

Executive Summary

Obesity is the result of causal, behavioral factors such as physical inactivity and poor dietary habits. Statewide policies to improve nutrition, exercise, and health in schools and communities are a promising approach to address the primary risk factors of obesity.

Highlights

- Missouri obesity rates continue to grow with associated costs projected to be **\$13 billion by 2030**.
- Healthy eating habits and physical activity **reduce the risk** of developing obesity for children and adults.
- Obesity prevention initiatives that **educate and develop healthy, active behaviors in childhood** might have the greatest chance to reduce obesity rates.

Limitations

- The prevalence of obesity and physical inactivity is generated from self-report data and can have inherent variability. Individuals may inaccurately report weight and physical activity metrics.
- Missouri has several obesity prevention initiatives; however, the effectiveness of these programs to reduce obesity remains undetermined.

Research Background

Prevalence and Costs of Obesity

Body mass index (BMI) is a person's weight in kilograms (kg) divided by their height in meters squared (m^2). Adult obesity is defined as a BMI (kg/m^2) greater than $30kg/m^2$; childhood obesity is defined as having a BMI greater than the 95th percentile for children of the same age and sex.¹ In Missouri, 35.0% of adults and 16.3% of children are classified as obese, ranking it within the top 20 most obese states.²⁻⁴ The prevalence of obesity in Missouri is greater in females (Figure 1a), ethnic minorities (Figure 1b), and those of low social-economic status (Figure 1c); these differences are mirrored in childhood obesity.⁵ Obesity is associated with many costly, fatal chronic diseases

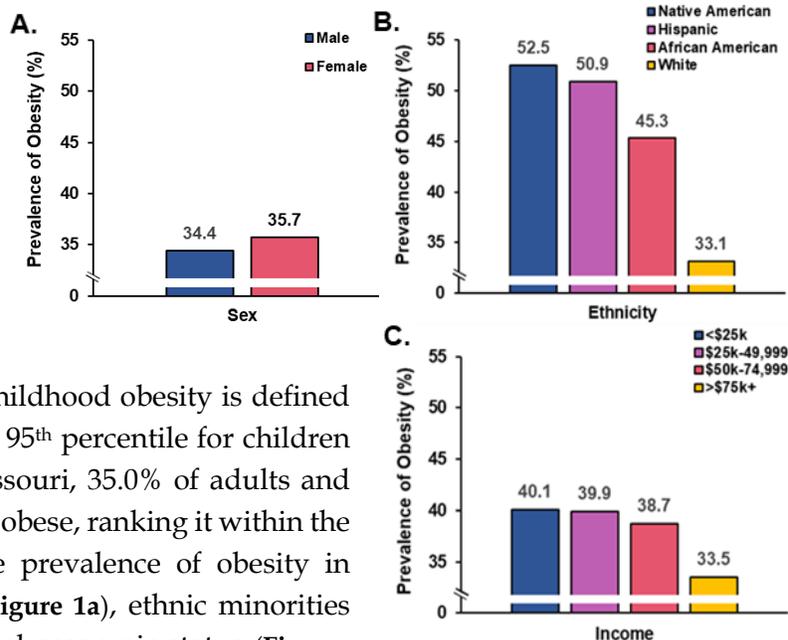


Figure 1. Obesity prevalence between (A) sex, (B) ethnicity, and (C) income. Figures adopted from United Health Foundation.³

such as cardiovascular disease, type II diabetes, and cancer.⁶ If obesity trends continue, Missouri healthcare expenditures can reach \$13 billion by 2030.⁷

Obesity is the Result of Energy Imbalance

Genetic, behavioral, and environmental factors contribute to the development of obesity; however, the two most significant causes are **physical inactivity** and **poor dietary habits**. Obesity is the result of an imbalance between energy in (dietary patterns) and energy out (physical activity). Obesity develops when an individual chronically consumes more calories than expended per day (**Figure 2a**). This continued energy imbalance results in weight gain, which can progress to obesity and the development of its associated chronic diseases. Reversing obesity is also the result of an energy imbalance; the calories consumed are less than caloric expenditure creating weight loss (**Figure 2b**).

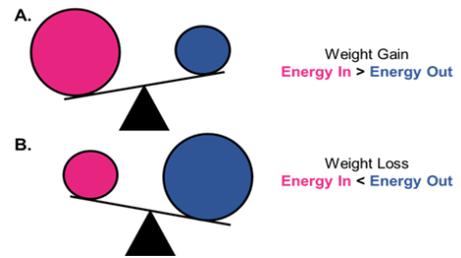


Figure 2. Energy balance for (A) weight gain and (B) weight loss.

Physical Inactivity

Habitual physical inactivity in the US has led to increased obesity rates and associated chronic diseases. The national health guidelines for physical activity recommend that children participate in at least 60 minutes of moderate-to-vigorous physical activity (MVPA) per day and at least 30 minutes of MVPA per day for adults. In Missouri, it is estimated that 74.9% of children and 30.6% of adults do not meet current physical activity guidelines.⁸ Physical activity declines as children progress through adolescence into adulthood. Youth who are active in childhood are likely to remain active into adulthood while those who are inactive remain sedentary throughout the lifespan.⁹ These findings highlight the importance of developing active lifestyle behaviors in youth to have a better chance of growing into healthy adults. Schools are an ideal environment to encourage physical activity, however, opportunities to engage in physical activity during the school day have been reduced.

Poor Dietary Habits

Most adults tend to overestimate how many calories are expended during an activity and underestimate how many calories are consumed, creating an energy imbalance.¹⁰ Easy access to high-calorie processed foods is a major contributing factor to the development of obesity cardiovascular disease, and type II diabetes.¹¹ A healthy, nutritious diet is one that includes vegetables, fruits, whole grains, fat free or low-fat dairy, and a variety of proteins while limiting saturated and trans fats, added sugars, and salt.¹² However, food insecurity affects approximately 15% of Missourians and consequentially, their dietary patterns.¹³ Differential access to nutritious foods such as fruits and vegetables is related to poor diet quality for individuals of socio-economic disparities; this is due to cost and neighborhood food environments. As such, more readily available sugar-sweetened beverages and high-fat foods are eaten, increasing the risk for developing obesity and chronic diseases when compared to high income households.¹⁴ Family eating habits and the school environment can help shape the dietary

patterns of children and lead to lifelong, healthy eating habits. In a study conducted in Missouri schools, modification to the school cafeteria environment (foods provided and signage) with educational nutrition letters sent home to parents to promote adequate nutrition resulted in children eating more nutritious foods and reducing intake of added sugars.¹⁵ Therefore, education and accessibility need to be considered when developing obesity prevention initiatives related to nutrition.

Missouri Obesity Prevention Initiatives

Missouri has several obesity initiatives including statewide, community, childcare, and school-based programs to reduce the prevalence of obesity in children and families (Table 1). These programs encourage physical activity participation, increase fruit and vegetable consumption, and decrease consumption of sugar-sweetened beverages. Missouri requires physical education in schools; however, this is not a daily requirement. Missouri received federal funds from the US Department of Agriculture (USDA) to improve nutrition quality of the Child and Adult Care Food Program. The Missouri Council on Physical Activity and Nutrition (MoCAN) developed a five-year strategy (2016-2020) to reduce obesity. The report should be available at the conclusion of the year; dependent upon the evaluation of this strategy, a new strategy may be needed. While these programs seemed to have improved knowledge about physical activity and nutrition, it is unknown whether the implementation of these programs has curbed the obesity epidemic in Missouri, particularly those of low socio-economic status and across ethnicities.

Table 1. Current obesity initiatives in Missouri

Program	Level	↑ Fruit and Vegetable Consumption	↓ Sweetened Beverage Consumption	↑ Physical Activity
12345 / Fit-Tastic	statewide	x	x	x
MoCAN	statewide	x	x	x
Maternal Child Health	statewide	x	x	x
Stock Healthy. Shop Healthy	community	x	x	
Eat Smart in Parks	community	x	x	
Missouri Live Well	community	x	x	
Missouri Livable Streets	community			x
WorkWell Missouri	community	x	x	x
Live Like your Life Depends on It	community	x		x
Farm to School	childcare school-based	x		
Eat Smart Child Care	childcare	Under Revision	Under Revision	
MO MOve Smart	childcare			x
Move Salad Bars to Schools	school-based	x		
School Wellness	school-based	x	x	x
Playground Stencils	school-based community			x
Culinary Skills Institute	school-based	x		

Note. X indicates the program encourages specific areas of diet and physical activity. Eat Smart Child Care is under revision with funds to improve nutrition quality from the USDA.

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