Obesity – A Kansas City Health Department Priority

Obesity is weight that endangers health because of its high body fat relative to lean body mass. Whether obesity should be considered a disease has been controversial.\(^1\) Nevertheless, the Council of the Obesity Society concluded that considering obesity as a disease is likely to have far more positive than negative consequences and to benefit the greater good by soliciting more resources into prevention, treatment, and research of obesity; encouraging more high-quality caring professionals to view treating the obese patient as a vocation worthy of effort and respect; and reducing the stigma and discrimination heaped on many obese persons.\(^2\)

Persons are classified as underweight, normal weight, overweight, and obese using the body mass index (BMI), expressed as weight/height\(^2\) (kg/m\(^2\)). Obese is subdivided into moderately obese (BMI >30 to <40) and morbidly obese (about 100 lb overweight or BMI ≥40). Alternatively, obesity may be characterized as class I with BMI ≥30 to <35, class II with BMI ≥35 to <40, and class III with BMI ≥40. There are limitations to the use of BMI in assessing obesity since the relationship of body fat to BMI varies with age, sex, ethnicity, and physical conditioning.\(^3\) In children, obesity is defined as BMI at or above the 95\(^{th}\) percentile of a specified reference population.\(^4\) Another alternative method to define obesity is percent of adiposity (body fat), >25% in men and >35% in women.\(^5\) While there is debate whether BMI or adiposity is the best method for diagnosing obesity, in the literature, use of BMI is fairly standard.\(^6\)\(^7\)

Obesity is highly prevalent in societies in the developed world and is linked to very high rates of chronic illnesses, higher than living in poverty, and much higher than smoking or drinking.\(^6\) Although excess body weight during midlife has been reported to have an increased risk of death,\(^5\) analyses of data from the National Health Interview Survey Linked Mortality Files indicate that overweight and mild obesity (Class 1) are not associated with lower life expectancy, while BMI categories >35 (Class 2 and Class 3) are associated with lower expected survival.\(^10\) Extremely obese individuals – those >80 lb over normal weight – live 3-12 years less than their normal weight peers.

The rise in obesity rates is a result of changes in the environment that have simultaneously lowered the cost of food production, lowered the time and monetary cost of food consumption, increased the real cost of being physically active at work and at home, and decreased the health consequences that result from obesity by bringing a host of new drugs and devices to the market to better manage the adverse effects that obesity promotes.\(^11\) This obesogenic environment evolved in response to consumers’ demand for labor-saving technology and convenient, affordable food.

**Prevalence**

Obesity has increased at an alarming rate in the US over the past three decades.\(^12\) The prevalence of morbidly obese is increasing faster in the US than the prevalence of moderately obese.\(^13\) In addition, it is believed that the obesity epidemic among children will lead to a large number of younger adults with type 2 diabetes.\(^14\)

**Children and adolescents**

During the past three decades the rate of childhood obesity in the US has more than tripled, and the current prevalence remains high (16.9%) among children across most age, sex, racial/ethnic, and socioeconomic groups.\(^15\) Correspondingly, social inequalities in the prevalence of obesity have increased because of more rapid increases in prevalence among children in lower socioeconomic groups.\(^16\) It is estimated that 2.7 million US children are severely obese, predominately black and Mexican American males 12-19 years of age who are in lower socioeconomic households.\(^17\) More than a third of these children face significant health risks and meet the criteria
of the adult metabolic syndrome and >400,000 meet criteria to have bariatric surgery.

In light of these trends, childhood obesity is viewed a major public health problem. One of the Healthy People 2010 objectives (19-3) is to reduce to 5% the number of children and adolescents who are obese. This target will prove challenging as the prevalence of obesity varies substantially across states, with Mississippi having the highest (21.9%) and Oregon the lowest (9.6%). Missouri’s prevalence rate is 13.6% and is lower than the rates of all adjoining states except Iowa (Figure 13.1).

Data from the Early Childhood Longitudinal Study, Birth Cohort, show that >18% of 4 year old children in the US are obese and that the prevalence of obesity varies by race/ethnicity. The National Health and Nutrition Examination Survey (NHANES) defines obesity among children and adolescents as BMI for age ≥95th percentile and morbidly obese at the 99th percentile (Centers for Disease Control and Prevention growth charts). The NHANES 2007-2008 survey found 9.5% of infants and toddlers were at the 95th percentile while among children and adolescents (ages 2-19 years), 16.9% at the 95th percentile and 11.9% were at the 97th percentile. Nationally, the prevalence of obesity among low-income, preschool-aged children was 14.6% in 2008. In Missouri, >30% of children 2-5 years of age enrolled in federally funded health programs are either overweight or obese.

The causes of childhood obesity are multifactorial and may be determined by factors that operate at the earliest stages of life, such as one’s race/ethnicity or a pregnant woman’s excessive weight gain. The prevalence of obesity can be influenced by culture and weight misperception; the odds of weight misperception are much higher among non-Hispanic blacks and Hispanics. The variable disparities in childhood obesity within and among states are associated with socioeconomic status, school outcomes, neighborhoods, type of health insurance, and quality of care. Children with certain chronic health conditions may be predisposed to obesity. And, while decreased physical activity is often cited as a reason for obesity among children and adolescents, it does not appear to be a major cause. Dietary habits are a major concern, particularly the consumption of energy dense foods and sugary drinks. There has been an increase in the percent of Missouri high schools in which students cannot buy candy, salty snacks, soda or sports drinks from vending machines or at a school store, canteen, or snack bar.

Obesity in childhood and adolescence is not without consequences such as increased risk of future diabetes type 2, premature death from cardiovascular diseases, and disability. Obese adolescents have the same risk of premature death in adulthood as people who smoke more than 10 cigarettes a day, while those who are overweight have the same risk as less heavy smokers. And, they are at risk of developing health-compromising behaviors that may compound medical and social problems associated with excess weight. In addition, obese children are more likely to sustain lower extremity injuries than those who are not obese. The impact of childhood obesity on employee health insurance is not well understood.

**OBESITY**
The US Preventive Services Task Force recommends that clinicians screen children >6 years of age for obesity and offer them or refer them to intensive counseling and behavioral interventions to promote improvements in weight status.39

Adults

Married individuals tend to be heavier than those who are unmarried, particularly men.40 Current estimates of obesity in the adult population can be derived from NHANES and the Behavioral Risk Factor Surveillance System (BRFSS), however, it is believed that the BRFSS underestimates the actual prevalence of overweight and obesity.41 This is because men and women significantly over report their height, increasingly so at older ages, plus men tend to overestimate their weight and women under report their weight, more so at younger ages.42 43 These behaviors then lead to faulty BMI calculations.

Projections based on NHANES data suggest that by 2030, 86% of adults in the US will be overweight or obese, with 51% being obese.44 Black women and Mexican-American men would be the most affected. By 2048, all American adults would become overweight or obese, while black women would reach that state by 2034.

NHANES data show that, in 2007-2008, the prevalence of obesity and extreme obesity among adults was 33.8% and 5.7%.45 The prevalence of obesity was higher among women, 35.5%, than men, 32.2%; however, the increases in the prevalence of obesity previously observed do not appear to be continuing at the same rate over the past 10 years, particularly for women and possibly for men.46 Men have a higher prevalence of class I obesity than women, while women have a higher prevalence of class II and class III obesity. The prevalence of class I obesity significantly increases with age in men, but not women, while the prevalence of class II and III obesity does not differ significantly by age for either men or women. Obese women who become pregnant are at greater risk for maternal and fetal health issues such as gestational diabetes and congenital anomalies.47 48

Kansas City

Based on 2009 BRFSS data, no state met the Healthy People 2010 obesity target of 15%. Overall, the self-reported obesity prevalence in the US was 26.7%, with Missouri being among the states with highest prevalence rates with a rate 30.6%.49 Significantly more blacks were obese than whites, 42.5% and 29.7%, respectively. In 2008, in the Kansas City region, the obesity prevalence was 30.7%. Figure 13.2 displays the relationship between income and BMI in Missouri based on the 2008 BRFSS. Trust for America’s Health’s report, F as in Fat: How Obesity Policies are Failing in America, 2009, ranked Missouri as having the 13th highest rate of adult obesity (http://healthyamericans.org/reports/obesity2009).

Based on a summary of Missouri Department of Health and Senior Services’ BRFSS surveys from 2005-2008 that recorded zip code level data for Kansas City, 2.2% of adult respondents ≥18 years old were underweight, 32.4% were of normal weight, 35.7% were overweight, and 29.7% were obese; the obesity rate was highest among non-Hispanic black female respondents (Tables 13.1 and 13.2).

Figure 13.2 Overweight and obesity by income level, Missouri, 2007 (source Missouri 2008 BRFSS report)
### Table 13.1 Body mass index status of adults responding to BRFSS telephone surveys, Kansas City, Mo, 2005-2008

<table>
<thead>
<tr>
<th>Race/ethnicity</th>
<th>Underweight</th>
<th>Normal weight</th>
<th>Overweight</th>
<th>Obese</th>
<th>Total</th>
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<tr>
<td>Total</td>
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<td>Other</td>
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<td>1.9</td>
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<td>34.6</td>
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#### Male

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<thead>
<tr>
<th>Race/ethnicity</th>
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<th>Normal weight</th>
<th>Overweight</th>
<th>Obese</th>
<th>Total</th>
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<tr>
<td>Total</td>
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#### Female

<table>
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<th>Obese</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
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### Table 13.2 Body mass index status by age for adults responding to BRFSS telephone surveys, Kansas City, Mo, 2005-2008

<table>
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<tr>
<th>Age category</th>
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<th>Obese</th>
<th>Total</th>
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#### Male

<table>
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<th>Age category</th>
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<th>Obese</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td>Total</td>
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<td>274</td>
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#### Female

<table>
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<tr>
<th>Age category</th>
<th>Underweight</th>
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<th>Overweight</th>
<th>Obese</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>27</td>
<td>2.6</td>
<td>377</td>
<td>35.6</td>
<td>335</td>
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</tbody>
</table>
For local information regarding obesity in children, the Kansas City University of Medicine and Biosciences’ Score 1 for Health initiative provides some data. That project found that Hispanic students in grades K-5 had the highest prevalence of being overweight or obese (Figure 13.3). While levels of being overweight were similar across grade levels, the prevalence of obesity was higher in later grades. The prevalence of being overweight or obese was higher in white students at lower socioeconomic status schools compared to higher socioeconomic status schools; the reverse was true for black students.

Of Score 1 participants whose BMI’s were screened in 2002 and 2006, the percent who had normal BMI in kindergarten and 1st grade declined 6% by the time they were in 4th or 5th grade. Most students who started out obese remained obese or overweight (93%), whereas students who started out overweight had a 1 in 3 chance of becoming normal weight, staying the same or becoming obese. The likelihood of changing from overweight to normal weight was significantly higher for students with higher socioeconomic status and was not associated with race.

Using the CDC standards for BMI percentiles in children, Score 1 participants had higher BMIs than ideal across the BMI spectrum. The Score 1 population had higher rates of overweight and obesity than Missouri and Kansas state statistics indicate.

**Health consequences**

Social research suggests that there has been a general shift in social norms related to body weight and that people view “overweight” as “about right” for their body image. Thus, they may be less likely to desire weight loss, limiting the effectiveness of public health campaigns aimed at weight reduction. This is of concern since unhealthy lifestyle patterns in diet, exercise, and coping are high prevalent among the overweight and obese population.

In comparison to men, women suffer a disproportionate burden of disease attributable to overweight and obesity. Obesity appears to lessen life expectancy markedly, especially among younger adults. Particularly at higher levels, obesity has been associated with increased mortality relative to persons of normal weight; yet demonstrating causality has been elusive. Overweight and obese women have lower mortality rates than males up until age 45, after which women’s mortality rates are much higher than men’s. While the impact of obesity on mortality may be decreasing over time, perhaps due to improvements in public health and health care, obesity remains the 2nd leading actual cause of death in the US. Nationally, children and adolescents who are obese experience a lower health-related quality of life, often as low as that reported by young cancer patients. If past obesity trends continue, the negative effects on the health of the US population will increasingly outweigh the positive effects gained from declining smoking rates. For example, as smoking prevalence decreases, obesity may become the biggest attributable cause of cancer in women.

Obese individuals also may have metabolic syndrome. There are various definitions for metabolic syndrome but the dominant underlying risk factors appear to be abdominal obesity and insulin resistance. Metabolic syndrome is viewed as a risk factor for heart attacks, strokes, peripheral vascular disease, and type 2 diabetes. Persons with lower socioeconomic position are at greater risk of metabolic syndrome. One reason appears to be
dietary patterns that favor energy dense foods and a low intake of fruits and vegetables.\textsuperscript{69} However, middle-aged obese men, with and without metabolic syndrome, are at increased risk of early death from cardiovascular disease.\textsuperscript{70}

Obesity-related quality-adjusted life years lost in the US have been increasing since at least 1993.\textsuperscript{71} Both chronic health conditions and limitations on the abilities to perform basic activities of daily living contribute to increased levels of disability among obese individuals.\textsuperscript{72} Disability rates are increasing among the non-elderly and the increases cut across all demographic and economic groups. Although mental health is one of the most important causes of disability among the non-elderly, the fastest growing causes are diabetes\textsuperscript{73} and musculoskeletal problems,\textsuperscript{74} conditions that are associated with obesity. Disability is projected to increase 1\% per year in 50-69 year olds if there were no further gains in weight.\textsuperscript{75} Women suffer a disproportionately large share of the disease burden of overweight and obesity that is not due solely to differences in medical comorbidity.\textsuperscript{76}

Obesity is significantly associated with increased length of disabled life in older men and women, and, in combination with arthritis, significantly decreases active life.\textsuperscript{77} It has a dramatic effect on people’s ability to manage the five basic activities of daily living: bathing, eating, dressing, walking across a room, and getting in or out of bed.\textsuperscript{78} While men with moderate obesity have a 50\% increased probability of having limitations on these abilities; severe obesity is associated with a 300\% increased probability. The effects are even larger for women. These differences underscore the need to distinguish between moderate and more severe levels of obesity.

**Economic impact**

Obesity outranks both smoking and drinking in its deleterious effect on health care costs;\textsuperscript{79} it accounts for 9.1\% of health spending in the US.\textsuperscript{80} It is estimated that the medical costs associated with obesity were $147 billion per year in 2008. More than half of obesity related medical costs are paid for through Medicare and Medicaid.\textsuperscript{81} Insurance spending on obese individuals is 56\% higher than that for people of normal weight, partially due to the number of medical conditions treated among the obese. And, for morbidly obese individuals, who comprise 3\% of the US adult population, health care costs are nearly double those of normal-weight adults and are >10\% of all health care spending.\textsuperscript{82}

Data show that young adults are obese (≥30 lb overweight) will incur $5,000-21,000 more in lifetime medical bills while those who are very obese (≥70 lb overweight) will incur $15,000-29,000 more in lifetime medical expenditures. Expenditures related to higher BMI have risen dramatically among white and older adults, but not blacks or those younger than 35 years old.\textsuperscript{83} The higher spending for obese patients is mainly attributable to treatment for diabetes and hypertension.\textsuperscript{84} In addition, hospitals are having to buy expensive new equipment such as reinforced toilets and oversized beds to treat the growing number of severely obese patients.\textsuperscript{85}

The impact of successful obesity prevention is likely to be larger in women than men, and similar in whites and blacks.\textsuperscript{86} While it is desirable to reduce the prevalence of obesity and obesity-related morbidity and mortality, as well as the economic burden of obesity, there are data to suggest that although effective obesity prevention will lead to a decrease in costs for obesity-related diseases, this decrease will be offset by cost increases due to diseases unrelated to obesity during the life-years gained.\textsuperscript{87} Meanwhile, the current economic environment favors underinvestment in obesity prevention by insurance companies.\textsuperscript{88}

In addition to medical expenditures, obesity affects employers. Overweight and obese attributable costs range from $175 per year for overweight male employees to $2,485 for obese female employees with a BMI of 35-39.9.\textsuperscript{89} The costs of obesity at a firm with 1,000 employees are estimated to be $285,000 per year with ~30\% of the costs associated with absenteeism. Obesity is a significant predictor of long-term (>7 days) sick leave usage.\textsuperscript{90} Morbidly obese employees (BMI ≥40), while representing only ~3\% of the workforce, account for 21\% of the obesity associated costs.

**OBESITY**
Prevention

The CDC published a set of 24 recommended community strategies to prevent obesity. These strategies are divided into 6 categories: (1) strategies that promote the availability of affordable healthy food and beverages; (2) strategies to support healthy food and beverage choices; (3) a strategy to encourage breastfeeding; (4) strategies to encourage physical activity or limit sedentary activity among children and youth; (5) strategies to create safe communities that support physical activity; and, (6) a strategy to encourage communities to organize for change.

There are two basic approaches to prevention of obesity-related morbidity and mortality. The first involves medical intervention often starting in childhood, and which must recognize ethnic/cultural differences in weight control practices. The other approach takes a more global view and focuses on the two most amenable risk factors - lack of regular physical activity and poor diet. Weighing In, a project of Kansas City’s Childhood Obesity Collaborative is an example of such an approach (www.mchc.net/programs/weighing_in_collaborative.aspx). In 2009, all states fell far short of meeting the Healthy People 2010 objectives for daily consumption of fruits and vegetables, with obese individuals having the lowest consumption rates.

Physical activity

Combined with poor diet, the lack of regular physical activity leads to obesity. In Missouri, 2009 BRFSS data found that more than a quarter of adults were physically inactive, while in the bistate metropolitan area 23% of adults had no physical activity in the prior month. Physical activity guidelines for Americans can be found at www.health.gov/paguidelines.

One putative contributing factor to reduced activity is the composition of the built environment, although proof of this is not clear. Kansas City with its large geographic area, low population density, and excellent interstate system, has an infrastructure that is associated with less walking and bicycling and with more automobile travel than more densely populated communities.

Diet

Exercise alone is not enough to offset obesity health risks. From a policy point of view, the various economic and psychosocial factors that fuel the obesity epidemic as well as increased availability of energy dense food and reduced physical activity, demand a more equal distribution of affordable nutritious food, and improved, more equitable, living and working conditions. Consequently, dietary approaches are becoming one of the newest targets of public health law, such as regulating sugary beverages. The manner in which food is marketed and advertised have a profound effect on obesity. Food cues created through marketing and advertising artificially stimulate people to feel hungry; external cues, such as food abundance, food variety and food novelty, cause people to overeat. In addition, portion sizes and energy intake for specific food types have increased markedly with greatest increases for food consumed at fast food establishments and in the home.

A complex web of factors and perceptions underpin nutrition behaviors. Individual barriers to eating more fruits and vegetables include food preferences, fatigue of taste buds for certain foods, life stresses, lack of forethought in meal planning, current personal health status, aging, and perceived impact of food on chronic disease status. Individual facilitators include presence of chronic disease, lifetime experience related to intake of fruits and vegetables, preferences for certain fruits and vegetables, and personal or spousal health status. Environmental community facilitators include availability of home gardens, low cost of foods at farm stands, and childhood exposure to fruits and vegetables, with environmental barriers consisting of contradictory media messages.
related to nutrition and health outcomes, limited worksite food options, food availability, and food cost at grocery stores.

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