

Obesity – A Kansas City Health Department Priority

Obesity is a condition in which body weight endangers health due to high body fat relative to lean body mass. Whether or not 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 outcomes than negative consequences. It will also benefit the greater good by soliciting more resources focused on prevention, treatment, and research of obesity. Such a movement may reduce the stigma and discrimination associated with obesity.²

Persons are classified as underweight, normal weight, overweight, and obese using the body mass index (BMI), expressed as weight/height² (kg/m²). Obesity is subdivided into two categories: moderately obese (BMI ≥ 30 to < 40) and morbidly obese (about 100 lb overweight or BMI ≥ 40). Alternatively, obesity may also be characterized as class I (BMI ≥ 30 to < 35), class II (BMI ≥ 35 to < 40), and class III (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 95th percentile of a specified reference population.⁴

Alternative methods to define obesity are also used, such as percent of adiposity (body fat) ($> 25\%$ in men and $> 35\%$ in women)⁵, waist circumference (≥ 102 cm (40 inches) in men and ≥ 88 cm (34.6 inches) in women)⁶, and body adiposity index (BAI) (defined as $((\text{hip circumference})/((\text{height})(1.5)) - 18))$ ⁷. While there is debate whether BMI or an alternative measure is the best method for diagnosing obesity, use of BMI in the literature is fairly standard.⁸⁻⁹ By any of these measures, increasing trends of obesity can be demonstrated.

The global obesity rate has doubled since

1980, but varies considerably between countries.¹⁰ Obesity is highly prevalent in the developed world and is linked to very high rates of chronic illnesses. Obesity prevalence is higher than the prevalence of those living in poverty, and much higher than those smoking or drinking.¹¹⁻¹² Although excess body weight during midlife has been reported to be associated with an increased risk of premature death,¹³ analyses of data from the National Health Interview Survey (NHIS) 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 life expectancy.¹⁴ Extremely obese individuals, those at least 80 lbs. over normal weight, live 3-12 years less than their normal-weight peers. A substantial proportion of obese people do not perceive they are above normal weight, possibly because of the increased prevalence of overweight and obesity in society.¹⁵

The rise in obesity rates is a result of many factors. Changes in the environment have simultaneously lowered the cost of food production and lowered the time and monetary cost of food consumption. The real cost of being physically active at work and at home has increased. In addition, the introduction of a host of new drugs and devices to the market to better manage the adverse effects that obesity promotes has decreased the health consequences that result from obesity.¹⁶ This environment, which may facilitate obesity, evolved in response to consumers' demand for labor-saving technology and convenient, affordable food. Consequently, even Americans in lower BMI categories have a high percent of body fat; the average American male has about 28% body fat while the average female has about 40%, according data from National Health and Nutrition Examination Surveys (NHANES).¹⁷

Prevalence

Obesity has increased at an alarming rate in the United States over the past three decades.¹⁸ The prevalence of morbidly obese individuals is increasing faster in the United States than the prevalence of moderately obese individuals.¹⁹ In addition, it is believed that the obesity epidemic among children will lead to a large number of younger adults with type 2 diabetes.²⁰

Children and adolescents

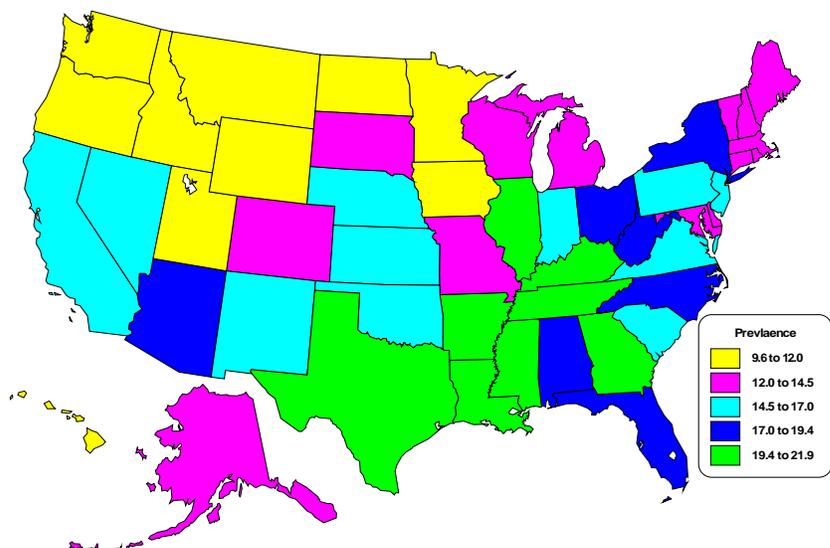
During the past three decades the rate of childhood obesity in the United States has more than tripled, and current prevalence (16.9%) remains high among children across most age, sex, racial/ethnic, and socioeconomic groups.²¹ Similarly, social inequalities in the prevalence of obesity have increased because of more rapid increases in prevalence among children in lower socioeconomic groups.^{22 23} It is estimated that 2.7 million U.S. children are severely obese. These children are predominately black and Mexican American males 12-19 years of age who are in lower socioeconomic households.²⁴ More than a third of these children face significant health risks and meet the criteria for adult metabolic syndrome and more than 400,000 meet criteria to have bariatric surgery. The arteries of obese children have a degree of stiffness normally seen in adults with heart disease, and it is unknown if this stiffness can be reversed.²⁵

In light of these trends, childhood obesity is viewed a major public health problem. *Healthy People 2020* objectives aim to have less than 9.6% of

children 2-5 years old, less than 15.7% of children 6-11 years old, and less than 16.1% of adolescents being considered obese. These targets will prove challenging as the prevalence of childhood obesity varies substantially across states, with Mississippi having the highest (21.9%) and Oregon the lowest (9.6%).²⁶ Missouri's prevalence rate is 13.6% and is lower than the rates of all adjoining states except Iowa (Figure 13.1).

Approximately 33% of U.S. children are overweight or obese at both 9 months of age and at 2 years of age.²⁷ Data from the Early Childhood Longitudinal Study Birth Cohort, show that more than 18% of 4 year-old children in the United States are obese and that the prevalence of obesity varies by race/ethnicity.²⁸ NHANES defines obesity among children and adolescents as BMI for age in at least the 95th percentile and morbidly obese at the 99th percentile (Centers for Disease Control and Prevention growth charts). The NHANES 2007-2008 survey

Figure 13.1. Prevalence of childhood obesity, United States, 2010



(Source: Singh et al, 2010)

found 9.5% of infants and toddlers were at the 95th percentile. Children and adolescents (aged 2-19 years) had 16.9% at the 95th percentile and 11.9% were at the 97th percentile.²⁹ In 2008, the national prevalence of obesity among low-income, preschool-aged children was 14.6%.³⁰ In Missouri, more than 30% of children between 2 and 5 years-old enrolled in federally-funded health programs are either overweight or obese.³¹

The causes of childhood obesity are multifaceted and may be determined by factors that operate at the earliest stages of life, such as one's race/ethnicity³² or a pregnant woman's excessive weight gain.³³ The prevalence of obesity can be influenced by culture³⁴ and weight misperception, which is much more common among non-Hispanic blacks and Hispanics.³⁵ 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.³⁶ Children with certain chronic health conditions may be predisposed to obesity.^{37 38}

³⁹ 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.⁴⁰ 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, school stores, or snack bars.⁴¹

Obesity in childhood and adolescence is not without consequences, such as increased risk of future type 2 diabetes,⁴² premature death from cardiovascular diseases,^{43 44} and disability. Obese adolescents have a significantly higher risk for severe obesity in adulthood.⁴⁵ They also 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.⁴⁶ Obese adolescents are at risk of developing health-compromising behaviors that may compound medical and social problems associated with excess weight.⁴⁷ In addition, obese children are more likely to sustain lower extremity injuries than those who are not obese.⁴⁸ The impact of childhood

obesity on employee health insurance is not well understood.⁴⁹

The U.S. Preventive Services Task Force recommends that clinicians screen children aged 6 years or more for obesity and offer them or refer them to intensive counseling and behavioral interventions to promote improvements in weight status.⁵⁰

Adults

Current estimates of obesity in the adult population can be derived from NHANES and the Behavioral Risk Factor Surveillance System (BRFSS). While the NHANES data are derived from actual weight and height measurements, the BRFSS data are based on self-report. Because of biased self-reporting of height and weight, BRFSS obesity prevalence rates are under-estimates and should be used with caution for health-care planning purposes.⁵¹

NHANES data from 2007-2008 show that the prevalence of obesity and extreme obesity among adults was 33.8% and 5.7%, respectively.⁵² 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. This discrepancy has been noted among women and is a possibility for men.⁵³ 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.^{54 55}

Projections based on NHANES data suggest that by 2030, 86% of adults in the United States will be overweight or obese, with 51% being obese.⁵⁶ Black women and Mexican-American men would be the most affected. Based on these projections, all American adults would become overweight or obese



by 2048, while black women would reach that state by 2034.

Among men, obesity prevalence is generally similar at all income levels; however, among non-Hispanic black and Mexican-American men, those with high income are more likely to be obese than those with low

income.⁵⁷ Higher income women are less likely to be obese than low income women.

Kansas City

Based on 2009 BRFSS data, no state met the *Healthy People 2010* obesity target of 15%.⁵⁸ Overall, the self-reported obesity prevalence in the United States was 26.7%, with Missouri being among the states with highest prevalence rates with a rate of 30.6%. Significantly more blacks were obese than whites, 42.5% vs. 29.7%, respectively. In the Kansas City region, the age-adjusted adult obesity prevalence was 27.5%. Figure 13.2 displays the relationship between income and BMI in Missouri (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 for Kansas City, 2.2% of adult respondents at least 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 (Table 13.1).

For local information regarding obesity in children, the Kansas City University of Medicine and Biosciences' *Score 1 for Health* initiative provides some data.⁵⁹ 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

Figure 13.2. Overweight and obesity prevalence by income level, Missouri, 2010



(source Missouri 2010 BRFSS report)

grades. The prevalence of being overweight or obese was higher in white students at lower socio-economic status schools compared to higher socio-economic status schools; the reverse was true to black students.

Of *Score 1 for Health* participants whose BMIs 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 over-

Figure 13.3. Percent of school-aged children in grades K-5 who were overweight/obese, Kansas City, MO, metropolitan area, 2006-2007 (source: *Score 1 for Health 2008 Community Report, Kansas City University of Medicine and Biosciences*)

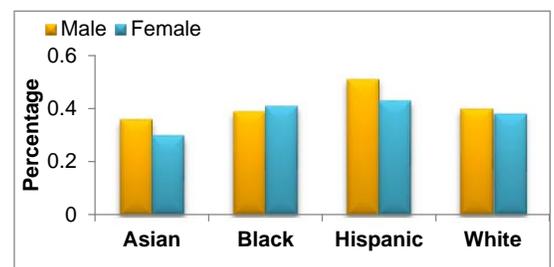




Table 13.1. Body mass index status of adults responding to BRFSS telephone surveys, Kansas City, MO, 2005-2008

All respondents		Underweight		Normal weight		Overweight		Obese		Total
Race/ethnicity		#	%	#	%	#	%	#	%	
White, non-Hispanic		27	2.2	423	35.0	432	35.8	352	26.9	1,207
Black, non-Hispanic		7	2.1	73	22.0	118	35.5	134	40.4	332
Other		3	1.9	54	34.6	55	35.3	44	28.2	156
Total		37	2.2	550	32.4	605	35.7	503	29.7	1,695
Male		Underweight		Normal weight		Overweight		Obese		Total
Race/ethnicity		#	%	#	%	#	%	#	%	
White, non-Hispanic		7	1.5	132	28.1	203	43.3	127	27.1	469
Black, non-Hispanic		3	2.8	25	23.1	45	41.7	35	32.4	108
Other		0	0.0	19	28.8	24	36.4	23	34.8	66
Total		10	1.6	176	27.4	272	42.3	185	28.8	643
Female		Underweight		Normal weight		Overweight		Obese		Total
Race/ethnicity		#	%	#	%	#	%	#	%	
White, non-Hispanic		20	2.7	291	39.4	229	31.0	198	26.8	738
Black, non-Hispanic		4	1.8	48	21.4	73	32.6	99	44.2	224
Other		3	3.3	35	38.9	31	34.4	21	23.3	90
Total		27	2.6	374	35.6	333	31.7	318	30.2	1,052

weight to normal weight was significantly higher for students with higher socioeconomic status and was not associated with race.

Using the Centers for Disease Control and Prevention (CDC) standards for BMI percentiles in

children, *Score 1 for Health* participants had higher BMIs than ideal across the BMI spectrum. *The Score 1 for Health* population had higher rates of overweight and obesity than Missouri and Kansas state statistics indicate.⁶⁰

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.⁶¹ 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 highly prevalent among the overweight and obese population.⁶² Still, more than one out of every six U.S. adults who has ever been overweight or obese has achieved a long-term weight loss maintenance of at least 10% of their body weight for at least one year.⁶³

In comparison to men, women have a disproportionate burden of disease attributable to overweight and obesity.⁶⁴ Obesity appears to lessen life expectancy markedly, especially among younger adults.^{65 66} Particularly at higher levels, obesity has

been associated with increased mortality relative to persons of normal weight, yet demonstrating causality has been elusive.^{67 68 69} 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.⁷⁰ While the impact of obesity on mortality may be decreasing over time,⁷¹ perhaps due to improvements in public health and health care, obesity remains the 2nd leading actual cause of death in the United States.⁷² 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.^{73 74} If past obesity trends continue, the negative effects on the health of the U.S. population will increasingly outweigh the positive effects gained from declining smoking rates.^{75 76} For example, as smoking prevalence decreases, obesity may become the biggest

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attributable cause of cancer in women.⁷⁷

Obese individuals also may have metabolic syndrome.⁷⁸ There are various definitions for metabolic syndrome but the dominant underlying risk factors appear to be abdominal obesity and insulin resistance. Metabolic syndrome is associated with a 2-fold increase in adverse cardiovascular outcomes and a 1.5-fold increase in all cause mortality.⁷⁹ Persons with lower socioeconomic status are at greater risk of metabolic syndrome. One reason appears to be that the dietary patterns of persons with a lower socioeconomic status favor energy dense foods and a low intake of fruits and vegetables.⁸⁰ However, middle-aged obese men, with and without metabolic syndrome, are at increased risk of early death from cardiovascular disease.⁸¹ In addition, Asian Americans have higher rates of metabolic syndrome than non-Hispanic whites, in spite of lower BMI values and lower prevalences of overweight and obesity.⁸²

Obesity-related quality-adjusted life years lost in the United States have been increasing since at least 1993.⁸³ 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.⁸⁴ 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 diabetes⁸⁵ and musculoskeletal problems.⁸⁶ These are both conditions that are associated with obesity. Disability is projected to increase 1% per year among 50-69 year-olds if there were no further gains in weight.⁸⁷ Women suffer a disproportionately large share of the disease burden of overweight and obesity that is not due solely to differences in medical comorbidity.⁸⁸

Obesity is significantly associated with an increased length of disabled life in older men and women. In combination with arthritis, obesity significantly decreases active life.⁸⁹ 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.⁹⁰ 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 substantial effect on health care costs;⁹¹ which equals 9.1% of health spending in the United States.⁹² It is estimated that the medical costs associated with obesity were \$147 billion per year in 2008. In addition, obesity affects other facets of life so much so that, on average, obesity costs society \$4,879 per year for each obese woman and \$2,646 for each obese man.⁹³

More than half of obesity-related medical costs are paid for through Medicare and Medicaid.⁹⁴ Insurance spending on obese individuals is 56% higher than that for people of normal weight, partially due to the number of medical conditions that occur and are treated among obese individuals. For mor-

bidity obese individuals, who comprise 3% of the U.S. adult population, health care costs are nearly double those of normal-weight adults and are more than 10% of all health care spending.⁹⁵

Data show that, compared to normal-weight adults, young obese adults (≥ 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 bills. Expenditures related to higher BMI have risen dramatically among white and older adults, but not blacks or those younger than 35 years-old.⁹⁶ The higher spending for obese patients is mainly attributable to treatment for diabetes and hypertension.⁹⁷ In addition, hospitals are having to buy ex-

pensive new equipment such as reinforced toilets and oversized beds to treat the growing number of severely obese patients.⁹⁸

The impact of successful obesity prevention is likely to be larger in women than men, and similar in effectiveness between whites and blacks.⁹⁹ While it is desirable to reduce the prevalence of obesity, obesity-related morbidity and mortality, and the economic burden of obesity, there are data to suggest that this decrease will be offset by cost increases due to diseases unrelated to obesity during the life-years gained.¹⁰⁰ This is true despite the fact that effective obesity prevention will lead to a decrease in costs for obesity-related diseases. Meanwhile, the current economic environment favors underinvestment in obesity prevention by insurance companies.¹⁰¹

Prevention

CDC published a set of 24 recommended community strategies to prevent obesity.¹⁰⁴ 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 the prevention of obesity-related morbidity and mortality. The first involves medical intervention, often starting in childhood,^{105 106} which must recognize ethnic/cultural differences in weight control practices.¹⁰⁷ 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.¹⁰⁸ *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).

Obese workers cost U.S. employers \$73.1 billion a year.¹⁰² Medical costs range from \$322 per year for an overweight male employee to \$6,087 for an obese man with a BMI of at least 40, while costs for women with comparable BMIs range from \$797 to \$6,694. Individuals with a BMI greater than 35 represent 37% of the obese population but are responsible for 61% of excess costs. When medical costs, "presenteeism" (being less productive on the job due to health problems), and absence from work are factored together, the per capita employer costs due to obesity are \$16,900 a year for women with a BMI of at least 40 and \$15,500 for men with a comparable BMI. Regardless of weight, presenteeism is the largest single driver of costs. Obesity also is a significant predictor of long-term (>7 days) sick leave usage.¹⁰³

Physical activity

Combined with poor diet, the lack of regular physical activity leads to obesity.¹⁰⁹ In 2009, Missouri BRFSS data showed that more than a quarter of adults were physically inactive, while in the bi-state metropolitan area, 23% of adults had no physical activity in the prior month.¹¹⁰ Physical activity guidelines for Americans can be found at www.health.gov/paguidelines.

One accepted contributing factor to reduced activity is the composition of the built environment,^{111 112} although proof of this is not clear.¹¹³ 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.¹¹⁴ From a policy point of view, there are various economic and psychosocial factors that fuel the obesity epidemic as well as increased avail-

ability of energy dense food and reduced physical activity. These factors demand a more equal distribution of affordable, nutritious food, and improved, more equitable, living and working conditions.^{115 116} The U.S. Department of Agriculture has updated its dietary guidelines for Americans which provide information and advice for choosing a healthy eating pattern. More specifically, a pattern that focuses on nutrient-dense foods and beverages, and that contributes to achieving and maintaining a healthy weight (www.dietaryguidelines.gov).

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.¹¹⁷

In response to the current suboptimal food offerings that exist in communities, dietary approaches are becoming one of the newest targets of public health law, such as regulating sugary beverages.¹¹⁸ Recent data indicate no change in total energy intake, but average carbohydrate intake decreased while average protein intake increased for both men and women.¹¹⁹

The manner in which food is marketed and advertised likely has a profound effect on obesity.¹²⁰ Food cues created through marketing and advertis-

ing 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.¹²¹

A complex web of factors and perceptions underpin nutrition behaviors.¹²² 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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