

Recent research has determined that more Americans are overweight than ever before. According to the Centers for Disease Control and Prevention (CDC) (2016a), 71% of the American adult population is currently obese or overweight. Within the past 30 years, the number of overweight children has doubled, and more recently, quadrupled in adolescents (CDC, 2015a). During 2011-2012, approximately 17% of children and adolescents aged 2-19 were considered obese in the United States (CDC, 2015d). This growing epidemic begins early in life, influenced by prenatal, genetic, family, and environmental factors. Studies have shown that children who are obese between the ages of 10-13 have an 80% chance of becoming an obese adult (American Academy of Child and Adolescent Psychiatry, 2011). Obesity in childhood is a key predictor of obesity in adulthood.

Understanding the causes of obesity as well as developing prevention and nutrition programs focused on the pre-school years is of paramount importance.

THE LOCAL EPIDEMIC

Texas ranked 11th in the country for the highest incidence of adult obesity in 2014 and 10th for the highest incidence of childhood obesity (Trust for America’s Health, 2016). In 2013, 66% of adult Texans were considered overweight or obese (Texas Department of State Health Services [DSHS], 2015). Studies have also shown that there is a disproportionate share of overweight in minorities. In 2015, only 23.7% of Hispanic Texans and 27.5% of Black Texans were of normal weight as compared to 31.1% of White Texans (Texas Department of State Health Services

[DSHS], 2012). In each category, Texans had higher rates of obesity than the national average (Ogden, Carroll, Kit, and Flegal, 2013).

OBESITY AMONG CHILDREN AND ADOLESCENTS AGED 2-19 YEARS: US, 2013-2014		
Race/Ethnicity	Gender	
	Male	Female
All	16.9%	17.1%
Hispanic	22.4%	21.4%
Non-Hispanic White	14.3%	15.1%
Non-Hispanic Black	18.4%	20.7%

(Food Research and Action Center [FRAC], 2016)

In 2013, 15.6% of the state’s high school students were classified as overweight and another 15.7% were reported as obese. Texas reported a higher rate of obesity but a lower rate of overweight compared to the national average (CDC, n.d.b).

Bexar County statistics indicated that, in 2013, 71% of adults and 32% of students were either overweight or obese (City of San Antonio Metropolitan Health District, 2014). Texas children weighed in at 15.6% overweight and 15.7% obese (CDC, 2015).

The 2015 Behavioral Risk Factor Surveillance System (DSHS, 2015) identified that almost 71% of individuals in the San Antonio metropolitan area were considered at risk of overweight or obesity. If the prevalence of overweight and obesity in Texas continues to rise, roughly 77% of the Texas population could be overweight by 2040 (DSHS, 2015).

OBESITY DEFINED

Obesity is defined as abnormal or excessive fat accumulation that presents a risk to health

(World Health Organization [WHO], 2013). This results in a weight greater than what is generally considered healthy for a given height (National Heart Lung and Blood Institute [NHLBI], 2012). Highly accurate, but expensive ways to measure body fat include dual-energy x-ray absorptiometry (DXA), bioelectrical impedance, and underwater weighing. Less expensive and more commonly used methods of measuring adiposity include skinfold thickness, body fat distribution, and weight-height indexes, such as body-mass index (BMI). Internationally, the BMI is used most often to diagnose obesity in adults and children.

For adults, the BMI is calculated by using the following formula (CDC, 2015b):

$$\text{Weight (lb)} / ([\text{Height(in)}]^2 * 703)$$

The resulting score places a person into one of four weight status categories: underweight, normal, overweight, or obese.

BMI FOR ADULTS (20+)	
BMI	Weight Status
Below 18.5	Underweight
18.5 – 24.9	Normal
25.0 – 29.9	Overweight
30.0 and Above	Obese
(CDC, 2015b)	

For 2-20 year olds, the BMI is calculated using the adult formula. However, weight status is determined using percentile ranges because of children’s highly variable growth patterns. The child’s BMI score is compared with age and gender specific growth charts provided by the Centers for Disease Control and Prevention (2015c).

BMI FOR CHILDREN AND TEENS (2-20 YEARS)	
Weight status category	Percentile range
Underweight	Less than the 5 th percentile
Normal	5 th percentile to less than the 85 th percentile
Overweight	85 th to less than the 95 th percentile
Obese	Equal to or greater than the 95 th percentile
(CDC, 2015b&c)	

FAT CELL DEVELOPMENT, OBESITY, AND HEALTH RISKS

Though BMI is the most common assessment of weight status category, it does not distinguish between muscle tissue and fatty (adipose) tissue. There are two types of adipose tissue: brown and white. Brown adipose tissue expends energy and has the ability to counteract obesity. White adipose tissue stores excess energy and consists of two distinct types of tissue. The first type, subcutaneous, is found directly below the skin and helps heat the body. The second type, intra-abdominal, produces hormonal chemicals, called adipokines (Kajimura et al., 2008). Excess intra-abdominal tissue is associated with the development of fat cells and obesity (International Chair on Cardiometabolic Risk, n.d.).

In obese people, fat cells within adipose tissue are forced to grow in size until they reach their maximum size, break down, and die. Though new fat cells form, the white blood cells, as part of the immune system, appear to gorge on the leftover dead cells, emitting potentially dangerous, large amounts of inflammation promoting proteins. This surge of chemicals may contribute to complications like arthritis, diabetes, and heart problems (O’Conner, 2013).

OBESITY PREVENTION IN EARLY CHILDHOOD

Obesity prevention is a pressing need as health care costs rise in the treatment of its complications. Today, most obesity prevention programs target children who are considered high-risk. For example, those who already qualify as obese or those who have obese parents. Studies on the effectiveness of early intervention programs have concluded that the introduction of healthy changes may decrease or prevent the development of obesity and associated health problems in school-aged children (Wojcicki and Heyman, 2010). In obese children, common medical conditions associated with obesity include type-2 diabetes, cardiovascular disease, high blood pressure, certain cancers, and osteoarthritis (National Institutes of Health (NIH), 2011). Obese children often battle psychosocial problems as well. Prevention programs include many

interventions from breastfeeding to nutrition programs.

Breast-feeding interventions

“Increasing breastfeeding initiation, duration, and exclusivity is a priority strategy in CDC’s efforts to decrease the rate of childhood obesity throughout the United States” (CDC, 2012, p3). Many researchers recognize the inverse correlation between the length of time infants are breastfed and the prevalence of overweight in children (the longer the duration of breastfeeding, the less likely the child is to become overweight). Conclusive evidence to explain why breastfeeding is associated with a lower prevalence of overweight and obesity in children has not yet been established.

However, since breastfeeding also has other health benefits such as reduced infections and allergies, breastfeeding recommendations are still considered good policy (Gillman, 2011).

The Centers for Disease Control and Prevention’s Breastfeeding Report Card 2016 reported breastfeeding data from mothers who gave birth in 2013. The Texas rates indicated that 81.9% of mothers initiated breastfeeding, 46.5% breastfed at 6 months, and 26.8% breastfed at 12 months (CDC, 2016).

Behavior modification/support interventions

Programs focused on changing the behavior of overweight children and supporting their families can be implemented through individual counseling, in school situations, and/or in governmental policy changes. The *Let’s Move* campaign, introduced by First Lady Michelle Obama to help prevent and decrease child obesity, seeks to empower parents to help keep their children healthy, combat the rise in obesity rates and increase the amount of physical activity children receive (Wojcicki and Heyman, 2010). In 2010, only 68% of Texas high schools taught 12 key physical activity topics in a required course and only 45% offered opportunities for all students to participate in intramural activities or physical activity clubs.

62% of Texas students did not attend physical education classes 5 days in an average week when they were in school and 50% did not attend PE classes in an average week at all (CDC, n.d.a).

Dietary Interventions

Dietary-based programs are designed to reduce total energy intake by including low-calorie foods, increasing fresh foods, especially vegetables, and reducing energy-dense, poor-nutrient foods like desserts. In January 2011 the publication *Dietary Guidelines for Americans, 2010* was released (United States Department of Agriculture [USDA], 2011a). In addition to providing specific dietary information for Americans ages 2 years and older, the traditional food pyramid was replaced with a new icon, *MyPlate*, “with the intent to prompt consumers to think about building a healthy plate at meal times” (USDA, 2011b, p1). Key recommendations include:

- Balancing calories to manage weight
- Foods and food components to reduce
- Food nutrients to increase
- Building healthy eating patterns (USDA, 2011a)

THE MAYOR’S FITNESS COUNCIL AND METRO HEALTH

In an effort to support the national *Let’s Move* initiative at the local level, both the Mayor’s Fitness Council and the City of San Antonio Metropolitan Health District have teamed up to fight childhood obesity. In 2011, Metro Health received \$15.6 million through the Communities Putting Prevention to Work (CPPW) to fund the *Find Your Balance* campaign (Roffidal-Blanco, 2011). The initiative is geared toward providing an increased amount of healthy food options in schools through salad bars. In 2011, San Antonio was recognized as one of the top three cities establishing the most salad bars in schools. “The San Antonio salad bar initiative will reach over 100,000 students in Bexar County” (Roffidal-Blanco, 2011, p.6).

Physical activity interventions commonly apply two objectives. First, the level of moderate to vigorous physical activity is increased. Second, sedentary activities are reduced. Having family-

time include fun and energetic activities is a good way to make exercise more appealing to children. Biking, walking and rollerblading are all great ways for families to increase physical activity (NHLBI, 2012). A 2013 survey of youth behavior reported that approximately 32.9% of high-school aged adolescents in Texas watched three or more hours of television on an average school day and 38.0% used a computer three or more hours per day (CDC, n.d.b). Limiting the amount of time spent in front of the television and computer will encourage children to find other activities, such as exercise and play, to fill their time.

Community programs are another way to increase physical activity. Studies have proven that the use of extracurricular programs involving physical activity have increased participants' levels of activity, decreased sedentary behavior and reduced negative obesity related conditions (CDC, 2009).

Local comprehensive nutrition and health education interventions

These programs are designed to improve knowledge and behaviors involved in making food and lifestyle choices. Programs available locally are described below:

SAN ANTONIO FOOD BANK NUTRITION EDUCATION PROGRAM

This program was designed to help San Antonio residents establish healthy eating habits and active lifestyles. The program also focuses on disease prevention by establishing and initiating healthy regimens. Core elements include:

- *Nutrition for All* promotes dietary quality, healthy cooking, food safety, and food budgeting
- *Diabetes Lifestyle Education* emphasizes healthy cooking, food label reading and understanding of a healthy plate in each meal
- *Nutrition for Parents of Young Children* helps parents raise healthy eaters and prevent common inadequate nutrition related health problems such as obesity

- *Healthy Cooking & Gardening Curriculum* connects 5th and 6th grade children to healthy foods through basic cooking and gardening skills
- *Get Fit SAFB* encourages SAFB employees to live lifestyles that promote healthy eating and active living.

(San Antonio Food Bank, 2009)

BEXAR COUNTY COMMUNITY HEALTH COLLABORATIVE
The Health Collaborative began in 1997 when San Antonio's major healthcare organizations conducted a health needs assessment for the city. The Collaborative incorporated in 2000 and has since, "developed into a powerful network of citizens, community organizations and businesses" (Health Collaborative, 2012). Its Project Measure Up (PMU) supports school districts in meeting federal and state mandates for youth obesity prevention activities in schools. The PMU volunteer corps assists schools in performing child fitness assessments for the FitnessGram program which provides school children with individualized fitness reports that include specific recommendations for improvement. The Collaborative also heads, sponsors and partners with local organizations for health-related events.

SAN ANTONIO SPORTS FOUNDATION (SASF)

Its *Fit Family Challenge* program, designed to motivate San Antonio families to learn about and increase physical activity and healthy nutrition, incorporates free, family-friendly activities and events with on-line resources, including training journals, to expose families to exercise and good nutrition alternatives (SASF, n.d.). Other programs designed to promote an active and healthy community include: Rock 'n' Roll San Antonio Marathon; All Can Ski (waterskiing clinic for people with physical disabilities); Corner Store Go!Kids Challenge (fitness program in elementary school physical education programs); I play! Afterschool Program (sports program for low-income students); and Kids Rock San Antonio (marathon prep training for K-5 grade youth) (SASF, 2010)

REFERENCES

- American Academy of Child and Adolescent Psychiatry. (2011). *Facts for families no. 79: Obesity in children and teens*. Retrieved from http://www.aacap.org/AACAP/Families_and_Youth/Facts_for_Families/Facts_for_Families_Pages/Obesity_In_Children_And_Teens_79.aspx
- Centers for Disease Control and Prevention (CDC). (n.d.a). *The Obesity epidemic and Texas students*. Retrieved August 31, 2016, from <https://nccd.cdc.gov/youthonline/App/Default.aspx>
- Centers for Disease Control and Prevention (CDC). (n.d.b). *Youth online: High school YRBS United States 2013 and Texas 2013 Results*. Retrieved August 31, 2016, from <https://nccd.cdc.gov/youthonline/App/Default.aspx>
- Centers for Disease Control and Prevention (CDC). (2009). Recommended community strategies and measurements to prevent obesity in the United States. *Morbidity and Mortality Weekly Report*, 58(RR-7). Retrieved from <http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5807a1.htm>
- Centers for Disease Control and Prevention (CDC). (2015). *Texas state nutrition, physical activity, and obesity profile*. Retrieved from <http://www.cdc.gov/nccdphp/dnpao/state-local-programs/profiles/pdfs/texas-state-profile.pdf>
- Centers for Disease Control and Prevention (CDC). (2015a). *Adolescent and school health: Childhood obesity facts*. Retrieved from <http://www.cdc.gov/healthyschools/obesity/facts.html>
- Centers for Disease Control and Prevention (CDC). (2015b). *About adult BMI*. Retrieved from http://www.cdc.gov/healthyweight/assessing/bmi/adult_bmi/index.html
- Centers for Disease Control and Prevention (CDC). (2015c). *About child and teen BMI*. Retrieved from http://www.cdc.gov/healthyweight/assessing/bmi/childrens_BMI/about_childrens_BMI.html
- Centers for Disease Control and Prevention (CDC). (2015d). *Overweight and obesity: Childhood obesity facts*. Retrieved from <http://www.cdc.gov/obesity/data/childhood.html>
- Centers for Disease Control and Prevention (CDC). (2016). *Breastfeeding report card—United States, 2016*. Retrieved from <http://www.cdc.gov/breastfeeding/pdf/2016breastfeedingreportcard.pdf>
- Centers for Disease Control and Prevention (CDC). (2016a). *FastStats: Obesity and overweight*. Retrieved from <http://www.cdc.gov/nchs/fastats/obesity-overweight.htm>
- City of San Antonio Metropolitan Health District. (2014). *Chronic Disease Prevention Program: Overweight and Obesity in Bexar County*. Retrieved from <http://www.sanantonio.gov/Health/HealthyLiving/ChronicDiseasePrevention/FactSheets.aspx#186951980-obesity>
- Food Research and Action Center (FRAC). (2016). *Overweight and obesity in the U.S*. Retrieved from frac.org/initiatives/hunger-and-obesity/obesity-in-the-us/
- Gillman, M. (2011). *Commentary: Breastfeeding and obesity – the 2011 scorecard*. Retrieved from <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3147075/>
- Health Collaborative. (2012). *Our history*. Retrieved from http://www.healthcollaborative.net/index.php?option=com_content&view=article&id=1&Itemid=8
- International Chair on Cardiometabolic Risk. (n.d.). *Abdominal obesity*. Retrieved July 16, 2015 from <http://www.cardiometabolic-risk.org/fileadmin/pdf/3%20Abdominal%20Obesity.pdf>
- Kajimura, S., Seale, P., Tomaru, T., Erdjument-Bromage, H., Cooper, M., Ruas, J., Chin, S., Tempest, P., Lazar, M., & Spiegelman, B. (2008). *Regulation of the brown and white fat gene programs through a PRDM16/CtBP transcriptional complex*. Retrieved from <http://genesdev.cshlp.org/content/22/10/1397.full.pdf>
- National Institutes of Health (NIH). (2011). *Children’s health: Obesity*. Retrieved from <http://www.nih.gov/about/discovery/allages/obesity.html>
- National Heart Lung and Blood Institute (NHLBI). (2012). *What are overweight and obesity*. Retrieved from http://www.nhlbi.nih.gov/health/dci/Diseases/obe/obe_what_are.html
- O’Conner, A. (2013). *The Healthy obese and their healthy fat cells*. *The New York Times*. Retrieved from http://well.blogs.nytimes.com/2013/10/09/the-healthy-obese-and-their-healthy-fat-cells/?_r=0
- Ogden, C., Carroll, M., Kit, B., and Flegal, K. (2013). *Prevalence of obesity among adults: United States, 2011–2012*. Retrieved from <http://www.cdc.gov/nchs/data/databriefs/db131.htm#were>
- Roffidal-Blanco, C. (2011). *San Antonio among top 3 cities for school salad bars: Effort supports First Lady Michelle Obama let’s move initiative*. Retrieved from http://eatrights.org/members/files/2011_November_newsletter.pdf
- San Antonio Food Bank (SAFB). (2009). *Nutrition education*. Retrieved from <http://safoodbank.org/nutrition-education/>
- San Antonio Sports Foundation (SASF). (n.d.). *What is Fit Family Challenge?* Retrieved August 04, 2015, from <http://www.sanantoniosports.org/fitfamilychallenge/index.html>
- San Antonio Sports Foundation (SASF). (2010). *Our Story* Retrieved from <http://www.sanantoniosports.org/history.htm>
- Texas Department of State Health Services (DSHS). (2015). *Behavioral risk factors surveillance system*. Retrieved from http://www.dshs.state.tx.us/chs/brfss/query/brfss_form.shtm
- Texas Department of State Health Services (DSHS). (2015). *Interagency obesity council*. Retrieved from http://www.squaremeals.org/Portals/8/files/publications/Reports/2015_InteragencyObesityReport_Final.pdf
- Trust for America’s Health. (2016). *Key health data about Texas*. Retrieved from http://www.healthamericans.org/states/?stateid=TX#section=1_year=2016,code=obesity
- United States Department of Agriculture (USDA). (2011a). *Dietary guidelines for Americans, 2010*. Retrieved from <http://www.cnpp.usda.gov/DGAs2010-PolicyDocument.htm>
- United States Department of Agriculture (USDA). (2011b). *First Lady, Agriculture Secretary launch MyPlate icon as a new reminder to help consumers to make healthier food choices*. Retrieved from http://www.cnpp.usda.gov/sites/default/files/myplate_myplate/PressRelease.pdf
- Wojcicki, J., and Heyman, M. (2010). *Let’s move – Childhood obesity prevention from pregnancy and infancy onward*. Retrieved from <http://www.nejm.org/doi/full/10.1056/NEJMp1001857>
- World Health Organization (WHO). (2015). *Obesity*. Retrieved from <http://www.who.int/topics/obesity/en/>