

Body Mass Index Surveillance in Fairfax County Public Schools



BACKGROUND:

Childhood obesity is a growing public health concern. In 2009-2010, the national estimate of overweight and obese children between the ages of 2 and 19 years was estimated at 31.8%. The 2011 Virginia Department of Health Youth Survey¹ estimates that 28.3 percent of Virginia's youth are overweight or obese. Consistent with national and state data, a 2013 report released by the Northern Virginia Health Foundation² indicated that nearly 26 percent of the youth in Northern Virginia are overweight or obese. These findings are of concern because, 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 – coronary heart disease, hypertension, Type 2 diabetes, increased risk for certain cancers and other chronic diseases³.

Given the prevalence of obesity and related complications, a number of organizations have recommended the implementation of obesity surveillance programs. In April 2011, the Fairfax County Health Department (FCHD) submitted a proposal to Fairfax County Public Schools (FCPS) to conduct surveillance of the Body Mass Index (BMI) of kindergarten students (attachment 1) in an effort to gain a better understanding of the overweight/obesity problem among Fairfax County children. BMI measures the relationship of lean muscle mass to body fat and is a reliable method to screen for overweight and obesity. The CDC and the American Academy of Pediatrics (AAP) recommend using BMI to assess overweight and obesity in children beginning at two years of age. In 2005, The Institute of Medicine (IOM) recommended annual school-based BMI measurement programs.

School-based BMI-measurement programs are conducted for surveillance or screening purposes. BMI surveillance programs are anonymous. Unlike BMI screening programs, which assess the weight status of individual students to identify specific students at risk and provide parents with information to help them take appropriate action, surveillance programs do not require individualized follow-up care for students. BMI surveillance programs assess the weight status of a specific population (e.g., students in an individual school, cluster or school district) to identify population trends and monitor intervention outcomes.

In Fairfax we have chosen to conduct BMI surveillance, with the intention of partnering with ongoing community health improvement activities to meet the following IOM identified goals for surveillance programs:

- The ability to describe trends in weight status over time among populations and/or subpopulations in a school or school district.
- Identify demographic or geographic subgroups at greatest risk of obesity to target prevention and treatment programs.
- Create awareness among school and health personnel, community members, and policy makers of the extent of obesity among Fairfax County youth.
- Provide an impetus to improve policies, practices, and services to prevent and treat obesity among youth.
- Monitor the effects of school-based physical activity and nutrition programs and policies.
- Monitor progress toward achieving health objectives related to childhood obesity in the community.

Schools play an important role in preventing childhood obesity and are a logical measurement site for a BMI surveillance program because they reach virtually all youth.

A school-based BMI surveillance program that provides community level data can be used to identify high priority areas within the county for targeting obesity prevention activities, measure effectiveness of ongoing initiatives and new strategies, as well as strengthen schools as the heart of health.

Schools are not expected to solve the obesity epidemic on their own. It is widely recognized that the physical activity and eating behaviors that affect weight are influenced by many sectors of society, including families, community organizations, health care providers, faith-based institutions, businesses, government agencies, the media, and schools. In Fairfax County, there is tremendous opportunity for engaging multi-sector community coalitions, such as the Northern Virginia Healthy Kids Coalition; the Partnership for a Healthier

Fairfax⁴ and other county partnerships, to better coordinate and integrate, where feasible, FCPS and Health Department programs with ongoing obesity prevention initiatives.

This report presents a review of BMI data obtained over a three-year period (SY 2010 – SY 2012) from kindergarten students entering the Fairfax County Public School system and provides recommendations for sustaining and improving the existing BMI surveillance pilot program.

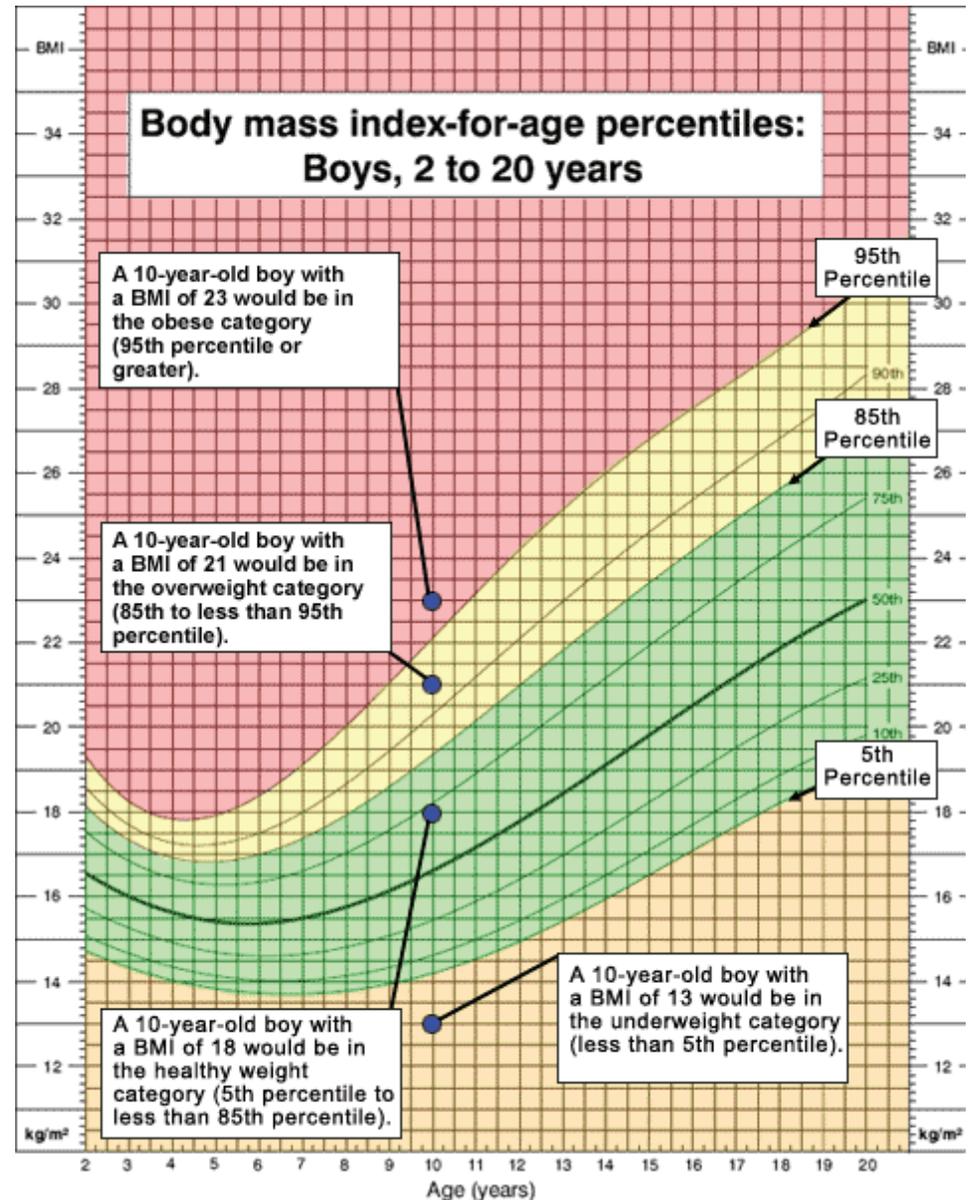
Methods

Height and weight status of kindergarten students was collected using information from students' physical exam forms. Data were de-identified, entered and analyzed in an FCPS data-base, in aggregate, for newly enrolled kindergarten students across 139 elementary schools for three consecutive school years (SY 2010-2011, SY 2011-2012, SY2012-2013). The number of kindergarten students sampled totaled 23,907 out of a total enrollment of 38,569 students (62% of kindergarten students). Data from kindergarten students with incomplete information (parent consent, date of measurement, height or weight measurement missing or illegible) were not included in the analysis.

BMI measures were calculated for each student using standard growth charts. For each school, the percentage of students who were underweight, normal weight, overweight, and obese was determined. BMI measurements were averaged together and analyzed by school, grade cohort, gender, ethnicity and by pyramids.

GROWTH CHARTS

See the following example of how some sample BMI numbers would be interpreted for a 10-year-old boy.



Source: Centers for Disease Control and Prevention (CDC). About BMI for children and teens.

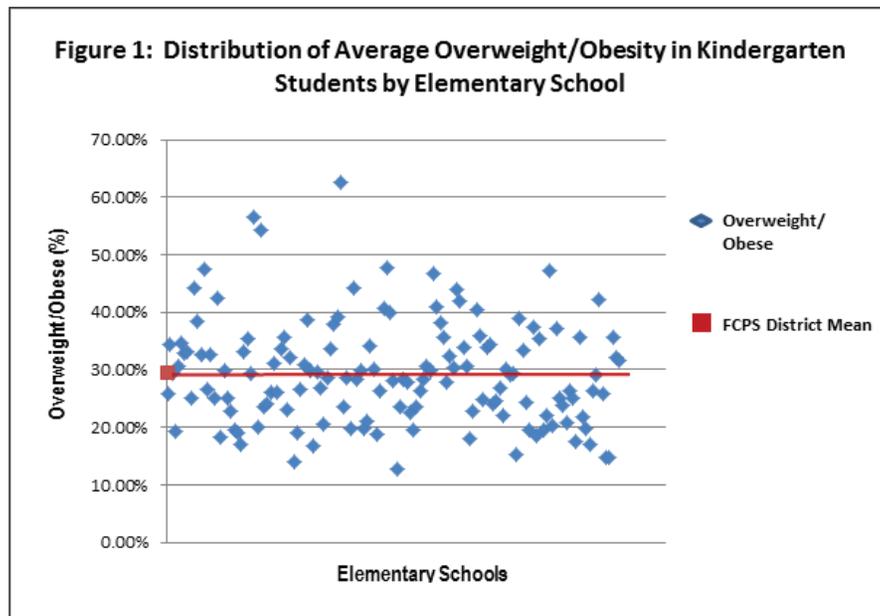
RESULTS

Consistent with national and state trends, a large proportion of students entering FCPS are overweight and obese. Table 1 summarizes the distribution of each cohort's Body Mass Index across the three different school years. Overall, the prevalence of overweight or obesity among newly enrolled kindergarten students is consistent year-to-year. Nearly 30 percent of all FCPS children entering kindergarten are overweight or obese. This is consistent with the national average of 33.8%.

TABLE 1

School Year	% Underweight in <5 Percentile	% Normal Weight Between 5 & 85 Percentile	% Overweight Between 85 & 95 Percentile	% Obese > 95 Percentile	% Overweight or Obese > than 85 Percentile
2010 - 2011	4.72%	67.10%	15.10%	13.07%	28.9%
2011 - 2012	5.2%	66.41%	14.15%	14.24%	28.7%
2012 - 2013	5.66%	65.51%	14.42%	14.41%	29.7%

FIGURE 1

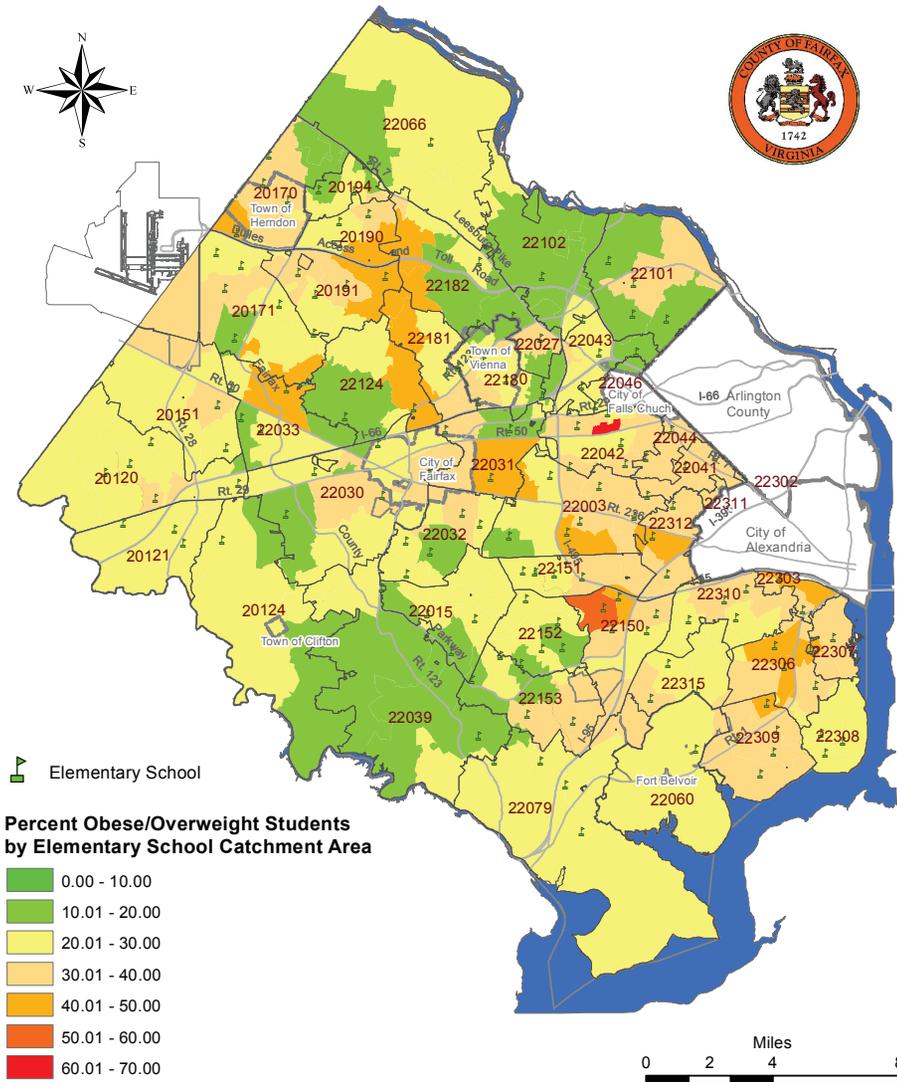


The distribution of overweight and obesity among FCPS kindergarteners by school ranges from 13 percent to 63 percent. As shown in Figure 1, 43% of the elementary schools in the county have overweight/obesity prevalence rates in new enrollees that are at or above 30 percent. Figure 2 shows the geographic distribution.

FIGURE 2

**Overweight/Obese Students
by Elementary School Catchment Area**

(School Year 2010-2011 to School Year 2012-2013)



Kindergarten BMI varied by demographic characteristics as well. Figure 3 shows the distribution of students who are overweight/obese by race, ethnicity, and gender. The prevalence of overweight and obesity in Hispanic students is 1.5 times the FCPS district-wide average.

FIGURE 3

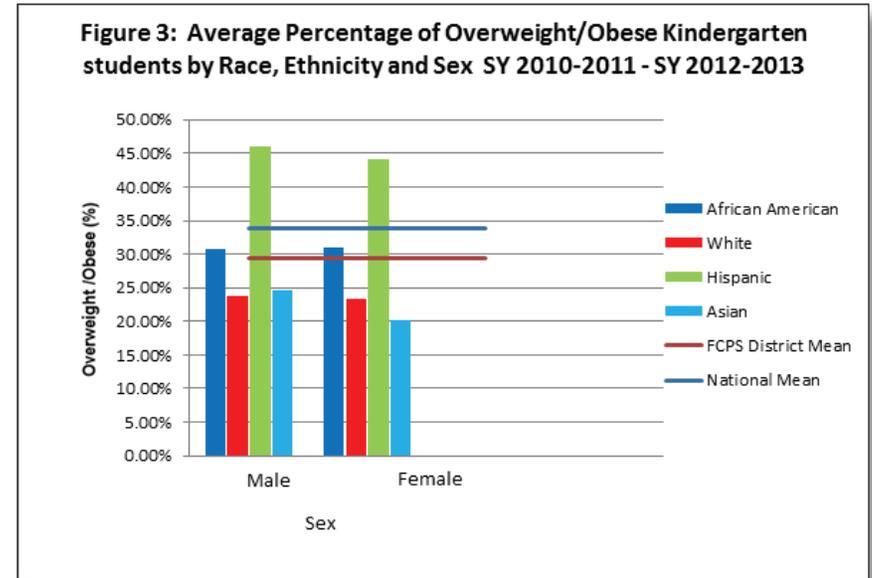


FIGURE 4

Figure 4 illustrates the distribution of the Hispanic population across Fairfax County. Areas of the county where the concentration of Hispanic residents is greater than 25% overlap with the school communities where the prevalence of overweight and obesity in the kindergarten sample is also greater than 30%.

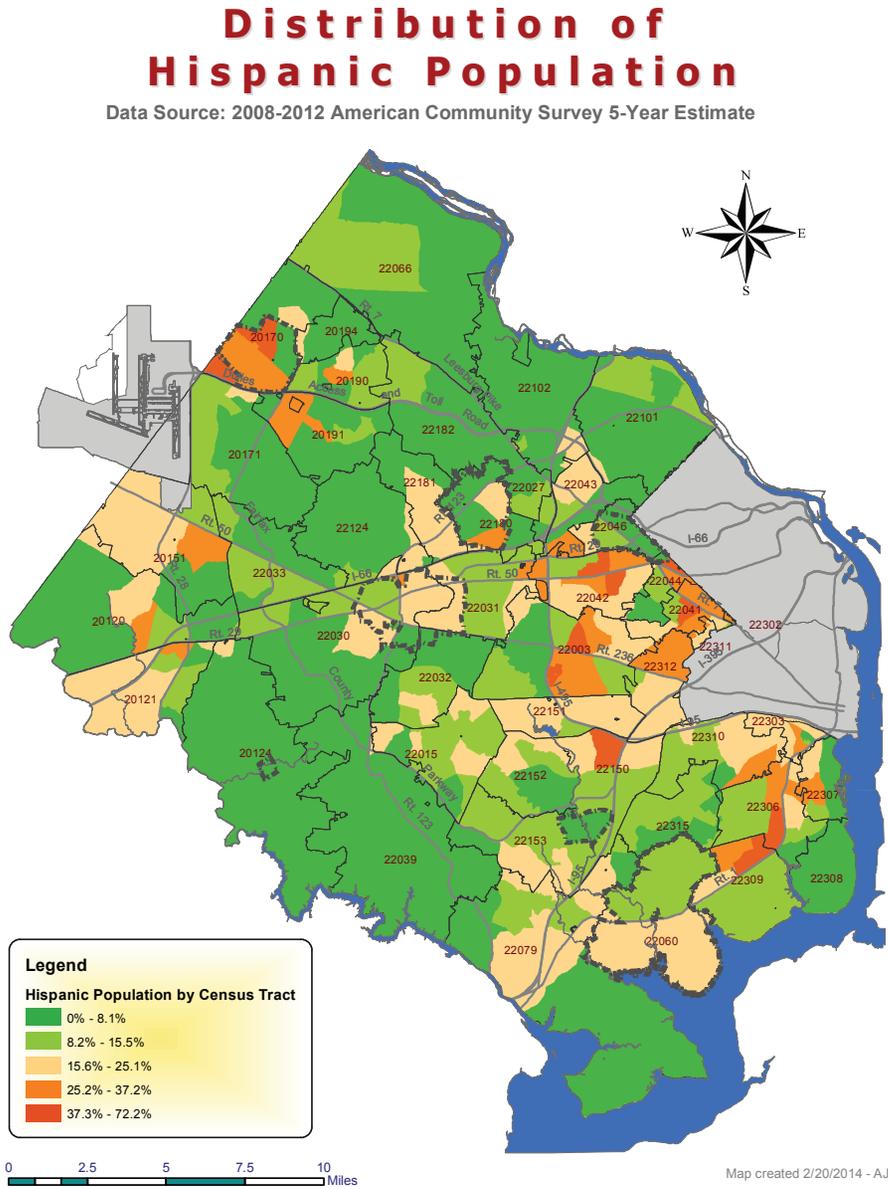
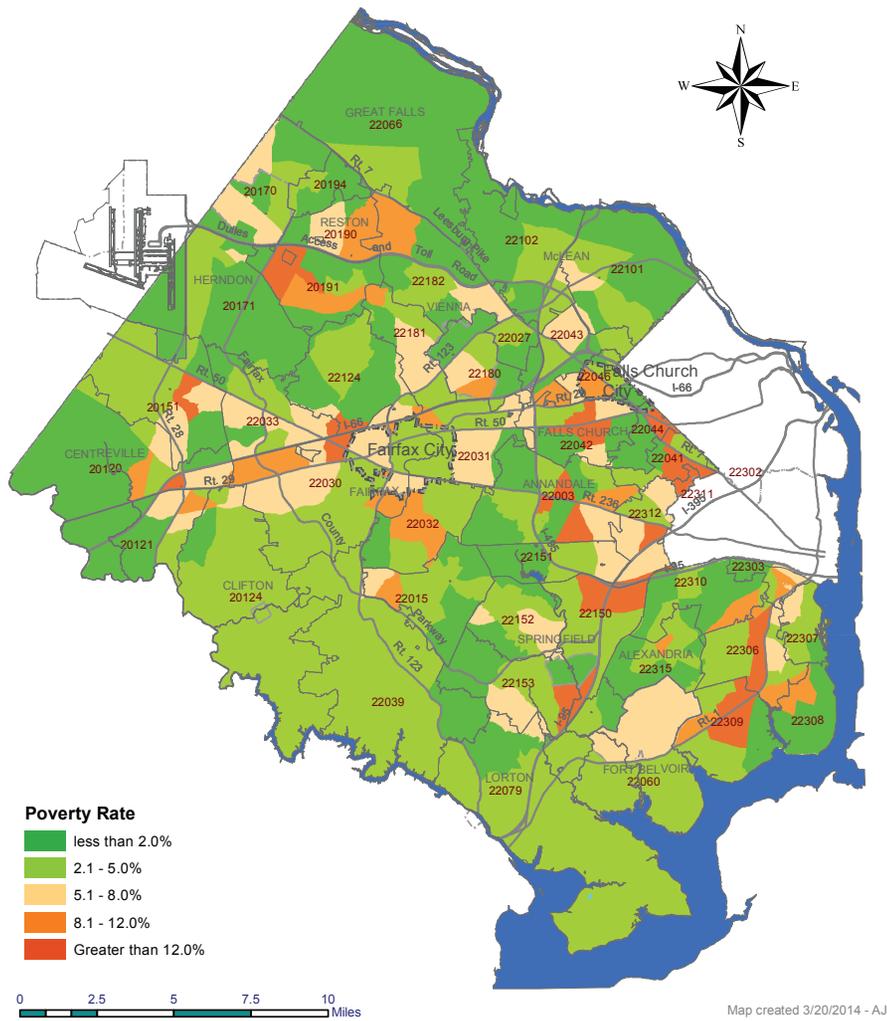


Figure 5 illustrates the distribution of household poverty in the county. Some areas of the county that have greater than 8.0% of the households living in poverty overlap with the areas where the prevalence of overweight and obesity in the kindergarten sample is greater than 30%.

FIGURE 5

**Poverty Status in Past 12 Months
(2006-2010 ACS 5-Year Estimates)**



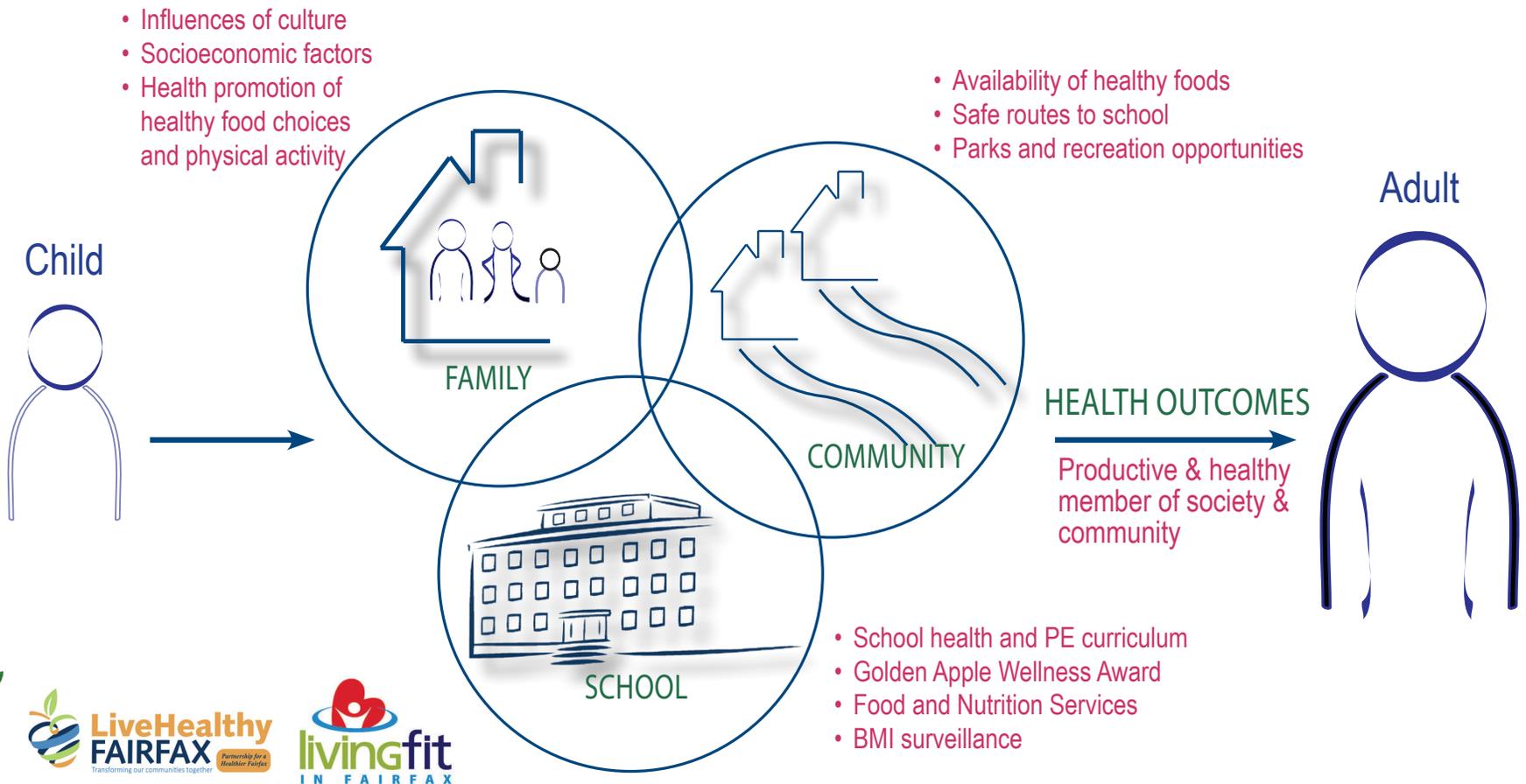
DISCUSSION

The BMI data collected over the three-year surveillance period demonstrated that each year nearly 30% of all enrolled kindergarten students were overweight or obese. These findings are consistent with the national average of 31.8% in children between the ages of 2 and 19 years. The geographic areas of the county where the prevalence of overweight and obesity is greater than the county average of 30% fall within the South County area, Falls Church, Reston/Herndon, and Fairfax City. Racial, ethnic and gender differences were also seen. For instance, there was a 15-percentage point increase above the district average in the Hispanic kindergarteners and a 10-percentage point decrease below the district average in Asian females. Analysis of where the Hispanic population within the county live shows an overlay with some areas of poverty and an increased prevalence of overweight and obesity in the kindergarten students. Poverty is one of the factors associated with poor health and obesity. Although the BMI data obtained in this study fails to show a consistent correlation between schools with a prevalence of obesity/overweight in children and poverty, further evaluation with maps from the same time period as the surveillance data may show a more consistent correlation.

Poor nutrition and lack of physical activity are well known contributors to childhood obesity and are areas where schools have taken a leadership role in addressing. Other challenges to healthy lifestyle choices, most of which fall outside the influence of the school setting, including socioeconomic status, living and working conditions, access and affordability of healthy foods, safe and walkable communities, access to recreational facilities and youth sports, etc. This study highlights the significant contribution that community factors have on childhood overweight and obesity and how early these factors negatively impact children. The finding of a nearly 30% prevalence of overweight or obesity this early in children underscores the importance of community, multi-sector approaches to prevention and the need for a comprehensive approach to obesity prevention besides school-based programs.

The Illustration below depicts the intersection of family, school, and community in influencing health outcomes. In Fairfax County, opportunities exist to enhance ongoing partnerships between these three domains to facilitate healthy outcomes in children.

Healthy Choices → Healthy Outcomes



Given the diversity of the Fairfax community, and the complexity of the factors that contribute to overweight and obesity, a 'one-size fits all' community and family strategy will not be the most effective approach to obesity prevention. Secondly, fiscal pressures demand smarter and more effective ways of delivering services and programs.

To that end, the Fairfax community needs to find ways to strengthen ongoing obesity prevention initiatives and programs through stronger collaboration and better leveraging of community partner assets. The Health Department's Outreach Unit, for example, can collaborate with the Health Department's School Health Services Program and FCPS to help increase penetration of obesity prevention messaging within high-risk communities. The FCPS BMI surveillance data can serve as a tool for identifying high-risk communities and assist in selecting populations for targeted obesity prevention efforts. The Partnership for a Healthier Fairfax, a coalition of individuals representing health care, businesses, nonprofit organizations, faith communities, schools, and government agencies, has developed a Community Health Improvement Plan (CHIP), which identifies opportunities for increased physical activity and healthy eating as priority health issues for the Fairfax community. The CHIP initiatives and strategies have strong community focus and support, and can be piloted in communities at highest risk of overweight and obesity, as determined by BMI surveillance data. The CHIP has interventions that specifically address the increased prevalence of overweight and obesity in children as well as other health choices that individuals can make to improve the overall health of Fairfax County. There are many more opportunities for collaboration beyond the examples cited where the BMI surveillance data could be useful for streamlining and integrating efforts and assessing progress in interventions.

LIMITATIONS

Data reporting errors prevented the inclusion of all kindergarteners and further reduced the sample size of the cohorts. The data used in calculating the BMI was obtained from school health physical forms, which are filled out by

community providers. For a record to be considered complete it needed to have the date of birth, date of assessment, height and weight, and parent consent for sharing the data. Additionally, there was variation (self-reported vs. instrument calibration) in how the data was collected and documented. Many parents also returned forms without signing a release of information. To improve the quality of the data and sample size, the current methodology will need to be changed to foster standardization. The inherent variability within the data collection process can be addressed by collecting height and weight data at the school site by trained staff rather than relying on information obtained in a variety of ways by a large number of community providers. Standardization of the data collection will ensure consistency and strengthen the data, resulting in better analysis and more accurate picture of the prevalence of overweight and obesity among kindergarteners in the county. Once a system is developed for collecting data at the school site, it will facilitate the data collection and analysis of BMI at other grade levels.

CONCLUSION

This pilot study demonstrates that a school-based BMI surveillance program can be successfully implemented in Fairfax County. Childhood obesity is a significant public health issue that requires a multi-sector approach for successful prevention. Community wide support and interventions provide the best opportunity for success. This surveillance program offers yet another opportunity for collaboration between FCPS and the Health Department, in collaboration with other community partners, to improve the health, wellbeing and educational success of children in Fairfax County through best practice community approaches. Although the BMI surveillance data is specific to kindergarteners in the public school system, the utilization of the data to inform and direct community interventions will benefit other children in the community as well. Given the fiscal challenges that all programs face, BMI data can be extremely useful in identifying and tracking obesity trends among high-risk groups and serve as a critical tool for evaluating and prioritizing intervention programs within the county. Furthermore, the data can be used

to create awareness about the extent of childhood overweight and obesity among school personnel, community members and policy makers, and provide an impetus for improvements in policy, systems and environmental solutions to obesity prevention. After three years, it is evident that the BMI surveillance can be an invaluable component of a comprehensive approach to obesity prevention in Fairfax County. Adopting the recommendations in this report will significantly enhance ongoing and future prevention efforts within the county and strengthen FCPS as the heart of community health.

RECOMMENDATIONS

1. FCPS continue to collect and analyze Kindergarten data from school entrance physicals. Information collected will be key in evaluating the success of community interventions and serve as baseline for evaluating school based interventions and other targeted interventions. The data will enable the assessment of differences in school characteristics and inform recommendations for wellness activities across the county. Over the course of the study period, some improvements were made in the area of data collection, however, additional improvements will be required to optimize the process and improve the quality of the data and ultimately the program.
2. FCPS and FCHD share study findings with relevant stakeholders who are partners in improving the health of Fairfax County. This data could serve as the basis for identifying priority areas for implementation of interventions in the community and opportunities for optimizing outcomes through enhanced collaboration.
3. FCPS and FCHD expand the BMI surveillance to collect student height and weight data for 3rd, 7th and 10th grade students. It is proposed that this be accomplished using a scale and stadiometer, beginning with the initial cohort of this study. This aggregate surveillance data can be used to describe trends in weight status over time among populations and to identify demographic or geographic subgroups at greatest risk of obesity. FCPS has a number of great programs that aim to support healthy choices.

In addition to informing community intervention programs, an expanded BMI surveillance provides the opportunity to inform the effectiveness of ongoing FCPS-specific programs over set periods of time and provide important data to plan, prioritize and obtain sustainability funding for these and future obesity prevention and education programs within the school setting. Expanding the BMI surveillance over multiple grades could provide information that would help policy and program staff to understand when and where the interventions in the school and community can be best utilized.

4. FCHD provide training to the school health public health nurses and school health aides to ensure consistency and reliability in measurement. Scales that link directly to a computer and have no visible display would be purchased for each elementary school at a total estimated cost of \$76,500. Data would be collected in the existing Health Promotion database.

RESOURCES

- ¹ "2011 Virginia Youth Survey Weighted Results Summary", June 2012 Office of Family Health Services Virginia Department of Health, http://www.vdh.virginia.gov/ofhs/youthsurvey/documents/2013/pdf/2011_Virginia_Youth_Survey_Result_Summary.pdf
- ² "How Healthy is Northern Virginia; A Look at the Latest Community Health Indicators", May 2013, Northern Virginia Health Foundation Online, <http://novahealthfdn.org/wp-content/uploads/How-Healthy-Is-Northern-Virginia.pdf>
- ³ "Overweight and Obesity Statistics", October 2012, National Institutes of Health, National Institute of Diabetes and Digestive and Kidney Disorders. <http://win.niddk.nih.gov/publications/PDFs/stat904z.pdf>
- ⁴ "Community Health Improvement Plan 2013-2018", October 2013, Live Healthy Fairfax Partnership for a Healthier Fairfax <http://www.fairfaxcounty.gov/livehealthy/pdfs/community-health-improvement-plan.pdf>

www.fairfaxcounty.gov/hd

A Fairfax County, Va. publication. February 2015. For more information or to request this information in an alternate format, call the Fairfax County Health Department at 703-246-2411, TTY 711.

