Overweight and Obesity among Kindergarten and Third Grade Children in Connecticut
2016-2017

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Overweight and Obesity among Kindergarten and Third Grade Children in Connecticut, 2016-2017

Executive Summary

- Children who are overweight or obese are at risk for a number of poor health outcomes such as cardiovascular disease, diabetes, asthma, cancer, and psychological stress.

- Data from the 2017 *Every Smile Counts* survey estimate overweight and obesity among Connecticut kindergarten and third grade students.

- An estimated 31.3% of kindergarten and third grade students are overweight or obese – 15.2% are overweight and 16.0% are obese.

- Third grade students are more likely to be overweight or obese compared with kindergarten students (34.8% vs 27.8%).

- The prevalence of overweight, obese, and overweight or obese do not vary by gender and have not changed significantly from 2012, when the survey was last conducted.

- Hispanic or Latino/a kindergarten and third grade students are more likely to be overweight or obese compared to White non-Hispanic students (44.2% vs 24.8%).

- Black or African American non-Hispanic students are also more likely to be overweight or obese compared with White non-Hispanic students (34.2% vs 24.8%).

- Low socioeconomic status is associated with obesity. In *Every Smile Counts*, the percentage of all students in the school who were eligible for free or reduced price lunch (FRPL) is an indicator of socioeconomic status.

   o An estimated 22.2% of students in schools with ≥75% of students eligible for FRPL are obese compared with 10.0% of students in schools with <25% of students eligible for FRPL.

- Evidence-based practices aimed at increasing physical activity and healthy eating in schools and communities are recommended to prevent and control obesity.

Introduction

If a child's weight is above the healthy weight for a child's height and age, that child's weight status is categorized as overweight or obese. Body Mass Index (BMI) is a common measure used to determine weight status. BMI is calculated by dividing a person's weight in kilograms by the square of height in meters. A child's weight status is further determined using BMI percentiles based on age and sex. For children and teens, overweight is defined as a BMI at or above the 85th percentile and below the 95th percentile, while obesity is defined as a BMI at or above the 95th percentile.[1]

The burden from childhood obesity is great. Nationally, about 17% of children and adolescents aged 2-19 years are obese. That is about 12.7 million children and adolescents. Childhood obesity is more prevalent among certain population groups. For example, 21.9% of Hispanic[i] and 19.5% of black children and adolescents are obese compared with 14.7% of white children and adolescents.[2]

Children who are overweight or obese are at risk for a number of poor health outcomes. For example, children who are overweight or obese are more likely to have high blood pressure and high cholesterol, putting them at risk for cardiovascular disease (CVD). In addition, obesity increases the likelihood of developing type 2 diabetes, asthma, sleep apnea, musculoskeletal disorders such as osteoarthritis and degenerative disease of the joints, and some cancers like endometrial, breast, ovarian, prostate, liver, gallbladder, kidney and colon cancer. Childhood obesity may also cause psychological stress leading to low self-esteem and social stigma. Finally, children who are obese are more likely to become adults who are obese and at an even greater risk of experiencing the negative health outcomes associated with obesity.[3]

DPH Every Smile Counts and Obesity Survey

In 2017, the Connecticut Department of Public Health (DPH) Office of Oral Health conducted *Every Smile Counts*, a statewide oral health survey among public schools with twenty-five (25) or more students in kindergarten and/or third grade. As part of this survey, more than 4,400 children received dental screenings and BMI measurements in twenty-five (25) districts.   This report presents the prevalence of overweight and obesity among Connecticut kindergarten and third grade students as estimated from *Every Smile Counts*.

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[i] Throughout this report, all racial groupings (e.g., Black or African American, White) exclude persons of Hispanic ethnicity. A Hispanic or Latino/a ethnicity category is included in figures and tables reflecting data separate from race categories. Therefore, the modifier "Non-Hispanic or Latino/a" is assumed. Furthermore, Hispanic or Latino/a is abbreviated as Hispanic and Black or African American is abbreviated as black.

Methods[4]

The survey methods for the 2017 *Every Smile Counts* were developed to compute statewide estimates of dental care, dental decay, and weight status among kindergarten and third grade students. The sampling frame for the survey included all public schools in Connecticut with a kindergarten and/or third grade enrollment of 25 or more. Some communities have kindergarten and third grade in different schools. If both the kindergarten and third grade school were included in the sampling frame, children in these communities would have a higher probability of being selected. For this reason, the sampling frame was further limited to schools with only third grade but the enrollment number used for selection included both kindergarten and third grade children. If a school with only third grade was selected, the appropriate kindergarten feeder school was added to the sample.

To assure representation by a variety of demographic and socioeconomic factors, the sampling frame was implicitly stratified by District Reference Group (DRG)[ii] and percent participation in the National School Lunch Program (NSLP). A systematic probability proportional to size sampling scheme was used to select a sample of 45 third grade schools. Seven of the selected third grade schools did not have kindergarten so the appropriate kindergarten feeder schools (n=7) were added to the sample for a total of 52 schools representing 45 sampling intervals.

A total of 42 schools, representing 36 sampling intervals, participated in the survey. Kindergarten and third grade data is available for 36 of the 45 sampling intervals (80% of sampling intervals).

Of the 5,796 children enrolled in the 42 participating schools, 4,423 had a dental screening or had their height/weight measured for a child response rate of 76%. The response rate for kindergarten students was 79% (2,189 screened out of 2,757 enrolled). The response rate for third grade was 74% (2,237 screened out of 3,039 enrolled).

Of the 4,423 students that were screened, 4,419 have data for both height and weight. Survey analyses utilized the CDC BMI-for-age analysis program, which calculates an age and sex specific percentile for children BMI percentiles.[5] The program identifies records with extreme or biologically implausible values for BMI, and these records were excluded from analysis. The BMI percentiles were collapsed into three categories: Obese, Overweight, and Not Overweight or Obese. Survey analyses also utilized Statistical Analysis System (SAS) 9.4 (PROC SURVEYFREQ). The data were adjusted to account for the complex sampling method.

[ii] District Reference Groups (DRGs) is a classification system in which districts that have public school students with similar socioeconomic status (SES) and need are grouped together.

Results

Table 1 provides the unweighted frequencies of the study population by gender, race and ethnicity, age, and grade. The study population is 50.6% third grade students and 50.5% male. Also, 58.3% of the children are white, 11.3% black, and 24.7% Hispanic.

Table 2 displays the prevalence of overweight and obesity among kindergarten children by gender and race and ethnicity. The prevalence of overweight and obesity did not differ significantly by gender among kindergarten children. However, the prevalence of overweight and obesity vary by race and ethnicity. Hispanic kindergarten children are nearly twice as likely to be overweight and obese compared with white kindergarten children. Also, black kindergarten children are 2.1 times more likely to be obese compared with white kindergarten children. The differences in the prevalence of overweight and obesity among black and Hispanic kindergarten children do not reach statistical significance (Figure 1). While most of the differences in prevalence of overweight and obesity in 2017 and 2012 did not reach statistical significance, the prevalence of obesity among Hispanic kindergarten children in 2017 is significantly lower than the prevalence in 2012 (2017: 16.4%; 2012: 22.6%).

Figure 1. Prevalence of Overweight and Obesity in Kindergarten Children by Race and Ethnicity, 2017
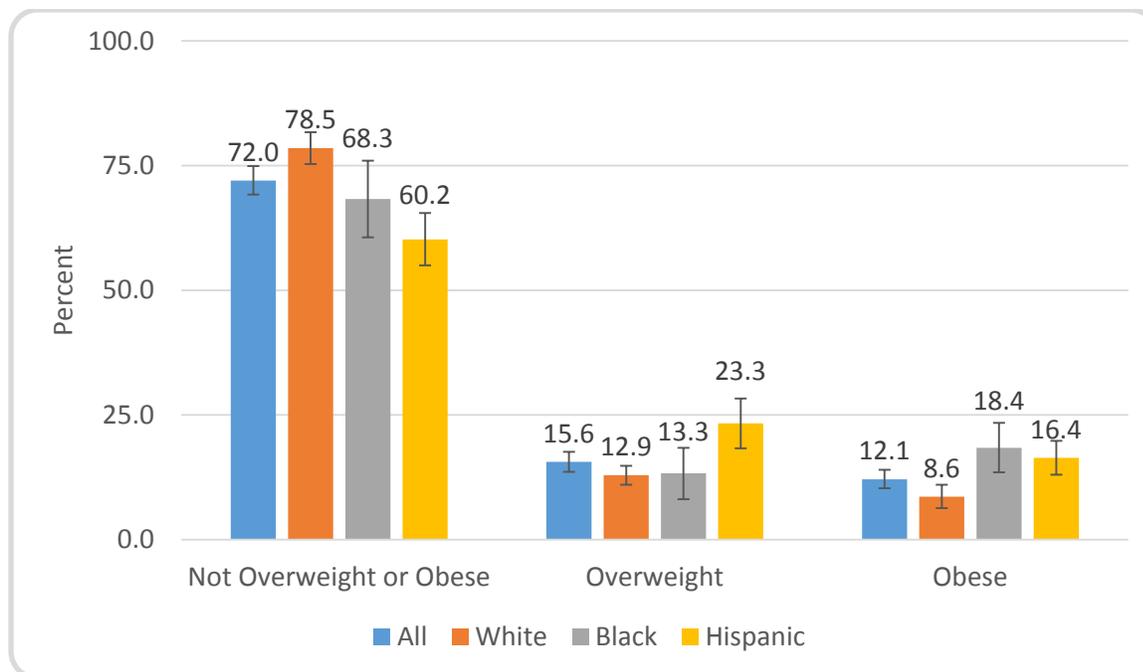
Among third grade children, the prevalence of overweight and obesity do not vary significantly by gender and did not change significantly from 2012 to 2017. The prevalence of obesity among third grade children does vary significantly by race and ethnicity. Hispanic children are 2.1 times more likely to be obese than white third grade children. The differences in obesity prevalence among black and white children and black and Hispanic children do not reach statistical significance. (Table 3, Figure 2)

Figure 2. Prevalence of Overweight and Obesity in Third Grade Children by Race and Ethnicity, 2017
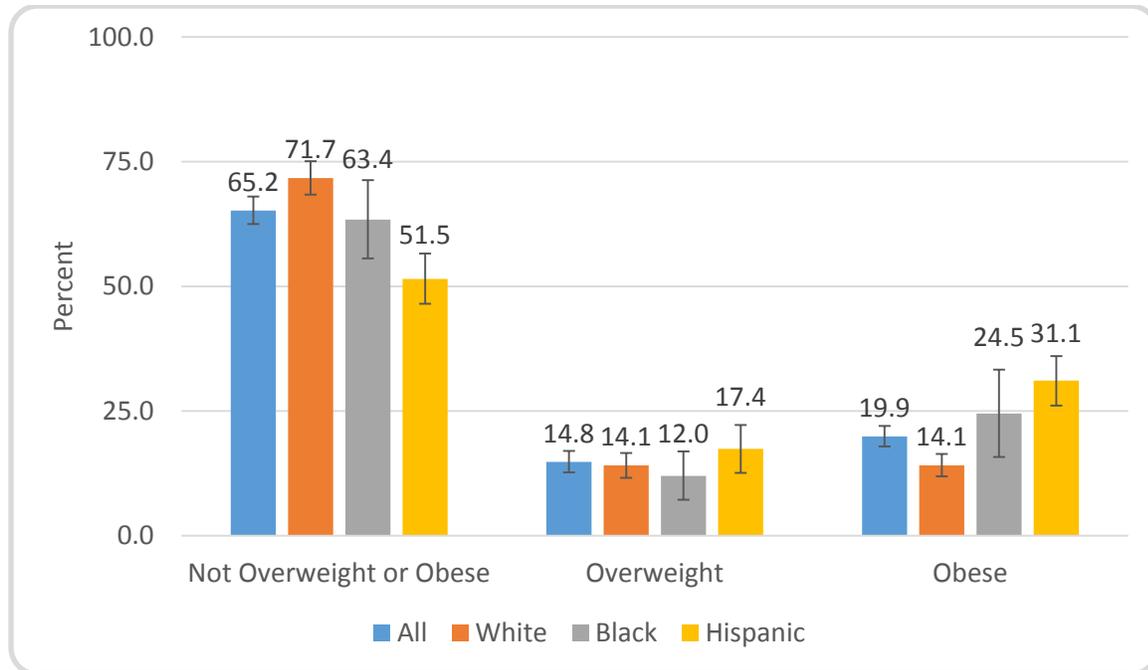
Among kindergarten and third grade children combined, the prevalence of overweight and obesity do not vary significantly by gender or survey year. The prevalence of overweight and obesity among kindergarten and third grade children does vary significantly by race and ethnicity. Hispanic children are more likely than white and black children to be overweight. Furthermore, black and Hispanic children are more likely to be obese than white children. The difference in prevalence of obesity among black and Hispanic children does not reach statistical significance. (Table 4, Figure 3)

Figure 3. Prevalence of Overweight and Obesity in Kindergarten and Grade 3 Children by Race and Ethnicity, 2017
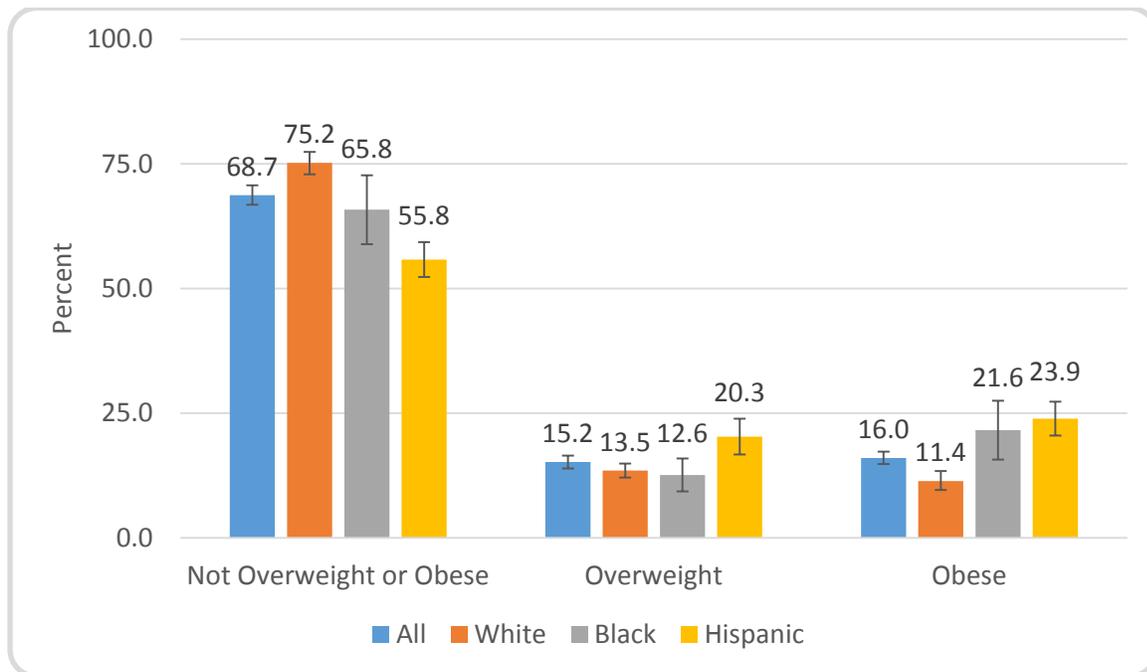
Table 5 displays data for the indicator "overweight or obese", defined as a BMI at or above the 85th percentile. The prevalence of overweight or obese varies by race and ethnicity and by grade. Black children are 1.4 times more likely than white children to be overweight or obese while Hispanic children are 1.8 times more likely to be overweight or obese than white children (Figure 4). The difference in prevalence of overweight or obese among black and Hispanic children did not reach statistical significance. Additionally, third grade children have a greater prevalence of overweight or obese compared with kindergarten children (Figure 5). The prevalence of overweight or obesity does not vary significantly by gender or survey year.

Figure 4. Prevalence of Overweight OR Obesity in Kindergarten and Grade 3 Children by Race and Ethnicity, 2017
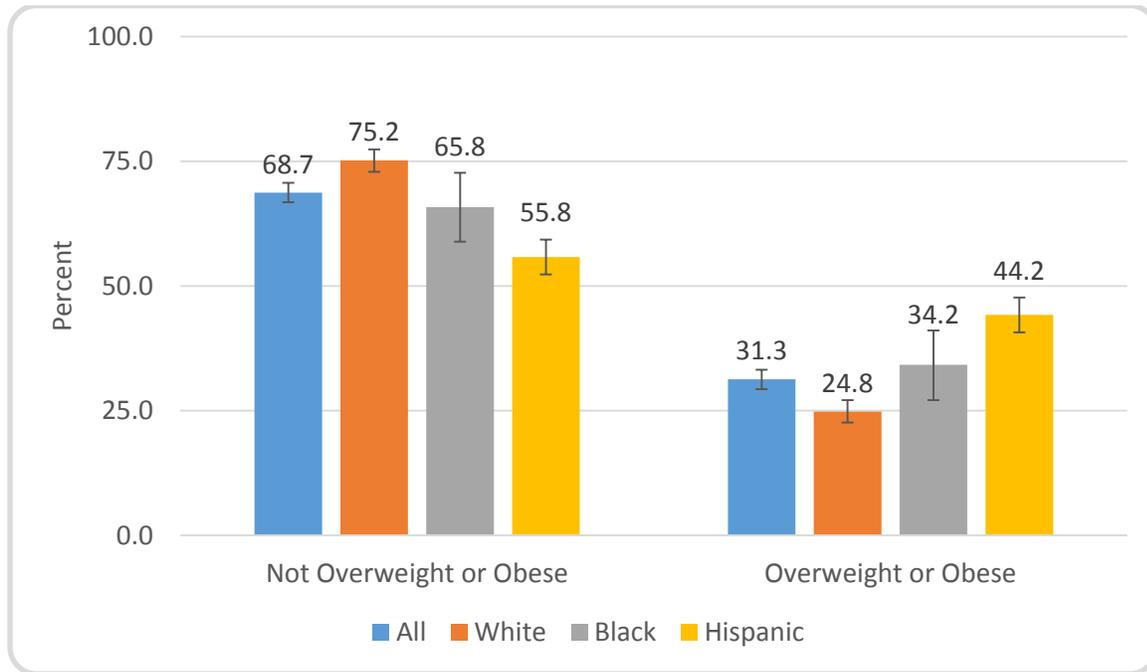
Figure 5. Prevalence of Overweight OR Obesity by Grade, 2017
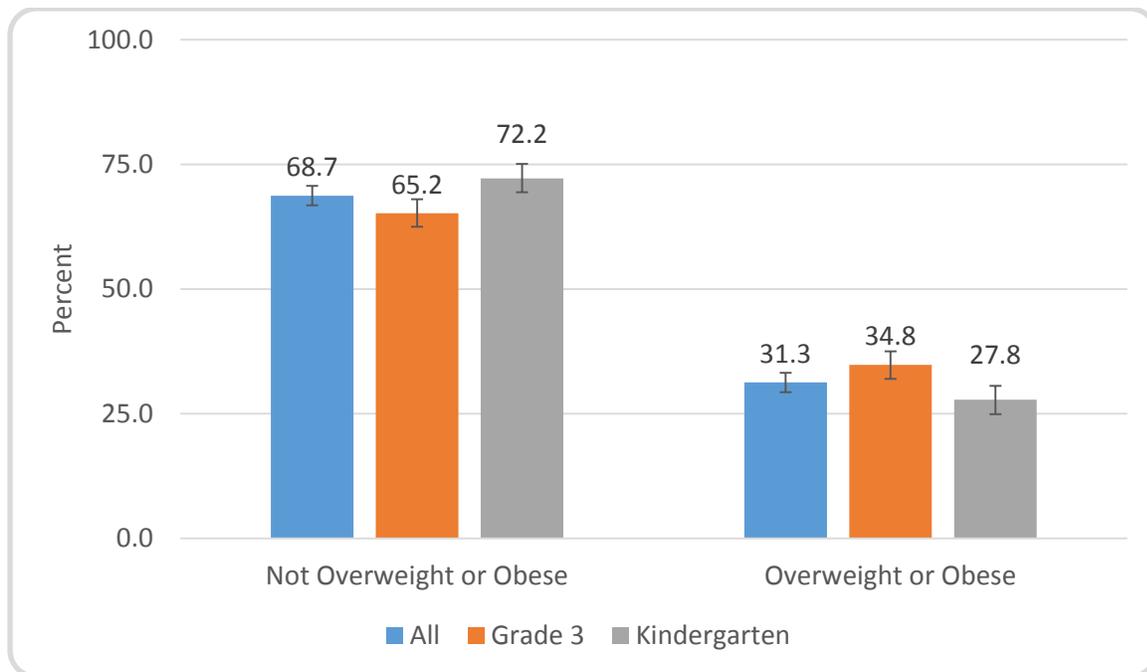
The percentage of all students in the school who were eligible for free or reduced price lunch (FRPL) is an indicator of socioeconomic status, specifically household income. Schools with higher percentages of students eligible for FRPL have a greater percentage of obesity compared with schools with lower percentages of students eligible for FRPL. For example, the prevalence of obesity in schools with 75% or more students eligible for FRPL is 22.2% compared with 10.0% in schools with less than 25% of students eligible for FRPL (Figure 6). The differences in the prevalence of overweight among the levels of FRPL eligibility did not reach statistical significance. In addition, the differences in the prevalence of overweight and obesity by FRPL eligibility from 2012 to 2017 did not reach statistical significance. (Table 6)

Figure 6. Prevalence of Overweight and Obesity by the Percent of Students Who are Income Eligible for Free or Reduced Price School Lunch (FRPL) Program, 2017
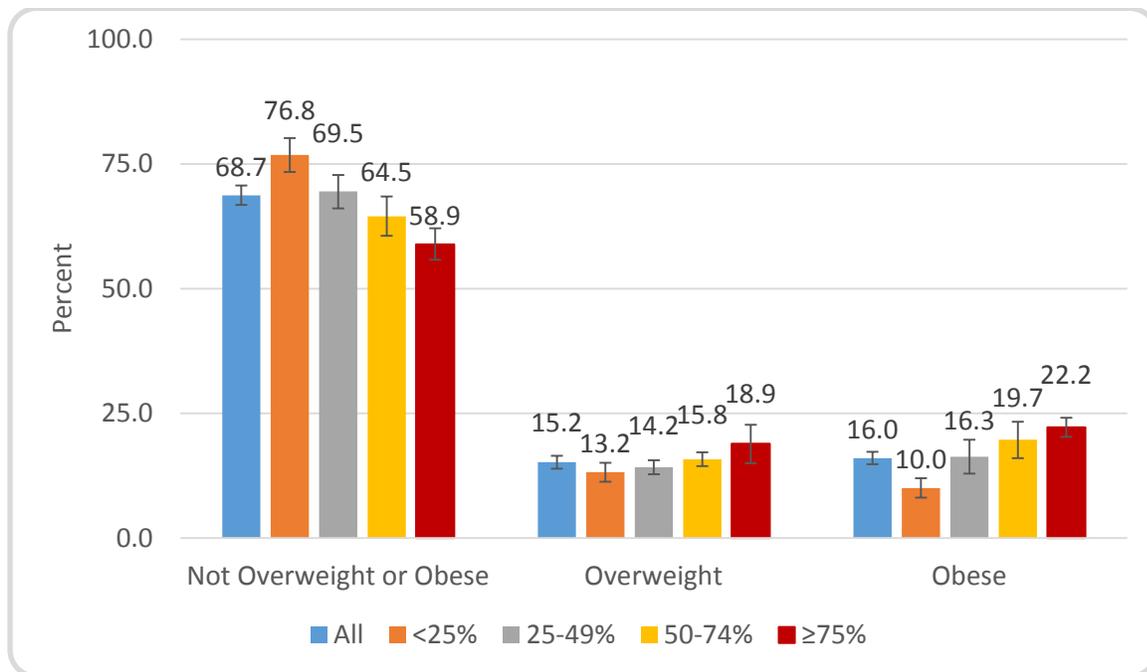
Discussion

The 2017 *Every Smile Counts* survey data indicate that approximately one-third of Connecticut kindergarten and third grade children are overweight or obese. This finding is consistent with the results of the Youth Risk Behavior Surveillance System (YRBSS). The YRBSS estimates that 26.6% of Connecticut high school students are either overweight or obese. Similar to the fact that the overweight or obese prevalence among kindergarten and third grade children did not change significantly from 2012 to 2017, the overweight or obesity prevalence among adolescents has not changed significantly from 2005 to 2015.[6]

Additionally, both the 2017 *Every Smile Counts* and the 2015 YRBS data show that the prevalence of overweight and obesity vary by race and ethnicity. As Figure 3 shows, black and Hispanic kindergarten and third grade students are more likely to be obese than white students. Among high school students, Hispanic students are significantly more likely to be obese than white youth (15.7% vs 11.1%).[7]

The 2017 *Every Smile Counts* and 2016 Behavioral Risk Factor Surveillance System (BRFSS) data show an association between income and obesity. In Every Smile Counts, eligibility for FRPL is a proxy for income. Students in schools with a higher percentage of students eligible for FRPL have higher prevalence of obesity (Figure 6). Similarly, 2016 BRFSS data estimate that 34.0% of children in households with annual incomes of less than $35,000 are obese compared to 13.6% of children in households with annual incomes of $75,000 or more.[8]

Many children are at risk for obesity because they eat high-caloric, low-nutrient foods and are physically inactive. Of children 2 to 17 years old, 55.5% have greater than 2 hours of screen time a day. Screen time is defined as the amount of time a child spends watching programs, movies, videos or playing video games on television and/or using a computer, tablet, or handheld device for playing video games or for something that is not schoolwork. Additionally, an estimated 41.6% of children eat fast food or pizza at school, at home or at a fast-food restaurant at least twice weekly. Furthermore, approximately 28.7% of children have one or more glasses, bottles, or cans of soda or other sugar sweetened beverages on an average day.[8]

To prevent obesity, the Community Preventive Services Task Force (CPSTF) recommends making healthier foods and beverages available in schools and reducing recreational sedentary screen time among children. The CPSTF recommends that schools implement school meal policies that ensure school breakfasts or lunches meet specific nutrition requirements (e.g., School Breakfast Program, National School Lunch Program) and/or provide fresh fruits and vegetables to students during lunch or snack. The CPSTF also recommends behavioral interventions to reduce sedentary screen time. These behavioral interventions teach self-management skills through classroom-based education, tracking and monitoring, coaching or counseling sessions, and/or family-based or peer social support.[9]

The Connecticut Department of Public Health (DPH) and the Connecticut State Department of Education (CSDE) along with other partners throughout the state promote healthy eating and active living among Connecticut's children and their families. For example, DPH and CSDE partner to provide professional development for school administrators and staff on creating a healthy environment through

implementation of nationally recommended policies and best practices to prevent obesity among children. DPH also provides technical assistance on healthy eating and physical activity to early care and education centers (ECEs). In addition, towns and local health departments are promoting physical activity by developing or improving existing walking or bike trails.

To prevent and control overweight and obesity, evidence-based practices aimed at increasing physical activity and healthy eating should be implemented in schools and communities. Addressing the social determinants of health, that is the conditions in which people are born, grow, live, work, age and die, is also necessary to eliminate disparities in overweight and obesity prevalence. The continuing efforts to prevent and control overweight and obesity should involve ensuring that all people, especially children and their families, have the opportunity to make choices that allow them to live long, healthy lives, regardless of their income, education or ethnic background.

Data Tables

Table 1. Demographic Characteristics of the Study Population, 2017

Demographics	Kindergarten	Third Grade	Total
Unweighted frequencies	2,173	2,222	4,395
Race (unweighted % of children)			
White, NH*	57.6	58.9	58.3
Black, NH	11.2	11.4	11.3
Hispanic	25.5	23.9	24.7
Asian, NH	4.0	4.4	4.2
Other/Unknown	1.6	1.4	1.5
Sex (unweighted % of children)			
Male	51.4	49.7	50.5
Female	48.6	50.3	49.5
Age in years (unweighted % of children)			
5	61.5	-	30.5
6	37.9	-	18.8
7	0.5	0.3	0.4
8	0.1	61.4	31.0
9	-	36.2	18.3
10	-	2.1	1.1
11	-	0.1	<0.1

*NH = non-Hispanic

Table 2. Distribution of Overweight and Obesity in Kindergarten Children

	Not Overweight or Obese		Overweight		Obese	
	2017	**2012**	**2017**	**2012**	**2017**	**2012**
	N % (95%CI)*	N % (95% CI)	N % (95% CI)	N % (95% CI)	N % (95% CI)	N % (95% CI)
Total	1,593 72.2 (69.4-75.1)	2,757 70.2 (67.9-72.6)	323 15.6 (13.6-17.6)	622 15.9 (14.5-17.2)	257 12.1 (10.3-14.0)	546 13.9 (12.2-15.6)
Gender						
Boys	822 72.0 (68.0-76.1)	1,410 70.5 (67.9-73.1)	163 16.3 (12.5-20.0)	295 14.7 (13.0-16.5)	132 11.7 (8.8-14.6)	296 14.8 (12.9-16.7)
Girls	771 72.4 (68.6-76.3)	1,347 70.0 (67.3-72.7)	160 14.9 (12.2-17.7)	327 17.0 (15.3-18.7)	125 12.6 (10.0-15.2)	250 13.0 (11.0-15.0)
Race and Ethnicity†						
White, NH‡	986 78.5 (75.3-81.7)	1,779 74.9 (72.6-77.2)	161 12.9 (11.0-14.8)	355 15.0 (13.4-16.5)	105 8.6 (6.3-11.0)	240 10.1 (8.6-11.6)
Black, NH	162 68.3 (60.6-76.0)	274 61.2 (56.2-66.1)	33 13.3 (8.1-18.4)	92 20.5 (15.9-25.2)	49 18.4 (13.5-23.4)	82 18.3 (14.4-22.3)
Hispanic	346 60.2 (55.0-65.5)	503 60.7 (57.7-63.7)	116 23.3 (18.3-28.3)	139 16.8 (13.2-20.3)	93 16.4 (13.0-19.8)	187 22.6 (20.0-25.1)

*N = unweighted frequency, CI = confidence interval
†Table 2 does not display rates for Asian students because the frequency was too small to calculate reliable rates.
‡NH = non-Hispanic

Table 3. Distribution of Overweight and Obesity in Grade 3 Children

	Not Overweight or Obese		Overweight		Obese	
	2017	**2012**	**2017**	**2012**	**2017**	**2012**
	N % (95%CI)*	N % (95% CI)	N % (95% CI)	N % (95% CI)	N % (95% CI)	N % (95% CI)
Total	1,463 65.2 (62.5-68.0)	2,758 66.4 (63.1-69.7)	341 14.8 (12.7-17.0)	642 15.5 (14.0-17.0)	418 19.9 (17.9-22.0)	755 18.2 (15.8-20.5)
Gender						
Boys	705 64.0 (59.2-68.8)	1,440 66.2 (62.7-69.8)	158 13.6 (10.7-16.6)	320 14.7 (12.8-16.6)	241 22.4 (18.9-25.8)	414 19.0 (16.3-21.8)
Girls	758 66.5 (63.0-69.9)	1,318 66.5 (62.9-70.2)	183 15.9 (13.3-18.5)	322 16.3 (14.4-18.1)	177 17.6 (14.4-20.8)	341 17.2 (14.5-19.9)
Race and Ethnicity†						
White, NH‡	939 71.7 (68.4-75.1)	1,862 71.6 (68.5-74.6)	186 14.1 (11.6-16.6)	362 13.9 (12.2-15.7)	183 14.1 (11.9-16.4)	377 14.5 (12.5-16.5)
Black, NH	159 63.4 (55.6-71.3)	283 57.4 (52.6-62.3)	37 12.0 (7.2-16.9)	80 16.2 (13.1-19.3)	58 24.5 (15.8-33.3)	130 26.4 (22.5-30.2)
Hispanic	270 51.5 (46.5-56.6)	398 52.4 (48.3-56.5)	96 17.4 (12.6-22.2)	152 20.0 (16.9-23.1)	165 31.1 (26.1-36.0)	210 27.6 (23.6-31.6)

*N = unweighted frequency, CI = confidence interval
†Table 3 does not display rates for Asian students because the frequency was too small to calculate reliable rates.
‡NH = non-Hispanic

Table 4. Distribution of Overweight and Obesity in Kindergarten and Grade 3 Children

	Not Overweight or Obese		Overweight		Obese	
	2017	**2012**	**2017**	**2012**	**2017**	**2012**
	N % (95%CI)*	N % (95% CI)	N % (95% CI)	N % (95% CI)	N % (95% CI)	N % (95% CI)
Total	3,056 68.7 (66.8-70.7)	5,515 68.3 (65.9-70.7)	664 15.2 (13.9-16.5)	1,264 15.6 (14.5-16.8)	675 16.0 (14.8-17.3)	1,301 16.1 (14.4-17.8)
Gender						
Boys	1,527 68.1 (65.6-70.6)	2,850 68.3 (65.7-70.8)	321 15.0 (12.7-17.2)	615 14.7 (13.4-16.1)	373 16.9 (14.8-19.1)	710 17.0 (15.1-18.9)
Girls	1,529 69.4 (66.7-72.1)	2,665 68.3 (65.6-70.9)	343 15.4 (13.4-17.5)	649 16.6 (15.2-18.0)	302 15.2 (12.9-17.4)	591 15.1 (13.3-17.0)
Race and Ethnicity†						
White, NH‡	1,925 75.2 (72.9-77.4)	3,641 73.2 (71.0-75.3)	347 13.5 (12.1-14.9)	717 14.4 (13.1-15.8)	288 11.4 (9.6-13.1)	617 12.4 (11.1-13.7)
Black, NH	321 65.8 (58.9-72.7)	557 59.2 (55.2-63.2)	70 12.6 (9.3-15.9)	172 18.3 (15.1-21.4)	107 21.6 (15.7-27.5)	212 22.5 (19.8-25.3)
Hispanic	616 55.8 (52.3-59.3)	901 56.7 (54.1-59.3)	212 20.3 (16.7-23.9)	291 18.3 (16.1-20.5)	258 23.9 (20.5-27.3)	397 25.0 (22.3-27.7)

*N = unweighted frequency, CI = confidence interval
†Table 4 does not display rates for Asian students because the frequency was too small to calculate reliable rates.
‡NH = non-Hispanic

Table 5. Comparison of Overweight OR Obese by Gender, Race and Ethnicity, and Age

	Not Overweight or Obese		Overweight OR Obese	
	2017	**2012**	**2017**	**2012**
	N % (95% CI)*	N % (95% CI)	N % (95% CI)	N % (95% CI)
Total	3,056 68.7 (66.8-70.7)	5,515 68.3 (65.9-70.7)	1,339 31.3 (29.3-33.2)	2,565 31.8 (29.4-34.1)
Gender				
Boys	1,527 68.1 (65.6-70.6)	2,850 68.3 (65.7-70.8)	694 31.9 (29-4-34.4)	1,325 31.7 (29.2-34.3)
Girls	1,529 69.4 (66.7-72.1)	2,665 68.3 (65.6-70.9)	645 30.6 (27.9-33.3)	1,240 31.8 (29.1-34.4)
Race and Ethnicity†				
White, NH‡	1,925 75.2 (72.9-77.4)	3,641 73.2 (71.0-75.3)	635 24.8 (22.6-27.1)	1,334 26.8 (24.7-29.0)
Black, NH	321 65.8 (58.9-72.7)	557 59.2 (55.2-63.2)	177 34.2 (27.3-41.1)	384 40.8 (36.8-44.9)
Hispanic	616 55.8 (52.3-59.3)	901 56.7 (54.1-59.3)	470 44.2 (40.7-47.7)	688 43.3 (40.7-45.9)
Grade				
Grade 3	1,463 65.2 (62.5-68.0)	2,758 66.4 (63.1-69.7)	759 34.8 (32.0-37.5)	1,397 33.6 (30.3-36.9)
Kindergarten	1,593 72.2 (69.4-75.1)	2,757 70.2 (67.9-72.6)	580 27.8 (24.9-30.6)	1,168 29.8 (27.4-32.1)

*N = unweighted frequency, CI = confidence interval
†Table 4 does not display rates for Asian students because the frequency was too small to calculate reliable rates.
‡NH = non-Hispanic

Table 6. Comparison of Obesity Prevalence in School by Student Population Income Proxy (percent of students who are income eligible for Free or Reduced Price School Lunch (FRPL) Program

% of students eligible for FRPL Program	Not Overweight or Obese		Overweight		Obese	
	2017	**2012**	**2017**	**2012**	**2017**	**2012**
	N % (95%CI)*	N % (95%CI)	N % (95%CI)	N % (95% CI)	N % (95%CI)	N % (95% CI)
<25%	1,417 76.8 (73.4-80.2)	3,351 73.7 (71.6-76.1)	251 13.2 (11.3-15.1)	638 14.1 (12.6-15.5)	182 10.0 (8.1-12.0)	548 12.1 (10.6-13.5)
25-49%	583 69.5 (66.1-72.8)	928 66.7 (62.9-70.4)	113 14.2 (12.8-15.6)	232 16.7 (14.4-18.9	134 16.3 (12.9-19.7)	232 16.7 (13.7-19.6)
50-74%	587 64.5 (60.6-68.5)	587 58.6 (53.7-63.5)	141 15.8 (14.4-17.2)	168 16.8 (13.7-19.9)	187 19.7 (16.0-23.3)	246 24.6 (20.6-28.5)
≥75%	469 58.9 (55.8-62.1)	649 56.4 (52.4-60.5)	159 18.9 (15.0-22.7)	226 19.7 (16.4-23.0)	172 22.2 (20.3-24.1)	275 23.9 (21.5-26.4)

*N = unweighted frequency, CI = confidence interval

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