirements (Michigan was not one of these states). It is unclear now how many states, if any, continue to have stricter nutrition standards than federal standards.

The availability of unhealthy competitive foods at school is associated with an increased risk for obesity, particularly in middle school students.³³ Most studies confirm that when unhealthy competitive foods are not sold in schools, students have more healthful diets.³⁴ More specifically, when competitive foods are made available at school, students consume fewer fruits, vegetables, and milk and drink more sugar-sweetened beverages.³⁵ One study suggested

that eliminating access to a school store or snack bar reduced the consumption of sugar-sweetened beverages by 22 calories per school day for middle school students and by 28 calories per school day for high school students.³⁶

When healthy competitive foods are made available, such as fruits and vegetables, students purchase and consume more of them. It is unclear whether or not students' diets improve when schools eliminate the availability of competitive foods altogether. It could be the case that instead of buying these unhealthy foods at school students are simply purchasing them outside of school, either during breaks or after school. However, the effort, time, and sometimes, cost, of purchasing these foods outside of school may be significant enough that students may replace these unhealthy competitive foods with the healthy ones available in schools. This may explain why student diets are healthier when school snacks are healthier.

Michigan Nutrition Standards. States have the authority to dictate policies regarding food and beverages sold at school so long as they are consistent with federal guidelines. While 35 states and Washington, D.C., have nutritional standards for competitive foods, Michigan is not one of them. Twenty-nine states and Washington, D.C., have laws that limit when and where competitive foods that do not meet federal requirements may be sold; again Michigan does not have these laws.³⁷ Yet, according to the CDC's *State Indicator Report on Fruits and Vegetables*, 2013, only 28.3 percent of middle and high school students in Michigan were offered fruits or non-fried vegetables at school celebrations, compared to a 33.6 percent national average.

In 2010, the Michigan State Board of Education approved the *Michigan Nutrition Standards*, which were developed by the Michigan Department of Education (MDE) and based on the national Dietary Guidelines for Americans. The recommended standards concern food and beverages served on school campuses and include recommendations for minimum nutrition requirements for breakfast, lunch, after school snacks, and beverages. The standards apply to food sold and offered during the school day, including items from vending machines, a la carte items, and fundraising activities on campus. The standards also apply to food and beverages served during activities that take

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place after the school day, including concessions, open houses, parent/teacher conferences, school group meetings, school celebrations, banquets, retirement parties, and school board meetings. The food standards set content guidelines for calories, saturated fat, and sodium in entrees and calories, total fat, saturated fat, trans fat, total sugar, and sodium for all other foods and cover standards for a broader range of foods than the national guidelines. The *Michigan Nutrition Standards* are in some ways more prescriptive than the USDA standards, but since they are recommendations, not requirements, it is difficult to assess their true impact on health.

MDE recommends that the *Michigan Nutrition Standards* are added to every school's School Improvement Plan, which schools are required to submit every three to five years. The incentive for local schools to comply with any nutrition standards is to receive federal reimbursement for the School Lunch Program. The Revised School Code states that schools participating in the school lunch or breakfast programs "shall" comply with USDA school lunch standards, but not all schools meet this criteria, including charter schools.³⁸ It would take state legislation to require all schools to comply with stricter nutrition standards, such as the *Michigan Nutrition Standards*.

Obesity Risk Factor 2 PHYSICAL INACTIVITY

Physical inactivity is a risk factor for childhood obesity and children and adolescents are not meeting federally recommended levels of daily activity.

The United States Department of Health and Human Services' (USDHHS) physical activity guidelines call for children and adolescents to engage in 60 minutes or more of physical activity daily. Most of these minutes should be spent in moderate or vigorous-intensity aerobic activity and should include vigorous-intensity activity at least three days of the week. The USDHHS guidelines call for children and adolescents to engage in muscle-strengthening and bone-strengthening exercise on at least three days of the week as part of their 60 minutes of activity. The

American Heart Association and National Association for Sport and Physical Education recommend that elementary school students participate in at least 150 minutes of physical education per week and high school students participate in at least 225 minutes of physical education per week.

Children and adolescents can meet these requirements for physical activity both during the school day and during after-school activities. As of 2011, only 27.0 percent of Michigan high school students were physically active for at least 60 minutes every day and only 27.7 percent of adolescents aged 6 to 17 participated in vigorous exercise every day (See **Table 4**).

Physical Education

Physical education is important in creating a foundation for healthy lifestyles in children and adolescents. Schools in particular take the lead in educating students in both academic and social disciplines,

The Revised School Code states that schools participating in the school lunch or breakfast programs "shall" comply with USDA school lunch standards, but not all schools meet this criteria, including charter schools.

including the importance of living an active lifestyle, which children may or may not be taught at home. Physical education, in varying degrees, has been part of academic curricula since before childhood obesity became an epidemic, but with more incentives for children and adolescents to live sedentary lives (video games,

television, and computer use) the importance of this education may be greater than ever. Additionally, with falling or constant budgets, growing core subject competency requirements, and pressure to improve test scores, schools have been reducing or eliminating outdoor recesses and physical education classes. Nearly half of all school administrators report cutting significant time from physical education and recess to increase classroom time devoted to reading and mathematics since the passage of the federal No Child Left Behind Act in 2001.³⁹

While constraints related to budget and performance requirements create a difficult tradeoff for school administrators in expanding physical activity opportunities for students, studies show that physical education may actually help students excel academically, creating a synergistic relationship among core academic subjects and physical education. A 1999

Table 4
Child and Adolescent Physical Inactivity and Activity Statistics, Rate and Rank, Michigan versus United States, 2013

	<u>Michigan Rate</u>	<u>National Rank</u>
Percentage participating in vigorous physical activity every day, ages 6-17 (2011)	27.7	34
Percentage of high school students:	<u>Michigan Rate</u>	<u>National Average</u>
Not participating in at least 60 minutes of physical activity on at least 1 day	15.2%	15.2%
Not participating in at least 60 minutes of physical activity per day on 5 or more days	50.3	52.7
Not physically active at least 60 minutes per day on all 7 days	73.3	72.9
Playing video or computer games or using a computer 3 or more hours per day	34.1	41.3
Watching television 3 or more hours per day	27.0	32.5
Not attending physical education classes on 1 or more days	64.1	52.0
Physically active at least 60 minutes every day (2011)	27.0	not reported

Note: For rank, 1= high rate, 51= low rate among 50 states and Washington, D.C

Sources: "F as in Fat: How Obesity Threatens America's Future, 2013." Trust for America's Health, Issue Report: August 2013.
 Youth Risk Behavior Survey, Centers for Disease Control and Prevention, 2013

vided in all public schools of this state.... Each pupil attending public school in this state who is physically fit and capable of doing so shall take the course in physical education."⁴³ While this statute requires public and charter schools to provide students with physical education, it does not mandate the amount of time dedicated to this subject before high school or on which content to focus. In contrast, Michigan's Merit Curriculum, which outlines high school graduation requirements, includes one credit of physical education and health; of this, 0.5 credits must be for physical education.

Accordingly, Michigan currently has no minimum requirements for physical education for grades K-8. This leaves school districts to determine their own curricula regarding this subject, resulting in huge disparities between physical education programs offered by districts and charter schools across the state.

California study found that fourth and fifth grade students' standardized test scores were higher when they participated in physical education that was two or three times longer than students in a control group.⁴⁰

Other studies have found that sacrificing class time for physical education does not harm academic performance or standardized test scores. In a 2007 study of fourth and fifth grades students in British Columbia, the introduction of daily 10-minute classroom activity sessions in addition to 80 minutes of weekly physical education resulted in similar standardized test scores for mathematics, reading, and language arts as children in the control group.⁴¹ A 2006 Michigan study of 200 sixth grade students demonstrated that children enrolled in physical education with 55 more minutes of daily classroom instruction had similar grades and standardized test scores as students not enrolled in physical education.⁴²

Physical Education Requirements in Michigan. In regards to health and physical education, Michigan statute states, "Health and physical education for pupils of both sexes shall be established and pro-

The MDE does have grade level content expectations for physical education in grades K-8, but these are recommendations, not requirements, and are not assessed by the state. In 2012, the State Board of Education approved a model policy on quality physical education and physical activity in schools which recommends that all public schools offer physical education opportunities that include the following components (not comprehensive):

- Curriculum aligns with the Michigan K-12 *Physical Education Content Standards and Benchmarks*⁴⁴ and provides students with knowledge and skills necessary for lifelong physical activity;
- Instruction is taught by a certified and endorsed physical education teacher;
- Instruction keeps students involved in pur-

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poseful activity for the majority of the class period and promotes physical activity outside of school;

- Establishes program assessment with regular completion to ensure program is meeting the needs of students;
- Assesses students regularly for attainment of physical education learning objectives and includes course grades in calculations of grade point average, class rank, and academic recognition programs;
- Offers instructional periods totaling 150 minutes per week at the elementary level and 225 minutes per week at the secondary level;
- Prohibits exemptions or substitutions; and
- Has a teacher to student ratio consistent with those of other subject areas.⁴⁵

The model policy from the State Board of Education recommends that all public schools provide daily opportunities for structured and unstructured physical activity outside of the physical education course. Specifically, they recommend at least 30 minutes of moderate to vigorous physical activity during the school day, outside of physical education class, including at least 20 minutes of scheduled recess. Other recommendations include:

- Not denying physical activity, including recess, to make up class work or for disciplinary reasons;
- Training teachers to integrate physical activity into their classrooms;
- Limiting sedentary time to less than two hours at one time;
- Providing recess before lunch period;
- Providing interscholastic or intramural programs; and
- Encouraging active commuting to and from school.

While 49 states have standards for physical education, their scope varies greatly from setting physical education time standards for all grade levels and preserving recess time for physical activity to providing for daily physical education.⁴⁶ Only a handful of states mandate the American Heart Association and National Association for Sport and Physical Education's recommended 150 minutes per week of

physical education classes for elementary students. Only 12 states have laws that specifically require schools to provide physical activity or recess during the school day. As of 2009, 13 states enacted legislation with enforceability language for physical education standards, and four states had sanctions if the requirements were not implemented.

Obesity Risk Factor 3

PHYSICAL INACTIVITY OUTSIDE OF SCHOOL

While some children and adolescents participate in active physical education or active break times during school hours, these opportunities are typically not sufficient to meet children's physical activity needs.

Physical activity during the school day is typically not sufficient to meet children's physical activity needs; therefore, they must engage in physical activity outside of school as well. While many short and long term health benefits are associated with exercise, much of the research on exercise among children and adolescents focuses on the impacts of physical activity on academic performance. Regular exercise has been demonstrated to improve student concentration, cognitive functioning, and classroom behavior leading to improved academic and standardized test performance.⁴⁷ Children and adolescents who are more physically active tend to perform better academically; in one study, students that reported participating in either school-based physical education or in-school and/or after-school sports were 20 percent more likely than their sedentary peers to earn an "A" in math or English.⁴⁸

Obesity Risk Factor 4

INSUFFICIENT HEALTH EDUCATION

Health education in schools is insufficient to teach children and adolescents what they need to know to live healthy lifestyles.

One commonly cited factor in driving childhood obesity rates is insufficient health education for children and adolescents; this responsibility is generally held by schools. As with physical education, health education that includes lessons on healthy eating and activity, and the consequences of unhealthy eating and inactivity, can be led by schools.

Food and Beverage Advertising to Children and Adolescents

General wisdom often blames the advertising of junk food (sugary cereals, sodas, candy, fast food restaurants, etc.) to children as causing childhood obesity, but evidence regarding the impact of food advertising and overall diet quality is not as convincing.⁹ Some research suggests that in the absence of junk food advertising on television, there would be a one-third reduction in childhood obesity in the United States today.^h Other research shows that advertising has a greater impact on brand recognition and brand consumption rather than on the consumption of an entire product type. For example, advertising is more effective when it is encouraging consumers to purchase one product over another, but may not be effective in encouraging people to eat an entire food group, such as sugar-sweetened beverages. In the case of junk food, state and local legislation that eliminates junk food advertising near schools may not prevent children and adolescents from eating junk food altogether, but would only make them less conscious of brand differentiation. In this case, overall diet quality may not improve. Similar results were seen when tobacco advertising was restricted; studies show that when cigarette advertising was restricted, aggregate cigarette smoking was not affected.⁹ However, most of these studies have been done with adults and not children.

Nonetheless, national governments worldwide have acted to limit the types of advertising to which children and adolescents are exposed. Canada, Great Britain, and Australia, among other developed countries, have banned all television advertising to children. The United States has attempted to ban certain goods from being advertised to children with varying levels of success. Many food companies as well as television networks have voluntarily stopped advertising unhealthy foods during shows geared to children.

⁹ Kuchler, Fred, Elise Golan, Jayachandran N. Variyam, and Stephen R. Crutchfield. "Obesity Policy and the Law of Unintended Consequences." United States Department of Agriculture, Economic Research Service, June 2005.

^h Veerman, J. Lennert, Eduard F. Van Beeck, Jan J. Barendregt and Johan P. Mackenbach. "By how much would limiting TV food advertising reduce childhood obesity?" *European Journal of Public Health* 19(4): 365-369 (2009).

Children and adolescents may not be exposed to models of healthy behaviors at home, and schools have historically stepped in to provide this education. Educating children on healthy behaviors and risk factors for obesity creates awareness which may lead to preventative or treatment-related action. Some studies have shown, however, that individually focused approaches to reducing obesity, specifically school-based interventions that educate children about diet and exercise, have shown little evidence of efficacy.⁴⁹

Health Education in Michigan Schools. Michigan's Revised School Code⁵⁰ outlines guidelines and requirements for health education in public schools. Among the subjects that shall be taught are: hygiene; abusive use of tobacco, alcohol, and drugs, and their effect upon the human system; the principal modes by which dangerous communicable diseases are spread and the best methods to restrict or prevent disease; and a program of instruction on reproductive health. In regards to health and physical education, the School Code states, "Health and physical education for pupils of both sexes shall be established and provided in all public schools of this state."⁵¹

Michigan currently has no minimum requirements for health education for grades K-8. As with the lack of physical education requirements, school districts are left to determine their own curricula regarding this subject and there may be disparities between health education programs offered by districts throughout the state.

Michigan requires high school students to complete 0.5 credits in health education in order to qualify to graduate.⁵² The graduation requirements are allowed to be modified, however, if students take an additional credit beyond the required credits in english language arts, mathematics, science, or world languages. Other modifications are allowed for students with an individualized education program (IEP) and for transfer students who completed two years of high school out-of-state or at a non-public school. While health education is required for high school students, schools have flexibility in the curriculum, though the MDE provides recommendations on how schools should carry out this credit requirement.

The Michigan State Board of Education provides recommendations, not requirements, for school health programs, including the health programs required for high school graduation. One such recommen-

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dation is that schools adopt the *Michigan Model for Health*, developed in 1985 by a collaboration of state departments. According to the *Michigan Model for Health's* website, a 2008 survey showed that roughly 80 percent of Michigan school buildings implemented the *Model* and 72 percent, or 1.2 million Michigan students, received the lessons. Components of the *Michigan Model for Health* specifically recommended by the State Board include:

- Providing at least 50 hours of health at each grade, K-12;
- Addressing social and media influences on student behaviors and helping students identify alternatives to specific high-risk behaviors;
- Emphasizing knowledge and skills critical for students in obtaining, understanding, and using basic health information and services in a way that enhances healthy living;
- Focusing on behaviors such as nutrition, physical activity, alcohol and drug use, sexual behaviors, and violence and injury, that may have the greatest effect on health; and
- Several others related to assessment of health-risk situations, and teaching developmentally appropriate skills.⁵³

The Michigan State Board of Education provides recommendations, not requirements, for school health programs, including the health programs required for high school graduation.

As part of the Michigan Merit Curriculum on health education, MDE recommends that Michigan high schools dedicate a portion of the health education course to nutrition and physical activity that includes content on:

- Distinguishing between unhealthy and healthy ways to manage weight;
- How to locate nutrition information, nutrition services, and help with weight management or unhealthy eating patterns;
- Demonstrating ability to use food labels;
- Preparing meal plans according to federal dietary guidelines;
- Assessing personal nutrition needs and levels of physical activity;
- Developing a personal plan for improving one's nutrition, incorporating physical activity into daily routines, and maintaining a healthy weight; and

- Advocating for nutritional food choices and physical activity at school.⁵⁴

MDE also makes available grade level content expectations for health education that were approved by the State Board of Education in 2007 for each grade K-8. MDE recommends that students are regularly assessed and tools to do so are provided by the *Michigan Model for Health*.

Obesity Risk Factor 5

INSUFFICIENT AND NON-COMPREHENSIVE PHYSICAL ACTIVITY AND NUTRITION STANDARDS IN CHILD CARE FACILITIES

Children in child care facilities may not be receiving adequate access to nutritious meals and snacks and opportunities for physical activity.

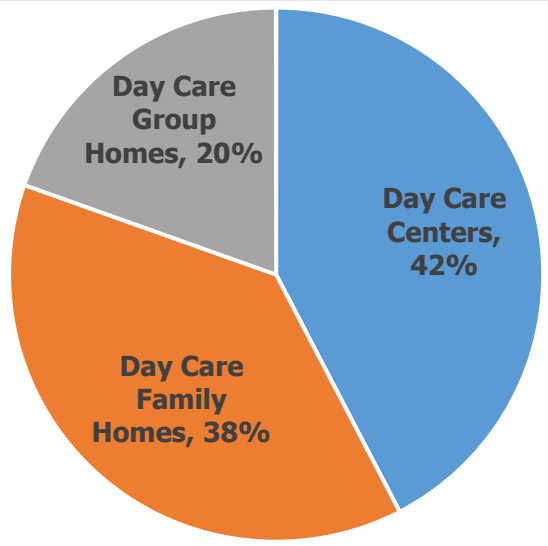
Children spend a significant amount of time every day in school and child care programs, especially those from families with working parents. While children

attending school benefit from many of the diet and activity requirements in schools, children from birth through preschool who have not yet entered school age and are in daycare at child care facilities, do not necessarily receive the same benefits.

The number of children in child care settings is significant. In households with employed mothers, 80 percent of preschool aged children are enrolled in some form of child care for an average of almost 40 hours per week, making the role of these child care providers just as important as schools in ensuring a healthy environment.⁵⁵ Like schools, child care programs are important in teaching and reinforcing healthy behaviors in children.

Child Care Nutrition and Physical Activity Standards in Michigan. Michigan's Department of Human Services recently published rules for child care centers, which are classroom based programs that provide care and education for children. Child care centers may include child care, prekindergarten, preschools, nursery schools, before and after school programs, and Head Start programs, but do not include child care in private homes.

Chart 1
Day Care Facilities by Type, July 2014



Definitions

Day Care Centers: classroom based programs that provide care and education for children.

Day Care Family Homes: provide care and education for up to six children in a private home.

Day Care Group Homes: provide care and education for up to 12 children in a private home.

Source: Statewide Text File of Child Care Facilities, Michigan Department of Human Services, July 24, 2014.

These rules contain specifications that food and beverages provided by child care centers meet the minimum meal requirements of child care food programs in the Child and Adult Care Food Program of the United States Department of Agriculture. This program provides for some reimbursement to qualified child care centers that meet food program specifications. Examples of nutrition requirements for meals in this program include: a breakfast that contains fluid milk, vegetable or fruit juice, and whole-grain or enriched bread and a lunch and supper that contain fluid milk as a beverage, a lean meat, poultry or fish, two or more vegetables or fruits, and whole-grain or enriched bread.⁵⁶ While state rules require day care center participation in this federal program, day care homes may voluntarily participate.

While these state rule changes are the first to introduce nutrition specifications for some children in child care settings, these rules do not apply to the children who receive childcare in private homes or to some for-profit child care centers. As a result, only 42 percent of the

child care facilities in Michigan are subject to these rules. This amounts to nearly 6,000 child care facilities that are not required to adhere to these nutrition rules (see **Chart 1**).

Additionally, these rules do not address physical activity among young children. However, some rules do so indirectly by increasing opportunities for physical activity. For example, the rules prohibit use of media for children under two years of age and specify that use of non-interactive media (such as televisions and computers) shall not exceed two hours per week per child. The rules also minimize the use of confining equipment for infants, such as swings and infant seats, to a maximum of 30 minutes at a time. Child care centers shall also provide a minimum of two playspaces, equipment for large and small muscle activity, and provide opportunity for outdoor play, unless prevented by weather.⁵⁷ Again, these rules are not enforced for non-child care centers, or 58 percent of child care facilities.

While these rules have the force and effect of law, there are few actual laws that address nutrition in child care settings. The Revised School Code contains language requiring that child care centers for before- or after-school programs for children in grades K-8, operated by or contracted with a school district, public school academy, or intermediate school district that serve food comply with the same nutrition requirements that apply to the food service by the school district, public school academy, or intermediate school district during the regular school day.⁵⁸ This law does not affect the portion of children receiving child care in other settings.

Obesity Risk Factor 6
LOW BREASTFEEDING RATES

Higher breastfeeding rates may lead to a reduction in childhood obesity.

While causality cannot be determined, a large body of research has found an association between breastfeeding and a reduction in obesity risk in childhood. Many disparities in breastfeeding rates exist; only 58 percent of Black infants are ever breastfed, compared with 76 percent of White and 80.6 percent of Latino infants. Eighty-eight percent of infants of college graduates are breastfed compared to only 66 percent of infants of high school graduates.⁵⁹

Risk Factors Impacting Adults

Obesity Risk Factor 7 PHYSICAL INACTIVITY

Adults are not engaging in enough physical activity, increasing the rate of obesity as well as other diseases and conditions.

Physical activity may result in many health benefits for already healthy people, people with chronic diseases, people at risk of developing chronic diseases, as well as for every age group and every racial and ethnic group. Research shows that at least 150 minutes per week of moderate-intensity aerobic activity consistently reduces the risk of many chronic diseases and other adverse health conditions. Some evidence also shows that regular physical activity may reduce symptoms of depression.

In adults, including older adults, there is strong evidence that regular physical activity may result in lower risks of: early death, coronary heart disease, stroke, high blood pressure, adverse blood lipid profile, Type 2 diabetes, colon cancer, breast cancer, and metabolic syndrome. Regular physical exercise is also likely to prevent weight gain, promote weight loss, improve cardio-respiratory and muscular fitness, prevent falls, reduce depression, and lead to better cognitive function. Moderately strong evidence suggests that physical activity may also lower the risk of hip fracture, lung cancer, endometrial cancer, increase bone density, and improve sleep quality.

Despite all the potential health benefits of physical activity, many adults are still not engaging in adequate activity. The United States Department of Health and Human Services (USDHHS) guidelines call for adults to engage in at least 150 minutes a week of moderate-intensity aerobic activity or 75 minutes a week of vigorous-intensity aerobic activity. For more extensive health benefits, USDHHS recommends adults engage in 300 minutes of moderate intensity aerobic activity or 150 minutes of vigorous intensity aerobic activity. USDHHS also recommends adults perform muscle-strengthening ac-

tivities on all major muscle groups on two or more days of the week. If older adults cannot meet these guidelines, they should be as physically active as possible and should do exercises that maintain or improve balance to reduce risk of falling.⁶⁰

Factors that influence physical activity levels include: socioeconomic status; race and ethnicity; attitudes, beliefs, and perceptions; family and social influences; neighborhood design, environmental characteristics, and public safety concerns; and availability of venues for physical activity.⁶¹ Policy solutions that target these groups or address these factors may be most successful in reducing obesity.

Physical Inactivity in Michigan. Physical inactivity, a risk factor for obesity, was perhaps not as prevalent as may be suggested by the obesity rate— 23.6 percent of Michigan adults reported engaging in no leisure time physical activity in 2014 compared to a United States average rate of 25.4 percent. More Michigan adults meet USDHHS aerobic activity guidelines than the United States average but fewer meet muscle-strengthening guidelines (See **Table 5**).

Obesity Risk Factor 8 INSUFFICIENT OPPORTUNITIES FOR OBESITY REDUCTION IN WORKPLACES

Workplaces can support healthy lifestyles for employees both in the workplace and outside the workplace.

Many employers have taken active steps to help promote the overall wellness of their employees.

**Table 5
Adult Physical Activity and Behavior Rates, Michigan versus United States Average, 2014**

Percent who reported:	Michigan	U.S. Average
No leisure-time physical activity	23.6%	25.4%
Meeting 150 minute aerobic activity guideline	53.5	51.6
Meeting 300 minute aerobic activity guideline	33.6	31.8
Meeting muscle-strengthening guideline	28.8	29.3
Biking or walking to work	2.7	3.4

Source: Centers for Disease Control and Prevention. State Indicator Report on Physical Activity, 2014. Atlanta, GA: U.S. Department of Health and Human Services, 2014.

Policies range from those that provide opportunities for healthy eating and physical activity to those that actively incentivize it. Improved health among the workforce can translate into lower health care expenditures for employers as well as higher productivity among employees, especially for large employers. A 2010 meta-analysis of large employer wellness programs found that for every dollar spent on wellness programs, medical costs fell by \$3.27 and absenteeism costs fell by \$2.73.⁶²

Workplace initiatives such as flextime policies, lunchtime walking groups, and access to fitness facilities, bicycle racks, walking paths, and changing facilities with showers can increase the number of employees who are physically active during the work day. These programs create opportunities for activity and create an environment that supports activity before, during, and after work hours. Ensuring that any onsite food (cafeteria and vending) provides a wide array of fresh and healthy foods may encourage healthier diets.

Employers are also incentivizing employees through employer-sponsored wellness programs. According to a 2012 survey, at least 63 percent of all firms with fewer than 200 employees (small firms) and 94

percent of firms with 200 or more employees (large firms) offered some type of wellness program (See **Table 6**). Most commonly, employers offered web-based resources for healthy living and a wellness newsletter. Twenty-eight percent of small firms and 65 percent of large firms offered gym membership discounts or on-site exercise facilities and 21 percent of small firms and 56 percent of large firms offered lifestyle or behavioral coaching. Firms in the Midwest region were more likely to offer gym membership discounts and on-site exercise facilities than those in the South or West. Only 10 percent of small firms offered any financial incentive to participate in wellness programs compared to 41 percent of large firms.

Thirty-five percent of small firms and 40 percent of large firms reported that their reason for offering wellness programs was to improve the health of employees and consequently reduce absenteeism. Thirty-four percent of large firms reported that they were also motivated to offer wellness programs to reduce health care costs, compared to only 8 percent of small firms. Thirty-eight percent of firms offering benefits and wellness programs reported that they offered the programs because they were part of their firm's health plan.⁶³

**Table 6
Wellness Program Statistics, by Firm Size, 2012**

	<u>Firm Size</u>				All Firms
	Small Firms		Subtotal	Large Firms	
	3-24 Employees	25-199 Employees			200 or more Employees
Percent of Firms that Offer at Least One Specified Wellness Program*	58%	79%	63%	94%	63%
Percent of Firms that Offer any Financial Incentive to Participate in Wellness Program**	6	18	10	41	11
Percent of Firms that Believe Wellness Programs are Effective in Improving Health of Employees	73	73	73	79	73

*Note: Includes the following wellness programs: weight loss programs, biometric screenings, gym membership discounts or on-site exercise facilities, smoking cessation program, lifestyle or behavioral coaching, classes in nutrition or healthy living, web-based resources for healthy living, flu shots, employee assistance programs (EAP), or a wellness newsletter.

**Note: Any financial incentive indicates firms that offer employees who participate in wellness programs one of the following incentives: smaller premium contributions, smaller deductibles, higher HRA or HSA contributions, or gift cards, travel, merchandise, or cash.

Source: Employer Health Benefits: 2012 Annual Survey. The Kaiser Family Foundation and Health Research & Educational Trust. <http://ehbs.kff.org/pdf/2012/8345.pdf>.

ADDRESSING MICHIGAN'S OBESITY PROBLEM

Risk Factors Impacting Everyone

Obesity Risk Factor 9

LACK OF AVAILABLE FRUITS AND VEGETABLES

Not all residents have sufficient access to fruits and vegetables.

Fruit and vegetable consumption are integral to a healthy diet, reducing the risk to children and adults in developing many chronic diseases while also aiding weight management. Greater access to nearby supermarkets is associated with healthier eating behaviors, typically because of their selection of fresh fruits and vegetables.⁶⁴ One large study found that Black Americans living in neighborhoods with at least one supermarket were more likely to consume fruits and vegetables than Black Americans living in neighborhoods without a supermarket. Additionally, this study found that among the large study group, Black Americans consumed 32 percent more fruits and vegetables for each additional supermarket located in their census tract.⁶⁵

Another large study effectively demonstrated that a greater availability of supermarkets was associated

with lower adolescent BMI while a higher prevalence of convenience stores was associated with a higher BMI. This association was stronger for Black students compared to Hispanic or White students, and for students whose mothers worked full-time compared with mothers that work part-time or do not work.⁶⁶

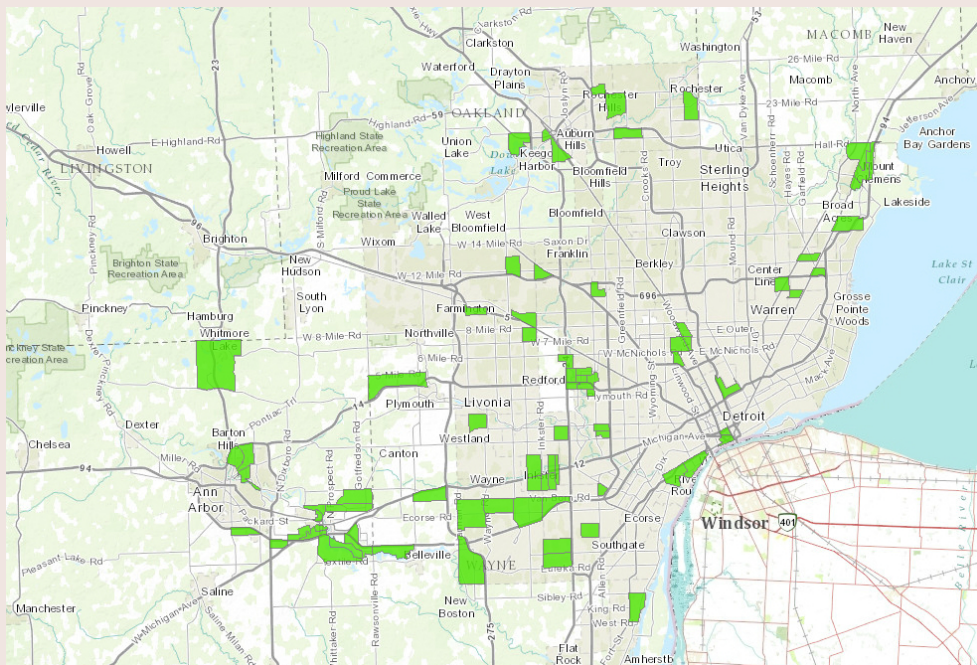
Fruit and Vegetable Consumption in Michigan. According to the National Center for Chronic Disease Prevention and Health Promotion, Michigan adults consume fruit about 1.1 times per day and vegetables about 1.6 times per day, the same as the national average, but lower than experts recommend.

Availability of Supermarkets and Grocery Stores in Michigan. Policies that improve the food retail environment can help increase access and the affordability of fruits and vegetables. According to CDC statistics, 63.9 percent of census tracts in Michigan have at least one healthier food retailer located within the tract or within one-half mile of its boundaries; this is less than the 69.5 percent United States average.

Supermarkets and grocery stores are the most com-

Map 2a

Low Income and Low Access to Supermarkets, Detroit Metropolitan Area, 2010



■ Census tract where population is low income and living more than 1 mile from a supermarket or large grocery store if in an urban area, or more than 10 miles from a supermarket or large grocery store if in a rural area.

Source: United States Department of Agriculture, Economic Research Service, Food Access Research Atlas, Updated March 25, 2014.

Map 2b
Low Income and Low Access to Supermarkets, Michigan, 2010



■ Census tract where population is low income and living more than 1 mile from a supermarket or large grocery store if in an urban area, or more than 20 miles from a supermarket or large grocery store if in a rural area.

Source: United States Department of Agriculture, Economic Research Service, Food Access Research Atlas, Updated March 25, 2014.

mon places to purchase fresh fruits and vegetables. A food desert is defined as a low-income census tract where a significant number or share of residents are more than one mile (urban) or 10 miles (rural) from the nearest supermarket, supercenter, or large grocery store. In Michigan, 972 census tracts (35 percent) meet the definition of a food desert. **Map 2a** displays census tracts in the Detroit metropolitan

area that meet this definition. Across the rest of the state, many of the places that qualify as a food desert are large tracts of forested land where few, if any residents live. Therefore, **Map 2b** displays the census tracts that qualify as food deserts using an expanded definition of a food desert (a low-income census tract where a significant number or share of residents is more than one mile (urban) or 20 miles

Table 7
Counties with Highest Rates of Low Income Population with Low Access to Grocery Stores, 2010

<u>Rank</u>	<u>County</u>	<u>Percent</u>
1	Muskegon	14.32%
2	Ingham	13.44
3	Alger	12.59
4	Ontonagon	12.31
5	Mackinac	11.76
<i>County Average</i>		5.41

Note: Number of people in a county with low income and living more than 1 mile from a supermarket or large grocery store, if in an urban area, or more than 10 miles from a supermarket or large grocery store, if in a rural area. For rank, 1= low access, 83= high access. The full list of the 83 counties and their rank can be found in **Appendix C**.

Source: United States Department of Agriculture, Economic Research Service, Food Access Research Atlas, February 2014.

Table 8
Counties with Highest Rates of Total Population with Low Access to Grocery Stores, 2010

<u>Rank</u>	<u>County</u>	<u>Percent</u>
1	Muskegon	35.11%
2	Alger	34.74
3	Ottawa	32.88
4	Ingham	32.85
5	St. Clair	32.65
<i>County Average</i>		16.91

Note: Number of people in a county living more than 1 mile from a supermarket or large grocery store, if in an urban area, or more than 10 miles from a supermarket or large grocery store, if in a rural area. For rank, 1= low access, 83= high access. The full list of the 83 counties and their rank can be found in **Appendix C**.

Source: United States Department of Agriculture, Economic Research Service, Food Access Research Atlas, February 2014.

(rural) from the nearest supermarket, supercenter, or large grocery store). See **Appendix B** for a state map that includes rural census tracts that are 10 miles from the nearest supermarket, supercenter, or large grocery store.

At the county level, wide variation is found in the rates of low-income population groups who have access to a supermarket or large grocery store. **Table 7** shows the counties with the highest rates of low access among low-income populations. In contrast, less than one percent of the low income population in some counties (Ogemaw, Oscoda, Arenac, Antrim, and Barry) have low access to grocery stores.

Table 8 shows the accessibility to stores of the entire county population, which again varies widely. Again, less than one percent of the populations of each Ogemaw, Oscoda, Arenac, Antrim, and Barry counties have low rates of access to stores.

Obesity Risk Factor 10

LOW COST OF UNHEALTHY FOODS AND HIGH COST OF FRUITS AND VEGETABLES

The relatively low cost of unhealthy foods increases their consumption, when compared to healthier foods.

Some researchers attribute part of obesity's growing

prevalence to the decline in the inflation adjusted price of food. Since 1950, real prices have dropped for sugar and sweets, carbonated drinks, and snacks and foods from vending machines, but have actually risen for fruits and vegetables.⁶⁷ The daily price difference for healthy foods was \$1.50 more in 2011 dollars, which translates to \$550 more per year per person.⁶⁸

The BMIs of low income children, especially those living below the federal poverty line, are more sensitive to fruit and vegetable pricing than those of higher income children and those of older, healthier-weight populations.⁶⁹ Some research shows that consumption of fruits and vegetables among low-income households responds more strongly to price changes than in other households. One study found that among children in the lowest quintile of income, a 10 percent decline in the price of fruits and vegetables was associated with a 1.4 percent reduction in their average BMI and a 10 percent increase in fast food prices was associated with a 2.6 percent reduction.⁷⁰

However, prices' expected contribution to growing obesity rates is likely relatively low. For example, one study found that all observed individual and socioeconomic factors, which includes prices, accounts for only 25 percent of the rise in childhood obesity from 1997 to 2003.⁷¹ Other research found

The Role of Fast Food Restaurants in Obesity Rates

Fast food restaurants, with their seemingly ubiquitous locations and low cost food options, are often anecdotally classified as a risk factor for obesity. In reality, the data supporting this supposition is mixed at best.

With low cost and easy access to convenience foods and fast food restaurants, the cost proposition for cooking has changed. The factors contributing to this are overall food prices, the number and location of fast food restaurants and convenience stores, availability of ready-made foods, and access to fresh fruits and vegetables.

Researchers have demonstrated a large positive correlation between the number of restaurants per capita and obesity rates since 1978.ⁱ Some research finds a particular detriment to having fast food restaurants near schools. One study found that having a fast food restaurant within a tenth of a mile of a school was associated with a 5.2 percent increase in obesity rates among 9th grade students. The presence of non-fast food restaurants was uncorrelated with obesity and weight gain.^j Another study found that when a fast food restaurant was located within one half mile of a middle or high school, children consumed fewer servings of fruits and vegetables, consumed more soda, and were six percent more likely to be overweight and seven percent more likely to become obese than children whose schools were not near fast food restaurants. Fast food prices are also inversely correlated with weight, so as prices decline, average weights rise.^k Additionally, as incomes rise so does fast food consumption; low income households eat less fast food than higher income households.^{l,m}

On the other hand, some researchers believe that fast food plays little to no role in the nation’s growing obesity rates. One study found who children who tend to eat foods high in saturated fats and added sugars when not eating fast food were more likely to be overweight or obese regardless of how often they frequented fast food restaurants. Children that ate overall diets with leaner proteins, less added sugar and saturated fat, and more fruits and vegetables were less likely to be obese even if they frequently consumed fast food. Additionally, children who ate at fast food restaurants, compared to those who did not, were more likely to have overall diets high in saturated fats and added sugars. The remainder of the diet consumed outside of fast food restaurants, which was mostly obtained from a grocery store, was independently associated with being overweight and obese, but fast food consumption was not. These researchers believe that their findings, “suggest that the location where foods are obtained may not be as important as the nutritional quality of the foods consumed.”ⁿ The fact that many fast food restaurants have begun offering healthy food options may also negate the impact of higher fast food consumption.

Fast Food Restaurants in Michigan. As of 2008, Michigan had approximately 0.70 fast food restaurants per 1,000 residents (7,005 fast food restaurants, 10,003,422 population in 2008). The states with the highest number of fast food restaurants relative to their populations are Vermont, Washington, D.C., Maine, Montana, and Rhode Island. Utah and Mississippi have the lowest number of fast food restaurants per capita.^o Obesity rates among these states are mixed showing that there is not an obvious correlation to the number of fast food restaurants per capita and statewide obesity rates. In fact, among the states and Washington, D.C. that had highest number of fast food restaurants, the highest 2013 obesity rate was in Maine, with 28.4 percent, which is the 23rd highest in the country. Vermont (23.7 percent), Washington, D.C., (21.9 percent), Montana (24.3 percent), and Rhode Island (25.7 percent) all have below average rates of obesity suggesting that the number of fast food restaurants is not the culprit. Consistent with research, the location of the restaurant (distance to a school), the availability of healthier choices, and the food choices made may be mediating the effect.

Table B
Counties with the Most and Least Fast Food Restaurants per 1,000 Population, 2011

Rank	County	Fast Food Restaurants per 1,000 Population
<i>Counties with Most Fast Food Restaurants</i>		
1	Mackinac	1.27
2	Dickinson	0.99
3	Schoolcraft	0.94
4	Arenac	0.89
5	Emmet	0.85
<i>Counties with Fewest Fast Food Restaurants</i>		
79	Alcona	0.28
80	Barry	0.27
81	Montmorency	0.21
82	Ontonagon	0.15
83	Keweenaw	0.00

Note: For rank, 1= high number of restaurants, 83= low number of restaurants

Source: United States Department of Agriculture, Economic Research Service, Food Access Research Atlas, February 2014.

ADDRESSING MICHIGAN'S OBESITY PROBLEM

The number of fast food restaurants by Michigan county varies dramatically (See **Table B**). Keweenaw has zero fast food restaurants. Among the other counties, the number of fast food restaurants in 2011 varied from 0.15 per 1,000 population in Ontonagon to 1.3 per 1,000 population in Mackinac. Again, a clear association between the number of fast food restaurants and obesity rates is not evident. For example, Barry County, which has the fourth highest obesity rate in the state has the fourth fewest fast food restaurants per 1,000 population. A high number of fast food restaurants also does not imply that the residents in those counties frequent fast food restaurants; for example, some of these areas have high rates of tourism and many of these restaurants may cater to this group.

Further blurring the common belief in the role of fast food restaurants in causing obesity is the amount that is spent on fast food. Michigan residents spent an average of \$491.95 each on fast food in 2007, the most recent year this data were collected. This was the 6th lowest expenditure per capita in the country, where Vermont (46th highest obesity rate) residents spent \$402.10 and Washington, D.C., (50th highest obesity rate) residents spent \$1,043.86 on average per year.^o These figures do not quantify the type of food that was purchased, which may explain why no simple pattern emerges connecting spending and obesity rates.

ⁱ S. Chou, M. Grossman, H. Saffer. "An economic analysis of adult obesity: results from the behavioral risk factor surveillance system." *Journal of Health Economics*, 23: 565–587 (2004).

^j Currie, Janet, Stefano DellaVigna, Enrico Moretti, and Vikram Pathania. "The Effect of Fast Food Restaurants on Obesity." Work Paper 14721. Cambridge, MA: National Bureau of Economic Research. 2009.

^k Chaloupka, Frank J., Lisa M. Powell, and Jamie F. Chriqui. *Sugar Sweetened Beverage Taxes and Public Health*. Prepared by the University of Illinois at Chicago for Bridging the Gap and Healthy Eating Research, programs of the Robert Wood Johnson Foundation. 2009.

^l Engelhard, Carolyn L., Arthur Garson, Jr., and Stan Dorn. "Reducing Obesity: Policy Strategies from the Tobacco Wars." Urban Institute July 2009.

^m Davis, Brennan, and Christopher Carpenter. "Proximity of Fast-Food Restaurants to Schools and Adolescent Obesity." *American Journal of Public Health* 99(3):505-510 (2009).

ⁿ Poti, Jennifer M., Kiyah J. Duffey, and Barry M. Popkin. "The association of fast food consumption with poor dietary outcomes and obesity among children: is it the fast food or the remainder of the diet?" *The American Journal of Clinical Nutrition* 99(1):162-171 (2014).

^o United States Department of Agriculture, Economic Research Service, Food Access Research Atlas, February 2014.

that at home and restaurants, including full service and fast food, food prices account for 12 percent of the rise in the percentage of obese adults between 1984 and 1999.⁷²

Food Prices in Michigan. Food prices are cheaper in Michigan compared to other states. The annual average cost for grocery items relative to costs in other urban areas nationwide varies across Michigan, but is consistently lower than the nationwide average. The indexes for grocery items in major Michigan metro areas are included in **Table 9**. For this index, 100 equals the nationwide average of both metropolitan

and non-metropolitan areas included in the data. For example, in Ann Arbor, grocery items cost 86.1 percent of the average for all places nationwide.

Obesity Risk Factor 11

HIGH CONSUMPTION OF SUGAR-SWEETENED BEVERAGES AND ENERGY DENSE FOODS

Michigan's population is consuming too many calories from sugar-sweetened beverages and energy dense foods that provide little nutritional value.

Whether because of limited access to healthy food options or personal choice, Michiganders are consuming too many calories above what they are expending from physical activity. Consumption of beverages sweetened with sugar, a common culprit in excessive calorie intake, is associated with obesity. In contrast, consumption of water and unsweetened beverages is associated with lower risks of obesity. Even in areas where residents have access to water and produce, they are consuming much of their calories from foods and beverages that offer little or no nutritional value.

Sugar-Sweetened Beverage Consumption in Michigan. In 2013, Michigan's consumption of sugar-

Table 9
Cost of Living Index, Grocery Items,
Michigan Metropolitan Areas, 2013

	Index
Ann Arbor	86.1
Detroit-Dearborn-Livonia	85.7
Grand Rapids-Wyoming	84.6
Kalamazoo-Portage	82.8

Note: 100 indicates the nationwide average

Source: Council for Community and Economic Research

sweetened beverages was 12th highest in the nation, with annual consumption at 37.1 gallons per capita.⁷³ Sugar-sweetened beverages include non-diet versions of soft drinks, fruit juices, sports drinks, ready to drink tea, energy drinks, flavored water, and ready to drink coffee.

Obesity Risk Factor 12 LARGE SERVING SIZES

Large serving size may encourage people to eat more.

Another way some communities have attempted to address obesity rates is through local mandates on portion sizes in restaurants and other venues serving food. Proponents of these policies point to evidence that 1) people do not notice differences in portion sizes, unknowingly eating more when given larger portions, and 2) when people eat larger portions they do not compensate by eating fewer calories at other meals. However, no studies exist on the impact of policies mandating serving sizes for food and beverages.⁷⁴

In 2012, New York City drew media attention for trying to limit soda sizes to 16 ounces (the mandate excluded diet sodas and beverages that contained 70 percent or more fruit juice). The size limit would have effected all restaurants, fast food establishments, movie theaters, sports stadiums, and food carts. Supported by then Mayor Bloomberg, the city's Board of Health approved the law which was supposed to take effect in March 2013. The soda size limit was to be enforced by the city's restaurant inspectors and business owners would have had nine months to comply with the changes.

In March 2013, before the law took effect, the New York Supreme Court invalidated the law, not because of the law itself, but because the Court believed that, "the Board of Health overstepped the boundaries of its lawfully delegated authority when it promulgated the portion cap rule to curtail the consumption of soft drinks."⁷⁵ In June 2014, New York's Court of Appeals upheld the lower court's ruling that the New York City's Board of Health "exceeded the scope of its regulatory authority" in instituting the ban, thus maintaining that the ban is illegal.⁷⁶

Affordable Care Act and Healthy Weights

As part of the federal Affordable Care Act, health plans and insurers must, at a minimum, provide coverage with no patient cost-sharing for evidence-based health services that are recommended by the United States Preventative Task Force (USPTF). According to their website, the USPTF recommends the screening of all children age six or older and adults for obesity. For patients with a BMI of 30 or greater, clinicians should offer or refer patients to intensive, multicomponent behavioral interventions, which would include counseling delivered by primary care clinicians and/or specialists such as nutritionists and dieticians.^p

The ACA only requires insurance companies to cover obesity screening and counseling and nearly half of the states do not require expanded obesity treatments in plans sold through their health insurance exchanges. Michigan has opted to expand the treatment options offered through the federal insurance exchange. Accordingly, insurance companies operating in Michigan will be providing coverage for medical weight-loss programs, bariatric surgery, and appointments with nutritionists. Insurance companies can charge copays and there may be some coverage limitations for these services; a patient may only see a dietician six times per calendar year and eligibility for bariatric surgery must be determined by a doctor. Coverage through the ACA should be equal to or better than what is available to many people enrolled in private insurance and should increase access to obesity reduction treatments.^q

A final major change in obesity treatment because of the ACA is that insurance companies may no longer use weight as a factor to determine health insurance premium rates. The only factors insurance companies may consider in rate setting are age, geography, and tobacco usage. While this change in the ability of insurance companies to discriminate by weight will make health care more affordable for the overweight and obese, those costs will now be shifted to entire insurance groups and borne by the non-obese.

^p United States Preventative Task Force. "USPTF A and B Recommendations." www.uspreventiveservicestaskforce.org/uspstf/uspsabrecs.htm

^q Dybis, Karen. "Detroit area hospitals expect to treat more for obesity under Obamacare." *Detroit News*. March 3, 2014.

Obesity and Income: Is there a link?

Income is one factor that has a tenuous link to obesity rates despite conventional wisdom. A study of weight and family income between 1971 and 2002 shows that socioeconomic disparities in being overweight may have changed overtime.^r Obesity among lower income children and families is often attributed to the high price of healthy food and the low price of energy-dense food such as fast food and sugar sweetened beverages. However, while higher incomes may allow individuals to substitute unhealthy food with healthier options, income may also promote weight gain because these individuals have the resources to consume more calories, regardless of their health quotient. Higher income populations may also spend more time in sedentary activities— such as having desk jobs and driving in cars rather than taking public transportation. Therefore, some research has shown that income has little to no influence on BMI.^s

Consistent across all socioeconomic status groups was a prevalence of the overweight classification among Black Americans compared to White Americans, suggesting that rather than an income disparity there is actually a racial disparity in obesity.^t

^r Wang, Youfa and Qi Zhang. "Are American Children and Adolescents of Low Socioeconomic Status at Increased Risk of Obesity? Changes in the Association between Overweight and Family Income between 1971 and 2002." *American Journal of Clinical Nutrition* 84(4):707-716 (2006).

^s Cawley, John. "The Economics of Childhood Obesity." *Health Affairs* 29(3):364-371 (2010).

While supported by New York City officials, it is unclear whether such a ban would have survived public opinion should it have been implemented. Many argued that the limit violated individual freedom of choice and would have been a burden on interstate commerce as companies would have had to produce different beverage sizes for consumers in New York City.⁷⁷ Still others pointed out the probable ineffectiveness of the law because it isolated sodas in the ban; milkshakes, large, high-caloric coffee drinks, and sodas sold at grocery stores and convenience stores were not included in the ban.

Obesity Risk Factor 13

ASYMMETRIC INFORMATION REGARDING NUTRITION FACTS

Nutrition facts are often missing, confusing, not used, and/or difficult to interpret.

Consumers are often unaware of the nutrition content of the foods they are consuming. The federal Nutrition Labeling and Education Act of 1994 requires that packaged foods contain printed nutrition labels to address this information asymmetry. However, the efficacy of these nutrition facts is questionable. Studies show that consumers find these nutrition facts confusing and misleading and have a difficult time making healthy decisions based on this data. Therefore, use of nutrition labels may be fairly low.⁷⁸

While packaged foods contain nutrition labels, this is only a portion of total food that people consume. Nutrition facts on menus would supplement the information gap and may be more important now than in the past as Americans now spend more of their food budgets at restaurants (48 percent today compared to 25 percent in 1955) and consume more of their daily calories outside their homes (32 percent today compared to 18 percent in 1978).^{79,80} Food eaten at restaurants is higher in sodium and fat and less frequently meets dietary recommendations.⁸¹ Studies show that consumers routinely underestimate the amount of calories and fat in restaurant meals.⁸²

Obesity Risk Factor 14

INSUFFICIENT COVERAGE OF TREATMENT OPTIONS BY HEALTH INSURERS

Medical treatments for obesity are not always covered by health insurers.

Both access to quality health care and the types of benefits, services, and providers covered by insurance companies will influence the usage of obesity treatment options. With the passage of the federal Patient Protection and Affordable Care Act of 2010 (ACA), health insurers are required, with limits to cost-sharing, to cover particularly defined "essential health benefits." Relevant to obesity diagnosis and treatment, the ACA requires coverage

of prescription drugs, preventative and wellness services, and chronic disease management. States have also historically mandated private market health insurers to cover specific benefits and services and, in order to comply with the ACA, must now designate benchmark plans that define the minimum benefits required of every non-grandfathered health plan sold in the state.

Obesity Treatment Coverage in Michigan. Per ACA requirements, Michigan has issued guidelines for its essential benefits benchmark plan. Relating to obesity treatment, Michigan's benchmark plan requires coverage of bariatric surgery (limited to one per lifetime) and weight loss programs (without a quantitative limit on service).⁸³

Michigan also requires that health carriers establish a program to prevent the onset of diabetes and provide coverage for equipment, supplies, and educational training related to the treatment of diabetes; the state does not have any specific mandated coverage to prevent obesity, one of the greatest risk factors for diabetes.

Obesity Risk Factor 15

DISTRIBUTION OF THE FINANCIAL COSTS OF OBESITY

The financial costs of obesity are not all incurred by the obese, rather they are spread across nearly the entire population.

One theory regarding the rise in obesity rates is that individuals do not bear the full financial cost burden of their unhealthy decisions and therefore have less incentive to make healthier decisions. Health insurance, both public and private, effectively

subsidizes the medical costs associated with obesity and distributes these costs to taxpayers (via Medicaid and Medicare) and to businesses and non-obese individuals (through insurance premiums).

However, some argue that weight gain is not entirely the fault of individual choice. While some have a genetic predisposition to weight gain, others are casualties of more sedentary work environments, poor walking and commuting infrastructure, and the ease and availability of low-cost, low-nutrition food options. Medical advances have also expanded treatment options for obesity-related diseases, which may improve the life span and quality of life for obese persons, but reduces the health costs of excess weight borne by obese persons.

Obesity Risk Factor 16

LACK OF AWARENESS OF WEIGHT STATUS

Individuals are often not aware of their own or their children's weight status, typically underestimating their classification as overweight or obese.

Without proper diagnosis of weight classification, some people may not know or choose to take action in modifying unhealthy behaviors or to seek medical treatment. This type of screening can be done by a medical professional or at home if individuals have access to a weight scale and the proper information.

Children in the Medicaid program have access to free obesity screening, but other children and adults may have to pay a copay for a doctor's visit to receive this diagnosis. Diagnosing a person as obese or overweight is important for treatment and can be integrated in schools and by health care services.

Arkansas's Leadership in Childhood Obesity Prevention and Treatment

In both 2003 and 2007, Arkansas passed legislation designed to reduce childhood and adolescent obesity. The legislation required students in kindergarten through grade 10 to have a body mass index screening every other year, eliminated vending machine access in public elementary schools, and established a statewide Child Health Advisory Committee to recommend nutrition and physical activity standards for public schools. A review of the impact of the legislation six years after its initial implementation showed that school environments were healthier and that families had a higher awareness of health problems associated with childhood obesity. Adolescents reported an increase in physical activity and a reduction in soda and fast food consumption.^t

^t The National Conference of State Legislatures. "Public Health and Cost Savings." Health Costs Containment and Efficiencies: NCSL Briefs for State Legislators, No. 14. February 2011.

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Obesity Risk Factor 17

COMMUNITIES ARE NOT PLAYING A ROLE IN OBESITY REDUCTION

Communities are not maximizing opportunities to improve the health of their residents.

Communities provide services demanded by local residents, but are also arguably responsible for creating opportunities that improve the health and welfare of their residents. In this way, communities can and do play an important role in improving health behaviors. Similar to schools, but unlike state-level programs, communities have the advantage of being able to implement programs and policies specific enough to meet the exact needs of their communities—whether it be a lack of nearby grocery stores or insufficient infrastructure for physical activity. Community programs can also target at-risk groups such as older adults or low-income families. The CDC points out that, “when communities, health care organizations, and other key sectors create environments and policies that support individual behavior change and systematize those policies, individual behavior changes are more likely to be sustained.”⁸⁴

Obesity Risk Factor 18

INSUFFICIENT PUBLIC HEALTH EXPENDITURES

Public health spending can help reduce obesity, but Michigan is spending relatively little.

Public health spending, which includes community disease prevention programs, makes up less than five percent of United States health spending. Yet public health spending increases between 1993 and 2005 were associated with significant decreases in infant deaths and deaths from cardiovascular disease, diabetes, and cancer.⁸⁵ These effects were 21 to 44 percent larger in low-income communities. For each 10 percent increase in public health spending, deaths from cardiovascular disease dropped 3.2 percent; this change cost local health agencies \$312,274 on average. Achieving a similar result to decrease the prevalence of obesity through the use of health care treatment would have required an additional 27 primary care physicians in the average community. With a median salary of over \$200,000 for primary

care physicians, this strategy would cost 17 times that of the public health investment.⁸⁶

Public Health Spending in Michigan. At the state level, Michigan spends relatively little in promoting public health compared to the 50 states and District of Columbia. In FY2012, Michigan spent \$172.0 million on public health initiatives. This translates to spending of \$17.41 per capita, the 37th highest in the nation. Hawaii, the top spending state, spent \$154.99 per capita on public health; the national median was \$27.40 per capita (See **Table 10**).⁸⁷

Health expenditure data show that in 2012 the State of Michigan spent 2.1 percent of its total expenditures on health (does not include spending for hospitals). This was the 36th highest among states where the

Table 10
State-Level Public Health Budgets Per Capita: Top Five, Bottom Five, Median, and Michigan, FY2012

Rank	County	FY2012 Per Capita Public Health Budget
<i>States with Largest Per Capita Public Health Budgets</i>		
1	Hawaii	\$154.99
2	Idaho	90.17
3	West Virginia	86.55
4	Alaska	81.02
5	New York	75.04
	<i>Median</i>	<i>27.40</i>
37	Michigan	17.41
<i>States with Smallest Per Capita Public Health Budgets</i>		
47	Wisconsin	\$13.10
48	Mississippi	8.89
49	Arizona	7.59
50	Missouri	6.08
51	Nevada	3.28

Note: “Public health” is defined to broadly include all health spending with the exception of Medicaid, CHIP, or comparable health coverage programs for low-income residents. Federal funds, mental health funds, addiction or substance abuse-related funds, WIC funds, services related to developmental disabilities or severely disabled persons, and state-sponsored pharmaceutical programs also are not included. For rank, 1= high spending, 51= low spending.

Source: Levi, Jeffrey, Laura Segal, Rebecca Laurent, and Albert Lang. “Investing in America’s Health: A State-by-State Look at Public Health Funding and Key Health Facts.” Trust for America’s Health, April 2013.

Michigan Health and Wellness 4x4 Plan

In an effort to improve the health of individuals and communities in Michigan, Governor Rick Snyder introduced the Michigan Health and Wellness 4x4 Plan. The plan focuses on personal responsibility in reducing obesity but covers other health goals as well. The centerpiece of the plan is the 4x4 tool that recommends four health behaviors (healthy diet, regular exercise, annual physical exams, and avoiding all tobacco use) and monitoring four key measures of health (body mass index, blood pressure, cholesterol, and blood sugar/glucose level).

According to Olga Dazzo, the former director of Michigan's Department of Community Health, these four actions and four measures, "are the science-based best practices to prevent or delay costly chronic illnesses."^u To promote personal responsibility, the state has implemented a marketing campaign and provides free or low-cost access to tools for personal goal tracking such as calorie counters, pedometers, and other health tracking tools.

The State will work with groups across the state, such as employers, trade and professional organizations, education systems, and departments of government to implement the goals of the 4x4 plan. In conjunction with these partners, the 4x4 plan seeks to:

- Implement *Michigan Nutrition Standards* in public school districts;
- Develop a model policy with the State Board of Education that includes physical education and activity before, during, and after school;
- Strengthen the farm-to-school network;
- Assist employers in creating work environments that support healthful eating and physical activity and award employers that successfully implement the 4x4 plan;
- Encourage hospitals and health care providers to provide every patient with his or her four health measures;
- Incorporate the 4x4 plan into the electronic health record system for health management and for ease of distribution to patients;
- Encourage Michigan restaurants to include calorie information on menus and post menus online along with nutrition content; and
- Establish a statewide physical activity program affordable for everyone, including low income individuals.

The projected first year cost of this project is \$18.25 million.^v In FY2013, Michigan appropriated \$2.25 million and the appropriation dropped to \$850,000 in FY2014.

^u Levine, David. "Michigan Fights Obesity with a 4x4." *Governing*, September 2012. www.governing.com/topics/health-human-services/gov-michigan-fights-obesity.html

^v "Our Health Begins with: The Michigan Health and Wellness 4x4 Plan." Michigan Department of Community Health, June 2012.

average was 3 percent. Arizona spent the most, with 6.3 percent of its total expenditures on health and Minnesota the least, with 0.9 percent. Since Minnesota is generally one of the healthier states, the data demonstrate that public health spending is not the only component to having healthy residents.

Local governments spent relatively more. In 2011, local governments in Michigan spent a total of nearly \$2.9 billion on health, excluding hospitals, which was 6.2 percent of total local government expenditures. Combined, Michigan's state and local governments spent 4.3 percent of total expenditures on health.⁸⁸

Other Risk Factors

Some risk factors influencing obesity rates offer benefits that may offset gains in obesity. Technology is one such example; technology has beneficially influenced our daily lives, yet has a profound positive correlation to obesity. Giving up technology is not a viable solution because of all the benefits technology provides. Rather, many of the solutions discussed below can help mitigate the levels of inactivity that

have become more prevalent as technology has become more pervasive.

Similarly, some risk factors are bigger than obesity. Public safety is an obvious concern for many reasons but increases obesity rates when people do not feel safe exercising or using active transport, such as walking and biking, to work or school.

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The rise in two-parent working households has also contributed to higher obesity rates. In particular, obesity rates have grown with the number of women entering the workforce. This is one of several factors that explain why obesity rates are higher in developed countries.⁸⁹ Because women have traditionally provided meals for spouses and children, the presence of both parents in the workforce may result in fewer hours available to cook nutritious meals and a higher reliance on less nutritious and energy dense convenience foods. To many, the benefits of women in the workforce outweigh the cost of obesity. Instead, policy solutions that accommodate expressing breast milk in the workplace, provide outlets for physical activity and healthy eating during the school day for K-12 students, and allow convenient access to fresh fruits and vegetables can all mitigate the obesity costs associated with two-parent working households.

While there are many reasons to lament the winter months, some research shows that it also may be unhealthy. Being indoors, in climate controlled settings during the winter months may contribute to obesity. Unfortunately, even the Michigan legislature does not have the power to control winter, so accordingly, other policies will have to offset winter's bulging impact. Michigan can learn generally from policies in a state like Minnesota, which also has long, cold winters, yet has one of the lowest obesity rates in the country.

Finally, individuals in areas with public transportation are more likely to engage in some physical activity related to transferring between transit points, when compared to driving. Michigan's strong ties to the automotive industry have resulted in development of highways to the exclusion of mass transit. More so than in most other states, Michigan's urban areas are poorly served by rail, bus, and other transit options.

The Role of Government in Addressing Obesity

Policymakers are generally concerned about the negative impacts of excess weight, including obesity, but differ in how to approach the problem. Whether government, at any level, should be involved in the fight to reduce obesity is a subject of debate.

Arguments in Support of Intervention

Those in favor of government intervention to help reduce obesity rates point to market failures that warrant intervention. One such market failure is asymmetric information regarding the nutrition of foods, particularly in restaurants. Because consumers do not possess all the nutritional content information of their meals, the federal, state, and/or local governments may choose to step in to compel this industry to provide easily accessible nutrition information to consumers.

Second, because children cannot properly evaluate food choices or the consequences of those choices, the government may need to step in to help them. Examples of this would be nutrition standards for lunches and competitive foods in schools, restricting food advertising near schools, and requiring fast food restaurants and convenience stores to be a certain distance away from schools.

Third, because obesity has financial consequences that all of society must ultimately pay for, either in the form of higher health insurance premiums or through rising Medicaid costs, government may intervene to help lower these costs to society.⁹⁰ Because premiums are often group-based, the premiums for the entire group rise causing the costs of health care treatments related to obesity to be shared and paid for by the non-obese in the group. The socialized financing of Medicaid also distributes the costs of a more overweight population group among all taxpayers. The costs associated with obesity are shared with everyone, not just those whose decisions and medical conditions create the costs.

Some schools of thought support the responsibility of government in protecting and improving public health. Under this view, government then has the responsibility to intervene as public health crises arise, and by many measures obesity meets this criteria. The government's involvement in protecting public health is already wide spread; state and local governments have:

- Instituted laws requiring individuals to wear helmets while riding bicycles or motorcycles;

- Injected fluoride into the public drinking water;
- Banned smoking in workplaces, restaurants, and many public places; and
- Taxed tobacco and alcohol to reduce consumption.

With regards to protecting the health of children and adolescents, state and local governments have a long history of addressing:

- Nutrition of school lunches;
- Nutrition guidelines for competitive foods;
- Physical education requirements;
- Physical activity opportunities during the school day; and
- Safe pedestrian and bike routes to schools;

Intervening to reduce obesity would be along the same lines as these programs and policies, which have prevented and treated a variety of public health issues.

Arguments in Opposition to Intervention

Those who oppose government intervention to address obesity believe many of these policies infringe on personal freedoms and do not wish the government to be making value judgments regarding health and life choices. Laws that limit the size of soda containers or the calorie content of dishes in restaurants, limit food options available to individuals in public places, require insurance surcharges for those who are obese, or limit the ability of companies to market to certain groups, in certain places, or at certain times, may infringe on personal choices

and the right of businesses to capitalize on market demand. Intervention in this market would entail various government agencies interfering in a very personal area of people's daily lives— what they should eat, how they spend money, and how they should spend their time.

Some groups also believe that some obesity policy interventions go too far and impose too great a cost. For example, while schools should not be serving junk food in the school lunch program, critics claim that the new school lunch mandates issued by the federal government in 2012 are too restrictive and prescriptive. Through these new mandates, public school officials will be taken away from academic and curricular issues to focus on guidelines for meal production that children and adolescents may not even want to eat. And they argue that the increase in funding from the federal government is not sufficient to meet these mandates.

Finding Middle Ground

However, there does seem to be middle ground among the two camps. Many who advocate against government intervention in public health issues may still concede the benefits of helmet and seat belt laws and school nutrition requirements. And even proponents of some health laws seem unwilling to allow government intervention to cross into ambiguously defined gray areas of policy such as those that limit soda container sizes or require overweight and obese individuals to pay surcharges or penalties for their health insurance. This group typically supports policies that have proven effectiveness, advocating for a results-based use of public funds.

Policy Options to Address Obesity

Based on the available evidence on obesity policy solutions, CRC has identified several public policy actions that will be most effective in the state's battle against obesity. The success of the majority of these policies is substantiated by academic research. Public policies that are ineffective are not included, but policies that have not been heavily researched are included if they have been recommended by experts in the field, namely the federal Centers for Disease Control and Prevention (CDC) and the Institute of Medicine (IOM).

This section divides the policy recommendations into three categories: school-level, state government-level, and local government-level. **Figure 1** provides a summary of the obesity policy options and the risk factors that they address.

It is important to note that many of these school,

state, and local level solutions will not provide complete relief from obesity. Many of these solutions address obesity directly while others encourage solutions and support results from individuals, health insurers, businesses, and communities.

School, state, and local policymakers are currently active in the fight to reduce obesity, however, many of these actions are not direct or strong enough to significantly affect obesity rates. For example, where many states are mandating changes in schools, Michigan is mostly recommending policies and leaving the decision on whether or not they should be implemented to local school boards. Additionally, where federal, state, or local mandates do exist, enforceability may be lacking in Michigan. The following policy options contain stricter standards that are more likely to result in each policy's desired outcome.

School-Level Policy Actions

Policy actions that seek to prevent or lessen obesity among children and adolescents are particularly effective. Preventative policies are less expensive than curative policies and the effect is compounded in children and adolescents, who if overweight when young are more likely to be overweight in adulthood, leading to entire lifetimes of health and cost implications.

Policy Option A

CONTROL FOOD ACCESS IN ALL SCHOOLS

(Addresses Obesity Risk Factors: 1, 9, 10, 11, and 12)

Because students may consume roughly half of their daily caloric intake at school, the importance of access to healthy food options in schools cannot be understated. To increase access and availability of healthy foods and minimize consumption of less healthy foods, school administrators may employ a variety of strategies targeting both national meal programs as well as competitive foods on school grounds.

To expand accessibility to healthy food during the school day, school administrators whose districts participate in the National School Lunch and National School Breakfast Programs could be promoting stu-

dent participation. Some students are eligible but not enrolled, and some students are enrolled but not participating. Students eligible in these programs may be at a higher risk for obesity and school administrators could continue to use marketing and other strategies to increase participation in school meal programs.

School districts that do not participate in the national school meal programs should strongly consider officially adopting and adhering to those meal standards or the *Michigan Nutrition Standards*.

To address the impact of competitive foods on student diets, school administrators can take actions that incentivize students to choose healthier ones without imposing an outright ban. In one study, decreasing the prices of healthy foods in vending machines (which tend to be more expensive than less healthy choices) was shown to be an effective means of promoting lower-fat food choices.⁹¹ State policies targeting junk food in schools have little impact on reducing adolescent BMI, but may reduce racial and ethnic disparities in soda consumption.⁹²

Completely eliminating vending machines is correlated to lower obesity rates in children, however, there are economic consequences for schools that

Figure 1
Summary of Obesity Risk Factors and Associated Policy Options

Risk Factors	Policy Options													
	School-Level			State-Level							Local-Level			
	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	Healthy Foods in Schools	Physical Activity in Schools	Health Education in Schools	Increase Public Health Spending	Require School Nutrition Standards	Set Minimum PE Requirements	Require Health Education Classes	Tax Unhealthy Food and Subsidize Healthy Food	Set Nutrition and Activity Standards for Child Care	Health Insurance Cost-sharing, Penalties, and Incentives	Increase Community Food Access	Local Government Planning for Active Lifestyles	Improve Safe Physical Activity Options	Expand Community Programs
2		✓				✓			✓					
3		✓		✓								✓	✓	✓
4			✓				✓							
5									✓					
6				✓										✓
7				✓						✓		✓	✓	✓
8				✓						✓				
9	✓			✓	✓			✓	✓		✓			✓

Figure 1 (continued)
Summary of Obesity Risk Factors and Associated Policy Options

Risk Factors	Policy Options														
	School-Level			State-Level						Local-Level					
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	
10 Low Cost of Unhealthy Foods and High Cost of Fruits and Vegetables	✓		Health Education in Schools	✓	Require School Nutrition Standards	Set Minimum PE Requirements	Require Health Education Classes	Tax Unhealthy Food and Subsidize Healthy Food	Set Nutrition and Activity Standards for Child Care	Health Insurance Cost-sharing, Penalties, and Incentives	✓	Increase Community Food Access	Local Government Planning for Active Lifestyles	Improve Safe Physical Activity Options	Expand Community Programs
11 High Consumption of Sugar-Sweetened Beverages and Energy Dense Foods	✓			✓	✓			✓	✓						
12 Large Serving Sizes	✓			✓					✓						✓
13 Asymmetric Information Regarding Nutrition Facts			✓				✓								✓
14 Insufficient Coverage of Treatment Options by Health Insurers										✓					
15 Distribution of the Financial Costs of Obesity										✓					
16 Lack of Awareness of Weight Status			✓				✓								
17 Communities are Not Playing a Role in Obesity Reduction											✓	✓	✓	✓	✓
18 Insufficient State-Level Public Health Expenditures				✓											

use the revenue from the vending machines to offset losses in other food service areas. One argument against restricting or banning access to competitive foods in schools is that they often help bring in a significant amount of revenue that schools use for a variety of academic and extra-curricular purposes. This revenue may be especially important given the budget challenges that Michigan schools have faced over the last decade. However, data show that restricting certain types of competitive foods and/or improving the nutritional quality of competitive foods has not negatively affected school revenue. Other studies have shown that limiting competitive foods may increase participation in school meal programs which may help compensate for revenue losses.⁹³

Policy Option B

EXPAND OPPORTUNITIES AND REQUIREMENTS FOR PHYSICAL ACTIVITY

(Addresses Obesity Risk Factors: 2 and 3)

When school administrators increase opportunities and requirements for physical activity during the school day, children and adolescents will be more physically active. As discussed above, a wide range of research shows that physical activity may help students perform better in other academic

When school administrators increase opportunities and requirements for physical activity during the school day, children and adolescents will be more physically active.

subjects, even when they receive less class time in those subjects to make room for physical education. Therefore, school administrators should strongly consider voluntarily adopting the *Model Policy of Quality Physical Education and Physical Activity in Schools*, approved by the State Board of Education, as a minimum standard for physical activity in their school.

Schools can create additional physical activity opportunities for students by expanding after-school sports programs. Participation in extra-curricular physical activities both at school and at other community settings has been shown to increase students' cardiovascular fitness as well as decrease the percent of body fat.⁹⁴ Policies that provide a

safe and supervised location for after-school activity, organized sports programs, and/or transportation for students would increase participation and help support physical activity outside of school.

State policymakers could offer grants to encourage schools to implement after school activities and intramural sports programs. School districts and local governments could allocate existing funds for this purpose, or seek state and federal grant funding to support these programs.

One way to expand these opportunities in a less

Coordinated Approach to Child Health (CATCH): A Cost Effective Health Promotion Program

CATCH is a school health promotion program that is designed to decrease fat, saturated fat, and sodium in children's diets, increase physical activity, and prevent tobacco use. The program includes activities in the classroom, out of the classroom, at home, and after-school, and attempts to involve families of the children involved. CATCH is used by schools in all 50 states and research has shown that CATCH is both effective and cost-effective.

A program in El Paso, Texas was tailored to a largely Spanish speaking low-income community and included a nutrition curriculum with healthy Mexican dishes and information on how to increase fruit and vegetable consumption. Physical activity increased anywhere from 52 to 59 percent and obesity rates flattened. A study of this program found that the net benefit was \$68,125 (in 2004 dollars) which represents the present value of the averted future costs related to poor nutrition and physical inactivity. The cost per quality-adjusted life years (QALY) saved was \$900.^w Based on these results, another researcher claims that CATCH is the most cost-effective way to prevent childhood obesity.^x

^w Brown, Henry Shelton, Adriana Pérez, Yen-Peng Li, Deanna M Hoelscher, Steven H Kelder, and Roberto Rivera. "The cost-effectiveness of a school-based overweight program." *International Journal of Behavior Nutrition and Physical Activity* 4(1): 47 (2007).

^x Cawley, John. "The Economics of Childhood Obesity." *Health Affairs* 29(3):364-371 (2010).

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costly way is to engage in shared use of school facilities. Many states have laws that encourage or require shared use of school facilities to increase the physical activity options for students outside of school hours. In many communities without this option, students and others in the community do not have a safe and/or affordable location to be physically active. The Michigan State Board of Education recommends that schools establish joint use agreements in their model policy.⁹⁵ In the absence of laws requiring schools to make their facilities available to the community, schools may otherwise close facilities to save costs on maintenance and security and prevent vandalism or liability from injuries.⁹⁶ These partnerships may make it more affordable for schools to keep their facilities open for physical activity and benefit students as well as the community.

Policy Option C

INCLUDE HEALTH EDUCATION IN CURRICULUM FOR ALL GRADES

(Addresses Obesity Risk Factors: 4, 13, and 16)

Local school boards and charter schools in Michigan are not required to include health education in curricula for students in grades K-8, however, health education is important in teaching children the fundamentals for healthy diets, physical activity, and healthy weight loss and weight maintenance. The *Michigan Model for Health*, the curriculum developed through a collaboration of state departments, provides recommendations for integrating health education into elementary and middle schools, and school boards and charter schools should consider adopting the Michigan State Board of Education recommended *Michigan Model for Health*.

State-Level Policy Actions

Policy Option D

INCREASE PUBLIC HEALTH SPENDING

(Addresses Obesity Risk Factors: 1, 3, 6, 7, 8, 9, 10, 11, and 18)

Similar to how state-level public health programs have abated other public health issues, increased public health spending at the state level in Michigan may have an important and meaningful impact on the rate of obesity across the state. As discussed above, Michigan's current state-level public health spending per capita is 37th highest in the country and 36 percent below the per capita national median.

The allocation of more public dollars to public health demonstrates the state's commitment to reducing its obesity rate. Increased public health spending could be used to support both state-level programs as well as local and school programs. Appropriations could support programs to:

- Help schools and child care programs comply with federal nutrition standards;
- Create after-school physical activity programs;
- Provide incentives for businesses to institute employee wellness programs;
- Provide grants and ongoing funding to build community infrastructure conducive to active lifestyles (parks, sidewalks, bike lanes, etc.);
- Improve public safety; and

- Fund targeted community programs.

Popular state policies provide tax credits for fitness or wellness choices, or fiscal incentives encouraging grocery store development and grocery store offerings of fresh fruit and vegetables. To fund anti-obesity efforts and additional health programs, some states raise money through specific taxes, such as those on unhealthy foods and beverages.

Policy Option E

REQUIRE AND ENFORCE ADHERENCE TO FEDERAL SCHOOL NUTRITION STANDARDS

(Addresses Obesity Risk Factors: 1, 9, 10, 11, and 12)

The Revised School Code requires K-12 school districts to "establish and operate a program under which lunch is made available to all full-time pupils enrolled and in regular daily attendance at each public school of the school district,"⁹⁷ and to adhere to nutrition standards prescribed by the USDA.⁹⁸ However, only public schools with 20 percent or more of their students meeting the income eligibility criteria for free or reduced-price lunches must provide breakfast.⁹⁹ These standards also do not apply to charter schools.

Even with these standards, more than 10 percent of Michigan schools serving lunch do not participate in the School Breakfast Program. In the 2011-12 school

State Appropriations for School Meal Program Compliance

School districts may not have sufficient resources to properly comply with the new federal school meal program standards. State appropriations could go toward providing adequate training and technical assistance for school administrators to help them comply with the new USDA standards, some of which are being implemented next year. State appropriations can also help school administrators comply with lunch standards if federal reimbursements are proven to be insufficient to meet the updated standards. A recent survey reveals that 97 percent of Michigan school districts need at least one piece of equipment, at a median cost of \$54,000 per school, in order to comply with USDA nutrition standards. Overall, \$244.7 million worth of food service equipment is needed in Michigan to better serve healthy meals, and administrators in 34 percent of schools are unsure whether they will have sufficient resources to purchase the equipment.^y

^yRobert Wood Johnson Foundation and The Pew Charitable Trusts. "Serving Healthy School Meals: Michigan Schools Need Updated Equipment and Infrastructure." Issue Brief, March 2014.

year only 900,046 students of the state's nearly 1.6 million students participated in the school lunch program (either, paid, reduced-price, or free lunch).¹⁰⁰ According to a March 2014 survey, 82 percent of school districts in Michigan are serving meals meeting the updated USDA standards, compared to 86 percent nationwide.¹⁰¹ These statistics show that some schools are not required to comply with National School Lunch Program standards and some that are required to, do not. Therefore, state policymakers could create school nutrition requirements that will help ensure equitable access to healthy meals and snacks at schools across the state.

State policymakers could also step in to mandate nutrition standards for all foods offered in schools, regardless of whether they are sold and regardless of the time of day they are offered. This would include foods and beverages exempt from federal standards such as those sold or provided outside of school hours. Absent of nutrition mandates from the state, schools can set their own nutrition standards.

Policy Option F

SET MINIMUM STANDARDS FOR PHYSICAL EDUCATION FOR GRADES K-12

(Addresses Obesity Risk Factor: 2)

While MDE's *Physical Education Content Standards and Benchmarks* are consistent with best practices for increasing physical activity for children and adolescents, they are not a required component of the curriculum. Some schools have independently adopted these recommendations, but to reduce disparities in programs across the state, and ensure quality physical education for all public school stu-

dents, Michigan policymakers could include some or all of these recommendations as requirements for physical education.

Increasing physical education requirements in schools has been shown to increase the amount of physical activity that children engage in each week, but has not been shown to be effective in reducing childhood and adolescent obesity rates.¹⁰² However, physical activity is related to lower body fat, greater muscular strength, stronger bones, improvements in cardiovascular and metabolic health, as well as improvement in mental and cognitive health.¹⁰³

Despite these benefits, not all parents and educators are in support of current physical education policies or the idea of requiring more time in physical education. Parents may oppose physical education standards for a variety of reasons, including concern for the health of their children, the possibility of physical injury, and bullying of children less athletically inclined. School administrators and educators may oppose requirements for physical education because of cost (equipment, facilities, and personnel) and because time spent in physical education is time away from other core subjects.

A 2012 survey by EPIC/MRA of 600 registered voters in Michigan revealed that 95 percent of those polled supported requiring at least 30 minutes of physical education two days per week for students in grades K-5. Eighty-four percent said that schools should also provide these students with 15 hours of health education per year. When asked about middle school students, 86 percent of those polled agreed that students should have 50 hours of health education per year and 87 percent said they should have at

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least 45 minutes per day in physical education for at least one semester per year.¹⁰⁴

To improve student performance in physical education, the state can institute standards that school districts would report. By including physical education in statewide student assessments and school evaluations, state policymakers are emphasizing the importance of this subject.

Policy Option G

REQUIRE A QUALITY HEALTH EDUCATION CURRICULUM FOR ALL GRADES

(Addresses Obesity Risk Factors: 4, 13, and 16)

To ensure that every student in Michigan has at least been presented and thoroughly instructed in the risk factors for obesity and components for healthy living, the state could require a health education curriculum for all grades. While the state already has set grade level expectations, these could be converted to requirements rather than recommendations.

Accordingly, to improve student performance in health education, the state can develop and disseminate curricula and guidelines or standards which school districts will report. By including health education in statewide student assessments and school evaluations, state policymakers are emphasizing the importance of this subject and prioritizing it along with other core academic subjects.

For minority school children, who are disproportionately obese and overweight, the effectiveness of obesity prevention and intervention programs was greater when the program objectives were specific, transcended the school and included the community, and were culturally relevant.¹⁰⁵

Policy Option H

TAX SUGAR-SWEETENED BEVERAGES AND CERTAIN UNHEALTHY FOODS AND SUBSIDIZE HEALTHY FOODS

(Addresses Obesity Risk Factors: 9, 10, and 11)

Taxes and subsidies are commonly employed government tools to encourage healthy behavior, dis-

incentivize unhealthy behavior, and raise revenues for general or specific programs and projects. Taxes have been used historically to reduce or moderate tobacco and alcohol use. In the case of obesity, other states and local governments have instituted taxes to disincentivize the consumption of foods and beverages associated with higher obesity rates such as sugar-sweetened beverages and candy. Often revenues from these taxes are used to directly subsidize fruit and vegetable purchases to help make healthy foods more affordable. Tax revenues may also fund programs addressing childhood obesity, farmers' markets, or community program efforts.

A trend favoring sugar-sweetened beverage taxes is in bloom across the country. Legislators in California, Vermont, Hawaii, Massachusetts, Mississippi, New York, and Rhode Island have all introduced legislation to create state and/or local soda taxes in the last few years, though none of these states have successfully implemented such a tax. In 2008, Maine passed a soda tax of 42 cents per gallon; 65 percent of voters repealed the tax two years later. A soda, bottled water, candy, and certain processed foods tax was successfully enacted in Washington State, only to be overturned by 63 percent of voters in November 2010.¹⁰⁶

Several states have amended their sales taxes or enacted excise taxes in an effort to address obesity and poor nutrition. Of the 45 states that have a sales tax, only 14 states tax groceries, though seven of these states tax groceries at a lower rate than the rate applied to other goods. Of the 31 states that exempt groceries from the sales tax, 17 states exclude candy from the grocery definition and tax it at the sales tax rate. Twenty-two states and Washington, D.C., exclude soda from the grocery definition and tax it at the general sales tax rate.

Four states add an excise tax to soda (on top of the sales tax rate): Arkansas, Tennessee, Virginia, and West Virginia. The excise tax in these four states is levied in three different ways. Arkansas and West Virginia levy the tax based on volume (\$0.21/gallon and \$0.01/16.9 ounce, respectively), Tennessee levies a gross receipts tax of 1.9 percent, and Virginia levies a tax based on a rate schedule.¹⁰⁷

Of the 31 states that exempt groceries from the sales tax, 17 states exclude candy from the grocery definition and tax it at the sales tax rate.

Michigan does not tax groceries and does not have any exclusions for candy or soda. The constitutionality of such exclusions is debatable: perhaps one of the reasons why a soda tax has not been introduced in the state.

One study used statistical modelling to show that in order to measurably reduce sugar-sweetened beverage consumption, prices would need to double.¹⁰⁸ On the other hand, several studies have estimated that just a 10 percent increase in the price of sugar-sweetened beverages could reduce consumption of them by 8 to 11 percent. Other studies have found that when prices of sugar-sweetened beverages increase, consumers will substitute those with a healthier beverage. Changing the relative prices of food and beverages impacts both consumption patterns and obesity levels; when unhealthy foods and beverages cost more relative to healthy ones, BMI is reduced as is the prevalence of overweight and obesity.¹⁰⁹

One study estimated that if Michigan had instituted a 10 percent tax on fattening foods^{iv} it would have collected \$1.4 billion in revenue during calendar years 2010 and 2011. If the state used some of these new revenues to subsidize fruit and vegetable purchases by the same amount, Michigan still could have seen a net state-level revenue increase of \$1 billion.¹¹⁰

Studies have found that the public is most likely to support taxes on sugar-sweetened beverages or unhealthy foods when the tax revenues are designated to promote health programs for key groups such as children and underserved populations. A 2012 California poll found that 62 percent of voters supported a state fee on soda when revenues were used to fund childhood obesity prevention programs.¹¹¹ In a 2011 poll in Vermont, only 42 percent of voters supported a sugar-sweetened beverage tax; when told the revenues of the tax would be used to make health care programs for low- and middle-income children more affordable, support rose to 77 percent.¹¹² Similarly, in a 2010 Mississippi poll, only 34 percent of

^{iv} Fattening foods are based on their classification by the Rayner model. The Rayner model is a repeatedly validated nutrient profiling model that is applied by the British Food Standards Agency. The model analyzes each food item on a numerical scale by balancing the food's nutritionally risky elements with its nutritional benefits to determine where the food falls on the "healthy" scale.

voters supported a sugar-sweetened beverage tax, but when told the revenues would fund programs to fight childhood obesity, support rose to 52 percent.¹¹³

The challenge of food taxes is determining what should be taxed. Many fruit juices have as many calories as soda as well as a high amount of sugar even though they contain real fruit juice. If the government taxes only soda then people may substitute away from soda and choose juice; since calorie content may be the same, obesity may not decline even though health may improve (fruit juices usually have some vitamins). To solve this problem, some stakeholders have proposed taxing sugar which would raise the price of all foods and beverages that use this as an additive.

While sugar-sweetened beverage taxes may effectively reduce consumption they also are regressive in that they burden low income consumers more heavily than higher income consumers. This expense is compounded in some low income areas where access to healthy food is limited but access to fast food and convenience food is plentiful. If tax policy is implemented in such a way as to make healthy foods more affordable and accessible for low-income populations then taxing unhealthy foods will not only be less of a burden but will also likely lead to better health among the most vulnerable population groups.

Food and Beverage Tax Options in Michigan. Taxing food and beverages in Michigan is prohibited in the state Constitution. The Constitution states, "No sales tax or use tax shall be charged or collected from and after January 1, 1975 on the sale or use of... food for human consumption except in the case of prepared food intended for immediate consumption as defined by law. This provision shall not apply to alcoholic beverages."¹¹⁴

Based on this constitutional language, Michigan policymakers have several options should they wish to tax food or beverages. First, policymakers could opt to place taxes on vending machine purchases as well as fountain beverages, which are typically considered to be intended for immediate consumption. Second, while taxes on food are prohibited, some indirect taxation, such as those at the wholesale level, are still an option. Third, policymakers may change the statutory definition of food. In doing this, they could

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How Obesity Reduction and Prevention Policy Can Emulate Success from Tobacco Policy

Several researchers and many policymakers have been looking at how the federal, state, and local governments have reduced smoking rates over the last 50 years to determine if there are policies that can also effectively be applied to reduce the obesity rate. In the mid-1960s, over 42 percent of the adult U.S. population smoked cigarettes; fewer than 20 percent smoke today. Policy interventions that were successful in achieving this lower rate of tobacco usage included:

- Imposing excise taxes that raised the price of cigarettes;
- Anti-smoking education in media, schools, and the community;
- Increased availability of smoking cessation drugs and behavioral support;
- Limitations and bans on tobacco advertising;
- Indoor smoking bans; and
- Enforced restrictions on youth access to tobacco.

Fighting obesity in a similar manner as tobacco has several merits. The main argument is that obesity and smoking are very similar in that:

- Both are risk factors in a variety of preventable diseases;
- Both generate significant health care costs that affect the individual and are passed on to all health care consumers;
- Both are difficult to treat clinically;
- Both have a higher prevalence among low-income groups and both have (or had) aggressive marketing campaigns;
- While tobacco is proven to be an addictive substance, some foods are associated with addictive like behavior— especially foods that contain caffeine or are high in sugar, or sugar-like products.

However, the differences between obesity and tobacco are substantial and do impact how obesity is addressed. First, exercise can offset the impacts of overeating, but there is not a known equivalent for tobacco use. Second, while no level of tobacco consumption is considered safe, food must be consumed. Not all obesity is caused by eating foods with low- or no nutritional value, it is also caused by overeating in general, even healthy foods. Foods that are high in fat should be eaten in moderation, rather than eliminated, especially since fat is required for good health. Therefore, elimination of fat, for example, is not recommended. However, there are some foods that provide no nutritional value, are instrumental in contributing to obesity, and can be eliminated; these include soda, candy, and many snack foods. Third, while smoking often begins in adolescence, most obesity occurs in adulthood.

Notwithstanding the differences in these approaches, researchers at The Urban Institute have identified several strategies that were implemented to combat smoking, show promise in impacting obesity rates, and do not require an investment of new public funding: excise or sales taxes on fattening foods, product labeling requirements, and a comprehensive marketing ban.^z At the state and local levels, time will tell if the impact of these policies is as great on obesity as it was on tobacco.

^z Engelhard, Carolyn L., Arthur Garson, Jr., and Stan Dorn. "Reducing Obesity: Policy Strategies from the Tobacco Wars." Urban Institute July 2009.

define sugar-sweetened beverages as non-food items and other similar definitions pertaining to candy and junk foods; at least 17 states already exclude candy from the grocery definition. Finally, policymakers can pursue a constitutional amendment that would need to be approved in a statewide election allowing for the imposition of a sales tax on certain or all food.

Another potential option is an excise tax to be added

to sugar-sweetened beverages and/or unhealthy foods. However, even without the label of being a sales tax, a party could argue in court that the excise tax mimics a sales tax. Courts dealing with this and similar issues have concluded "a court must determine the true nature of the tax and not be misled by legislative legerdemain."¹¹⁵ Therefore, an excise tax may not hold up if challenged in the courts.

Policy Option I

ADOPT NUTRITION STANDARDS AND PHYSICAL ACTIVITY REQUIREMENTS FOR LICENSED CHILD CARE PROVIDERS

(Addresses Obesity Risk Factors: 2, 5, 9, 11, and 12)

As with schools, rules and regulations are in place to positively impact nutrition offered in child care facilities, but these regulations are not uniformly applied to all child care providers and therefore result in discrepancies across the state. In addition to universally applicable standards, efforts could be made to further enhance the nutrition requirements for all licensed child care providers, not just care provided at child care centers. Making sure that children in care facilities are offered healthy foods and beverages is essential to the health of young children and in developing healthful eating habits as they age.

The IOM recommends requiring each licensed child care facility to provide opportunities for physical activity for at least 15 minutes per hour of care and to implement appropriate strategies to ensure that the amount of time toddlers and preschoolers spend standing or sitting still is limited.

The state could also adopt physical activity requirements for all licensed child care providers. Very little research has been conducted about the relationship between physical activity and body weight among toddlers and preschoolers, but the weight of this group has increased over the last 30 years.¹¹⁶ The IOM recommends requiring each licensed child care facility to provide opportunities for physical activity for at least 15 minutes per hour of care and to implement appropriate strategies to ensure that the amount of time toddlers and preschoolers spend standing or sitting still is limited. It also recommends limiting equipment that restricts infants' movement. At a minimum, the IOM recommends providers be required to give toddlers and preschoolers at least 30 minutes of physical activity per day for half-day programs and one hour for full-day programs.

Because of strong evidence of a positive association between television viewing and BMI among adults and children, the CDC recommends community policies that limit access to screen time to no more than two hours per day for children aged two and younger at licensed child care facilities.¹¹⁷

Policy Option J

ENCOURAGE GREATER HEALTH INSURANCE AND TREATMENT COST-SHARING, PENALTIES, AND INCENTIVES

(Addresses Obesity Risk Factors: 7, 8, 14, and 15)

Similar to how the state set up financial incentives for local governments requiring employees to share in at least 20 percent of health insurance premium costs, state policymakers could enact incentives to motivate *all* employers to increase cost sharing with employees and introduce penalties and incentives related to obesity within reasonable affordability limits. Options that focus the financial costs of obesity on obese individuals, rather than spreading out costs among all those insured, may be effective in incentivizing both healthier behaviors for overweight and obese individuals and weight maintenance for already healthy weight individuals. This could

be done through:

- Greater cost-sharing in medical procedures related to obesity;
- Higher cost-sharing of insurance premiums;
- Incentives for weight loss for overweight and obese individuals; and/or
- Incentives for weight maintenance for healthy weight individuals.

The ACA prohibits insurance companies from charging higher premiums based on weight and employers have limited ability to impose penalties on workers who do not participate in the company's wellness program or do not meet certain health targets such as healthy BMI. However, the ACA allows for incentives of up to 30 percent of the cost of coverage for achieving health-related standards, up from 20 percent prior to the ACA. Sometimes these penalties will be framed as incentives or discounts for participation for eligible employees and often take the form of premium discounts, cost-sharing waivers, or expanded benefits.

A RAND study recently found that 69 percent of employers with at least 50 employees and workplace

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wellness programs use financial incentives to encourage wellness program participation and 10 percent use incentives tied to health-related standards, such as target body weight. Incentives for screening activities were more successful than incentives for joining intervention programs and disease management. Incentives above \$50 are particularly effective

in encouraging employees to complete a health risk assessment. The study concluded that lifestyle management interventions in workplace wellness programs are successful in increasing health behaviors such as exercise, but the effects on health care costs of these programs is fairly low and statistically insignificant.¹¹⁸

Local-Level Policy Actions

Policy Option K

USE ZONING AND FINANCIAL INCENTIVES TO INFLUENCE FOOD ACCESS

(Addresses Obesity Risk Factors: 9, 10, and 17)

The prevalence of supermarkets, grocery stores, fast food restaurants, and convenience stores are important components in health and obesity rates among residents in close proximity to these establishments.

Supermarkets and Grocery Stores

Best practices for increasing access to healthy foods include state and local government incentives that encourage new food retailers to locate in underserved areas or encourage existing stores to offer healthier food and beverage choices. Financial incentives could include tax abatements, loans, loan guarantees, and grants (often referred to as Healthy Food Financing Initiatives) that may reduce the costs of the investment for businesses.

The Trust for America's Health designates the Pennsylvania Fresh Food Financing Initiative as the most successful program to date. This program, which began in 2004, has financed supermarkets and fresh food outlets in 78 urban and rural areas for nearly 500,000 residents throughout the state. The program is also cited as creating or retaining 4,860 jobs

in underserved neighborhoods as well as increasing tax revenues.¹¹⁹

Zoning changes and small business support also help increase the availability of healthy foods in underserved areas.

Fast Food Establishments and Convenience Stores

A strategy that focuses on curbing the availability of unhealthy and calorically dense foods is to reduce the availability of establishments that sell these foods. This strategy is most commonly implemented by limiting zoning for fast-food establishments and convenience stores, particularly in low-income neighborhoods and next to schools. To supplement the loss in access to food, local policies can provide incentives for grocery stores and farmer's markets to develop in these areas.

Policy Option L

PURSUE PLANNING CONSISTENT WITH ACTIVE LIFESTYLES

(Addresses Obesity Risk Factors: 3, 7, and 17)

Michigan local governments could alter zoning policies, develop safe walking and biking routes, and provide recreation and fitness facilities and programs to promote active lifestyles.

Issues and Considerations for Local Zoning

Local zoning board decisions are often disconnected to goals that do not directly promote the economic vitality of the area—the primary consideration used by zoning boards in decision-making. This disconnect may have negative consequences on areas such as public health if local policymakers do not take active steps to harmonize the goals for each department in the locality. For example, zoning boards may be inclined to approve zoning for fast food restaurants because it expands the tax base of the local government. Other considerations by zoning boards that may work in opposition to local health goals are the risks associated with losing development to neighboring cities. These are important economic considerations, but local leaders need to assess their policy making goals and how obesity and resident health play a role in the long term economic health of the city. Ignoring the costs of obesity at the local level may be more costly than local governments can afford.

Zoning

Mixed use development zoning allows residential, commercial, and public land uses to be in close proximity to one another, reducing the distance between destinations, and increasing the number of trips people can make by foot or bike. Zoning for single use development often creates barriers to active transport because of the distance between destinations. One study found that each additional kilometer walked per day was associated with a 4.8 percent reduction in the likelihood of obesity.¹²⁰ Research demonstrates that mixed-use developments are associated with increased walking and biking.¹²¹ One study found that the odds of obesity declined as mixed land use increased and each additional hour spent in a car per day was associated with a 6 percent increase in the likelihood of obesity.¹²²

Safe Walking and Biking Routes

Research that associates increased physical activity and the presence of walking infrastructure, such as sidewalks, footpaths, and pedestrian crossings, is mixed, with research showing both positive correlations and no change at all. Additionally, a causal relationship is difficult to establish because people

Example of Local Government Planning for Active Lifestyles: Complete Streets

Complete streets legislation was introduced in Michigan in 2010 and appropriations for the program were first made in the state's FY2009-10 transportation budget. In the appropriations bill, the state allocated funds for complete streets indicating, "legislative intent that department and local road agencies...adopt complete streets policies" and directing "the department to provide assistance to local agencies."^{aa} Public Acts 134 and 135 of 2010 carried out this intent by providing for a Complete Streets Advisory Council to educate and advise state and local government road infrastructure departments throughout the state. Complete streets programs strive to create safe and effective transportation networks for all users—pedestrians, bicyclists, senior citizens, children, and drivers. As of June 2014, 25 communities had adopted local complete street ordinances, policies, plans, or guidelines and 71 communities had adopted complete street resolutions.^{ab}

^{aa} Public Act 116 of 2009

^{ab} Michigan Complete Streets Coalition. www.micompletestreets.org/

who enjoy walking may be more likely to move to communities with existing walking infrastructure. Therefore, it is difficult to determine whether walking infrastructure actually encourages more physical activity in the community. However, it is certain that without this infrastructure, activity opportunities are limited.

To improve opportunities for physical activity, communities are creating and expanding bike lanes, shared-use paths, and bike routes on new and existing roads for active use in recreation and utilitarian purposes. To encourage commuting by bike, communities are also providing bike racks in commercial and other public places. These practices are commonly referred to as complete streets programs. While studies do show that an improved cycling infrastructure increases the frequency of biking, much of this infrastructure comes at a high cost for local governments and may result in increased danger to drivers and cyclists when they share roads.¹²³

Recreation and Fitness Facilities

Having a built environment conducive to physical activity provides more opportunities for both children and adults to engage in the recommended levels of daily physical activity. This includes sidewalks, shared-use paths, crosswalks, parks, green spaces, and recreation facilities.

One study found statistically significant negative associations between obesity and both natural amenities and recreation facilities per capita at the county level.¹²⁴ Michigan has 8.7 recreation and fitness facilities^v per 100,000 population, the 33rd highest rate in the country. Massachusetts has the highest number of facilities at 15.8 per 100,000 population and Hawaii has the lowest at 5.6 per 100,000 population. By Michigan county, the number of recreation and fitness facilities varies substantially with 0.3 per 1,000 population in Presque Isle County to 0.013 per 1,000 population in Van Buren County. However, 14 counties have zero recreation and sports facilities.¹²⁵ Michigan also has a high number of beaches, lakes, and other natural amenities that provide opportunities for recreation and fitness.

^v Defined as facilities that are primarily fitness establishments and recreational sports facilities.

Policies consistent with these research findings would include state and local-level spending to maintain Michigan's natural amenities and to encourage the development of recreation facilities.

Policy Option M

IMPROVE SAFE PHYSICAL ACTIVITY OPTIONS

(Addresses Obesity Risk Factors: 3, 7, and 17)

Local governments can continue to improve the public safety of their local communities in an effort to increase the levels of physical activity among residents. Safer neighborhoods will lead to a higher frequency of physical activity among adults and children who live in these neighborhoods.¹²⁶ Safety concerns may explain why adolescent girls are less likely to engage in active transport, such as walking and biking, to and from school than boys.¹²⁷ Children and adults that feel safe in their neighborhoods are more likely to play in neighborhood parks and other sports facilities. The fact that low income neighborhoods often have higher crime rates may be causing or exacerbating low rates of physical activity among this population group. Public safety improvements will have profound effects on the quality of life of children and adults in high crime areas as well as provide safer opportunities for fitness and recreation.

Safe Routes to Schools

Communities can incorporate measures to increase safe active transport options for students. The prevalence of students walking or biking to school is based on many factors. Surveys show that students are more likely to walk or bike to school in areas where streets are well connected, with a high density of street intersections, and that boys are more likely to engage in active transport to school than girls.¹²⁸ Policies that improve the safety and connectedness of paths to schools may increase the number of children utilizing active transport, even in rural areas. This includes incorporating traffic calming and controlling measures into community planning, such as reduced speed limits, speed humps, marked crosswalks, and traffic lights with pedestrian signals.

A study by the Environmental Protection Agency (EPA) found that among students living within one mile of school, the percentage of walkers fell from 90 percent in 1969 to 31 percent in 2001. Reasons

for this include low population density of the built environment, little mixing of land use, long blocks, and incomplete sidewalks. The EPA suggests that rather than building larger schools, the trend should be reversed in order to locate schools in neighborhoods, and make them more accessible by walking and biking.¹²⁹

The Michigan Department of Transportation (MDOT) administers federal grants that provide educational programs, infrastructure improvements, and encouragement activities to help children safely walk and bike to school. These Safe Routes to School grants are entirely federally funded with no local matching requirement. In 2012, MDOT awarded grants to six schools in five counties (Benzie, Berrien, Eaton, Genesee, and Kent) to install sidewalks and shared-use paths, update school zone signs, install crosswalk markings at intersections near campus, install pedestrian signals, and hold classroom competitions and other incentives to encourage participation. One study found that the combination of the Safe Routes to School program, school promotion, and in-school education increased the number of students walking to school.¹³⁰

Active transport for students in many of Michigan's rural areas is challenging as they often live many miles from school. Rural areas across the country are still engaging in Safe Routes to School Programs by adding sidewalks along major highways and those leading to school properties. However, this challenge is significant in encouraging active transport to school in rural areas, and Safe Routes to School Programs may be more easily implemented in urban and suburban communities.

Policy Option N

EXPAND COMMUNITY PROGRAMS TARGETING OBESITY

(Addresses Obesity Risk Factors: 3, 6, 7, 9, 10, 12, 13, and 17)

Community-based programs that focus on obesity prevention are highly cost effective and local governments should consider increasing their investment in these programs. These programs increase levels of physical activity, improve nutrition, and reduce smoking and other tobacco use rates. A study conducted through a partnership of Trust for America's Health, The Urban Institute, The New York Academy of Medicine, the Robert Wood Johnson Foundation,

Community Transformation Grants

The Affordable Care Act contains several components that address obesity prevention. One of these is the creation of the Prevention and Public Health Fund (PPHF) that supports programs, medical screenings, and research in line with goals identified to prevent obesity. One of the ways PPHF does this is through Community Transformation Grants (CTGs). Communities receiving CTGs are required to use the grant toward efforts on one or more of the evidence-based obesity prevention efforts identified by the CDC and meet measurable outcomes. In the case of obesity, the performance goal for grants is a five percent reduction in obesity through nutrition and physical activity interventions.

The grant funds are attached to specific outcomes but communities can implement tailored approaches to achieving these goals that are most appropriate for their communities. In 2011, the CDC, which implements the program, awarded \$103 million to 61 state and local government agencies, tribes and territories, and nonprofit organizations in 36 states, along with nearly \$4 million to 6 national networks of community-based organizations. In 2012, the CTG was expanded to include areas with fewer than 500,000 people in neighborhoods, school districts, villages, cities, and counties; more than \$70 million was awarded to 40 communities.

In FY2011 and FY2012, no Michigan communities were awarded CTGs, however, the Sault Ste. Marie Tribe of Chippewa Indians and Spectrum Health Hospitals were awarded \$500,000 and \$333,321, respectively, in both fiscal years. In FY2012, the Central Michigan District Health Department was awarded \$1.64 million.

The award to the Sault Ste. Marie Tribe of Chippewa Indians will go toward helping a tribal population of over 176,000 reduce tobacco use, increase active living and healthy eating, provide quality clinical and preventative services, and ensure healthy and safe physical environments. The Spectrum Health Hospitals award is to build capacity to support healthy lifestyles in Kent County (population 614,462). The grant will also target tobacco use, active living and healthy eating, quality clinical and preventative services, and social and emotional wellness.

the California Endowment, and The Prevention Institute, concludes that nationwide, a \$10 per person per year investment (\$2.9 billion annually) in proven community-based disease prevention programs could save more than \$2.8 billion annually in health care costs for the first two years, \$16 billion annually within five years, and in 10 to 20 years savings could rise to as much as \$18 billion annually. The return on investment for every dollar spent on this strategy is \$0.96 for the first two years, \$5.60 within five years, and \$6.20 for years 10 to 20. About 13 percent of these savings will be to Medicaid, but the majority of the savings (70 percent) will be to private insurers and individuals.¹³¹

Programs that do not require medical treatment, target communities rather than individuals, and have been demonstrated to improve health meet this criteria. These programs may include extended school hours allowing children to play with adult supervision, access to fresh produce through farmers' markets, making nutritious foods more affordable and accessible in low-income areas, and requiring nutrition labeling of foods.

Using these results, the study estimates that a \$10

per person annual community-based investment in Michigan (total investment of \$100.9 million annually) would result in a total state net savings of \$90.9 million per year for the first two years. This results in a \$0.90 return above and beyond each \$1 invested in these programs. The net savings increase as the investments continue, with Michigan receiving a potential return on investment of \$5.40 above every dollar spent at five years, and \$6.03 above every dollar spent in years 10 to 20.

Another research study found that implementing a combination of three strategies—expanding health care coverage, delivering better preventative and chronic care (such as adhering to recommended guidelines), and improving community prevention (through enabling healthier behavior and safer environments)—was more effective in saving lives and money than when any of these strategies was implemented alone.¹³²

Research regarding the effectiveness of community-wide campaigns is also very positive. The CDC reports that based on a review of ten studies, these campaigns lead to about a 4 percent increase in the percent of people engaging in physical activity and

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a 16 percent increase in energy expenditure. An example of one such campaign occurred in Broome County, New York where United Health Services hosted an eight week multimedia campaign coupled with community activities to increase the number of sufficiently active older adults (40-65 year olds). Through partnerships with local human services agencies, the program "B.C. Walks," bought advertisements in radio, cable television, the local newspaper, and prime-time slots on network television. They gave local doctors and nurse practitioners pre-

scription pads with the B.C. Walks logo so they could prescribe daily physical exercise for their patients. The campaign worked with transportation and land use officials to expand safe walking opportunities and also grew into work-site and school walking programs. In the end, 78 percent of Broome County residents reported hearing about the campaign and the number of older adults who reported an increase in walking was 34 percent higher in Broome County compared to a control county.¹³³

Discussion

In considering school, state, and local level policy to meaningfully impact obesity rates, policymakers should contemplate several important considerations. First, obesity prevention is a far more cost effective strategy than diagnosis and treatment. Most current policies address these two strategies, and while both routes are worthwhile, prevention will result in greater cost savings in the long run. Most policymakers recognize this, however, it is nearly impossible to measure what never occurred, so prevention strategies are difficult to justify if policymakers cannot stand by measurable results.

Policy balance is important. Taxes and restrictions will not incite a healthier population unless these policies are balanced with opportunities for healthier choices.

Second, as a pervasive problem, obesity, and public health in general, should be a consideration of all public policy. The Affordable Care Act created the National Prevention Council which, in 2011, developed the National Prevention Strategy. Included in this strategy are recommendations for school districts and state, tribal, and local governments to include health criteria as a component of decision making. The National Prevention Strategy also recommends conducting comprehensive community health needs assessments and developing state and community health improvement plans.¹³⁴ As caretakers of public resources, health assessments and plans are congruent to policymakers' charge to protect and progress the welfare of the citizens in their jurisdiction.

Third, policymakers should be cognizant of unintended consequences and externalities; policies designed to positively influence health outcomes may be having the opposite effect. At least one

researcher has found that the increase in cigarette prices, due in part to taxes and lawsuits, has contributed to the growing rate of obesity.¹³⁵ One possible explanation for this phenomenon is addictive habits formed, cultivated and maintained by smoking may be transferred to food after a smoker quits. Or those individuals who have addictive tendencies and would have turned to tobacco are now turning to food. While this policy outcome is certainly unintended it does demonstrate the importance of researching potential policy repercussions prior to enactment and implementation and to allow for the introduction of complementary policies that may prevent negative externalities.^{vi}

Fourth, a thread of commonality exists among many of the most effective obesity intervention policies: curbing availability.¹³⁶ Reducing availability of a harmful substance has been very effective in reducing use of tobacco and alcohol products. While food itself is not harmful, curbing the availability of certain types of fatty, sugary, and non-nutritional foods may have similar outcomes. These strategies range in type from taxing the goods, introducing age restrictions, restricting or eliminating certain foods from schools, reducing hours retailers are open, and

^{vi} In the case of cigarettes and obesity, some research has shown that cigarettes are more harmful than obesity so some policymakers and stakeholders may still view the rise in obesity as a result of reduced cigarette use as a beneficial outcome. See Preston, Samuel H, Andrew Stokes, Neil K. Mehta, and Bochen Cao. "How will more obesity and less smoking affect life expectancy?" Center for Retirement Research at Boston College: Issue Brief 14-2, January 2014. http://crr.bc.edu/wp-content/uploads/2014/01/IB_14-2.pdf

capping the location and density of fast food establishments in certain geographic areas.

Fifth, policy balance is important. Taxes and restrictions will not incite a healthier population unless these policies are balanced with opportunities for healthier choices. In addressing obesity prevention, the IOM says, "Successful obesity prevention thus involves reducing negative and increasing positive influences on a societal level. Taking a population approach to obesity prevention is not to deny the

importance of...genetic or biological factors, but to recognize the difficulty of maintaining energy balance when sedentary lives are the norm and high-calorie foods are ubiquitous."¹³⁷

And finally, many of these policies are long term in nature. Impacts to obesity rates may not materialize for 5 to 10 years. While it takes time to lose weight, maintenance of a healthy weight is also important, but measured over the long run.

Conclusion

Research regarding the health impacts of obesity and how best to treat it are constantly being updated. The plethora of consequences, causes, and solutions add to the discussion and knowledge base of the obesity problem, but are not always helpful in inciting action to remedy the problem. This CRC report waded through these issues, focusing first on the economic costs of obesity to individuals and the state as a whole. In identifying the costs of obesity, obesity was established as a problem providing motivation to pinpoint causes and seek appropriate solutions.

This report narrowed the field of risk factors for obesity to nearly one and a half dozen and the number of potential policy solutions to just over a dozen. These policy solution options are those best suited to combat problems specific to Michigan.

None of the implications of these risk factors, nor their associated solutions are easy or straightforward, however. The United States Department of Agriculture's Economic Research Service summarizes the primary economic tradeoffs and multiple interacting dimensions of the societal influences that result in

obesity as, "technological changes driving modern economic growth have raised household incomes, reduced the price of food, and increased the price of physical activity. The resulting increase in energy consumption (food intake) and flattening of energy expenditure (physical activity) has tilted the weight equation in favor of a steady weight gain across all segments of U.S. society."¹³⁸

Because there is no one cause for the growth of obesity in the state, there is not a simple solution. School, state, and local leaders have already learned this through the variety of programs and policies they have implemented. A multitude of factors contribute to the growing instance of obesity and a variety of solutions must be executed. School, state, and local government policies have a unique role in that they have the potential to do a great deal of good, but in the end, they cannot force residents or students to eat less or exercise more. Their role is one that shapes the environment in which we live, work, and learn so as to create opportunities, incentivize actions, and educate about both.

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Appendix A

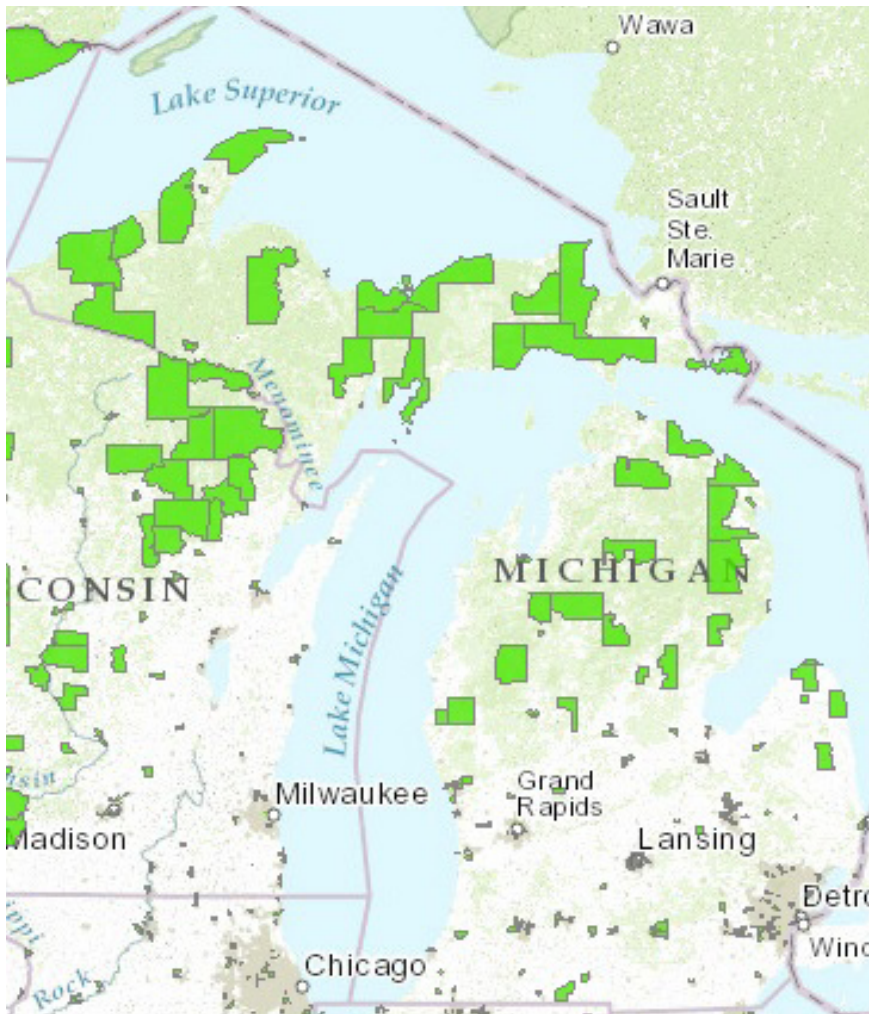
Obesity Rate, Population, and Per Capita Income, By Michigan County

County	Adult Obesity Rate, 2010	Population, 2013	Per Capita Personal Income, 2012	County	Adult Obesity Rate, 2010	Population, 2013	Per Capita Personal Income, 2012
Alcona	30.1%	10,906	\$31,439	Mackinac	33.8	11,061	36,911
Alger	32.6	9,739	26,758	Macomb	30.0	865,892	37,664
Allegan	34.2	107,415	35,197	Manistee	28.7	26,304	31,560
Alpena	33.4	29,091	35,310	Marquette	29.5	67,700	34,141
Antrim	31.2	28,750	34,599	Mason	32.3	29,226	34,059
Arenac	34.3	16,295	31,535	Mecosta	30.9	44,642	28,982
Baraga	32.0	12,693	28,836	Menominee	31.6	24,661	33,688
Barry	37.0	64,942	34,895	Midland	30.7	84,924	45,423
Bay	33.5	106,681	34,757	Missaukee	32.9	15,051	26,884
Benzie	31.6	19,659	33,905	Monroe	33.4	157,218	38,401
Berrien	36.5	162,757	37,764	Montcalm	32.0	68,117	26,844
Branch	35.1	45,591	29,979	Montmorency	31.7	10,025	28,737
Calhoun	37.1	140,203	35,623	Muskegon	35.5	174,938	31,685
Cass	31.4	56,370	36,787	Newaygo	35.3	47,981	29,855
Charlevoix	27.1	26,423	38,767	Oakland	26.9	1,268,464	55,761
Cheboygan	32.7	25,967	31,135	Oceana	34.9	31,211	33,513
Chippewa	37.9	39,023	29,943	Ogemaw	34.4	21,496	28,662
Clare	29.3	31,472	29,746	Ontonagon	33.9	7,718	31,337
Clinton	33.2	78,707	37,363	Osceola	33.9	24,952	27,556
Crawford	29.7	13,904	29,415	Oscoda	30.4	8,379	27,483
Delta	31.4	37,126	33,465	Otsego	31.7	24,688	32,616
Dickinson	29.8	26,098	40,715	Ottawa	25.5	282,128	36,663
Eaton	32.9	108,664	34,986	Presque Isle	33.3	13,489	31,994
Emmet	28.9	35,221	41,955	Roscommon	33.3	25,074	31,210
Genesee	36.0	421,800	32,421	Saginaw	39.7	203,430	33,079
Gladwin	34.2	25,493	27,233	Sanilac	36.0	46,258	33,234
Gogebic	28.3	15,916	32,492	Schoolcraft	27.5	8,247	33,060
Grand Traverse	31.4	92,146	39,462	Shiawassee	34.6	74,291	30,802
Gratiot	37.0	44,237	32,729	St. Clair	30.5	162,237	35,458
Hillsdale	30.3	50,363	29,651	St. Joseph	33.0	68,808	31,652
Houghton	26.7	40,820	29,798	Tuscola	30.9	62,274	30,417
Huron	29.0	38,317	41,741	Van Buren	31.8	86,201	32,499
Ingham	30.5	289,963	35,127	Washtenaw	23.3	358,718	43,202
Ionia	33.7	70,090	27,654	Wayne	34.3	1,787,658	36,141
Iosco	34.2	25,429	30,133	Wexford	32.5	33,873	29,151
Iron	31.3	11,657	36,028				
Isabella	31.1	73,956	30,434				
Jackson	34.4	165,797	32,670				
Kalamazoo	30.7	263,825	38,225				
Kalkaska	30.4	23,391	29,445				
Kent	30.7	629,078	38,824				
Keweenaw	32.2	2,337	39,786				
Lake	31.6	12,902	28,933				
Lapeer	33.5	95,079	33,752				
Leelanau	26.5	22,458	47,949				
Lenawee	32.3	108,508	33,519				
Livingston	26.6	189,846	43,513				
Luce	34.5	7,991	26,036				

Source: United States Department of Agriculture, Economic Research Service, Food Access Research Atlas, February 2014. Per capita personal income from the United State Department of Commerce, Bureau of Economic Analysis. Accessed July 17, 2014.

Appendix B
Map of Michigan Food Deserts

Low income with Low Access to Supermarkets, 2010



■ Census tract where population is low income and living more than 1 mile from a supermarket or large grocery store, if in an urban area, or more than 10 miles from a supermarket or large grocery store, if in a rural area.

Source: United States Department of Agriculture, Economic Research Service, Food Access Research Atlas, Updated March 25, 2014.

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Appendix C Michigan County Grocery Store Access Rates, 2010

Rank	County	Percent of Population Low Income with Low Access	Percent of Population Low Access	Rank	County	Percent of Population Low Income with Low Access	Percent of Population Low Access
1	Muskegon	14.3%	35.1%	48	Manistee	3.4	12.4
2	Alger	12.6	34.7	49	Otsego	3.4	12.3
3	Ottawa	8.7	32.9	50	Cheboygan	6.5	12.1
4	Ingham	13.4	32.8	51	Alcona	4.8	11.9
5	St. Clair	10.6	32.7	52	Luce	4.6	11.8
6	Dickinson	9.6	31.9	53	St. Joseph	4.2	11.1
7	Ontonagon	12.3	31.8	54	Lapeer	3.2	10.1
8	Mackinac	11.8	30.8	55	Houghton	4.4	10.1
9	Livingston	3.9	30.0	56	Wexford	4.3	9.7
10	Oakland	4.6	30.0	57	Gladwin	3.3	9.2
11	Genesee	9.0	29.8	58	Missaukee	4.1	8.8
12	Huron	11.5	29.6	59	Isabella	4.0	8.1
13	Presque Isle	8.3	28.8	60	Kalkaska	2.8	7.3
14	Chippewa	10.1	27.8	61	Alpena	2.7	6.8
15	Keweenaw	5.8	27.3	62	Gratiot	2.5	6.7
16	Jackson	9.9	26.5	63	Tuscola	3.3	6.7
17	Midland	7.1	26.2	64	Sanilac	2.0	6.2
18	Kalamazoo	8.8	26.0	65	Ionia	1.7	6.2
19	Schoolcraft	10.2	25.9	66	Clare	3.4	6.2
20	Iosco	10.3	25.8	67	Cass	1.6	6.0
21	Washtenaw	6.8	25.6	68	Montcalm	3.5	6.0
22	Berrien	8.4	24.6	69	Van Buren	1.5	5.9
23	Calhoun	8.9	23.6	70	Charlevoix	1.3	5.9
24	Macomb	4.5	23.2	71	Mason	2.1	5.8
25	Kent	5.2	22.3	72	Allegan	1.5	5.7
26	Lenawee	6.5	22.1	73	Hillsdale	1.6	5.7
27	Delta	7.1	22.1	74	Menominee	2.1	5.6
28	Gogebic	7.4	21.1	75	Montmorency	1.1	3.7
29	Saginaw	7.2	20.7	76	Oceana	2.1	3.7
30	Monroe	4.7	20.6	77	Newaygo	1.4	3.3
31	Eaton	5.4	20.2	78	Barry	0.9	2.8
32	Roscommon	8.9	19.0	79	Antrim	0.1	0.3
33	Bay	6.5	18.8	80	Arenac	0.1	0.2
34	Leelanau	4.4	17.8	81	Oscoda	0.0	0.1
35	Clinton	3.4	17.7	82	Ogemaw	0.0	0.0
36	Mecosta	10.1	17.7	83	Benzie	0.0	0.0
37	Emmet	5.8	17.6				
38	Grand Traverse	3.8	17.6				
39	Crawford	7.2	17.2				
40	Marquette	5.2	16.2				
41	Lake	7.0	16.0				
42	Shiawassee	7.0	15.9				
43	Osceola	5.8	15.8				
44	Iron	5.7	15.2				
45	Wayne	4.0	15.1				
46	Baraga	3.8	14.9				
47	Branch	6.2	14.4				

Note: Low access is defined as living more than 1 mile from a super-market or large grocery store, if in an urban area, or more than 10 miles from a supermarket or large grocery store, if in a rural area. For rank, 1=low access, 83=high access of entire population.

Source: United States Department of Agriculture, Economic Research Service, Food Access Research Atlas, February 2014.

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