Kindergarten BMI Surveillance Report 2017-2018

Alexandria, VA

Alexandria City Public Schools
Alexandria Health Department

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Executive Summary

Purpose
The purpose of this report is to assess obesity in City of Alexandria youth, utilizing the body mass index (BMI) measures for incoming kindergarteners at Alexandria City Public Schools (ACPS) during the 2017-2018 school year. By identifying demographic and geographic areas at greater risk of obesity, Alexandria may better target prevention and treatment programs, and improve awareness among school and health personnel, community members and policy makers.

Methodology
Data from school registration documents were used to obtain race, ethnicity, zip code, school, date of birth and date of examination as well as height and weight for calculation of a BMI for each child. For the 2017–2018 school year, 17.1 percent of ACPS kindergarteners were obese, which was close to the national average of 17.0 percent but well above the Healthy People 2020 (HP 2020) goal of less than 14.5 percent. There were no statistically significant differences found between the incoming kindergarteners' weight status from years 2014 to 2017, or between sexes in any year.

Summary of Results
17.1% of 2017 incoming ACPS kindergarteners were obese and an additional 12.4% were overweight. The highest rate of obese or overweight kindergarteners was found in Hispanic youth (41.0%); in kindergarteners residing in zip codes 22312 (37.2%), 22311 (34.5%) and 22305 (34.2%); and in kindergarteners attending Cora Kelly (55.0%), Patrick Henry (36.1%), William Ramsay (35.8%) and John Adams (35.4%) elementary schools.

Considerations
The data presented in this report helps to elucidate the current magnitude of childhood obesity for incoming kindergarten students. Continued surveillance of childhood and adolescent BMI will be important to track trends in obesity, to target resources within the City of Alexandria, and to understand and evaluate interventions.

Introduction

Childhood obesity is an established high priority health issue and an area of public health concern and intervention. From 2011-2014, the national prevalence of obesity in the United States for children 2-19 years old was 17.0 percent[1]. According to the Centers for Disease Control and Prevention (CDC), overweight children are more likely to become overweight or obese as adults and experience the same disease risks as obese adults, including coronary heart disease, hypertension, type-2 diabetes and increased risk for cancers and chronic diseases[2,3]. According to the CDC's national data from 2009-2010, the rates of obesity in children have tripled in the last two generations in the United States[4]. Although Northern Virginia consistently maintains the lowest rate of obesity in the state, Virginia was ranked 23rd highest nationally in 2011 for its percentage of overweight and obese children according to the National Survey of Children's Health[5].

There are currently limited methods of surveillance for tracking obesity nationally, and more specifically in Alexandria. Weight status is calculated in the Youth Risk Behavior Survey (YRBS) for 8th, 10th and 12th graders in Alexandria City Public Schools (ACPS), but this data is limited by the accuracy of self-reporting. Women Infant and Children (WIC) data is accessible at the state level but is not generalizable. As a mechanism for tracking and assessing the obesity rates of Alexandria's youth, the Kindergarten BMI Surveillance Report 2014-2016 and this Kindergarten BMI Surveillance Report 2017-2018 have been completed by Alexandria Health Department (AHD) in collaboration with ACPS and the School Health Advisory Board (SHAB).

The Alexandria Children and Youth Master Plan 2014's first goal is to ensure that "Every Child Will Be Physically Safe & Healthy" and plan includes numerous strategies that relate to preventing and reducing obesity among Alexandria children and youth[6]. SHAB, the Partnership for a Healthier Alexandria, ACPS and AHD initiated the BMI surveillance work in 2014 to inform prevention programs, to help prioritize policy initiatives, and to assist allocating resources toward decreasing childhood obesity in Alexandria. The surveillance and reporting of incoming kindergarteners' weight status aligns with the Health and Wellness goals outlined not only in the Alexandria Children and Youth Master Plan 2014, but also in the ACPS 2020 Strategic Plan and the Alexandria Community Health Improvement Plan (CHIP) 2014–2019[6,7,8].

Goals

The purpose of this Kindergarten BMI Surveillance Report is to assess obesity in Alexandria youth, utilizing body mass index (BMI) measures for incoming kindergarteners at ACPS during the 2017–2018 school year. Identifying demographic or geographic subgroups at greater risk of obesity will inform Alexandria's approach to prevention and treatment programs, and improve awareness among school and health personnel, community members and policy makers.

The data presented in this report - as well as the Kindergarten BMI Surveillance Report 2014–2016 - identifies the existing magnitude of childhood obesity and overweight for incoming kindergarten students. BMI surveillance programs aim to assess the weight status of a specific population to identify population trends and monitor intervention outcomes. This report is to inform and educate City of Alexandria stakeholders on the weight status of incoming kindergarteners in the 2017-2018 school years and to identify weight disparities that exist by:

- Sex
- Race/ Ethnicity
- Zip-code
- School

Methodology

ACPS School Health Services staff obtained information from the Commonwealth of Virginia School Entrance Health Form, MCH 213G (or its equivalent), provided at kindergarten enrollment. Data collection included race, ethnicity, height, weight, zip code, school, date of birth and date of examination. ACPS collected and entered the anthropometric data (i.e., height and weight) for incoming 2017–2018 ACPS kindergarteners. Once a complete dataset was compiled by ACPS staff, an anonymous identity number was assigned to each student and personal identifying information was removed prior to providing the data to AHD. AHD subsequently used that data to calculate a BMI for each individual. This data-reporting methodology was used for data reported in the 2013–2014, 2014–2015 and 2015–2016 school years (as reported in the 2014-2016 Report). Data in this Report are presented in aggregate without personal identifiers and follows the rules established by the ACPS Accountability Office to ensure confidentiality.

AHD calculated the BMI for each child using the English formula (BMI=[weight in pounds/(height in inches)2] x 703). AHD then assigned appropriate weight status categories using StataSE 14 statistical analysis software. Each BMI was assigned a weight status category by the standard percentile distribution as defined by the sex-specific CDC growth charts (see Table 1 in the Appendix). Data analysis was completed with PowerSchool, Excel 2010, StataSE 14 and ArcGIS.

For children and teens, BMI is age and sex specific and is often referred to as BMI-for-age. Although BMI does not measure body fat directly, research shows that it is correlated with direct measures of body fat (9). BMI is not a diagnostic tool, but serves as a useful screening tool to determine weight categories as well as who may be overweight or obese and at risk for health problems[9]. It is important to note that childhood obesity is a predictor of adulthood obesity[2].

The chi-squared test was used to determine the statistical significance of differences in the proportion estimates for the weight status category for each of the following: incoming classes, sex, race/ethnicity and sex. The chi-square test is intended to test how likely it is that an observed distribution is due to chance. When the p-value of a chi-square test for difference is <0.05, there is strong evidence against the null hypothesis of no difference between the categorical prevalence data. If the initial chi-square test was found significant (*p-value <0.05*), an additional chi-square test was done to identify the differences within the category.

Limitations

There are several limitations to these studies. Health data for incoming students - including measures such as height and weight - may not be uniformly collected. Incoming students are seen by private healthcare providers whose tools for measuring height and weight are uniquely calibrated and whose staff may not be equally trained.

Of the 1,475 children registered as incoming ACPS kindergartners for the 2017–2018 school year, completed health records were available for analysis for 1,473 (99.9%). Numbers for 2014–2015, 2015–2016, 2016-2017 were lower with 1,146 (80.4%), 1,378 (93.9%) and 1,362 (93.7%) completed health records available respectively. The students for whom records were not available may be missing for a number of reasons (e.g. some may have registered for, but not attended, school). Differences in weight categories for students without completed health records are unknown. The percentage of health records for students categorized as economically disadvantaged is unknown. This report only provides surveillance data for ACPS, and does not include private school or home schooled kindergarteners in the City of Alexandria.

Results

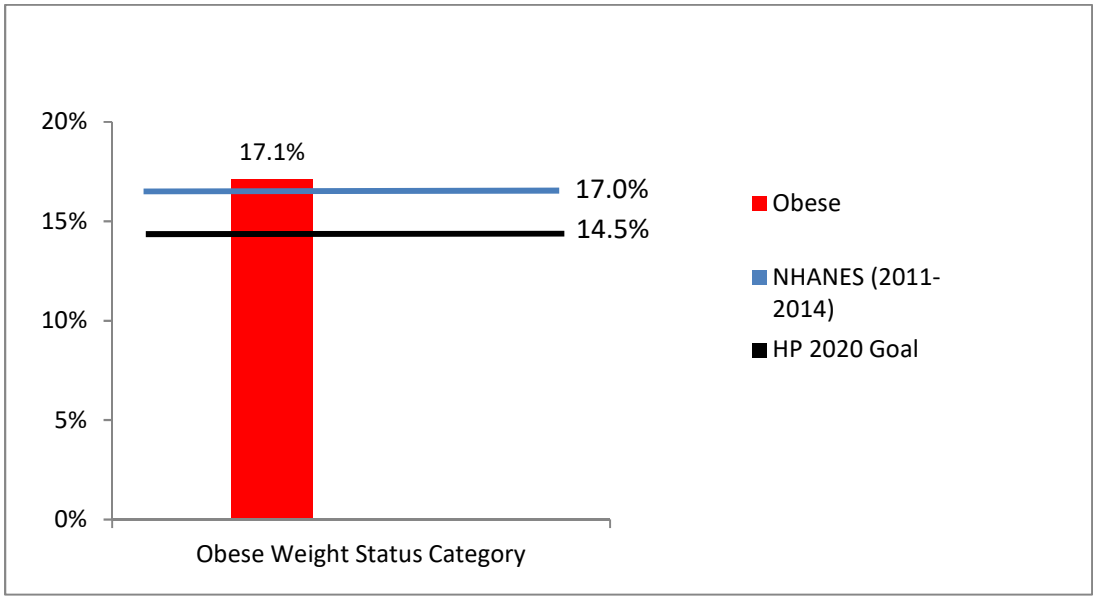
A. Comparison to National Benchmarks

For the 2017-2018 school year, 29.5 percent of kindergarteners were overweight or obese, with 17.1 percent obese and 12.4 percent overweight. For the 2014–2016 school years, 32 percent of kindergarteners were overweight or obese, with 17.8 percent obese and 14.2 percent overweight. Compared to national benchmarks, ACPS kindergarteners' BMI statuses are close to national statistics but well above Healthy People (HP) 2020 goals.

The CDC conducts the National Health and Nutrition Examination Survey (NHANES) to characterize the health and nutritional status of adults and children in the United States. This is the closest national data available for comparison to Alexandria kindergarteners. The 2011-2014 NHANES found that approximately 17.0 percent of children 2-19 years old were obese[1].
The US Department of Health and Human Services' Office of Disease Prevention and Health Promotion promulgates national health objectives through Healthy People 2020 (HP 2020). There is no suggested goal for the kindergartener BMI; instead, HP 2020 aims to lower the

national measures of obesity in all children 2-19 years old to 14.5 percent by the year 2020. (HP 2020 provides goals for obesity but not for overweight measures). Figure 1, below, shows that the 2017-2018 incoming ACPS kindergarteners' aggregate obesity rate was close to NHANES national data but was above the HP 2020 national goal.

Figure 1: Incoming ACPS Kindergarten Obese Weight Status, 2017, Compared to NHANES 2011–2014 and HP 2020 Goal



B. Yearly Comparisons

There was no statistically significant difference between incoming kindergarteners' weight status from years 2014 to 2017 (p=0.159). Figure 2, below, presents the percentage of obese ACPS kindergarteners by year of entry.

Figure 2: Incoming ACPS Kindergarten Obese Weight Status, 2014-2017

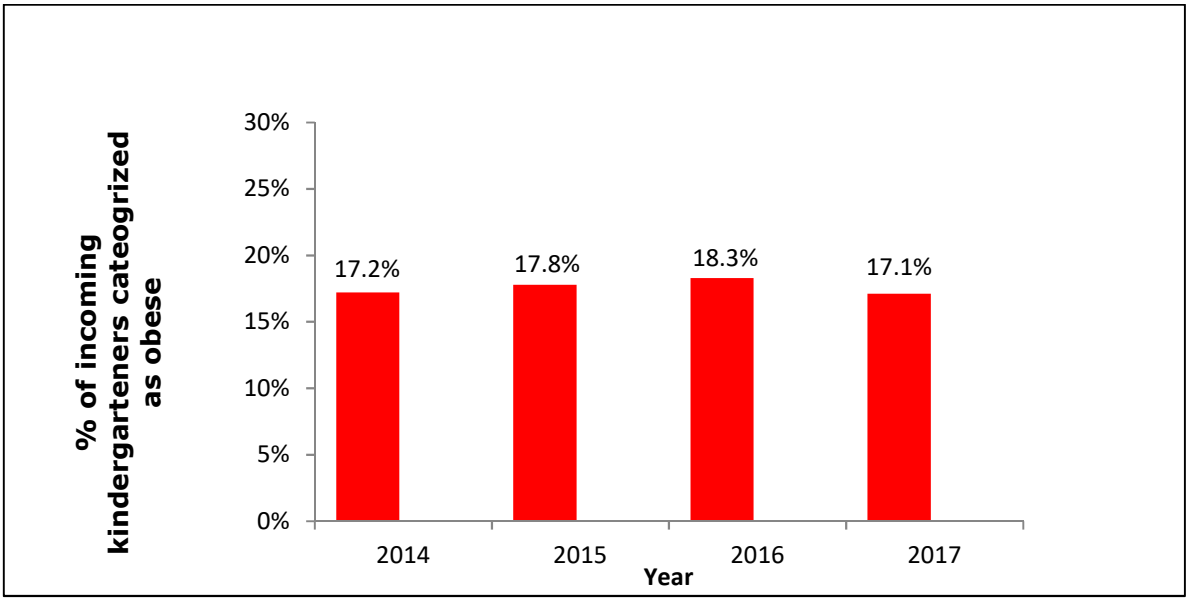


Figure 3, next page, shows that the distribution of weight status categories of ACPS incoming kindergarteners between 2014 and 2017 has been relatively stable across the years.

Figure 3: Incoming ACPS Kindergarten Weight Status, 2014–2017

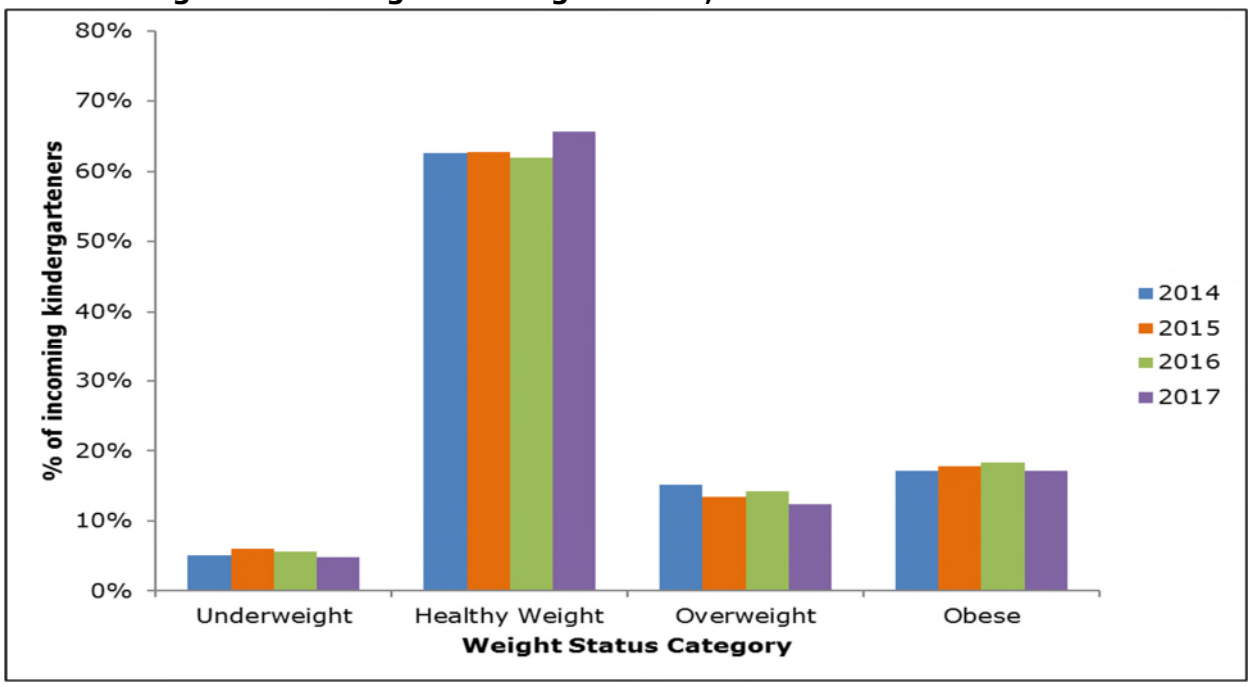


Table 2, in the Appendix, displays the distribution of incoming kindergarten class weight status by year as well as the aggregated weight status distribution for all four years of incoming kindergarteners, 2014–2017.

C. Sex

When stratified by sex, no statistically significant differences in weight status category were found for overweight and obese (*p=0.484*), or obese (*p=0.573*) incoming 2017 kindergarteners. In total, 16.5 percent of females were obese and 13.8 percent of females were overweight, compared to 17.6 percent of males who were obese and 11.2 percent of males found overweight. A higher proportion of males (5%) were underweight compared to females (4.6%); this difference was also observed throughout 2014-2016 data (see Table 3 in the Appendix).

Figure 4a, below, shows the distribution of weights for incoming male kindergarteners for incoming years 2014 through 2017.

Figure 4a: Incoming ACPS Kindergarten Weight Status for Males, 2014-2017

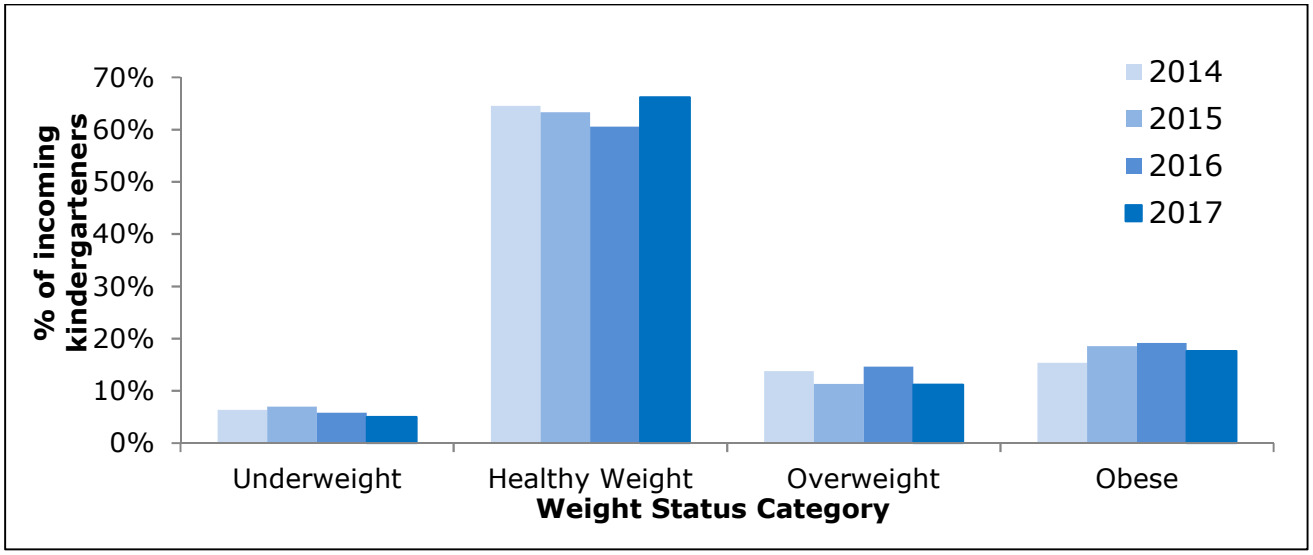
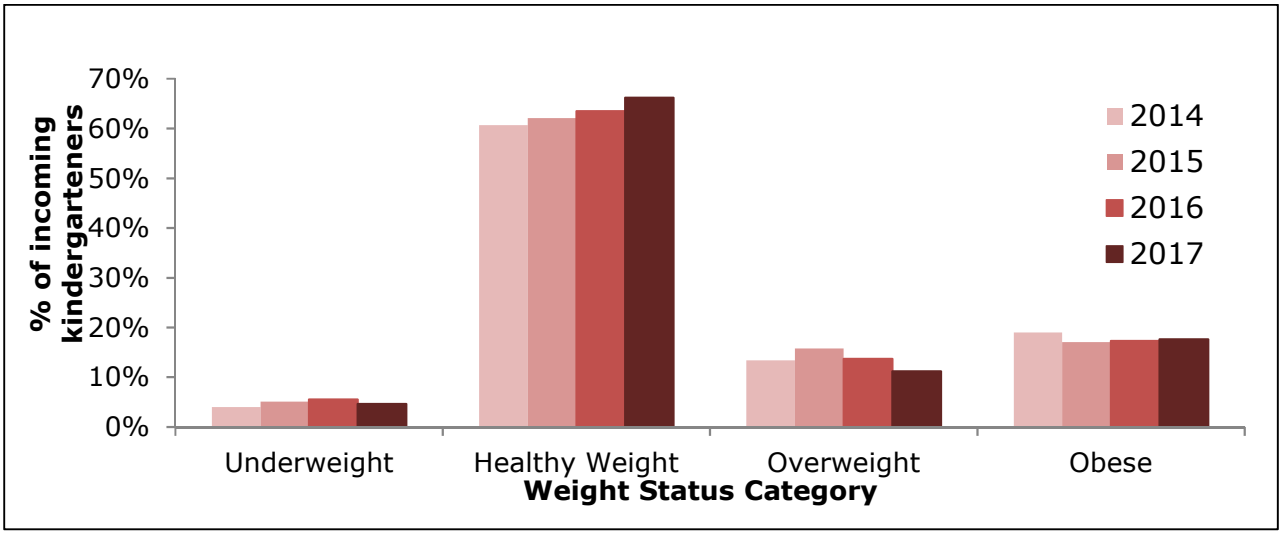


Figure 4b, below, shows the distribution of weights for incoming female kindergarteners for incoming years 2014 through 2017.

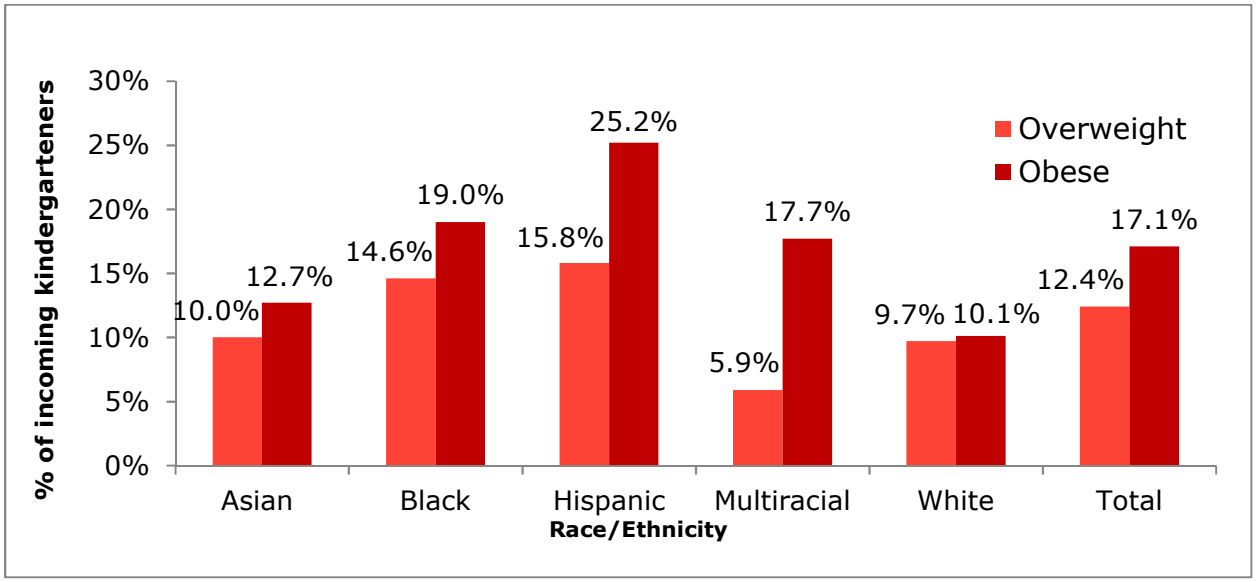
Figure 4b: Incoming ACPS Kindergarten Weight Status for Females, 2014-2017



D. Race/Ethnicity

When stratified by race/ethnicity, statistically significant differences were observed between weight status category for overweight and obese ($p<0.001$), and obese ($p<0.001$) incoming 2017 kindergarteners. A higher proportion of obese students was observed among Hispanic students at 25.2 percent; this was statistically significant when performing additional chi-square tests for differences of proportions with white, black, and Asian students taken separately. Lower proportions of obese students were observed in white (10.1%) and Asian (12.7%) students. This is graphically presented in Figure 5, below. (Table 4 in the Appendix presents this data in a table format). No statistically significant changes were observed within any race/ethnicity over the period of 2014-2017.

Figure 5: Incoming ACPS Kindergarten Weight Status by Race/Ethnicity, 2017*



** Race and ethnicity are self-reported by parents when completing ACPS forms.*

E. Zip Code

When stratified by zip code, statistically significant differences were observed between weight status category for overweight and obese (p=0.001), and obese (p=0.009) for incoming 2017 kindergarteners across several zip codes. Zip codes with the highest proportion of overweight and obese students were 22312 (37.2%), 22311 (34.5%) and 22305 (34.2%). Zip codes with lowest proportions of overweight and obese students in the incoming 2017 class were 22301 (13.8%) and 22302 (25.0%). No statistically significant changes were observed from 2014–2017 within any zip code.

Figure 6, below, provides a graphic representation of the percentage of overweight and obese kindergartners by zip code over the 2014–2017 period. Subsequently, Figure 7 (next page) is a map of Alexandria showing the percentage of overweight and obese incoming kindergartners in 2017; this information is also provided in table format in the Appendix (Table 5).

Figure 6: Incoming ACPS Kindergarten Weight Status for Overweight and Obese by Zip Code, 2014-2017

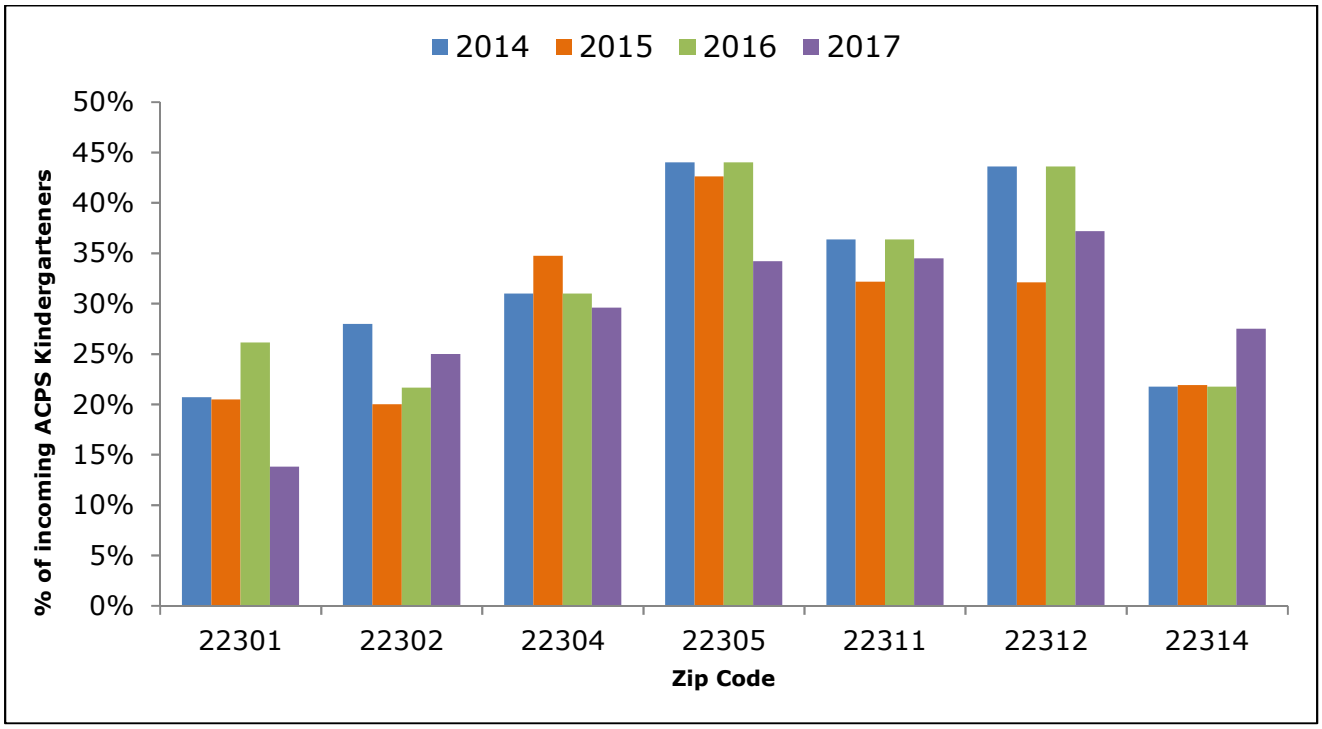
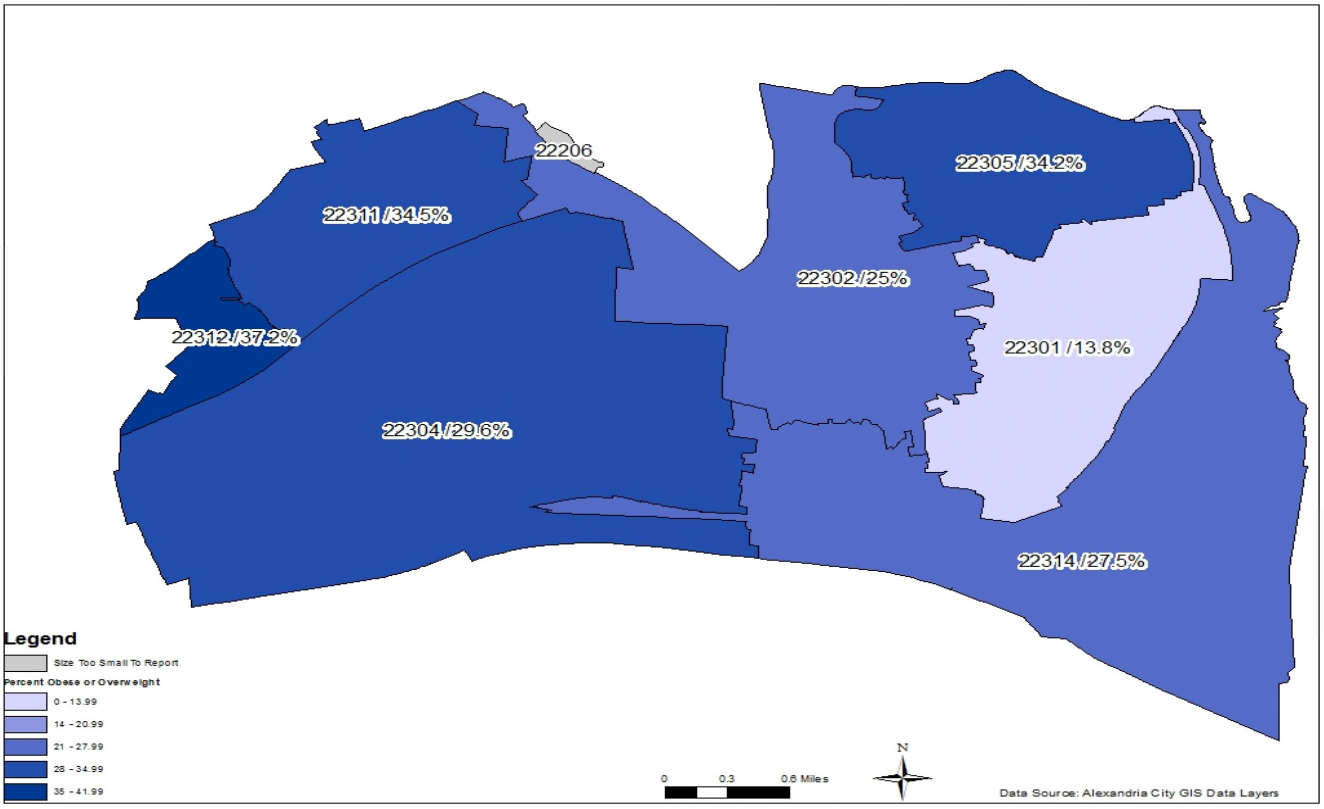


Figure 7: Incoming ACPS Kindergarten Weight Status for Overweight and Obese by Zip Code, 2017

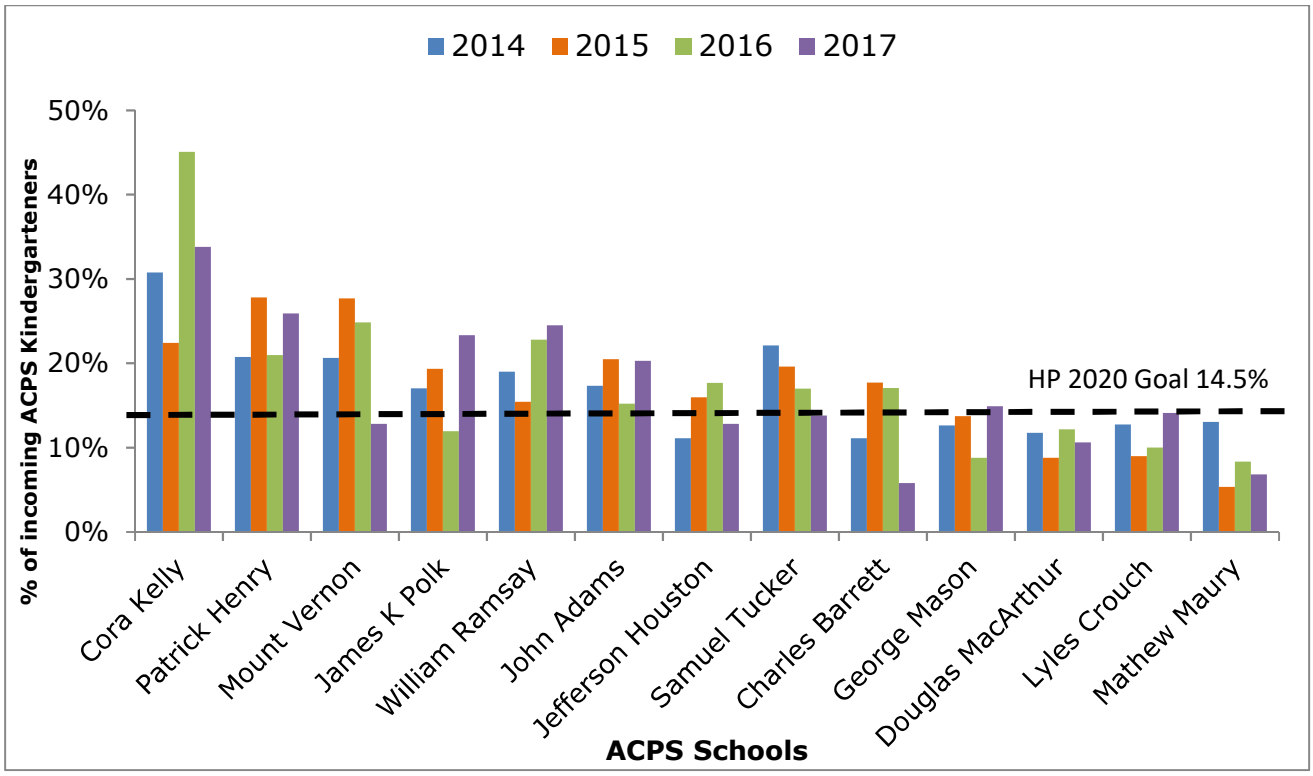


F. School

When stratified by school, statistically significant differences were observed for overweight and obese (*p<0.001*), and obese (*p<0.001*) incoming 2017 kindergarteners across various schools. In 2017, Cora Kelly had the highest percentage of incoming kindergarteners classified as obese (33.8%), followed by Patrick Henry (25.9%), William Ramsay (24.5%), and James Polk (23.3%). Schools with the lowest percentage of incoming kindergarteners classified as obese in 2017 were Charles Barrett (5.8%) and Mathew Maury (6.8%).

Figure 8, on the next page, presents the percentage of incoming ACPS kindergartners classified as obese, by school and across the entry years 2014 through 2017 (207 data also presented in Table 6 in the Appendix).

Figure 8: Incoming ACPS Kindergarten Weight Status for Obese Kindergarteners by School, 2014-2017 (with HP 2020 Goal for Obese 2-19 Year Olds)



G. Economic

In 2017, approximately 53% of the incoming kindergarten class at ACPS were categorized as economically disadvantaged. Students are categorized as economically disadvantaged if they are eligible for the National School Lunch Program's free and reduced price meals; if they receive benefits via Temporary Assistance for Needy Families (TANF); if they are eligible for Medicaid; or if they are identified as migrants any time during the school year. National studies show that, although not consistent across race and ethnicity groups, low-income children and adolescents are more likely to be obese than their higher income counterparts[10].

ACPS elementary schools with the highest proportions of students categorized as economically disadvantaged are William Ramsay (83.0%), James K. Polk (77.0%) and Cora Kelly (75.3%)[11]. These three schools are among the four elementary schools with the highest percentage of incoming kindergarteners classified as obese.

Conclusion

29.5 percent of incoming 2017 kindergarteners attending public school in Alexandria were categorized as overweight or obese. In the 2014–2016 school years, 32 percent of incoming kindergarteners were overweight or obese. Compared to national benchmarks, ACPS kindergarteners remain above Healthy People 2020 goals.

While no significant differences were noted by sex, higher proportions of overweight or obesity were found in Hispanic youth (41.0%); students residing in zip codes 22312 (37.2%), 22311 (34.5%) and 22305 (34.2%); and in the following elementary schools: Cora Kelly (55.0%) Patrick Henry (36.1%) and William Ramsay (35.8%). Elementary schools with the highest proportions of students categorized as economically disadvantaged are William Ramsay (83.0%), James K. Polk (77.0%) and Cora Kelly (75.3%).

These findings align with national data reported by the CDC, which indicate a higher prevalence of obesity in pre-school children from low-income families and in families of Hispanic origin, compared to non-Hispanic, non-low-income children[12, 13].

As indicated earlier in the report, continued weight status surveillance is an important step in responding to demographic and geographic areas at greater risk of obesity. Continued surveillance of childhood and adolescent BMI will track trends in obesity and support evaluating existing interventions to best target resources.

Resources

The following are resources to help take action towards decreasing childhood obesity, and improving the health and wellbeing of Alexandria.

Health Matters in Alexandria
This is a web-based resource through which the community can learn about community health and wellbeing within the City of Alexandria. The site, maintained by the Alexandria Health Department, provides information on topics including local health, promising public health best practices, and community news and events.
www.healthmattersalexandria.org/

Northern Virginia Healthy Kids Coalition
A community partnership to get kids healthy and to fight obesity, the Northern Virginia Healthy Kids Coalition (NVHKC) is a grassroots coalition of local organizations – including Inova Health System, area school districts and others – mobilized around a common goal: to promote better health for children of all ages.
www.inova.org/inova-in-the-community/nvhkc/index.jsp

Partnership for a Healthier Alexandria
This citizen-led coalition of non-profit organizations, schools, municipal agencies, local businesses, government, community leaders and concerned citizens works to promote and expand health in Alexandria. The partnership emerged in 2006 to address major health priorities that were identified in Alexandria's first Community Health Assessment.
healthieralexandria.org

Public Health Advisory Commission
The Public Health Advisory Commission is charged by the Alexandria City Council to advise and support the City and City Council by evaluating and advising on all health matters and on the priority of public health needs in the City.
www.alexandriava.gov/health/info/default.aspx?id=14870

School Health Advisory Board
This board supports health access and outreach for ongoing programs, and implements school-based healthcare initiatives. In 2016, they reviewed new Federal Food and Nutrition Services guidelines and USDA Smart Snacks Standards, and drafted relevant policy.
www.acps.k12.va.us/Page/1232

Acknowledgments

This report was a collaborative effort by the School Health Advisory Board, Alexandria City Public Schools, the Partnership for a Healthier Alexandria, and Alexandria Health Department. Special thanks to Dr. Barbara Nowak and Erika Gulick for their guidance, data and mapping. AHD Epidemiologist Melissa Arons MS, RN conducted data analyses and prepared this report. The report was approved by AHD Health Director Stephen A. Haering, MD, MPH, FACPM; any errors in the analyses are the responsibility of AHD.

Appendix

Table 1: CDC Weight Status Categories for Children

Weight Status Category	Percentile Range
Underweight	Less than 5th percentile
Healthy weight	5th percentile to less than 85th percentile
Overweight	85th to less than 95th percentile
Obese	Equal to or greater than 95th percentile

Table 2: Weight Status Categories for ACPS Incoming Kindergarten Classes, 2014-2017

Weight Status Category	2014	2015	2016	2017
Underweight	5.1%	6.0%	5.7%	4.8%
Healthy Weight	62.7%	62.7%	61.9%	65.7%
Overweight	15.1%	13.5%	14.2%	12.4%
Obese	17.2%	17.8%	18.3%	17.1%
Overweight or Obese	32.3%	31.3%	32.5%	29.5%

Table 3: Weight Status Categories for ACPS Incoming Kindergarten Class by Sex, 2017,

Weight Status Category	Boys	Girls	Total
Underweight	5.0%	4.6%	4.8%
Healthy Weight	66.2%	65.1%	65.7%
Overweight	11.2%	13.8%	12.4%
Obese	17.6%	16.5%	17.1%
Overweight or Obese	28.8%	30.3%	29.5%

Table 4: Weight Status Categories for ACPS Incoming Kindergarten Classes by Race/Ethnicity, 2017, by Race/Ethnicity

Weight Status Category	Asian	Black	Hispanic	Multi	White
Underweight	6.4%	5.5%	1.9%	5.9%	6.3%
Healthy Weight	70.9%	60.9%	57.0%	70.6%	73.9%
Overweight	10.0%	14.6%	15.8%	5.9%	9.7%
Obese	12.7%	19.0%	25.2%	17.7%	10.1%
Overweight or Obese	22.7%	33.6%	41.0%	23.5%	19.9%

Table 5: Weight Status Categories for ACPS Incoming Kindergarten Classes by Zip Code, 2017,

Weight Status Category	22301	22302	22304	22305	22311	22312	22314
Underweight	6.5%	5.9%	5.6%	4.5%	4.8%	2.6%	2.3%
Healthy Weight	79.7%	69.1%	64.8%	61.3%	60.3%	60.3%	70.2%
Overweight	6.5%	9.6%	10.6%	17.1%	14.5%	12.8%	15.2%
Obese	7.3%	15.4%	19.0%	17.1%	20.1%	24.4%	12.4%
Overweight or Obese	13.8%	25.0%	29.6%	34.2%	34.5%	37.2%	27.5%

Table 6: School by Weight Status Categories for ACPS Incoming Kindergarten Class, 2017

School	Underweight	Healthy Weight	Overweight	Obese	Over/Obese
Cora Kelly	0.0%	45.0%	21.3%	33.8%	55.0%
Patrick Henry	2.8%	61.1%	10.2%	25.9%	36.1%
Mount Vernon	4.5%	71.2%	11.5%	12.8%	24.4%
James K Polk	7.0%	61.2%	8.5%	23.3%	31.8%
William Ramsay	3.3%	60.9%	11.3%	24.5%	35.8%
John Adams	6.3%	58.2%	15.2%	20.3%	35.4%
Jefferson Houston	7.0%	68.6%	11.6%	12.8%	24.4%
Samuel Tucker	6.6%	63.2%	16.5%	13.8%	30.3%
Charles Barrett	6.9%	72.1%	15.1%	5.8%	20.9%
George Mason	6.0%	68.7%	10.5%	14.9%	25.4%
Douglas MacArthur	2.1%	75.9%	11.4%	10.6%	22.0%
Lyles Crouch	4.2%	67.6%	14.1%	14.1%	28.2%
Matthew Maury	5.7%	83.0%	4.6%	6.8%	11.4%

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