

# Child and Adolescent Obesity in Massachusetts: Opportunities for Effective Policy Interventions at the State Level

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Within the last three decades the rates of childhood obesity have doubled, while the rates of adolescent obesity have tripled. Nationwide in 2009-2010, 16.9% of children ages 2-19 were obese.<sup>20, 25</sup>

Among Massachusetts high school students in 2009, 10.9% were obese,<sup>3</sup> while 16.1% of 2- to 5-year-olds were obese in 2010.<sup>4</sup> Massachusetts ranks 22nd nationwide in state prevalence of overweight and obese children, and its prevalence rate has risen since 2003.<sup>5</sup>

Childhood obesity can have both short- and long-term health consequences.<sup>25</sup> Examples of immediate health effects include high blood pressure, high cholesterol, prediabetes, bone and joint problems, and sleep apnea. Long-term health effects include persistent obesity into adulthood, heart disease, type 2 diabetes, stroke, some cancers, and osteoarthritis.<sup>3</sup>

This report will provide information on the extent of the problem of childhood and adolescent obesity in Massachusetts, modifiable risk factors, and effective prevention and policy programs that can help alleviate this problem.

## HOW DO WE MEASURE OBESITY?

The primary means of measuring obesity is body mass index (BMI). BMI is calculated using a child's weight and height, and children are categorized into overweight and obese based on age- and sex-specific percentiles. Overweight children are at or above the 85th percentile for their age and gender. Obese children are at or above the 95th percentile.<sup>24</sup>

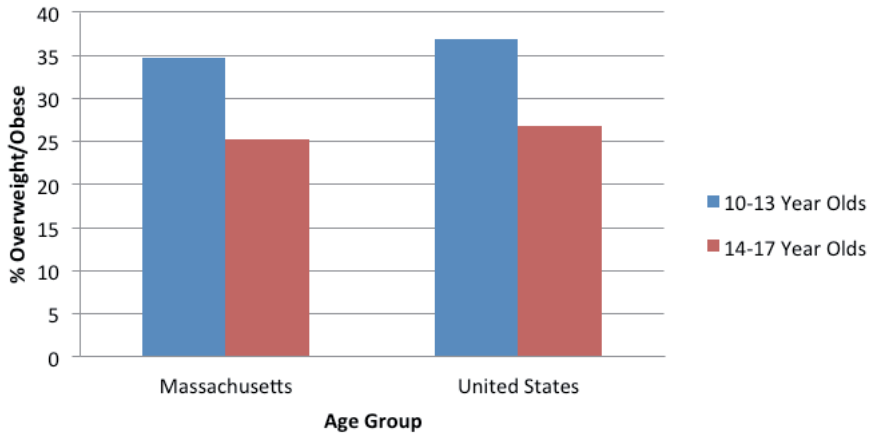
## DISPARITIES IN CHILD AND ADOLESCENT OBESITY

Although child and adolescent obesity is an overarching problem for our state, there are disparities in obesity rates in several demographics, including age, gender, race/ethnicity, income, and health insurance coverage.

### Age

Nationwide in 2009-2010, the prevalence of obesity was 12.1% among 2- to 5-year-olds, 18% among 6- to 11-year-olds, and 18.4% among 12- to 19 year-olds. Between 1999 and 2010, children ages 6-19 had significantly higher rates of obesity than children ages 2-5 years.<sup>25</sup>

In Massachusetts, the most recently available data is from the 2007 National Survey of Children's Health. This self-report survey breaks down overweight/obesity prevalence into 10- to 13-year-old and 14- to 17-year-old age categories. Figure 1 shows the prevalence rates by age category for both Massachusetts and the U.S. as a whole. As shown, 10- to 13-year-olds have higher rates of overweight/obesity.<sup>21</sup>



**Figure 1: Age and Rates of Childhood/Adolescent Overweight/Obesity in Massachusetts and United States in 2007.**

Source: National Survey of Children’s Health (2007)

**Gender**

Nationwide in 2009-2010, the prevalence of obesity among children and adolescents ages 2-10 was significantly greater in boys (18.6%) than in girls (15.0%). When breaking these percentages down by race/ethnicity, gender differences only exist for non-Hispanic White children; there are no gender differences among non-Hispanic Black or Hispanic children. In addition, analyses over time show that between 1999 and 2010, boys showed a significant increase in obesity, but girls did not.<sup>25</sup>

In Massachusetts in 2007, we see similar gender differences in rates of childhood/adolescent overweight/obesity, as shown in Figure 2. Overall, 34.3% of boys were overweight/obese, while 25.9% of girls were.<sup>21</sup>



**Figure 2: Gender and Rates of Childhood/Adolescent Overweight/Obesity in Massachusetts and United States in 2007.**

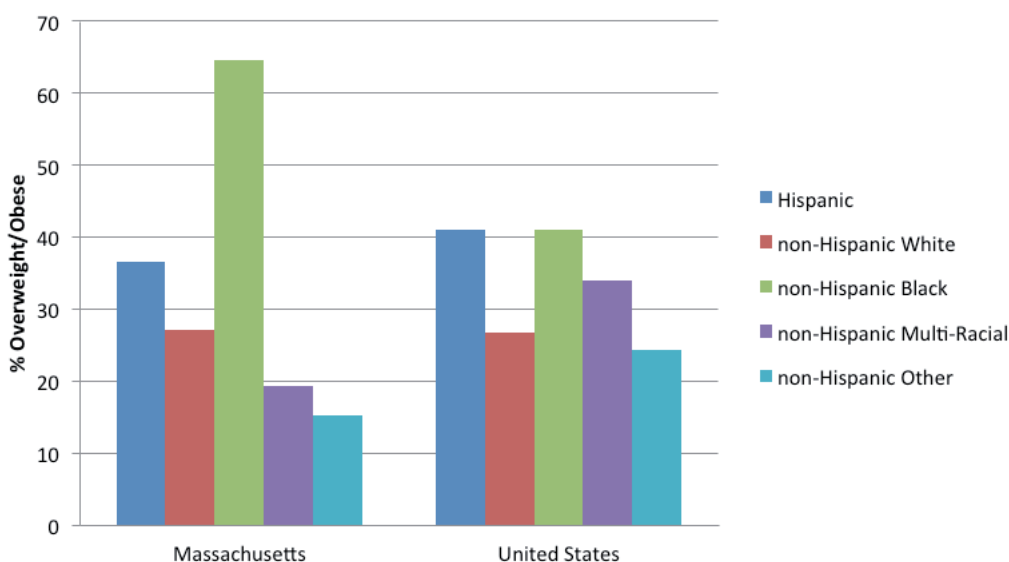
Source: National Survey of Children’s Health (2007)

### Race/Ethnicity

Nationwide in 2009-2010, significant racial/ethnic differences were found in childhood/adolescent obesity rates. The highest rates were found among non-Hispanic Black children/adolescents (24.3%), followed by Hispanic children/adolescents (21.2%). The lowest rates were among non-Hispanic White children/adolescents (14.0%).<sup>25</sup>

Between 1999 and 2010, non-Hispanic Black and Hispanic children were significantly more likely to be obese than non-Hispanic White children. In addition, non-Hispanic Black male children showed significant increases in obesity rates over that time, while no other racial/ethnic group did for either boys or girls.<sup>25</sup>

In Massachusetts in 2007, we see the highest rates of overweight/obesity for non-Hispanic Blacks (64.7%), followed by Hispanics (36.6%) (see Figure 3). This stands in contrast to nationwide percentages, where non-Hispanic Blacks and Hispanics have similar rates of overweight/obesity (~41%).<sup>21</sup>

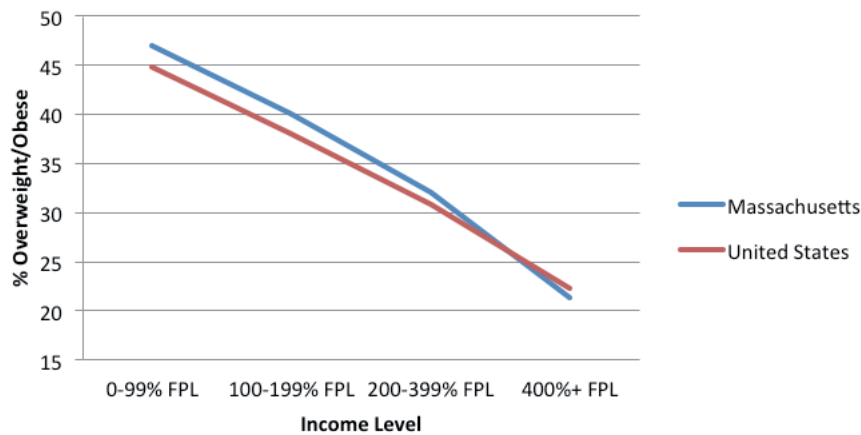


**Figure 3: Race/Ethnicity and Rates of Childhood/Adolescent Overweight/Obesity in Massachusetts and United States in 2007.** Source: National Survey of Children's Health (2007)

### Income

In 2009, nearly 33% of the nation's low income children ages 2-4 years were overweight or obese, with approximately 14.6% obese. Among these low-income children, American Indian and Alaska Native (20.7%) and Hispanic (17.9%) children had the highest rates of obesity, and American Indian/Alaska Native children are the only racial/ethnic group to show an increase in obesity since 2003 among low income children ages 2-4 years.<sup>26</sup>

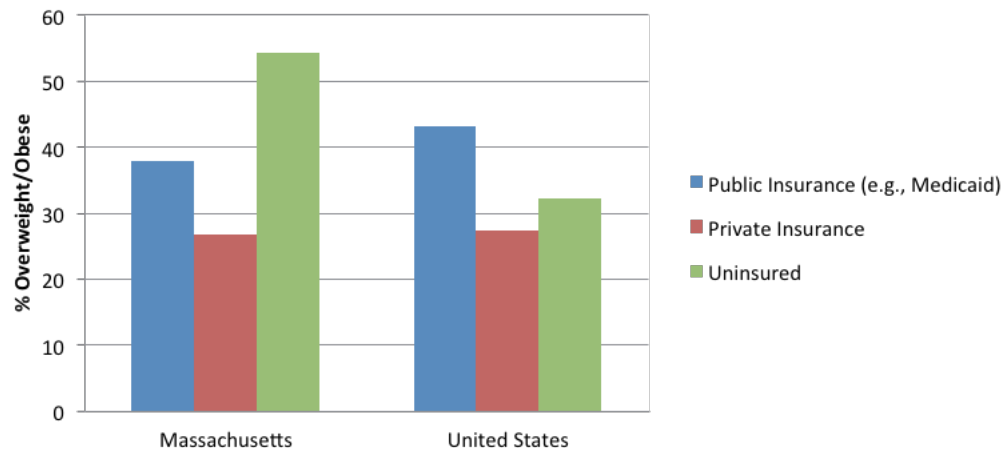
In the U.S. and Massachusetts, income predicts overweight/obesity levels, as shown in Figure 4. In Massachusetts, 44.8% of those below the federal poverty line (FPL) were overweight or obese in 2007, in comparison to 22.2% who were 400% or more above the FPL. Similar decreases as a function of %FPL were seen nationwide.<sup>21</sup>



**Figure 4: Income and Rates of Childhood/Adolescent Overweight/Obesity in Massachusetts and United States in 2007.** Source: National Survey of Children’s Health (2007)

**Health Insurance Coverage.**

Data on disparities in childhood/adolescent obesity is only available from the 2007 National Survey of Children’s Health. The data are consistent for Massachusetts and the nation as a whole (see Figure 5), and shows that people with private health insurance coverage have lower rates of overweight/obesity than those with either public insurance coverage or none at all.<sup>21</sup>



**Figure 5: Insurance Coverage and Rates of Childhood/Adolescent Overweight/Obesity in Massachusetts and United States in 2007.** Source: National Survey of Children’s Health (2007)

**Reasons for the Disparities**

The majority of research on disparities in child and adolescent obesity focuses on disparities between racial/ethnic groups and income levels. As shown above, there are concerning disparities within Massachusetts and the nation as a whole based on race/ethnicity, socio-economic status, and type of health insurance coverage. Research over time suggests that these types of disparities have persisted and increased, and thus deserve serious attention from state policymakers.<sup>1</sup>

These factors, in turn, are influenced by environments that are amenable to change. At-risk racial/ethnic groups and people of lower socio-economic status tend to reside in neighborhoods with below-average availability of healthful food but above-average availability of fast foods.<sup>15</sup> Children and adolescents who live in neighborhoods without a park or recreation center have significantly higher rates of obesity, even after considering the influences of socio-economic status, other health behaviors, health insurance, and health care quality.<sup>1</sup> Children who live in unsafe neighborhoods or in poorly kept or dilapidated houses also have higher rates of obesity.<sup>1</sup>

Racial/ethnic differences in child and adolescent obesity are at least partly due to racial/ethnic differences in food-related beliefs, preferences, and behaviors; however, these are not the only influences. Some other influences include higher rates of obesity and gestational diabetes in pregnant women of disadvantaged groups, attitudes of parents that may lead to overfeeding of children, higher than average availability and consumption of high-calorie foods and beverages, and below-average physical activity.<sup>15</sup>

Research provides strong support for the following in reducing disparities for disadvantaged groups: having supermarkets instead of smaller convenience stores, having places to exercise, and increasing safety. Thus, strategies to reduce these disparities along racial/ethnic and socio-economic lines would be to change the environments to provide safe places to exercise and increase supermarket access.<sup>16</sup>

### CAUSES OF OBESITY

Primarily, obesity occurs as a result of an energy imbalance, meaning that the caloric intake through the consumption of food and drinks is greater than the calories an individual expends through metabolism and exercise over time.<sup>27</sup> But what causes this energy imbalance in the first place?

#### Biological factors

Biological factors, including genetic predisposition to obesity, metabolism level, and ill health, play a role in influencing energy imbalance and obesity. While biology is an important factor, environmental factors play a significant role in influencing obesity.<sup>31</sup>

#### Environmental factors

Apart from biology, there are three broad environmental factors that may contribute directly to obesity:<sup>27</sup>

- activity environment
- food environment
- societal influences

In the United States, less than 50% of children between the ages of 6 and 11 are getting at least an hour of physical activity per day.<sup>30</sup> This statistic is cause for concern, as an individual's **activity environment**, referring to the influence of the environment on an individual's activity level, is one factor that may contribute to obesity. The lack of adequate bike lanes or crosswalks, for example, may prevent students from biking or walking to school.

Activity environments vary and can affect groups differently. The lack of exercise facilities in low socio-economic status areas has influences on obesity rates.<sup>16</sup> In short, activity environment influences individuals' physical activity, including the type, frequency and intensity of the physical activities an individual undertakes.<sup>27</sup>

Foods low in nutrients and high in energy, including sugar-sweetened beverages, comprise nearly 40% of children's daily caloric intake.<sup>28</sup> This relates to the second broad environmental factor influencing obesity: **food environment**. Here the availability, convenience, and price of food may influence an individual's dietary habits, including the quality, quantity and frequency of eating.

Lack of healthy options in school cafeterias, for example, may contribute to higher rates of obesity among school children. A recent study in Somerville, Massachusetts (see below), for example, found the consumption of sweetened beverages to be significantly associated with obesity in school children.<sup>9</sup> Food consumption is thus linked to a wider range of environmental factors that influence what people choose to eat.

Finally, there are **societal influences** on energy imbalance and obesity. For example, media, peer pressure, culture, and/or education may expose individuals to certain ideas about food and consumption. This environment in turn contributes to an individual's psychology.<sup>27</sup>

Exposure to fast food marketing, for example, may contribute to the development of a psychological drive towards particular types of high caloric and heavily processed food. Culture also matters: Variations in cultural beliefs and practices related to food and feeding may contribute to different patterns of obesity among ethnic groups.<sup>15</sup> Patterns and preferences of consumption that contribute to energy imbalance and obesity may thus derive from social influences.<sup>27</sup>

## OBESITY PREVENTION

### Effectiveness of Prevention Programs

In the last decade different approaches have addressed the childhood obesity problem in the U.S. A recent review of 55 intervention programs showed that BMI score reduction was highest in programs targeting children between 6 and 12 years of age.<sup>33</sup> Additionally, the following prevention strategies and policies were the most effective:

- incorporation of prevention programs into the school curriculum addressing healthy eating, physical activity, and body image;
- increased physical activity sessions and development of fundamental movement skills;
- higher nutritional quality food provided by schools;
- cultural practices and environments that support eating healthier foods and being more active throughout the day;
- support of teachers to implement health promotion strategies; and
- support from parents and home activities encouraging children to eat more nutritious food, spend less time on screen-based activities, and be more active.

Despite these promising results, conventional intervention programs would benefit from expanding their focus beyond schools and individual behavior changes.<sup>8, 29</sup>

Because less than 50% of children's waking hours are spent in school, intervention efforts are well-advised to consider all daily influences of children's energy balance. To address the complex and stubborn problem of obesity, prevention efforts need to occur at all levels: individual, family, community, and the broader society.<sup>12</sup>

### Rethinking: Prevention Programs Addressing the Entire Community

More recent prevention programs combine traditional hierarchical top-down approaches, such as school programs, with bottom-up approaches influencing entire communities. These new types of programs not only affect individuals' behaviors, but are also using multiple strategies across multiple settings to change behavior patterns in the entire community, creating room for holistic, versatile, and long-term change.<sup>8, 11</sup> The result is a more complex intervention involving the whole community, targeting the environmental and social determinants of health.

New intervention strategies should focus on making physical activity into a routine and integral part of life, changes in the food and beverage environment allowing for healthier choices, reshaping of messages about nutrition and physical activity, and greater involvement of health care providers and insurers.<sup>12</sup> At the community level, possible interventions could include the improvement of bikeways, sidewalks, and public transport, as well as a healthy restaurant initiative. At the school level, intervention could include the introduction or revision of the school wellness policy.

As described earlier, no single factor is responsible for energy imbalance in children. A comprehensive approach as described here takes the complex nature of the problem into account and focuses on the most malleable determinants of health, the social and physical environment. When creating community interventions, planners must be careful to consider community needs and allow for ownership by stakeholders in their community.

## PREVENTION EFFORTS IN MASSACHUSETTS

### Case Study: Shape up Somerville: Eat Smart, Play Hard™

One example of a recent prevention program is one that Christina Economos and her colleagues implemented in Massachusetts called Shape Up Somerville (SUS). This study, conducted from 2002 to 2005 in three elementary schools in Somerville, Mass., was an environmental change intervention designed to prevent and reduce obesity in early-elementary school children from a culturally diverse and high-risk population group.<sup>6</sup>

The researchers on the SUS team worked with the community to develop strategies to influence energy balance in first-third graders through a series of interventions that focused on increasing options for physical activity throughout the day, decreasing sedentary behavior, and improving dietary choices. SUS addressed a variety of environmental factors influencing obesity rates within the targeted population through community-wide engagement. Intervention activities were developed and implemented to make changes in before-, during-, and after-school environments. Some of the community initiatives included:<sup>6</sup>

- School food service reform
- Enhanced nutrition and physical activity curricula
- A healthy restaurants initiative
- An increased number of community gardens
- Renovated parks
- Improved bike, pedestrian, and public transport

The SUS initiative offered positive and promising results. The children involved significantly reduced their sugar-sweetened beverage consumption, reduced screen time, and increased their participation in organized sports and physical activities. As a result, after two years, the BMI of the participants decreased, and researchers reported a nearly 30% reduction in the prevalence of overweight and obesity.<sup>7</sup>

These results show that interventions to prevent and reduce childhood obesity are effective when engaging many sectors and involving many different members of the community, over a sustained period. These community members may include children and families, schools, business leaders, policymakers, health care practitioners, and community organizers, among others.<sup>7,9</sup>

### Other Prevention Efforts in Massachusetts

In recent years, international<sup>34</sup> and national organizations<sup>22</sup> have worked on different intervention strategies. However, many believe that the state and local level is where the most progress can be achieved. Success is highly dependent on initiatives around the state, commitment of stakeholders, and collaboration between different executive branch offices. In Massachusetts, different actors — including schools, health plans, and community organizations — have started to work on the reduction of childhood obesity.<sup>10</sup>

The statewide initiative “Mass in Motion” was launched in 2009 by the Department of Public Health with the aim to prevent overweight and obesity, and to promote wellness in Massachusetts. It focuses on healthy eating and physical activity at home, at work, and in the community.<sup>18</sup> Key efforts for the Mass in Motion community initiatives, which are represented in 33% of Massachusetts communities, are (1) to support schools, neighborhood stores, restaurants, farmers’ markets, and food pantries to offer healthy, affordable choices to increase access to fresh foods; (2) to support physical activity by increasing safe opportunities, for example through creation of parks, enhanced open spaces or other recreational facilities; and (3) to redesign neighborhoods that promote and support walking and biking.

A special subprogram, “Mass in Motion Kids,” is running from September 2012 until June 2014, and is working with two communities in Massachusetts on making changes in children’s environment, as well as in policy. The program, funded by the Centers for Disease Control and Prevention, focuses on underserved children ages 2-12. It aims to make changes in primary care, schools, and after-school programs; create policy change; and build awareness by using a communitywide social marketing campaign.<sup>18</sup>



### Policy Initiatives

The Institute of Medicine<sup>12</sup> identified schools as the national focal point for obesity prevention efforts. Within the last years, different school-based policies have been implemented. The largest portion focused on the improvement of healthy food in schools rather than improving physical activity.<sup>19</sup>

In 2010 and 2011, Massachusetts changed existing policies on competitive food and beverages and established standards. To date, no policies specifically address physical activity or the amount, frequency, and intensity of it.

Research has shown that schools are ideal places to increase the physical activity of young people, but also that the school setting could be better used to support physical activity.<sup>2</sup> Research also indicates that physical education programs using standardized curricula and goals result in more physically active children<sup>17</sup> and that well-designed playgrounds, open spaces and available equipment increase activity during and after school time.<sup>23</sup>

In addition, research shows that implementation of state policies requiring that children spend a specific amount of time in physical activity every day is an effective strategy to promote regular activity.<sup>14</sup> To ensure changes in school, policy support is advisable. State policymakers can support the process by setting standards for physical activity, ensuring that physical activities are incorporated into school wellness policies, and improving opportunities for physical activities beyond the school day.<sup>32</sup>

### MEASURING SUCCESS

Monitoring success is a crucial part of any intervention. Only then can states and communities evaluate their efforts and identify which part of the intervention worked in which specific context. Evaluation also opens the door for adjusting specific parts of the intervention programs, comparing success factors between different communities and share with others what works.

To ensure this, statewide regulations and requirements for collecting BMI indicators and fitness assessments, and tracking community change efforts, are needed. However, this is a much bigger issue, as no consensus on a set of indicators exists yet.

The National Institute of Medicine (IOM)<sup>13</sup> recently published a plan to evaluate the advancement of obesity prevention efforts and to provide guidance for systematic and routine planning. The plan consists of a set of indicators covering four areas: Community Health Assessment, Surveillance, Community Program and Intervention Monitoring, and Summative Evaluation.

At the national level, the implementation of the plan would provide the benefit of a better understanding of general trends over time. However, as the IOM points out, implementation would be particularly helpful in receiving context-specific information about each state and different communities. The focus of most information is on individual behavior, energy expenditure, food intake, and BMI. Less represented are indicators tracking changes in policies and the environments at the community and population levels. To continue and improve current intervention efforts, it is crucial to find out what works. The improvement of indicators and evaluation efforts is of great importance to help legislators and policymakers refine existing policies.<sup>13</sup>

### SUMMARIZED POLICY IMPLICATIONS

- Focus prevention efforts on groups at risk (e.g., low income and minority populations).
- Start prevention efforts as early as possible, as early as infancy.
- Support intervention programs promoting robust, long-term community engagement and civic participation.
- Develop communitywide policies to promote and sustain change.
- Create policies for physical activity in school.
- Standardize indicators evaluating obesity prevention efforts to improve existing policies.
- Strengthen indicators that track changes in community policies and the environment.



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