

School's Role in Obesity Prevention

Charlie Murr¹ and Sean Wells^{1#}

¹Olympia High School

#Advisor

ABSTRACT

Fast food, advanced transportation, and behind the desk jobs characterize the lifestyle of the majority of Americans. Unfortunately, this lifestyle has resulted in one of America's worst epidemics: obesity. In 2000, over 15% of Americans aged 6-19 were obese/overweight. In 2020, this statistic grew tremendously, when obesity was prevalent in 22.2% of people aged 12 to 19-years old in America alone (CDC 2022). In an effort to battle obesity, government and societies have turned to schools to be the firsthand prevention for the pandemic. This has been evident in past national and state legislation regarding what students eat at lunch. However, the focus of these actions has been on school food, but the importance of exercise within schools has been overlooked. Using a survey, the aim of this research is to analyze the exercise patterns of high school students in an Orange County Public School. The findings conclude that about 30% of students are getting the recommended amount of exercise through the school each day, but most of these students are doing so through extra-curricular sports. Therefore, the students who are getting enough exercise are doing so because they want to, not because the school is making them. Consequently, schools need to play a bigger role in challenging obesity by requiring more mandatory exercise for students.

Literature Review

History and Government Intervention in School Obesity

In this literature review, different works and articles will be used to examine the multitude of ways schools have intervened to weaken the obesity epidemic. The South Carolina School Food Service Program helped develop the most prominent way schools and the government have tried to help with obesity, specifically the foods they provide through different school lunch programs. In their source, "History of the National School Lunch Program," they dive into the history of different programs and laws enacted by the government to improve school lunches, beginning with the National School Lunch Act in 1946. The aim of the act was to provide students with nutritious foods and safeguard their health, such as incorporating more protein rich foods (South Carolina Food Service Program 2020). Additionally, the federal government passed its most recent and biggest change in school lunch programs in 2010, the Healthy, Hunger-Free Kids Act. The School Nutrition Association helps break down the different requirements in the Healthy, Hunger-Free Kids Act of 2010 in their publication, "Nutrition Standards for School Meals." The two biggest adjustments to school meals plans is that students are required to take at least one half-cup serving of fruits or vegetables, and 80% of grains offered in the meals must be whole grain-rich. The new law issued by the Obama foundation also sought to limit the amount of sodium, unhealthy fat, and extra calories in each meal. For grades 6-8, schools have to provide a lunch that is between 600-700 calories, and 750-850 calories for students in grades 9-12 (School Nutrition Association 2022). However, the federal government can only do so much to help with the obesity epidemic. Other reports and studies examine how lower levels of government, such as state governments, have intervened to make policies in schools regarding obesity to better fit the needs of the state. In a research report by Saul Spigel, he identifies factors that have played crucial roles in childhood obesity: increased fast food, junk food, and soda consumption.

Outside of the cafeteria, schools are allowed to provide foods that do not abide by federal nutrition regulations. Therefore, students will have access to unhealthy food and drinks through vending machines and snack bars. This has caused state legislatures to take charge and issue their own restrictions on what foods are allowed to be sold in school. In 2001, the California legislature banned soda sales in middle and high schools during the school day and sales of high fat, high sugar food for 10 school districts. Similarly, Kentucky Lieutenant Governor Harry introduced a ban on the sale of soft drinks, certain fruit juice, candy, and gum in vending machines and school stores and by school groups as fundraisers, as well as a restriction on the sale of fast food items in school cafeterias (Spigel 2002). Kim Krisberg further explores government roles in school obesity prevention by providing how they have taken different approaches to the problem in her study, "Schools taking center stage in battle against childhood obesity." She explains how the Arkansas state legislature implemented a new childhood obesity plan, but not one that was targeted towards school lunches. The new legislation required schools to annually measure the body mass index of every student and report the results to parents. Just after 2 years of the new policy, parents provided feedback saying how they are now inspired to take a bigger role in the health of their child. In addition to Arkansas, New Jersey has taken a leading role in attacking the obesity epidemic. Kathy S. Kuser, director of Food and Nutrition at the New Jersey Department of Agriculture, devised a new statewide nutrition policy. The key components included soda, candy, and foods of minimal nutritional value as defined by USDA cannot be served on school campus. The policy gained popular support as Kuser and her colleagues reached out to families and teachers explaining the scientific benefits of the new policy. (Krisberg 2005). Numerous governments around the United States have implemented new school nutrition policies in hopes of improving the health of students, but have they been very effective? A research study led by the Yale School of Public Health hoped to answer this question. They partnered with the Rudd Center for Food Policy and Obesity at the University of Connecticut and followed nearly 600 students from 12 public schools in New Haven. By assessing the body mass index of students, they found that schools with enhanced nutritional policies and programs had students with a healthier body mass trajectory compared to schools without nutritional programs. Additionally, the research concluded, "Students in schools with enhanced support to implement nutrition policies had an increase in BMI percentile of less than 1%, compared with students in schools without enhanced support for these policies and programs who demonstrated increases of 3% to 4%" (Greenwood 2018). This study done by researchers at the Yale School of Public Health supports that school nutrition programs and policies have shown clear improvements in students' health. These sources help provide a general understanding of the background and ways differing levels of government have tried to help schools battle child and adolescent obesity. The South Carolina Food Service Program and the School Nutrition Association focus on federal government intervention, whereas Sigel and Krisberg focus on state government policies trying to end obesity. Both at the federal and state level, the government has tried to help student health through reform of school food and lunch, ultimately attacking the obesity epidemic through food consumption. The research done by the Yale School of Public Health helps prove the effectiveness of these government nutrition policies and programs for schools. However, even though these programs have been proven to work, why are the numbers relating to adolescent obesity not slowing down?

Family Influence

As many professionals have seen the effectiveness of school lunch programs in battling obesity, they have begun to change their views to target society instead of schools when it comes to reducing the impact of obesity. Researchers from the RAND Corporation, a national nonprofit research and analysis corporation, and the University of Southern California worked together with PhD expertise to see if the Healthy, Hunger-Free Kids Act of 2010 (HHFKA) improved body mass trajectories of children. Before the HHFKA was implemented, they evaluated the height, age, sex, and weight of 3,388 of students in kindergarten and grades 1-5 who participated in the National School Lunch Program (NSLP) to calculate their body mass index. A year after the HHFKA was implemented, they did the same exact study with 2570 students from the same grade levels as the previous study. Additionally, the students in each test group came from low-income families. The research found that before HHFKA implementation, students that participated

in the NSLP had a higher obesogenic body mass index trajectory than students who did not participate in the NSLP. Students who did not participate in NSLP had steeper decreases in BMI compared to students who did participate in NSLP. However, after HHFKA was implemented, students who did and did not participate in NSLP had a very similar body mass index trajectory. The HHFKA helped eliminate this gap of body mass index trajectory, and the HHFKA ultimately improved the BMI trajectories for all students (Richardson et al. 2018). The research done by the RAND Corporation illustrates that schools have done most of their role in preventing childhood obesity, so therefore more focus needs to be put on families and society to end the disease. In an article published by the U.S. News, Amy Norton references the argument of Dr. Dariush Mozaffarian: "So it's asking too much of schools to expect them to change the course of childhood obesity, " he said. "The quality of food from other sources, including grocery stores and restaurants, needs to be addressed" (Norton 2022). In an article published by the Global Pediatric Health, health scientists agreed on the main way to prevent obesity: educate parents and families. Instead of targeting schools, this article believes in educating parents on proper nutrition for their kids, and making them aware of portion size and control (Sanyaolu et al. 2019). Sarah Burke, a social worker at Providence College, further examined this notion that families should be most responsible for preventing obesity amongst children and adolescents. She surveyed students from Providence College about their body mass index, family lifestyle, and the environment they grew up in. Through her findings, she found two major correlations relating to obesity: students who were more active as a child reported lower BMI, and there was a negative relationship found between the family lifestyle variable of the frequency of food being used as a positive reinforcement and body mass index (Burke 2011). Burke's research exemplifies that one of the major sources of adolescent obesity is the family. The subjects in the research who answered with positive family lifestyles and positive habits that their families rooted into them had lower BMI ratings. Both the studies done by the Rand Corporation and Sarah Burke illustrate the changing view of obesity prevention. Instead of trying to implement reforms in school through lunches, the main worry should be on the values, practices, and knowledge that families implement into their kids.

Research Gap

As the literature reports, two prominent ways to attack adolescent obesity is through schools and families. Numerous school lunch programs have been proven to be successful, and it is evident that families can implement healthy habits into their kids. Unfortunately, obesity numbers amongst adolescents are still not improving. There has to be something that is not getting the attention it deserves that could drastically help and battle the obesity epidemic. Much of the literature focuses on reforming food in schools, such as the lunches, snacks, and vending machines. In addition, experts try to blame society and families for not playing their role in obesity prevention. There is an evident gap in that most research and reform has been focused on food in schools, but there is not much attention towards reforming physical activity in schools. Past research has overlooked one of the most effective ways in preventing obesity: exercise. Many high schools have neglected preventing obesity through increased exercise. They have focused on providing students with better food, but have hardly changed physical classes to help fight obesity. High school students spend around a third of their day in school, and the majority of this time is sitting behind a desk. They do not get many opportunities to exercise. This study will aim to determine if schools need to reform their exercise programs to help prevent adolescent obesity by requiring more mandatory exercise.

Research Question

The foundation of my research is inspired by the question: "What role do Orange County Public High Schools (OCPS) play in improving the health of adolescents and preventing the obesity epidemic?"

Hypothesis

OCPS high schools are not implementing enough mandatory exercise for students throughout all four years of high school. This hypothesis stems from the overall stagnant numbers in adolescent obesity. At the federal, state, and county level, schools have reformed the food they serve to students to promote a healthier lifestyle. However, obesity is still trending upwards despite these efforts by schools. Therefore, just changing the food students eat is not enough. I believe that schools need to reform exercise programs, not just food programs, if they really want to play a major role in preventing adolescent obesity. This research will hopefully prove that the majority of high school students are not getting enough exercise each day due to the lack of school involvement. If my hypothesis is correct, schools can use my research to inspire future proposals for more mandatory exercise in all four years of high school, not just one year. If the majority of students respond that they get minimal daily exercise in school, OCPS schools, as well as any schools around the nation, should use that as a motivator to reform the established physical education programs in school.

Method

Rationale

This study examines the effectiveness of high school exercise in the United States in programs supplied by the school. The goal of my research is to explore whether forced daily exercise in school will help the health of students, so this research will hopefully inspire school districts in the United States to adopt new mandatory physical activity programs for students. The main objective when starting my research was to decide on a focus group. Initially, my plan was to focus only on students in HOPE classes, the only mandatory physical education class in OCPS, and measure the amount of exercise they get through heart rate monitors. After talking with my guidance counselor, however, I realized that this path would not provide me with enough subjects and data. I wanted to analyze the effect my school has on students as a whole, not just a minute fraction of students who take HOPE class. Additionally, to be able to calculate the amount of exercise a student gets using their heart rate, I would have to obtain personal information, such as weight. Many students would not feel open about sharing their weight, so my testing field would shrink even further if I chose to do my initial method.

Student Survey

To ensure that I gather data that reflects everyone in my school, not just a single group, I figured the best method was to conduct a survey to get opinions and statistics straight from the students on the amount of school-related exercise they get. There were two main ways I distributed my survey: hanging QR codes around the school and going into classrooms to ask students to take the survey. When it came to going to classrooms, I made sure to visit classes that had students from different grade levels to make sure my data was representing all of the students and not just one grade. For instance, the first class I went to was Chemistry Honors, which is a sophomore dominant class. Therefore, I made sure that the next class I go to had limited sophomores, so I went to a Debate 3 Honors class that has mainly juniors and seniors. The last class I visited was AP Human Geography, which is a freshman-only class. Other than these selected classes, the rest of my gathered data was random through QR codes. This method allowed me to gather data from multiple perspectives, groups, and the overall population at my high school.

I gathered responses from 96 students. Before beginning the survey, the students had to agree to an informed consent form, which was attached to the survey (Appendix A). If the students did not agree to the consent form, they were not allowed to move on and take the survey. Those students who did agree only had to answer two simple questions, which are shown in Appendix B. The first question served to gather how much school-related exercise

students are getting every day. This can include P.E. classes, after school sports, and any other physical activity that is done with the school. The purpose of this question is to see what percentage of students are receiving above the minimum daily recommended exercise (60 minutes) each day from the school. The use of the second question was to see if there is a correlation between those students who are getting enough school-related exercise and students who are involved in after-school sports. This will allow me to determine if the school plays a major role in requiring exercise out of students, or if the students are the main ones making the choice. If there is a correlation, then that means the school has a minimal influence in providing kids with enough required exercise, and it is fully up to the students on whether or not they want to exercise and live a healthy lifestyle.

Results and Discussion

After gathering data from 96 unanimous students, I analyzed it to develop numerous conclusions. The first question I asked was “How much school related exercise do you get per day?” The intent behind asking this question was to develop a general statement on whether or not students are getting enough exercise in school. For reference, the CDC recommends a minimum of 60 minutes of physical activity for teens daily. This is not asking how much exercise students get in a day. It is focusing on how much exercise they get with the available accommodations that the school provides. For answer choices, the students could either choose 0-15 minutes, 15-30 minutes, 30-60 minutes, 60-90 minutes, or over 90 minutes of exercise.

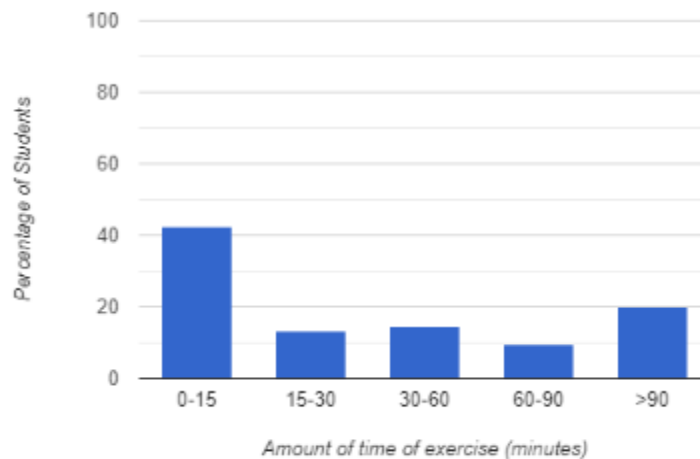


Figure 1: Students were asked how many minutes of school related exercise they get each day.

Figure 1 shows student responses for question 1. 42.7% of students responded that they get only 0-15 minutes of school related exercise each day. In other words, nearly half of the students receive practically no exercise from the school. However, 19.8% of students said they get over 90 minutes of exercise each day in school, and 9.4% said they got 60-90 minutes of exercise. Only around 29.2% of the students are actually getting the recommended amount of daily exercise (60 minutes) from the school. The other 70.8% of students are getting below the recommended daily exercise.

Furthermore, I wanted to establish and clarify whether those students that are getting over the daily recommendation of exercise are doing so voluntarily or by requirement of the school. This will allow me to further conclude whether schools need to provide more required exercise in schools. I asked students a simple yes or no question: Are you involved in any extracurricular sports with the school? This mainly focuses on after-school sports, such as basketball, football, soccer, etc.

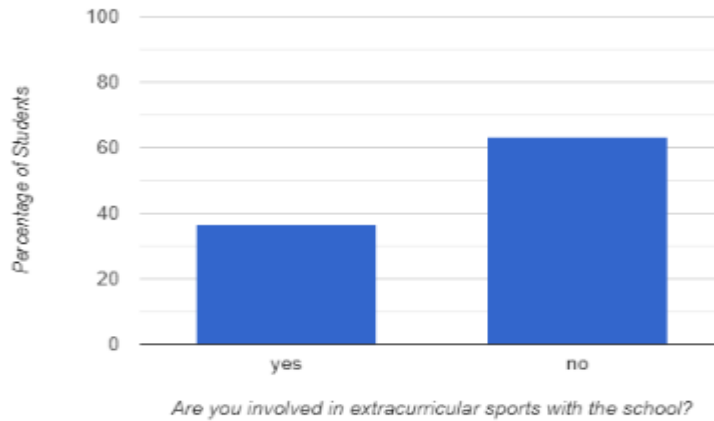


Figure 2: Students were asked if they are involved in any extracurricular sports with the school.

Figure 2 shows student responses to question 2 regarding whether or not they are involved in after-school sports. 36.5% of the students reported that they are involved in extracurricular sports. Using this data, I wanted to see if there is a correlation between the students who are involved in extracurricular sports and the students who get over 60 minutes of exercise per day.

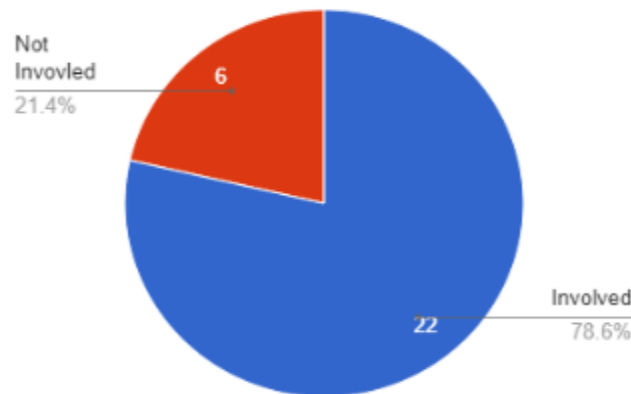


Figure 3: 28 students answered that they got over 60 minutes of school related exercise each day. This chart analyzes whether those students said they are involved in after-school sports or not.

After collecting the responses to question 1 regarding the amount of school related exercise students get, I focused on those who responded with 60-90 minutes and over 90 minutes. I then looked at whether or not they responded yes or no to question 2. This allows me to conclude whether those who are getting a good amount of exercise are doing so by their own choice or by the school's choice. This also further supports whether or not schools need to implement longer mandatory exercise; the only optimal amount of exercise students are receiving are through after school sports and activities, not through physical or health classes. Out of the 28 people who responded with either 60-90 minutes or over 90 minutes in question 1, 22 of them said they are involved in extracurricular sports with the school in question 2, as shown in Figure 3. Upon inspection, there is a correlation between the students who get over the recommended amount of exercise and those who play school sports. The majority of students who are getting over

60 minutes of exercise are doing so through extracurricular sports. Essentially, they are getting above the daily recommended amount of exercise because they want to, not because the school is requiring them to exercise. Extracurricular activities are not required by the school, but instead it is a choice students get to make.

Based on the gathered results (Appendix C), OCPS schools are playing a minimal role in implementing required exercise for students. Essentially, it is fully up to the students on whether or not they want to exercise and how much they want to exercise. If a student lacks the motivation or desire to exercise, they have minimal influence by the school to force them to exercise and live a healthy lifestyle. Schools need to have a more active role when it comes to students getting an ample amount of exercise each day.

Conclusion

Initially, I began this course to ultimately assess the effectiveness of HOPE class, a physical health class that is required in high schools around Florida, in supporting students to develop a healthy lifestyle. I wanted to determine if students were getting enough vigorous physical exercise each week in HOPE class, with the goal of concluding whether or not schools need to adjust their HOPE class to provide students with an ample amount of exercise. This proposal would be tested by calculating the target heart rate of HOPE students, and strapping a heart rate monitor to their chest to track their heart rate throughout their exercise during HOPE class. Unfortunately, to calculate the target heart rate, I would need to gather the weight of students, and the majority of students are not open about sharing their weight. This caused me to alter my research, but a future project can develop an alternate and realistic method to measure the amount of exercise students receive in HOPE/PE classes in high school. Despite my initial failure, I still wanted to focus my attention on how much HOPE class affects high school students, so I turned to the faculty of my high school to get answers. However, after discussing with multiple P.E. teachers, this path would take me nowhere with my research. Primarily, absence is a huge problem in HOPE class, so it would be very hard for me to gather reliable data in the given time period from enough people. Also, teachers do not have the biggest impact on the effectiveness of HOPE class. Teachers have to follow a set curriculum, so they cannot lead the students in physical activity based on their desires. Therefore, trying to investigate the teachers' role in providing students with enough exercise would not have produced a prominent research project. Teachers are already trying hard to help students get exercise, but they are held back by the set curriculum given to them. After realizing that focusing on teachers would have been an insufficient research project, I broadened my question to go beyond just HOPE class. At my local high school, HOPE is the only required physical activity class. So, I wanted to investigate how much of a role schools play in preventing adolescent obesity through their implemented exercise programs. The goal of this research is to determine whether schools need to implement more required physical activity in school. Students only have to take HOPE one year in high school, so they can decide to do no exercise in high school the other three years. This research could answer if schools need to require more exercise out of students, such as taking a P.E. class every year instead of only one year. However, my research is not without limitations. My research may be insufficient enough to represent a larger pool of high schools for two reasons. Firstly, I only gathered 96 responses from students. As this is only a small pool of subjects, it may not be enough to represent the population of my high school. Secondly, I only focused on the high school I attend. I am researching the effectiveness of physical activity programs of schools inside Orange County Public Schools. Therefore, the data I gathered from my school may differ heavily from another school in the region. To solve this issue, a future researcher could try to allow students from all Orange County schools to participate in the survey. This can be done by talking to OCPS principals and superintendents to get permission to release a survey through the OCPS Canvas page. All OCPS students use Canvas every day to access and turn in assignments, so this would be an effective way to get results from a wide variety of schools. Based on student responses on how much school-related exercise they get each day, 29.2% of students responded that they get over 60 minutes of school-related exercise every day, which is the amount of daily exercise the CDC recommends for adolescents. Conversely, 42.7% of students said they only get 0-15 minutes of school-related exercise each day, which is essentially no exercise. Out of the students who responded that they get over 60 minutes of exercise each day, 78.6% of them said they are involved

in after-school sports with the school. There is a correlation between students who are getting the recommended amount of exercise in school: the majority of students who get above the daily amount of exercise in school each day are participating in after school sports. This means they are exercising because they want to engage in sports and activities, not because the school is requiring them to do so. Therefore, high schools need to play a more active role in helping the health of students by implementing more mandatory exercise in school. An easy way to do this is to require students to take a physical activity class every year of high school. Instead of only requiring one year of HOPE class, high schools can implement a four-year program to ensure that students are getting an ample amount of exercise throughout their high school years. Schools cannot just let the students decide whether or not they want to exercise. Schools have to be the first ones in trying to prevent obesity by requiring more exercise instead of letting it be a choice.

Works Cited

- Burke, Sarah. "Childhood social factors and their impact on young adulthood obesity." *Social Work Theses*, 2011, https://digitalcommons.providence.edu/cgi/viewcontent.cgi?article=1075&context=social_wrk_students. Accessed 23 September 2022.
- Centers for Disease Control and Prevention. "Childhood Obesity Facts." CDC, 17 May 2022, <https://www.cdc.gov/obesity/data/childhood.html>. Accessed 22 September 2022.
- Greenwood, Michael. "School-based nutritional programs reduce student obesity." *YaleNews*, 17 December 2018, <https://news.yale.edu/2018/12/17/school-based-nutritional-programs-reduce-student-obesity>. Accessed 22 September 2022.
- Harvard School of Public Health. "School Obesity Prevention Recommendations: Complete List." Harvard T.H. School of Public Health, 24 October 2020, <https://www.hsph.harvard.edu/obesity-prevention-source/obesity-prevention/schools/school-obesity-prevention-recommendations-read-and-print/#:~:text=School%20Meals%2C%20Competitive%20Foods%2C%20and,schools%20can%20help%20prevent%20obesity>. Accessed 13 October 2022.
- Krisberg, Kim. "'Schools taking center stage in battle against childhood obesity.'" *EBSCO*, The Nation's Health, September 2005, <https://search.ebscohost.com/login.aspx?direct=true&db=asn&AN=18199859&site=ehost-live>. Accessed 14 September 2022.
- National Center for Education Statistics. "Back-to-school Statistics." NCES, 2022, [https://nces.ed.gov/fastfacts/display.asp?id=372#:~:text=Preliminary%20data%20for%20fall%202021,students%20\(source%2C%20source\)](https://nces.ed.gov/fastfacts/display.asp?id=372#:~:text=Preliminary%20data%20for%20fall%202021,students%20(source%2C%20source)). Accessed 21 September 2022.
- Norton, Amy. "Better School Lunches Blunt U.S. Kids' Weight Gain." *USNews.com*, U.S. News, 9 May 2022, <https://www.usnews.com/news/health-news/articles/2022-05-09/better-school-lunches-blunt-u-s-kids-weight-gain>. Accessed 18 September 2022.
- Richardson, Andrea, et al., "Association of the Healthy, Hunger-Free Kids Act of 2010 With Body Mass Trajectories of Children in Low-Income Families." *JAMA Network*, 5 May 2022, <https://jamanetwork.com/journals/jamanetworkopen/fullarticle/2791873?resultClick=3>. Accessed 24 September 2022.
- "Nutrition Standards for School Meals." *School Nutrition Association*, 2022, <https://schoolnutrition.org/wp-content/uploads/2022/06/Nutrition-Standards-for-SchoolMeals.pdf>. Accessed 4 October 2022.
- Sanyaolu, Adekunle, et al. "Childhood and Adolescent Obesity in the United States: A Public Health Concern." *NCBI*, Global Pediatric Health, 1 December 2019, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6887808/>. Accessed 21 September 2022.

South Carolina School Food Service Program. "Chapter 3: History of National School Lunch Program." South Carolina Department of Education, 2020, <https://ed.sc.gov/districts-schools/health-and-nutrition/nutrition-program-administrative-resources/nutrition-programs-reference-manual/chapter-3-history/>. Accessed 22 September 2022.

Spigel, Saul. "Childhood Obesity." *Connecticut General Assembly*, 19 June 2002, <https://www.cga.ct.gov/2002/olrdata/ph/rpt/2002-R-0529.htm>. Accessed 22 September 2022.