

2012 South Carolina Children's Health Report

Overweight and Obesity

Prepared by:
Kate Callahan-Myrick, MPH
Children's Health Assessment Survey Coordinator
Khosrow Heidari, MA, MS, MS
Division Director
Division of Chronic Disease Epidemiology
Bureau of Community Health and Chronic Disease Prevention



2012 South Carolina Children's Health Report

Overweight and Obesity

ACKNOWLEDGMENTS

This document is the result of collaboration among the staff of the Division of Chronic Disease Epidemiology, under the leadership of Khosrow Heidari, Division Director, with invaluable contributions from the following Department of Health & Environmental Control partners:

- Shae Sutton, PhD, Director, and Harley Davis, MPH, SC BRFSS Coordinator, Office of Public Health Statistics and Information Services
- Mike Smith, MPH, Maternal and Child Health Epidemiologist, Bureau of Maternal and Child Health
- The Surveillance and Epidemiology Team, Bureau of Community Health and Chronic Disease Prevention
- The Division of Nutrition, Physical Activity, and Obesity

External Partners:

- Robert Oldendick, PhD, Executive Director, Institute for Public Services and Policy Research, University of South Carolina
- Technical assistance provided by Vito DiBona, MS consultant.

This publication was supported by Maternal and Child Health Title V, and Coordinated Chronic Disease Grant funding from the Centers for Disease Control and Prevention. Its contents are solely the responsibility of the author and do not necessarily represent the official views of the Centers for Disease Control and Prevention.

Suggested citation:

South Carolina Department of Health and Environmental Control (2014). *2012 South Carolina children's health report, overweight and obesity*. SC Department of Health and Environmental Control/Division of Chronic Disease Epidemiology.

Contact Information:

South Carolina Department of Health and Environmental Control
Bureau of Community Health and Chronic Disease Prevention
Division of Chronic Disease Epidemiology

2012 South Carolina Children's Health Report

Overweight and Obesity

Executive Summary

In the United States, obesity has more than doubled in children and tripled in adolescents in the past 30 years (Centers for Disease Control and Prevention (CDC), 2013). This rapid increase in the prevalence of overweight and obese children is also occurring in South Carolina. Childhood obesity is accompanied by an increase in conditions that were, in previous years, unheard of among children. Children and adolescents who are overweight or obese are at a higher risk of developing cardiovascular diseases, high cholesterol levels and blood pressure, and are more likely to have bone and joint problems, sleep apnea, and develop pre-diabetes (CDC, 2013). Children who are overweight or obese also face an increased risk of social and psychological problems such as stigmatization and poor self-esteem (CDC, 2013). For the first time in two centuries, the current generation of children in America may have shorter life expectancies than their parents (American Heart Association).

In South Carolina

- 1/3 of all South Carolina high school students were overweight or obese in 2012.
- Most South Carolina youth do not meet the recommendations for eating fruits, vegetables, or whole grains daily.
- Empty calories from added sugars and solid fats contribute an average of 40% of the daily calories for children and adolescents aged 2-18 years.
- Less than 1/3 of high school aged females reported that they were physically active for at least 60 minutes for five or more days per week.
- 50.1% of all South Carolina children are reported watching 2 or more hours of television on an average school day.
- In 2012, 34.7% of high school students reported that they did not participate in any physical activity during the past 7 days, with 77.8% of all high school females not participating in any physical activity in the past 7 days.

2012 South Carolina Children’s Health Report

Overweight and Obesity

The South Carolina Children’s Health Assessment Survey (CHAS)

The South Carolina Children’s Health Assessment Survey (CHAS) is an annual, statewide, surveillance system that captures the health status and behaviors of children aged 0-17. It was introduced in 2012 to fill many gaps that existed regarding available data of children’s health in South Carolina. Prior to the development of the CHAS, such child health information was available for only certain age groups or was not consistently collected annually. The CHAS was designed to attain a comprehensive, valid, and reliable understanding of the state-level estimates of the health of children.

The CHAS is a follow up to the South Carolina Behavioral Risk Factor Surveillance System (BRFSS). During the BRFSS interview, respondents were asked if they have any children under the age of 18 years living in their household. If the respondent answered yes, they are invited to participate in the CHAS at a later date.

The 2012 CHAS was comprised of 18 modules, with a total of 157 questions.

The modules included in the 2012 CHAS were:

- | | | |
|---------------------------------------|---|------------------------|
| 1) Respondent Relationship | 7) Immunizations | 13) Oral Health |
| 2) General Health | 8) Demographics | 14) Nutrition |
| 3) General Information | 9) School Performance | 15) Physical Activity |
| 4) Height/Weight | 10) Asthma | 16) Food Insecurity |
| 5) Breastfeeding | 11) Child Health Conditions | 17) Family Involvement |
| 6) Health Care Access and Utilization | 12) Children with Special Health Care Needs | 18) Tobacco Indicators |

There were 1,419 completed interviews with parents/caregivers of children throughout the state. The information reported in this document is based on the results of those interviews, and the data has been weighted to represent all children in South Carolina.

2012 South Carolina Children's Health Report

Overweight and Obesity

Background

Childhood obesity is reaching epidemic proportions and has become the most prevalent chronic condition affecting the health of children and adolescents worldwide (Raychaudhuri & Sanyal, 2012). The negative health impact of childhood obesity does not only affect children while they are young, it can also lead to additional adverse health outcomes later in life. Overweight and obesity in childhood and adolescence is a predictor of obesity in adulthood. In these situations, the health conditions associated with childhood overweight and obesity continue into adulthood and become larger health issues (CDC, 2013). Obese adults are at risk for many serious health conditions, including high blood pressure, high cholesterol, type 2 diabetes and its complications, coronary heart disease, stroke, gallbladder disease, osteoarthritis, sleep apnea, and respiratory problems, as well as certain cancers (DHHS, Surgeon General's Report, 2010; CDC).

Overweight is defined as having excess body weight for a particular height from fat, muscle, bone, water, or a combination of these factors. Obesity is defined as having excess body fat. Overweight and obesity are the result of a "calorie imbalance," where too few calories are expended for the amount of calories consumed. For each individual, body weight is determined by a combination of genetic, metabolic, behavioral, environmental, cultural, and socioeconomic influences (CDC, 2013). Although the causes for obesity are multifactorial, minimal physical activity, increased levels of sedentary time, and excess consumption of energy dense foods are the major lifestyle factors believed to be contributing to weight gain and risk of obesity in youth (Fuemmeler, Anderson & Masse, 2011).

This report utilized the South Carolina Children's Health Assessment Survey (CHAS) to describe the state of childhood obesity in South Carolina in 2012. The CHAS has provided South Carolina with the opportunity to assess health risk factors and BMI status that were previously unavailable in the state. This is the first complete obesity and overweight profile of children ages 2-17 in South Carolina.

2012 South Carolina Children’s Health Report

Overweight and Obesity

Measuring Overweight and Obesity in Children

There are various ways that body fat can be estimated, such as underwater weighing, electrical impedance, and skin fold calipers. The most commonly used screening tool is the calculation of body mass index (BMI) from the weight and height of an individual. BMI is a fairly reliable indicator of body fatness for most people. BMI does not measure body fat directly, but research has shown that BMI correlates to direct measures of body fat. Calculating BMI is one of the best methods for population assessment of overweight and obesity. Because calculation requires only height and weight, it is inexpensive and easy to use for clinicians and for the general public (CDC, 2013).

$$\text{BMI} = 703 \times (\text{weight (lbs.)}/\text{height}^2 (\text{in}^2)) \text{ or}$$

$$\text{BMI} = (\text{weight (Kg)}/\text{height}^2 (\text{cm}^2))$$

For children and adolescents, defining overweight or obesity based on BMI can be difficult because height and weight are age and gender dependent and change throughout the child’s development. For children age 2 to 17 years old, the CDC has developed a definition based on the 2000 CDC growth charts for age and sex (Nemiarly, Shim, Mattox & Holden, 2012). The BMI categories used for children and adolescents are:

Table 1. Classification of BMI-for-Age and Sex of Children and Adolescents (ages 2-17)

Classification	Body Mass Index (kg/m ²)
Underweight	Below the 5 th percentile ranking
Normal/Recommended	≥ 5 th and < 85 th percentile ranking
Overweight	≥ 85 th and < 95 th percentile ranking
Obese	≥ the 95 th percentile ranking

2012 South Carolina Children's Health Report

Overweight and Obesity

Child Overweight and Obesity in South Carolina *Overview*

In 2012, 35.1% of all children and adolescents aged 2-17, in South Carolina were either overweight or obese, with 15.2% considered overweight and 19.9% considered obese.

Overweight and obesity are not distributed equally among all children. There are many factors that play a role in the prevalence of overweight and obesity. Table 1 shows disparities in overweight and obesity for children in South Carolina. In 2012, males (36.2%) had a higher prevalence of overweight and obesity than females (33.8%). Overweight and obesity prevalence was highest for black children, with 43.8% of all black children in South Carolina being either overweight or obese. Almost 40% of all children aged 5-11 were overweight or obese and nearly 39% of all children aged 12-13 were overweight or obese in the state.

Table 2. 2012 Prevalence of Overweight and Obesity among Children Aged 2-17 in South Carolina

	Overweight (85th to 94th percentile)	Obese (95th percentile or above)	Overweight or Obese (85th percentile or above)
Total	15.2	19.9	35.1
Percentage by Gender			
Male	14.6	21.6	36.2
Female	15.8	18.0	33.8
Percentage by Race			
White	15.1	16.5	31.6
Black	16.7	27.1	43.8
Other	10.7	15.7	26.4
Percentage by Grade			
Pre School	5.8	21.1	26.9
Elementary	15.7	23.7	39.3
Middle	22.0	17.9	39.9
High	14.2	15.8	30.0
Percentage by Age Group			
2 - 4 Years	8.1	20.3	28.4
5 - 11 Years	17.1	22.8	39.9
12 - 13 Years	20.1	18.7	38.8
14 - 17 Years	13.4	14.3	27.7

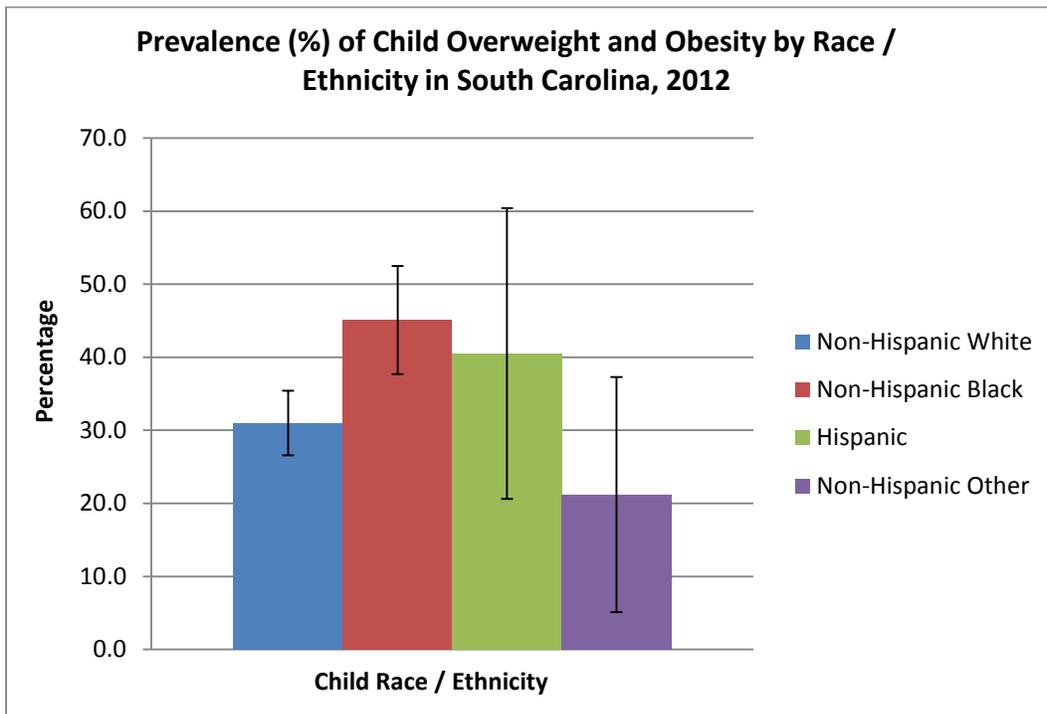
2012 South Carolina Children's Health Report

Overweight and Obesity

Child Overweight and Obesity in South Carolina Race / Ethnicity

Disparities in obesity prevalence exist between races and ethnicities in South Carolina. Non-Hispanic blacks had the highest prevalence of overweight and obesity (45.1%), followed by children of Hispanic or Latino ethnicity (40.5%). Non-Hispanic whites had a lower obesity prevalence than both Hispanic and blacks (31.0%). The distribution of obesity prevalence by race / ethnicity can be seen in Figure 1. In South Carolina, it is difficult to assess the Hispanic population by other factors, such as gender or age, due to the small sample size available. When there are multiple years of data available from the CHAS, more information will be available regarding the distribution of the Hispanic population by other demographic characteristics of interest.

Figure 1.



~ The error bars represent the confidence intervals for each prevalence (%)

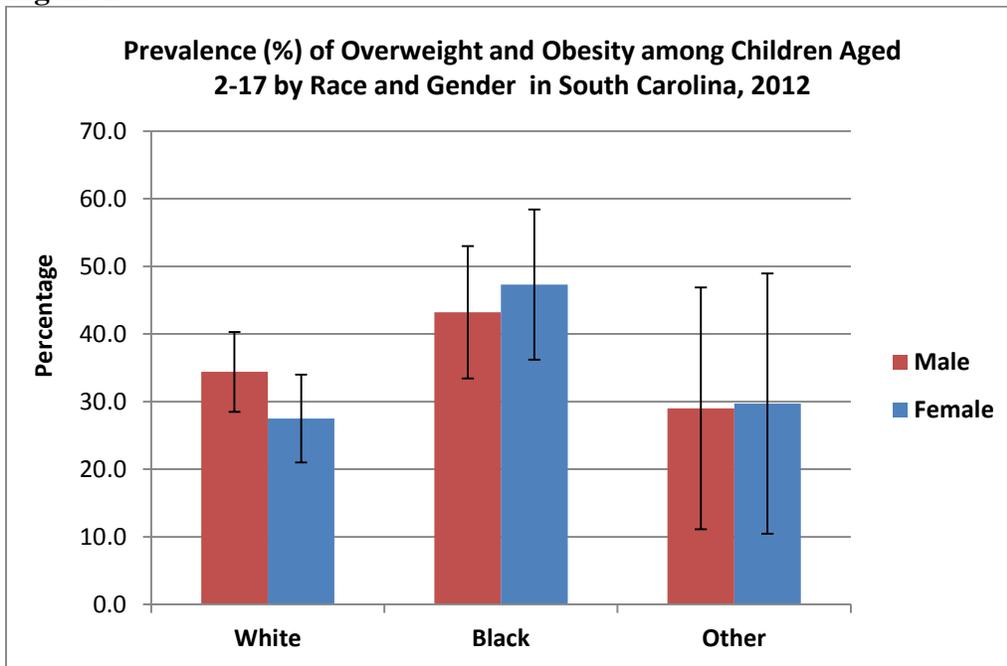
2012 South Carolina Children's Health Report

Overweight and Obesity

Child Overweight and Obesity in South Carolina Race and Gender

As previously mentioned, overweight and obesity prevalence are different between gender and race. In table 2, males had a higher overall prevalence of overweight and obesity than females. When each race is separated, then broken down by gender, differences in prevalence can also be seen by gender for each race. In 2012, of all South Carolina children aged 2-17, white females had the lowest prevalence of overweight and obesity (27.5%), followed by males (29.0%) and females (29.7%) of other races. Black males and females had the highest prevalence of overweight and obesity, with black females (47.3%) having the highest prevalence among all children in South Carolina.

Figure 2.



*The 'Other' race category includes Asian, Native Hawaiian, Pacific Islander, American Indian, and Alaska Native

~ The error bars represent the confidence intervals for each prevalence (%)

2012 South Carolina Children's Health Report

Overweight and Obesity

Child Overweight and Obesity in South Carolina *Age Categories*

Prior to the administration of the CHAS, South Carolina lacked comprehensive surveillance data for children younger than middle school ages. Data were available for children younger than 5 years old enrolled in the Special Supplemental Nutrition for Women, Infant and Children (WIC) program, a federally-funded program that supports pregnant women and families with young children by providing nutrition education, nutritious foods, and breastfeeding support. Data for these children are reported by states to the CDC through the Pediatric Nutrition Surveillance System* (PedNSS). A limitation of this data is that it is not representative of all children younger than 5 in South Carolina, but only of those children five-years old and younger who meet the WIC eligibility requirements and who are enrolled in the program.

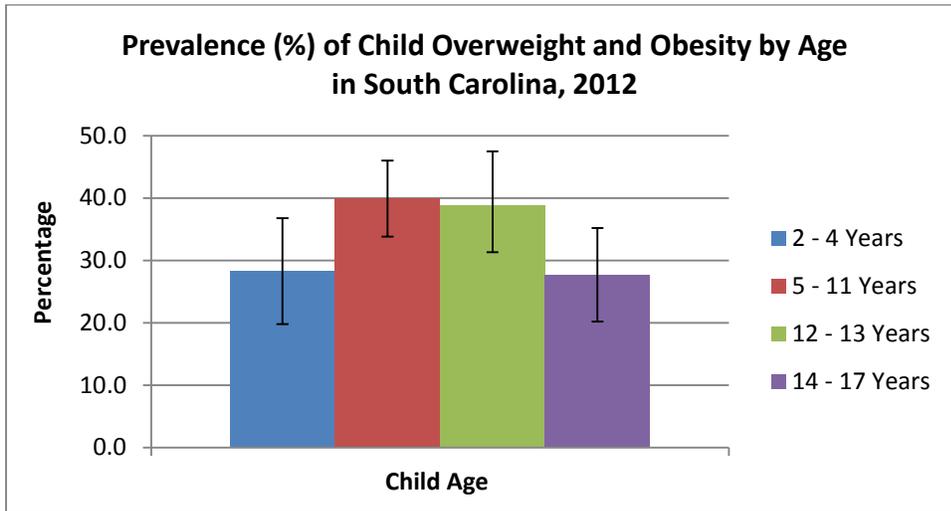
This is the first year that we are able to have a clear, reliable documentation of overweight and obesity status for children aged 2 through 17 in South Carolina.

In 2012, children between the ages of 5 and 13 had a high prevalence of overweight and obesity, with almost 40% of children ages 5-11 being overweight and obese, and 39% of children ages 12-13 being overweight and obese. Although the prevalence of overweight and obesity was lower for children aged 2 -4 years and for ages 14-17, it was still nearly 30% for each population.

2012 South Carolina Children's Health Report

Overweight and Obesity

Figure 3.

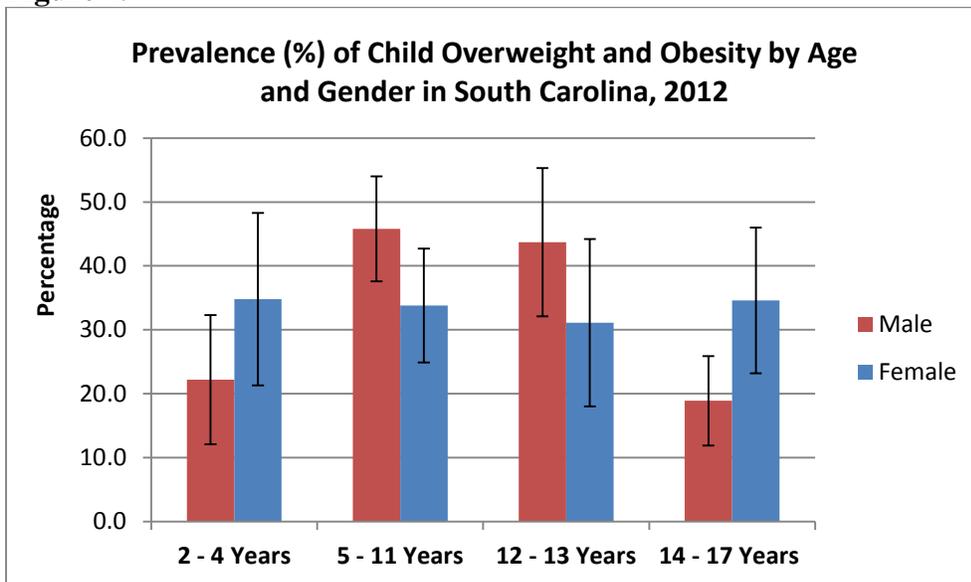


~ The error bars represent the confidence intervals for each prevalence (%)

Age and Gender

The prevalence of overweight and obesity are very dynamic, changing with age and by gender. The highest prevalence of overweight and obesity was seen among males aged 5-11 years (45.2%) and 12-13 years (45.7%). A higher prevalence of overweight and obesity was seen among females in the 2-4 year (34.8%) and 14-17 year age group (34.6%).

Figure 4.



~ The error bars represent the confidence intervals for each prevalence (%)

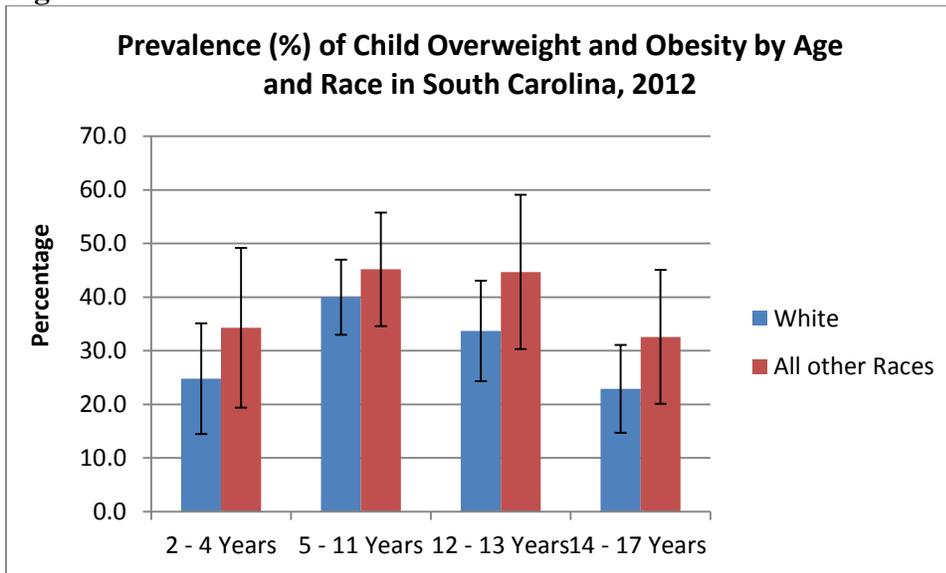
2012 South Carolina Children’s Health Report

Overweight and Obesity

Age and Race

Overweight and obesity also vary between races at different ages. Figure 4 shows the difference between whites and all other races. At each age range, blacks had a higher prevalence of overweight and obesity, topping out at 53.1% in the 5-11 age range. For whites, the highest prevalence of overweight and obesity is also seen in the 5-11 age range, with 40% of white children being overweight or obese in South Carolina.

Figure 5.



*The ‘Other’ race category include Black,s Asian, Native Hawaiian, Pacifica Islander, American Indian, and Alaska Native

~ The error bars represent the confidence intervals for each prevalence (%)

2012 South Carolina Children's Health Report

Overweight and Obesity

Child Overweight and Obesity in South Carolina *Grade Categories*

South Carolina Children Pre-School Students (Before Kindergarten, age range of 3-5 years old)

In 2012, 26.9% of all South Carolina pre-school students were either overweight or obese, with males (27.9%) more likely to be overweight or obese than females (26.0%). While 5.8% of all pre-school students were considered overweight, the percent of female students who were overweight (6.6%) was greater than the percent of male students who were overweight (4.9%). The percent of all pre-school students who were obese was 21.1%; the percent of male students who were obese (22.9%) was greater than the percent of female students (19.5 %) who were obese.

Before children enter school, differences by race for both overweight and obese can be seen. While 26.9% of all SC pre-school students were considered overweight or obese, the percent of black pre-school students who were overweight or obese (37.8%) was greater than the percent of overweight among their white counterparts (19.6%).

South Carolina Children Elementary School Students (Grade K-5)

In 2012, 39.3% of all South Carolina elementary students were either overweight or obese, with males (44.3%) more likely to be overweight or obese than females (34.2%). There were a total of 15.7% of all elementary school students considered overweight. There was a lower percent of female students who were overweight (14.5%) compared to males who were overweight (16.8%) in the state. The total percent of all elementary school students who were obese was 23.7%; the percent of male students who were obese (27.5%) was greater than the percent of female students (19.6%) who were obese.

There were differences by race for both overweight and obese among elementary students. While 39.3% of all elementary students were considered overweight or obese, the percent of

2012 South Carolina Children's Health Report

Overweight and Obesity

black elementary school students who were overweight or obese (45.5%) was greater than the percent of overweight among their white counterparts (34.7%).

South Carolina Children Middle School Students (Grade 6-8)

In 2012, 39.9% of all South Carolina middle school students were either overweight or obese, with males (44.9%) more likely to be overweight or obese than females (32.0%). While 22.0% of all middle school students were considered overweight, the percent of female students who were overweight (23.0%) was slightly greater than the percent of male students who were overweight (21.4%). The percent of all middle school students who were obese was 17.9%; the percent of male students who were obese (23.5%) was substantially greater than the percent of female students (9.0%) who were obese.

Middle school students had differences by race for overweight and obesity. While 39.9% of all middle students were considered overweight or obese, the percent of black middle school students who were overweight or obese (43.4%) was greater than the percent of overweight among their white counterparts (36.9%).

South Carolina Children High School Students (Grade 9-12)

In 2012, 30.0% of all South Carolina high school students were either overweight or obese, with males (24.8%) less likely to be overweight or obese than females (34.4%). While 14.2% of all high school students were considered overweight, the percent of female students who were overweight (17.5%) was greater than the percent of male students who were overweight (10.3%). The percent of all high school students who were obese was 17.9%; the percent of male students who were obese (14.5%) was a bit less less than the percent of female students (16.9%) who were obese.

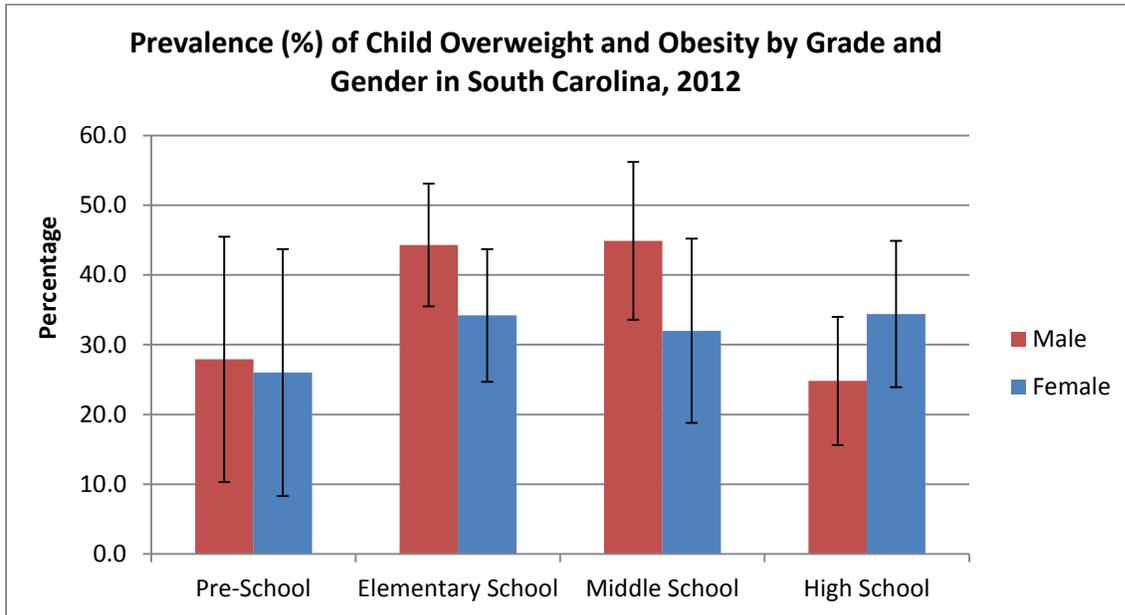
Disparities were also seen between races among high school students. While 30.0% of all high students were considered overweight or obese, the percent of black high school students who

2012 South Carolina Children's Health Report

Overweight and Obesity

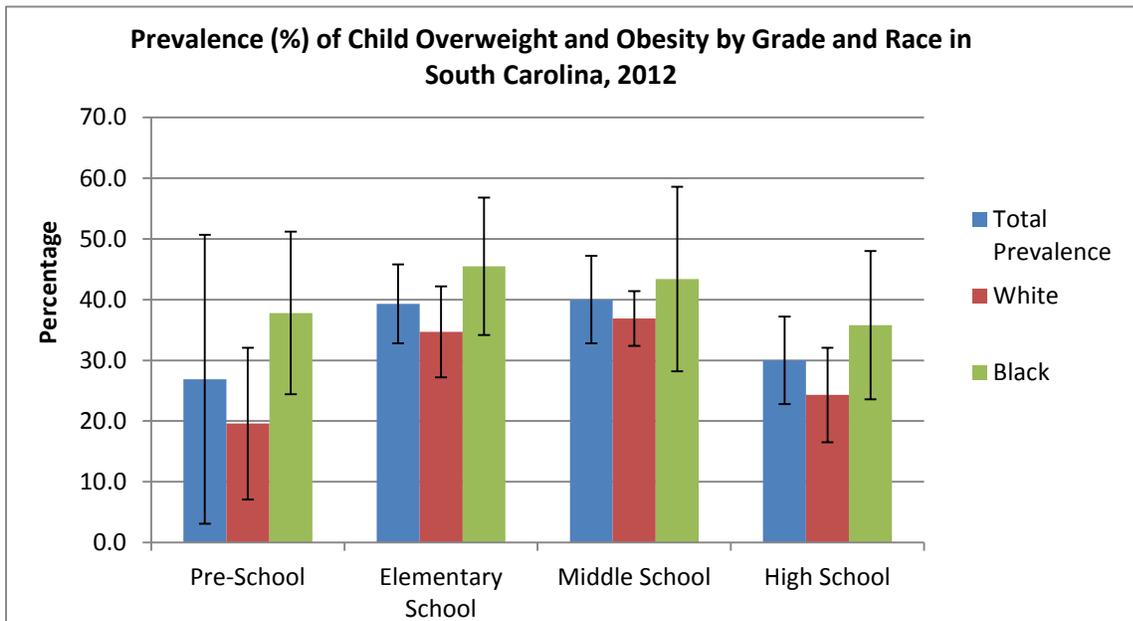
were overweight or obese (35.8%) was greater than the percent of overweight among their white counterparts (24.3%).

Figure 6.



~ The error bars represent the confidence intervals for each prevalence (%)

Figure 7.



~ The error bars represent the confidence intervals for each prevalence (%)

2012 South Carolina Children's Health Report

Overweight and Obesity

Physical Activity

According to the U.S. Surgeon General, children can obtain significant health benefits by including moderate physical activity on most days of the week. Energy expenditure in the form of physical activity is important to maintain a healthy weight (Pulgaron, 2013). Engaging in regular physical activity is widely accepted as an appropriate measure for combatting a variety of health factors, including childhood overweight and obesity (Tremblay, LeBlanc, Kho, Saunders, Larouche, Colley & Goldfield et al., 2011). Regular physical activity is one effective behavior that can help combat the “calorie imbalance” that leads to overweight and obesity among children (Bauer, Berge & Neumark-Sztainer, 2011). It can improve strength, endurance, help build healthy bones and muscles, help control weight, decrease anxiety, increase self-esteem, and may improve blood pressure and cholesterol levels in children and adolescents (CDC, 2013).

The Physical Activity Guidelines for Americans recommends that children and adolescents, aged 6-17, participate in 60 minutes (1 hour) or more of physical activity daily (U.S. Department of Health and Human Services (DHHS), 2014). The guidelines for children and adolescents focuses on three types of activity: aerobic, muscle-strengthening, and bone-strengthening. It is recommended that most of the 60 minutes or more a day should be either moderate- or vigorous-intensity aerobic physical activity. As part of their 60 or more minutes of daily physical activity, it is recommended that children include muscle-strengthening and bone-strengthening physical activity on at least 3 days of the week (DHHS, 2014). Although evidence has indicated that physical activity can reduce the risk of a number of serious health conditions, less than half of U.S. children aged 6-11 and only 6-11% of 12-15 year olds engage in the DHHS recommended physical activity amounts weekly (Dunton, Liao, Almanza, Jerrett, Spruijt-Metz, Chou & Pentz, 2012).

Daily and Weekly Physical Activity in South Carolina

In 2012, 81.6 % of children reportedly participated in an average 60+ minutes of physical activity daily. A decline in daily physical activity participation was seen as children got older, with those who were younger than age 4 participating more daily (92.5%) than those who were aged 14-17 (67.2%). Males were more likely to participate in 60+ minutes of physical activity

2012 South Carolina Children's Health Report

Overweight and Obesity

(85.6%) than females (77.3%). Larger disparities were seen among those who reported participating in 5+ days of physical activity weekly compared to those who did not. Of all children in South Carolina, 52.6% were reported to participate in an average of 5+ days of physical activity weekly. A higher prevalence of males (67.8%) were physically active 5+ days per week than females (58.6%).

Table 3. 2012 Daily and Weekly Physical Activity by Grade in South Carolina, aged 2-17

	Pre-School Pre-Kindergarten	Elementary School Kindergarten-5th Grade	Middle School 6th Grade - 8th Grade	High School 9th Grade - 12th Grade
Participates in 60+ Minutes of Physical Activity Daily				
Total	90.3	88.2	73.1	65.5
Percentage by Gender				
Male	88.6	91.9	76.5	73.0
Female	91.8	84.1	67.7	59.0
Percentage by Race				
White	86.6	88.7	71.6	60.8
Black	95.6	88.9	71.1	72.6
Black and Other Races	90.3	88.1	74.6	70.4
Participates in 5 or More Days of Physical Activity Weekly				
Total	58.5	53.0	52.3	45.3
Percentage by Gender				
Male	49.0	54.4	61.2	63.7
Female	66.2	50.5	37.4	28.2
Percentage by Race				
White	56.6	50.1	47.3	49.1
Black	61.5	58.8	57.8	38.2
Black and Other Races	61.8	59.6	59.5	41.5

Obesity and Daily Physical Activity

Overall, 34.0% of those who reported participating in physical activity 60+ minutes per day were overweight or obese, compared to 39.5% of those who were not physically active for 60+ minutes daily. Males who were physically active 60+ minutes daily were at a decreased risk of overweight obesity (34.5%) compared to males who were not physically active for 60+ minutes daily (45.2%). The same was seen for females, where 33.4% of females who reported being

2012 South Carolina Children's Health Report

Overweight and Obesity

physically active for 60+ minutes daily were overweight or obese, and 35.2% who did not exercise for as long were overweight or obese. When looking at race, blacks had an overall higher prevalence of overweight or obesity regardless of physical activity. White children who reported 60+ minutes of physical activity daily were less likely to be overweight or obese (30.4%) compared to their counterparts who did not participate in 60 minutes or more (36.5%). Black children, however, saw an increase of overweight or obese with the increased reporting of physical activity expenditure, where 44.0% of all black children who were physically active 60+ minutes daily were overweight or obese, and 41.3% of all black children who did not participate in 60+ minutes of physical activity daily were overweight or obese.

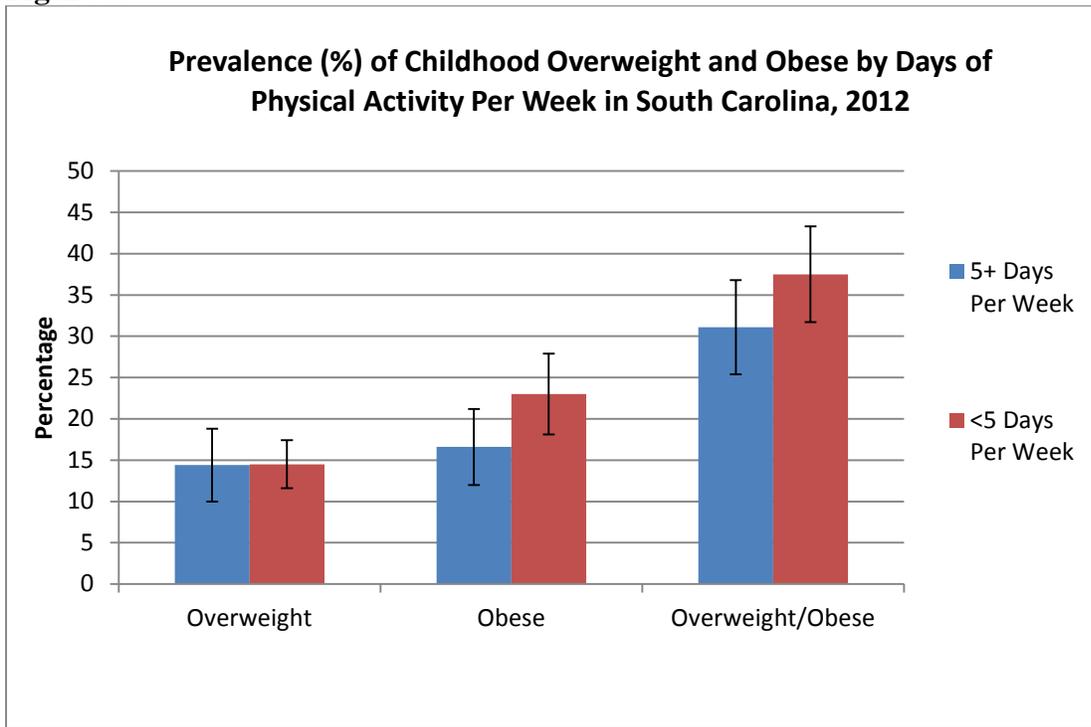
Obesity and Weekly Physical Activity

In 2012, 31.1% of those who reported participating in physical activity for 5+ days per week were overweight or obese, compared to 37.5% of those who were not physically active for 5+ days per week. Males who were reportedly physically active for 5+ days per week were at a decreased risk of overweight or obesity (32.8%) compared to males who were not physically active for 5+ days per week (38.9%). The same was seen for females, where 28.6% of females who were reported being physically active for 5+ days per week were overweight or obese, and 36.2% who reportedly did not exercise for as long were overweight or obese. A decrease in weekly physical activity participation was seen as children got older, with 58.5% of those who were in pre-school, compared to 45.3% of high school students were reported to participate in 5+ days of physical activity weekly. When looking at race, blacks had an overall higher prevalence of overweight or obesity regardless of physical activity. Blacks who were reported to engage in 5+ days physical activity weekly were less likely to be overweight or obese (39.1%) than black who reportedly did not participate in 5+ days of physical activity weekly (47.4%).

2012 South Carolina Children's Health Report

Overweight and Obesity

Figure 8.



**Physical Activity is defined 60+ minutes*

~ The error bars represent the confidence intervals for each prevalence (%)

Sedentary Behaviors

In recent years, physical activity patterns for children have shifted from outdoor play to indoor entertainment, such as television viewing and computer game playing (Raychaudhuri & Sanyal, 2012). A recent study found that 6-11 year olds are spending 6 hours and 16-19 year olds are spending 8 hours daily in some type of sedentary behavior, not associated with school (Tremblay et al., 2011). This increase in sedentary behaviors has limited the amount of energy that children expend daily. Research has shown that children are spending the majority of their time in sedentary activity, watching TV or playing video games (Tremblay, LeBlanc, Kho, Saunders, Larouche, Colley & Goldfield et al., 2011). Increased use of electronic media has been associated with increased risk of childhood obesity, where those in the 90th BMI percentile or above saw an increase in BMI of 0.54 kg/m² for every 1 hour increase of screen time use (Mitchell, Rodriguez, Schmitz & Audrain-McGovern, 2013). Tremblay et al., 2011 found similar results, where increased screen time was significantly associated with increased BMI among

2012 South Carolina Children's Health Report

Overweight and Obesity

children and adolescents. Another study found that those who watched 2 or more hours of television per day had increased serum cholesterol levels, and high blood pressure compared to their peers who watched less television daily (Byrne, Cook, Skouteris & Do, 2011). Byrne et al., 2011 also found that increased amounts of screen time were also associated with increased insulin resistance and increased systolic and diastolic blood pressure levels.

One lifestyle factor that influences both physical activity levels and nutritional behaviors is screen time. Children who are watching television or playing computer games are not being physically active. Several studies confirm a direct association between sedentary time and overweight and obesity in adolescents (Must, Bandini, Tybor, et al, 2007). In the 1970s, a child watched about 20,000 commercials per year. This amount has increased dramatically; a child now watches more than 40,000 television commercials each year. Since exposure to television advertising can influence food and beverage choices, unhealthy dietary choices along with sedentary time while watching television can lead to energy imbalance and weight gain (Must et al., 2007).

It is recommended that youth engage in two hours or less of entertainment from television and other electronic devices each day. In South Carolina, in 2012, 50.1% of children were reported to engage in two or more hours of screen time per school day from television and computers alone. By race, more than half (61.7%) of black children in South Carolina reported two or more hours of sedentary time per school day from television and computer use, compared to 45.7% of white children. Among South Carolina children, there is a gender disparity with 52.6% of males reporting two or more hours of sedentary time per school day from television and computer use compared to 47.8% of females.

2012 South Carolina Children's Health Report

Overweight and Obesity

Table 4. Prevalence (%) of Children Who Spend 2+ Hours in Front of Television or Computer Daily by Grade in South Carolina, aged 2-17

	Pre-School Pre-Kindergarten	Elementary School Kindergarten-5th Grade	Middle School 6th Grade - 8th Grade	High School 9th Grade - 12th Grade
Spends 2 or More Hours in Front of Television and Computer Daily				
Total	40.8	41.7	65.7	69.0
Percentage by Gender				
Male	48.7	44.5	76.7	67.7
Female	34.4	39.3	55.4	70.1
Percentage by Race				
White	35.7	40.0	54.4	72.1
Black	48.4	48.6	85.4	81.4
Black and Other Races	48.1	41.7	81.7	65.9

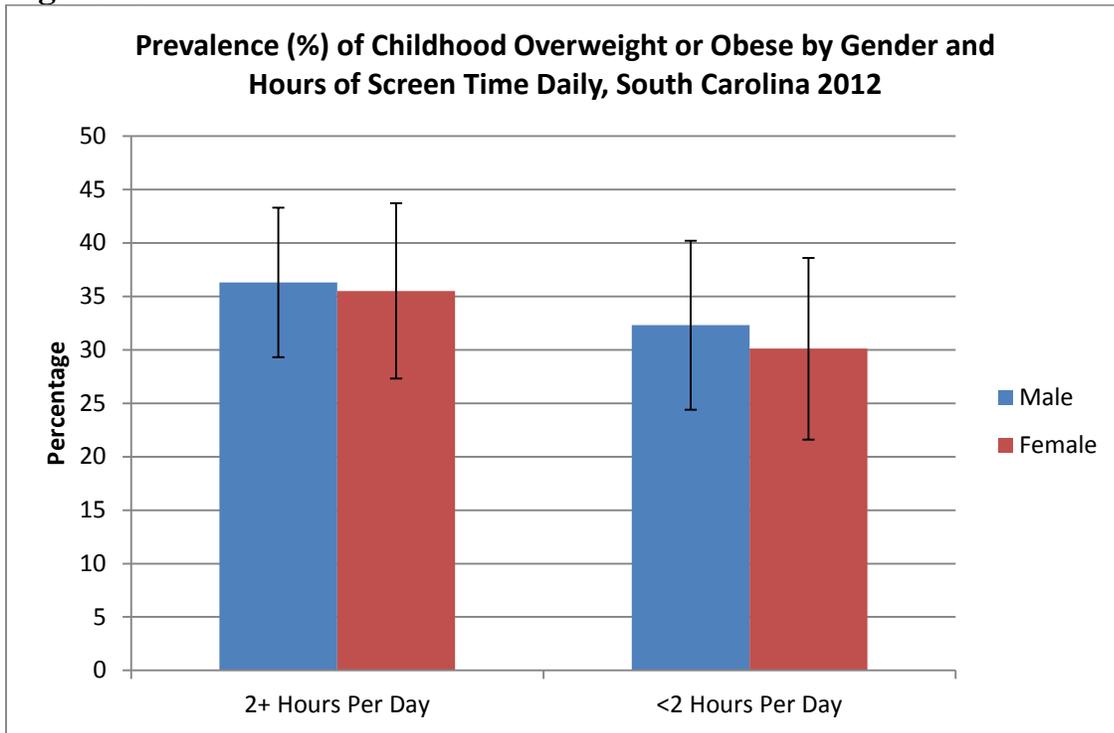
Screen time and Overweight / Obese

In South Carolina, as screen time increased, the prevalence of child overweight or obese increased as well. There were clear differences seen between the prevalence of overweight or obese of children who had 2+ hours per day of screen time (36.1%) and those who had less than 2 hours (31.1%). These differences were also seen by gender where 36.3% of males who were reported to have 2+ hours were overweight or obese, and 32.3% of males who were reported less than two hours were overweight or obese. Among females, 35.5% who had 2+ hours of screen time daily were overweight or obese compared to 30.1% of females who had less than 2 hours daily. White children who had 2+ hours of screen time also had a higher prevalence of overweight or obese (33.3%) compared to their counterparts who had less than 2 hours of screen time (28.6%).

2012 South Carolina Children's Health Report

Overweight and Obesity

Figure 9.



~ The error bars represent the confidence intervals for each prevalence (%)

Nutrition

Along with adequate physical activity, good nutrition is another cornerstone of healthy living. Healthy eating is associated with reduced risk for many diseases. Proper nutrition promotes optimal growth and development in children and helps prevent increased cholesterol and blood pressure levels, decreases the risk of developing chronic diseases, such as CVD, cancer, and diabetes (CDC, 2013). Dietary Guidelines for Americans recommends a diet that is rich in fruits, vegetables, whole grains, and fat-free and low-fat dairy products for persons aged 2 and older (CDC, 2013). Most U.S. youth do not meet the recommended daily intake of 2 ½ cups of fruits and 6 ½ cups of vegetables and the minimum whole-grain recommendation of 2-3 ounces daily. Empty calories from added sugars and fats have been found to comprise 40% of children's daily caloric intake. Fifty percent of those come from soda fruit drinks, dairy and grain desserts, pizza, and whole milk (CDC, 2013). Evidence has found that unhealthy eating behavior is linked to childhood and adolescent overweight and obesity (Byrne et al., 2011). Poor nutrition can lead to

2012 South Carolina Children's Health Report

Overweight and Obesity

an energy imbalance and increase one's risk of becoming overweight or obese, can affect child growth and development, and hinder cognitive function (CDC, 2013).

In recent years, the availability and accessibility to high calorie foods has increased significantly. Americans are eating food prepared away from home more than ever. Food eaten outside of the home tends to be less healthy, providing more calories, sugar, sodium, and fat than food prepared in the home. In 1970, households spent 26% of their total food spending on food-away-from-home; by 2002, this percentage had increased to 46% (USDA, Economic Research Report 4, 2005). During this same time period, portion sizes have increased dramatically. The most glaring example is the notorious "super-sizing." According to CDC, portion sizes began to rise in the 1970s, increased in the 1980s, and have grown ever since. For example, in 1957, the typical serving of soda was 8 fluid ounces. A typical serving size of soda is now 32 to 64 fluid ounces. During this time period, there has also been a steady rise in the prevalence of obesity.

In 2012, over half (56.8%) of all children, aged 2-17, in South Carolina were consuming less than 3 servings of fruit daily, and over half (58.6%) were consuming less than 3 servings of vegetables daily. A higher prevalence of males were eating less than three servings of fruit (63.4%) and less than three servings of vegetables (66.2%) compared to females. When asked the type of milk that the child typically drank, a resounding 61.3% of caregivers reported that their children mostly drank whole milk, with black children drinking the highest prevalence of whole milk (71.3%). Sweetened beverages appear to be a popular drink choice among children in South Carolina, with 65.3% of all children having reported drinking at least one drink per day. Males (70.4%) and black children (80.5%) had the highest prevalence of reported daily sweetened beverage consumption.

2012 South Carolina Children's Health Report

Overweight and Obesity

Table 4. Prevalence (%) of Reported Child Nutrition Consumption in South Carolina, 2012

	Total	Males	Females	White	Black
	%	%	%	%	%
Ate less than three servings of fruit per day					
Total	56.8	63.4	50.4	47.0	58.0
Ate less than three servings of vegetables per daily					
Total	58.6	66.2	51.2	58.2	56.3
Did not drink any 100% fruit juice					
Total	39.3	35.9	42.2	45.8	27.0
Drank whole milk instead of skim or reduced fat milk					
Total	61.3	63.6	60.2	53.0	71.3
Drank at least one serving of any sugar sweetened beverage per day					
Total	65.3	70.4	60.5	60.0	80.5
Drank three or more servings of any sugar sweetened beverage per day					
Total	27.2	30.9	23.4	21.7	24.6

2012 South Carolina Children's Health Report

Overweight and Obesity

Conclusion

With 35.1% of all children aged 2-17, in South Carolina being either overweight or obese, this is of serious concern in the state. This means that more than 1 out of every 3 children is overweight or obese in the state. Childhood obesity is a critical concern because it contributes to many childhood diseases and increases the risk of obesity into adulthood. Overweight and obese people are at greater risk of chronic diseases such as, type 2 diabetes, high cholesterol, coronary heart disease, and stroke. If obesity remains unaddressed, this epidemic in South Carolina can lead to increasing rates of these chronic diseases.

The risk factors of poor nutrition and physical inactivity among children are influenced by a complex and interrelated set of individual and community factors. Long-term gains in obesity and related chronic disease prevention will be maximized through a comprehensive, collaborative, and long-term approach involving a wide range of partners and stakeholders. Reducing the growing prevalence of childhood overweight and obesity in South Carolina will require sustained commitment at all levels to create places in which the healthy choice is the easy choice.

2012 South Carolina Children's Health Report

Overweight and Obesity

References

- Bauer, K., Berge, J., & Neumark-Sztainer, D. (2011). The importance of families to adolescents' physical activity and dietary intake. *Adolescent Med*, 22, 601-613.
- Byrne, L., Cook, K., Skouteris, H., & Do, M. (2011). Parental status and childhood obesity in Australia. *International Journal of Pediatric Obesity*, 6, 415-418. doi: 10.3109/17477166.2011.598938.
- Centers for Disease Control and Prevention, Adolescent and School Health. (2013). *Childhood obesity facts*. Retrieved from website: <http://www.cdc.gov/healthyyouth/obesity/facts.htm>
- Centers for Disease Control and Prevention, Adolescent and School Health. (2013). *Nutrition facts*. Retrieved from website: <http://www.cdc.gov/healthyyouth/nutrition/facts.htm>
- Centers for Disease Control and Prevention, Adolescent and School Health. (2013). *Physical activity facts*. Retrieved from website: <http://www.cdc.gov/healthyyouth/physicalactivity/facts.htm>
- Dunton, G., Liao, Y., Almanza, E., Jerrett, M., Spruijt-Metz, D., Chou, C., & Pentz, M. (2012). Joint physical activity and sedentary behavior in parent-child. *Medi Sci Sports Exerc*, 44(8), 1473-1480. doi: 10.1249/MSS.0b013e31825148e9.
- Fuemmeler, B., Anderson, C., & Masse, L. (2011). Parent-child relationship of directly measured physical activity. *International journal of behavioral nutrition and physical activity*, 8(17), Retrieved from website: <http://www.jibnpa.org/content/8/1/17>.
- Mitchell, J., Rodriguez, D., Schmitz, K., & Audrain-McGovern, J. (2013). Greater screen time is associated with adolescent obesity: a longitudinal study of the BMI distribution from ages 14-18. *Obesity*, 21(3), 572-575. doi: 10.1002/oby.20157.
- Must, A., Bandini, L., Tybor, D., Phillips, S., Naumova, E., & Dietz, W. (2007). Activity, Inactivity, Screen Time in Relation to Weight and Fatness Over Adolescence in Girls. *Obesity*, 15(7), 1774-1781.
- Nemiary, D., Shim, R., Mattox, G., & Holden, K. (2012). The relationship between obesity and depression among adolescents. *Psychiatr Ann.*, 42(8), 305-308. doi: 10.3929/00485713-20120806-09.
- Pulgaron, E. (2013). Childhood obesity: A review of increased risk for physical and psychological comorbidities. *Clinical Therapeutics*, 35(1), A18-A32. doi: 10.1016/j.clinthera.2012.12.0140149/2918.
- Raychaudhuri, M., & Sanyal, D. (2012). Childhood obesity: Determinants, evaluation, and prevention. *Indian Journal of Endocrinology and Metabolism*, 16(2), S192-S194. doi: 10.4103/2230-8210.104037.
- Tremblay, M., LeBlanc, A., Kho, M., Saunders, T., Larouche, R., Colley, R., Goldfield, G., & Connor Gorder, S. (2011). Systematic review of sedentary behavior and health indicators in school-aged children and youth. *International journal of behavioral nutrition and physical activity*, 8(98), Retrieved from <http://www.ijbnpa.org/content/8/1/98>.
- United States Department of Health and Human Services, Office of Disease Prevention and Health Promotion. (2014). *Physical Activity Guidelines for Americans*. Retrieved from website: <http://www.health.gov/PAGuidelines/>